# PAINTER (GENERAL)

## NSQF LEVEL - 4

## 2nd Year

## TRADE PRACTICAL

**SECTOR:** CONSTRUCTION

**(As per revised syllabus July 2022 - 1200 Hrs)**



Directorate General of Training

**DIRECTORATE GENERAL OF TRAINING**
**MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP**
**GOVERNMENT OF INDIA**

**NATIONAL INSTRUCTIONAL MEDIA INSTITUTE, CHENNAI**

Post Box No. 3142, CTI Campus, Guindy, Chennai - 600 032

**Sector : Construction**

**Duration : 2 Years**

**Trades : Painter (General) - Trade Practical - 2nd Year - NSQF Level- 4 (Revised 2022)**

**Developed & Published by**

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# FOREWORD

The Government of India has set an ambitious target of imparting skills to 30 crores people, one out of every four Indians, to help them secure jobs as part of the National Skills Development Policy. Industrial Training Institutes (ITIs) play a vital role in this process especially in terms of providing skilled manpower. Keeping this in mind, and for providing the current industry relevant skill training to Trainees, ITI syllabus has been recently updated with the help of Media Development Committee members of various stakeholders viz. Industries, Entrepreneurs, Academicians and representatives from ITIs.

The National Instructional Media Institute (NIMI), Chennai, has now come up with instructional material to suit the revised curriculum for **Painter (General) -Trade Practical - 2nd Year - NSQF Level - 4 (Revised 2022) - in Construction Sector** in **Annual Pattern.** The NSQF Level - 4 (Revised 2022) Trade Practical will help the trainees to get an international equivalency standard where their skill proficiency and competency will be duly recognized across the globe and this will also increase the scope of recognition of prior learning. NSQF Level - 4 (Revised 2022) trainees will also get the opportunities to promote life long learning and skill development. I have no doubt that with NSQF Level - 4 (Revised 2022) the trainers and trainees of ITIs, and all stakeholders will derive maximum benefits from these Instructional Media Packages IMPs and that NIMI's effort will go a long way in improving the quality of Vocational training in the country.

The Executive Director & Staff of NIMI and members of Media Development Committee deserve appreciation for their contribution in bringing out this publication.

Jai Hind

Additional Secretary/Director General (Training)
Ministry of Skill Development & Entrepreneurship
Government of India.

New Delhi - 110 001

# PREFACE

The National Instructional Media Institute (NIMI) was established in 1986 at Chennai by then Directorate General of Employment and Training (D.G.E & T), Ministry of Labour and Employment, (now under Directorate General of Training, Ministry of Skill Development and Entrepreneurship) Government of India, with technical assistance from the Govt. of Federal Republic of Germany. The prime objective of this Institute is to develop and provide instructional materials for various trades as per the prescribed syllabus under the Craftsman and Apprenticeship Training Schemes.

The instructional materials are created keeping in mind, the main objective of Vocational Training under NCVT/NAC in India, which is to help an individual to master skills to do a job. The instructional materials are generated in the form of Instructional Media Packages (IMPs). An IMP consists of Theory book, Practical book, Test and Assignment book, Instructor Guide, Audio Visual Aid (Wall charts and Transparencies) and other support materials.

The trade practical book consists of series of exercises to be completed by the trainees in the workshop. These exercises are designed to ensure that all the skills in the prescribed syllabus are covered. The trade theory book provides related theoretical knowledge required to enable the trainee to do a job. The test and assignments will enable the instructor to give assignments for the evaluation of the performance of a trainee. The wall charts and transparencies are unique, as they not only help the instructor to effectively present a topic but also help him to assess the trainee's understanding. The instructor guide enables the instructor to plan his schedule of instruction, plan the raw material requirements, day to day lessons and demonstrations.

IMPs also deals with the complex skills required to be developed for effective team work. Necessary care has also been taken to include important skill areas of allied trades as prescribed in the syllabus.

The availability of a complete Instructional Media Package in an institute helps both the trainer and management to impart effective training.

The IMPs are the outcome of collective efforts of the staff members of NIMI and the members of the Media Development Committees specially drawn from Public and Private sector industries, various training institutes under the Directorate General of Training (DGT), Government and Private ITIs.

NIMI would like to take this opportunity to convey sincere thanks to the Directors of Employment & Training of various State Governments, Training Departments of Industries both in the Public and Private sectors, Officers of DGT and DGT field institutes, proof readers, individual media developers and coordinators, but for whose active support NIMI would not have been able to bring out this materials.

**Chennai - 600 032** **EXECUTIVE DIRECTOR**

# ACKNOWLEDGEMENT

National Instructional Media Institute (NIMI) sincerely acknowledges with thanks for the co-operation and contribution extended by the following Media Developers and their sponsoring organisation to bring out this IMP for the trade of **Painter (General) - 2nd Year - Trade Practical - NSQF Level - 4 (Revised 2022)** under the **Construction** Sector for ITIs.

**MEDIA DEVELOPMENT COMMITTEE MEMBERS**

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NIMI records its appreciation of the Data Entry, CAD, DTP Operators for their excellent and devoted services in the process of development of this Instructional Material.

NIMI also acknowledges with thanks, the invaluable efforts rendered by all other staff who have contributed for the development of this Instructional Material.

NIMI is grateful to all others who have directly or indirectly helped in developing this IMP.

# INTRODUCTION

**TRADE PRACTICAL**

The trade practical manual is intented to be used in workshop . It consists of a series of practical exercises to be completed by the trainees during the 2nd year course of the **Painter (General)** under **Construction Sector.** Trade supplemented and supported by instructions/ informations to assist in performing the exercises. These exercises are designed to ensure that all the skills in compliance with NSQF Level - 4 (Revised 2022) syllabus are covered.

This manual is divided into Eight modules. The Eight modules are given as below

Module 1 - **Paper Cutting and Pasting Technology**

Module 2 - **Wooden Surface Preparation and Painting**

Module 3 - **Building Interior and Exterior wall Painting**

Module 4 - **Building Painting Estimate & Costing**

Module 5 - **Metal Surface Preparation and Paint Coating**

Module 6 - **Painting Equipments and Painting Techniques**

Module 7 - **Painting Process and Types of Paint Defects**

Module 8 - **Paint Coating Designs and Painted Surface Testing**

The skill training in the shop floor is planned through a series of practical exercises centred around some practical project. However, there are few instances where the individual exercise does not form a part of project.

While developing the practical manual a sincere effort was made to prepare each exercise which will be easy to understand and carry out even by below average trainee. However the development team accept that there is a scope for further improvement. NIMI, looks forward to the suggestions from the experienced training faculty for improving the manual.

**TRADE THEORY**

The manual of trade theory consists of theoretical information for the two years course of the **Painter (General)** Trade Theory NSQF Level - 4 (Revised 2022) under **Construction Sector**. The contents are sequenced according to the practical exercise contained in NSQF Level - 4 (Revised 2022) syllabus on Trade Theory attempt has been made to relate the theoretical aspects with the skill covered in each exercise to the extent possible. This correlation is maintained to help the trainees to develop the perceptional capabilities for performing the skills.

The Trade theory has to be taught and learnt along with the corresponding exercise contained in the manual on trade practical. The indicating about the corresponding practical exercise are given in every sheet of this manual.

It will be preferable to teach/learn the trade theory connected to each exercise atleast one class before performing the related skills in the shop floor. The trade theory is to be treated as an integrated part of each exercise.

The material is not the purpose of self learning and should be considered as supplementary to class room instruction.

# CONTENTS

# LEARNING / ASSESSABLE OUTCOME

On completion of this book you shall be able to

| S.No. | Learning Outcome | Ref. Ex.No. |
|---|---|---|
| 1 | Develop a craft work and artistic work on radium/ vinyl/ thermocol etc. PCS/N9441 | 2.1.112 - 2.1.116 |
| 2 | Identity different types of Plywood, MDF & low-quality wood and make wooden surface used various techniques, decorate, paint and make an attractive wooden article. PCS/N5016 PCS/Q5006 PCS/N5004 (PCS/Q5004) | 2.2.117 - 2.2.130 |
| 3 | Develop internal and external Building painting by using different decorative press. PCS/N5016 PCS/Q5006 PCS/N5002 PCS/Q5002 | 2.3.131 - 2.3.153 |
| 4 | Choose different pipes as per safety aspect and apply line painting with colour code. PCS/N5110 PCS/N5111 PCS/Q5109 | 2.4.154 - 2.4.161 |
| 5 | Process of cleaning and painting on metal surface for preventive coat. PCS/N5110 PCS/N5111 (PCS/Q5109) | 2.5.162 - 2.5.180 |
| 6 | Identify, replace and assemble different pneumatics and paint gun. [Different components– Compressor, Pressure Gauge, Filter Regulator, Valve for hose] PCS/N9442 | 2.6.181 - 2.6.183 |
| 7 | Perform Spray Painting technique. (Spray Gun / hose handling, air & paint pressure controlling,) PCS/N9443 | 2.6.184 - 2.6.185 |
| 8 | Operate the system of spray booths, Oven, cleaning & their maintenance, application of sealant component on metallic joints. PCS/N5105 PCS/Q5108 | 2.6.186 - 2.6.188 |
| 9 | Perform aspect ratio mixing of paint, hardner& solvent. Measure Viscosity of paint. Operate the Spray painting system. PCS/N5004 PCS/Q5002 PCS/N5105 PCS/Q5108 | 2.6.189 - 2.6.195 |
| 10 | Identify and apply of spray painting in Home appliances, Agricultural equipment's, Machines, Automotive Bodies etc. PCS/N9444 | 2.6.196 - 2.7.207 |
| 11 | Removal of dents & recover the damaged accidental area. Repaint & recovering damaged area. PCS/N9445 | 2.7.208 - 2.7.218 |
| 12 | Finish special effects for Modern furniture. PCS/N5002 PCS/Q5002 | 2.8.219 |
| 13 | Identify different types of powder coating and apply the Powder coating technique in appropriate place. PCS/N5109 PCS/Q5102 | 2.8.220 - 2.8.221 |
| 14 | Integrate quality testing for various Paints & Painted films. PCS/N9902 | 2.8.222 - 2.8.223 |

## SYLLABUS

**2nd Year** **Duration: Two years**

| Duration | Reference Learning Outcome | Professional Skill (Trade Practical) (With inidcative hour) | Professional Knowledge (Trade Theory) |
|---|---|---|---|
| Professional Skill 42Hrs;<br>Professional Knowledge 13Hrs | Develop a craft work and artistic work on radium/ vinyl/ thermocol etc.<br>**PCS/N9441** | 112. Make a manually ornamental design on radium or vinyl. (05 hrs.)<br>113. Make a symbol or image design by computer in graphics & cut it with plotter. (8 hrs.)<br>114. Do "Instruction board" on acrylic sheet with help of multi layer radium or vinyl. (13 hrs.)<br>115. Make a lettering/ image/symbol design for "Instruction board" by computer in graphics, with help of radium or vinyl & cutting it with plotter, pasting on glass/ acrylic/ sun mica or different sheets. (10 hrs.)<br>116.Create a design for wall decoration by computer in graphics & cut it on multi colour vinyl, paste on wall. (09 hrs.) | Different medium paper for plotter cutting. Manual cutting Instruments & their safety/ care/ precautions, proper<br>pasting procedure, pasting techniques, care & precaution. (13 hrs) |
| Professional Skill 84 Hrs;<br>Professional Knowledge 27 Hrs<br>. | Identity different types of Plywood, MDF & low-quality wood and make wooden surface used various techniques, decorate, paint & make an attractive wooden article.<br>**PCS/N5016**<br>**PCS/Q5006**<br>**PCS/N5004**<br>**PCS/Q5004** | 117. Clean, sanding, knotting, stooping, staining preparation wooden surface properly for polish. (05 hrs.)<br>118. Make & apply putty for varnishing & polishing. (05 hrs.)<br>119. Apply polish on prepared wooden surface with cotton rags. (05 hrs.)<br>120. Clean, sanding, knotting, stooping, staining preparation wooden surface properly for varnish. (05 hrs.)<br>121. Apply varnish on prepared wooden surface with brush. (05 hrs.)<br>122. Prepare wooden article& apply varnish with spray. (08hrs.)<br>123. Prepare wooden article& apply melamine or PU wooden finish with spray. (05hrs.)<br>124. Make a wooden top with thick layer of melamine polish. (05hrs.) | Polish paper-Types and uses. Putty - Definition, their material types and uses. Method of mixing & its different system of application. Varnish - Definition; types and characteristics of varnish. Process of makingof varnish its importance and contains. Polish- Types and uses. Different application methods. (09 hrs) |
| | | 125. Prepare wooden surface properly for painting. (05 hrs.)<br>126. Apply wood primer by brush (05 hrs.)<br>127. Make putty for wood finishing. (05 hrs.)<br>128. Apply putty & prepare wooden surface properly. (05hrs.)<br>129. Do paint wooden surface properly with brush (05hrs.) | Paint - Definition; classification and use.<br>Pigment, Binders, Solvent, oil,dryers;Additives.<br>Painting- Definition and importance of painting. (09hrs) |

| Duration | Reference Learning Outcome | Professional Skill (Trade Practical) (With inidcative hour) | Professional Knowledge (Trade Theory) |
|---|---|---|---|
| | | 130. Prepare & spray painting on different furniture taking all precautions. (15 hrs.) | Method of wooden surface painting. (09 hrs) |
| Professional Skill 189 Hrs;<br><br>Professional Knowledge 60 Hrs | Develop internal and external Building painting by using different decorative press.<br>**PCS/N5016**<br>**PCS/Q5006**<br>**PCS/N5002**<br>**PCS/Q5002** | 131. Prepare ceiling surface for lime wash. (05 hrs.)<br>132. Prepare wall surface for lime wash. (05 hrs.)<br>133. Apply POP on wall for lime painting. (03 hrs.)<br>134. Make & mixing of lime & stainer. (02 hrs.)<br>135. Apply Lime on ceiling & wall with brush properly. (10 hrs.)<br>136. Prepare ceiling & wall for distemper painting. (05 hrs.)<br>137. Make wall putty for distempering. (02 hrs.)<br>138. Apply wall putty with finish & prepare wall surface. (08 hrs.)<br>139. Mixing & apply a distemper properly for wall. (8 hrs.) | Types, uses of building (wall) paints. Wall primer- Water base / Oil base, types of putty for wall. Mixing, Preparation process of Lime and Distemper. Other required EquipmentsBelow lamp, bucket, plum-bob, putty blender, Paint strainer. Types of Trestle, ladder, scaffolding. (10hrs) |
| | | 140. Prepare ceiling & wall surface with putty & Apply interior emulsion paint. Use roller & brush. (20 hrs.)<br>141. Prepare office & work shop interior wall surface with putty, Apply enamel or luster paint. (20 hrs.) | Colour selection for interior wall painting and use of Paints. Effects; Intention; Purpose of colors. Paint mixing and preparation process. Difference between emulsion paint and Oil paint. (10hrs) |
| . | | 142. Make scaffolding for exterior wall painting. (05hrs.)<br>143. Clean exterior wall aria with cleaning process & water pressure process (05 hrs.)<br>144. Prepare exterior wall with white cement for painting. (08 hrs.)<br>145. Paint the prepared wall by brush with cement paint. (08 hrs.)<br>146. Prepare exterior wall with exterior priming for painting. (8 hrs.)<br>147. Paint the prepared wall by brush with emulsion paint. (8hrs.)<br>148. Decorate the projection with dark shade apply special shades of emulsion colour. (04 hrs.) | Color selection for exterior wall painting and use of Paints. Method of paint mixing and preparation. Paint used for exterior wall painting. (11hrs) |
| | | 149. Decorate the wall with design roller/ stamp/ stencil. (15 hrs.)<br>150. Prepare wall & create texture, use different medium, colour& make a different textures. (15 hrs.) | Difference between brush painting and Roller painting. Types of Roller and preparation of texture for wall painting. (18hrs) |

| Duration | Reference Learning Outcome | Professional Skill (Trade Practical) (With inidcative hour) | Professional Knowledge (Trade Theory) |
|---|---|---|---|
| | | 151. Prepare wall & design wall paper pasting on wall (10 hrs.)<br>152. Find the defect on wall before painting and remove it. (08 hrs.)<br>153. Find the defect on wall after painting and remove it. (07 hrs.) | Wall defects and defects removal process of wall painting. (9hrs) |
| Professional Skill 84Hrs;<br>Professional Knowledge 27Hrs | Choose different pipes as per safety aspect and apply line painting with colour code.<br>**PCS/N5110**<br>**PCS/N5111**<br>**PCS/Q5109** | 154. Prepare & paint by brush windows, grill, doors, safety doors, gate etc. (16 hrs.)<br>155. Paint a ceiling and wall with dip-feed roller / pad or airless spray. (16 hrs.) | Building Painting estimate & costing. (14hrs) |
| | | 156. Paint the GI pipe, take all precautions while painting. (08 hrs.)<br>157. Paint the sanitary pipe, take all precautions while painting. (08 hrs.)<br>158. Paint the MS square & round pipe, take all precautions while painting. (09 hrs.)<br>159. Paint deferent pipe line with colour code as per ISI. (11 hrs.)<br>160. Demonstrate knowledge of safety procedures in Industrial pipe line painting (Demo by video & charts). (08 hrs.)<br>161. Identify colour code wise – Pipe lines, different types of valves. (08 hrs.) | Intention and effects of pipe line painting, Colour Codes of pipe line painting. ISI colour code.(13hrs) |
| Professional Skill 105Hrs;<br>Professional Knowledge 34Hrs<br>. | Process of cleaning and painting on metal surface for preventive coat.<br>**PCS/N5110**<br>**PCS/N5111**<br>**PCS/Q5109** | 162. Scrap thecorrode metal surface. (06hrs.)<br>163. Clean the metal surface by w ire brush or orbital wire brush. (06 hrs.)<br>164. Burn the old paint from metal surface by blow lamp or gas flame. (06 hrs.)<br>165. Do dry sanding with help of emery paper/cloth (06 hrs.)<br>166. Apply wet sanding on old painted object. (06 hrs.)<br>167. Clean the metal surface by Sander machine. (06 hrs.)<br>168. Level different metal surface by portable hand grinder. (06 hrs.) | Corrosion- Definition and classification. Reasons for rusting and effect of climate. Different anti-rusting process. (11hrs) |
| | | 169. Apply degreasing process on metal surface. (05 hrs.) | Metal surface - types and selection of sanding paper (polish paper). Metal surface cleaning- |

| Duration | Reference Learning Outcome | Professional Skill (Trade Practical) (With inidcative hour) | Professional Knowledge (Trade Theory) |
|---|---|---|---|
| | | 170. Apply de-rusting or pickling process on corrode metal. (06 hrs.)<br>171. Treated phosphating on metal surface with all pre-treatment process. (06 hrs.)<br>172. Demonstrate practical of Different types of, Industrial Pt system by video. (06 hrs.) | Mechanical and chemical cleaning. (Dry/ wet Sanding, scraping, wire brushing, orbital wire brushing, paint burning, sand and shot- blasting, pickling and phosphating). (07hrs) |
| | | 173. Make a proper thin metal primer for brush application. (02 hrs.)<br>174. Prepare metal surface & apply ready primer on metal surface by brush. (05 hrs.)<br>175. Apply enamel / polyester putty or filler on primed surface. (08 hrs.)<br>176. Apply enamel paint on primed metal surface. (05 hrs.) | Metal Primer - Types, Purpose, application and use. Types of surface. Types of solvent or reducers / thinner/ automotive paints (Enamel, NC, Stoving, PU, Epoxy, rubber base sound deadener paint, metallic, pearl, water base automotive paint), lacquer. (07hrs) |
| | | 177. Prepare and paint metallic article by brush. (10 hrs.)<br>178. Prepare & colour making for deep painting. (01 hr)<br>179. Prepare article for deep painting. (04 hrs.)<br>180. Demonstrate practical of Electro coat Deeping process & conveyor system by video. (05 hrs.) | Types of painting process- Traditional and modern technology. Ex.- Brushing, Deeping, barreling, Aerosol, roller coating, suction spray, vertical spray, pressure vessel, spray airless, electrostatic, powder coating etc. (09hrs) |
| Professional Skill 21Hrs;<br><br>Professional Knowledge 07Hrs | Identify, replace and assemble different pneumatics and paint gun. [Different components – Compressor, Pressure Gauge, Filter Regulator, Valve for hose]<br>**PCS/N9442** | 181. Identify pneumatic components – Compressor, pressure gauge, Filter-Regulator-Lubricator (FRL) unit, and Different types of valves and actuators. (05 hrs.)<br>182. Demonstrate knowledge of safety procedures in spray systems and personal Protective Equipment (PPE) (orally & video). (05 hrs.)<br>183. Maintenance, troubleshooting, and safety aspects of pneumatic and Painting instruments (The practical for this component may be demonstrated by video) (11 hrs.) | Spray Gun - Principles of spray painting, spray gun accessories and their function different types of spray guns. Holding of spray gun and stroke adjustment. Types of spray painting method. Air compressor for Painting Process. Required instruments for spray painting. (07hrs) |
| Professional Skill 21Hrs;<br><br>Professional Knowledge 07Hrs | Perform Spray Painting technique. (Spray Gun / hose handling, air & paint pressure controlling,)<br>**PCS/N9443** | 184. Knowledge & Inspect spray gun holding and stroke adjustment, Paint adjustment, air adjustment techniques. (11 hrs.)<br>185. Spraying practice on the surface like as edges, corner, square, round & curved area. (10 hrs.) | Description of spray painting plant. Types of booth, description of booth, care and maintenance of spray booth. (07hrs) |

| Duration | Reference Learning Outcome | Professional Skill (Trade Practical) (With inidcative hour) | Professional Knowledge (Trade Theory) |
|---|---|---|---|
| Professional Skill 21Hrs;<br>Professional Knowledge 07Hrs | Operate the system of spray booths, Oven, cleaning & their maintenance, application of sealant component on metallic joints.<br>**PCS/N5105**<br>**PCS/Q5108** | 186. Operate, maintenance, troubleshooting, and safety aspects of paint spray booth. (07 hrs.)<br>187. Operate, and safety aspects of Oven Setting, temperature & timing. (07 hrs.)<br>188. Apply sealant on metallic joints. (07 hrs.) | Types of oven for painting. Description of oven and its care.<br>Sealant - Definition and description. Purpose of sealant application - edge protection; prevention of water leakage. (Hiding the metal joint/clinch). (07hrs) |
| Professional Skill 42Hrs;<br>Professional Knowledge 13Hrs | Perform aspect ratio mixing of paint, hardner& solvent. Measure Viscosity of paint. Operate the Spray painting system.<br>**PCS/N5004**<br>**PCS/Q5002**<br>**PCS/N5105**<br>**PCS/Q5108** | 189. Paint preparation & mixing for spray painting. (04 hrs.)<br>190. Practice to Measure the viscosity of paint. (08 hrs.)<br>191. Spray Painting practice on ornamental objects, with deferent types of paints. (08 hrs.) | Paint viscosity - importance, method of the paint viscosity. Paint preparation & mixing for different application. (07hrs) |
| | | 192. Spraying metallic primer on metal surface. (05 hrs.)<br>193. Apply Car patch, Putty, Filler on metallic surface & prepare it. (08 hrs.)<br>194. Spraying Surfacer on primed or putty finish surface. (04 hrs.)<br>195. Spraying finish Top Coat on prepared job. (05 hrs.)<br>* Use enamel/ N.C. paints. (Or latest paints.) | Introduction and uses of Pressure feed. (06hrs) |
| Professional Skill 84Hrs;<br>Professional Knowledge 27Hrs | Identify and apply of spray painting in Home appliances, Agricultural equipment's, Machines, Automotive Bodies etc.<br>**PCS/N9444** | 196. Prepare the surface of home appliances (ex- fan, cooler, fridge, washing machine etc.). (06 hrs.)<br>197. Priming & surfacing on home appliances. (07 hrs.)<br>198. Apply finish undercoat &top coat on home appliances. (07 hrs.)<br>* Use enamel/ N.C./ P.U. paints- Solid/ Metallic/ Pearl/. | Airless and Electrostatic Spray painting. (09hrs) |
| | | 199. Prepare the surface of machine (ex- lath, drilling, grinding, compressor, suing machine etc.). (06 hrs.)<br>200. Priming & surfacing on machine. (08 hrs.)<br>201. Apply finish undercoat & top coat on machine. (08 hrs.)<br>* Use Enamel/ Epoxy/N.C./ P.U. /paints. (Or latest paints.) | Process of article and machine painting. (09hrs) |

| Duration | Reference Learning Outcome | Professional Skill (Trade Practical) (With inidcative hour) | Professional Knowledge (Trade Theory) |
|---|---|---|---|
| | | 202. Prepare the Tow wheeler body and spares surface. (06 hrs.)<br>203. Priming & surfacing the Tow wheeler body and spares surface. (07 hrs.)<br>204. Apply finish undercoat & top coat on Tow wheeler body and spares surface. (08 hrs.)<br>Use Automotive paints. Apply Graphic sticker on painted surface properly & apply lacquer coat evenly. Use Enamel/ N.C./ P.U. paints/- Solid/ Metallic. (Or latest paints.)<br>205. Identify the parts of Electrostatic gun assembly & operate it carefully. (07 hrs.)<br>206. Identify the parts of Airless gun assembly & operate it carefully. (07 hrs.)<br>207. Demonstrate practical of Different types of Spray painting, Industrial Painting system by video. (07 hrs.) | Car: Process of repainting. (Removal of dent, car patch, putty process, metal primer, surface, paint) Spray painting. Types of paint defects & its remedies. Importance of polishing, removal defects by polishing. (09hrs) |
| Professional Skill 84Hrs;<br>Professional Knowledge 27Hrs | Removal of dents & recover the damaged accidental area. Repaint & recovering damaged area.<br>**PCS/N9445** | 208. Dissemble essential damage parts, inspect & mark denting aria. Choose & decide process tools for denting. (08 hrs.)<br>209. Removed dent on marked aria, apply essential method. (12 hrs.)<br>210. Do sanding or burn on denting area & apply primer & surface. Apply putty layer on necessary area evenly. (12 hrs.)<br>211. Use wet sanding, level denting surface aria, apply thin coat of surface. (06 hrs.)<br>212. Masking on unwanted aria properly. (07 hrs.)<br>213. Match the shade Overlay proper equally on unmask aria. (07 hrs.)<br>214. Unmasked the mask aria carefully & checkout properly & touch-up it by necessary process. (05 hrs.)<br>215. Apply final coat rub and wax properly & matched it. (06 hrs.) | Removal of defects by polishing. Removal dented aria on the different surface, types of denting process. (18hrs) |
| | | 216. Demonstrate knowledge of Paint defects & its remedies. (video). (05 hrs.) | Types of paint defects & its remedies. Importance of polishing, removal defects by polishing. (09hrs) |

| Duration | Reference Learning Outcome | Professional Skill (Trade Practical) (With inidcative hour) | Professional Knowledge (Trade Theory) |
|---|---|---|---|
| | | 217. Check & Find out different paint defects (run down, sagging, pin hole, orange peel, oil & water spot, over/ dry spray, uncover shade variation etc.). (05 hrs.)<br>218. Mark the defected area, Decide Techniques & apply remedies properly. Make finished surface. (11 hrs.) | |
| Professional Skill 21Hrs;<br>Professional Knowledge 07Hrs | Finish special effects for Modern furniture. **PCS/N5002** **PCS/Q5002** | 219. Process Finish special effects on different furniture & different surface. (like as- colour gradations, malty tones applying, different textures, etc.). (21 hrs.) | Furniture making is a multiple skills, using different applications on one object like Painting, Polishing, Varnishing, Waxing, staining, PU coating textures creating etc. (07hrs) |
| Professional Skill 21Hrs;<br>Professional Knowledge 07Hrs | Identify different types of powder coating and apply the Powder coating technique in appropriate place. **PCS/N5109** **PCS/Q5102** | 220. Prepare & Clean the metallic article in chemical (degreasing, de-rusting, activation, phospheting, passivation & water rainssing as required etc.) (08 hrs.)<br>221. Proceed powder coating on cleaned article & bake it in oven in appropriate temperature & timing. (13 hrs.) | Operating system of Powder coating technique. Chemical cleaning process, Types of coating powders. (07hrs) |
| Professional Skill 21Hrs;<br>Professional Knowledge 07Hrs | Integrate quality testing for various Paints & Painted films. **PCS/N9902** | 222. Demonstrate knowledge of Paint defects & its remedies. (video). (10 hrs.)<br>223. Test the quality of paints & Painted surfaces by various method & instruments. (11 hrs.) | Different types of paints & painted surface testing equipments, Types of testing methods. Use & care. (07hrs) |

# Practice on make a manually ornamental design on radium

**Objective:** At the end of this exercise you shall be able to
- **draw the ornamental design on radium or vinyl.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Drawing pencil | - 1 No. |
| • Eraser | - 1 No. |
| • Radium sign colour pencil | - 1 No. |
| • Painting brush | - 1 No. |

**Equipments**

| | |
|---|---|
| • Drawing board | - 1 No. |

**Materials**

| | |
|---|---|
| • Drawing sheet | - as reqd. |
| • Baniyan cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Make a manually ornamental design and apply radium**

1 Select the ornament to be manually draw the design on it.

2 Select the radium drawing sheet and cut the paper size as required.

3 Draw the borderline on the drawing sheet.

4 Measure the ornamental design and mark the measurement in enlarge size on the drawing sheet.

5 Draw the ornament design as shown on Fig 1.

6 Draw the ornament design in a thin pencil line.

7 Compare the ornament design drawing with original ornament design.

8 If any correction on it, correct it.

9 Ensure the drawn ornamental design is as well as original design.

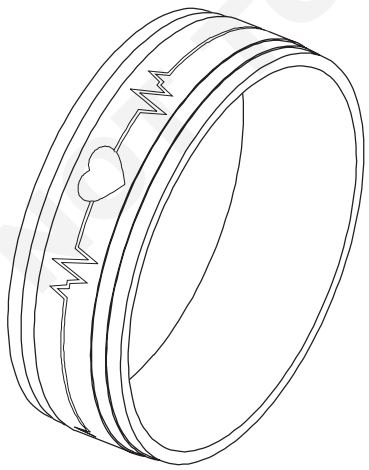
10 Darken the lines of ornament design and mark the area to be apply radium colour on it.

11 Apply radium colour on the marked area of the ornament design drawing.

12 Ensure the radium is glow in dark as Fig 2.

**Note: You can use the radium/vinyl sheet/ sticker to make a manually ornamental design**

Fig 1



PG20N21112H1

Fig 2

PG20N21112H2

# Practise on make symbol or image design by computer in graphics

**Objectives:** At the end of this exercise you shall be able to
- **make a computer graphic design of image or symbol**
- **printout the computer graphic design with plotter cutter.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.

**Equipments**

- Computer system - 1 No.
- Plotter cutter - 1 No.

**Materials**

- Plotter paper - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.

## PROCEDURE

TASK 1: **Make a image by using computer graphic system**

1 Select the image/symbol design to draw by using graphic software. (Business design, enterprise design, products design, execution design architecture designing and engineering buildings and structures, interior designs land scape architecture, industrial design, fashion design, etc)

2 You have a image/symbol design to draw a graphic

3 You think to design the image and understand the design philosophy and design principles.

4 Gather the image design knowledge from various sources.

5 Open the computer system with graphic design software.

6 Open the graphic design folder.

7 Study the graphic design tools and practice to operater each graphic design tools.

8 Study the image/symbol design to draw in computer.

9 Draw image line, diagram by using graphic design software as original image you have in hand.

10 Ensure the drawn line diagram image is as original image.

11 Select the colour box and coloring tool.

12 Select the colour from the colour box and colour the drawn image in different colour.

13 Ensure the colour painting of the drawn image is as original image, if need edit the figure colour by adding, reducing, brushing method.

— — — — — — — —

TASK 2: **Cut the computer graphic design image with plotter cutter (Fig 1)**

1 Switch on the printer.

2 Import and edit the file formats including SVG, AI, EPS, PNG, PDF, GSD, SCUT, WPC and other popular formats as editable objects to cut any shape and customs artworks.

3 Simply use the powerful tracing tool to create cutable outliner from any imported roster graphics or scanned images. Easily create accurate vector paths ready for cutting.

4 Easy mode editing tools give total control over outlines individual lines, curves and nodes can be manipulated to any degree for perfect results.

5 Weld text and shapes together wherever an overlap occurs. There are two ways to combine shapes/ letters together welding and joint.

6 Draw the design and cut the rhinestone templates. It can cut and print by plotter. The shadow layer option will create cutable shadow from any shape, by working with layers.

7 Print and cut made easy, fast and accurate automatic creation of registration marks for print and cut application. Easily print your image and then cut out around the printed image using your cutting plotter. Which is perfect to create decals and stickers user control over registration size thickness and offset will help the cutter fine the contour cut marks easily.

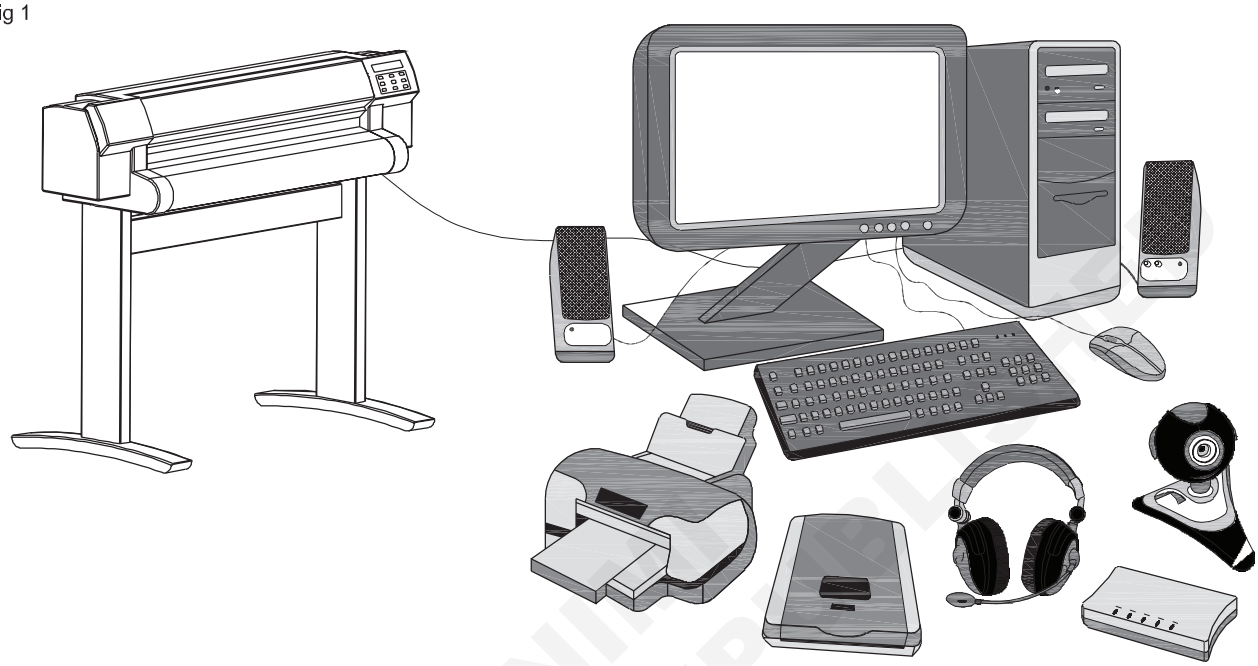
8 Get the job done, faster, flexible cut settings that allow you to cut exactly what you want, you can set cut mode, multicut pressure and speed cut selection only, blade offset, mirroring, overcut print cut and

many more professional vinyl cutter controls, cut vinyl signs with incredible ease.

9 Works with a wide range of vinyl cutters/plotters including GCC, Vevor use cutter roland, graphic, loline, mutoh, summa UK cutter, refine, seiki, Rabbit, Saga, Pcut Rotts, DGI, Foism, New star, desay master, vinyl, are supported vinyl cutters and plotters.

**Note: A plotter cutter is a cutting device controlled by a computer that can digitally produce art pieces, signs designs and crafts, can handle such as paper, sticker, cardstocks, adhesive vinyl, heat transfer materials, magnet sheets, window film etc.**

Fig 1



PG20N21113H1

# Practice on make a instruction board on acrylic sheet with multilayer radium or vinyl

**Objectives:** At the end of this exercise you shall be able to
- **make a instruction board on acrylic sheet**
- **write or draw the instruction with help of multi layer radium sticker.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Pencil white marking - 1 No.
- Radium sign colour pencil - 1 No.

**Equipments**

- Work bench - 1 No.

**Materials**

- Acrylic sheet - as reqd.
- Radium colour sticker - as reqd.
- Baniyan cloth - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Make a instruction board on acrylic sheet with multilayer radium sticker**

1 Study the sentence and logo of instructions to be write on acrylic sheet.

2 Select the colour acrylic sheet to make a instruction board.

3 Mark the board measurement on the acrylic sheet and cut the size of board by hand knife or hacksaw.

4 Colour the acrylic sheet background colour, if sheet is not in a colour. Cut the radiem sticker for border line of the board.

5 Stick the border line on the instruction board.

6 Darken the border line with radium sticker.

7 Measure the sentence letters and logo size.

8 Mark the sentence and logo on the instruction board by specified marker.

9 Draw the straight line for write a sentence by sticker.

10 Remove the sticker back sheet and stick the radium colour sticker letters and logos on the instruction board as shown in Figs 1 & 2.

11 Mark and cut the letters, sentance, and logo on selected radium/vinyl sticker sheet.

12 Carefully remove the stickers from the radium sticker sheet and stick sticker on the acrylic sheet instruction board.

13 Ensure the instruction board is as per specification and verify the instruction sentence and logo radium is reflect and shining in dark.

Fig 1

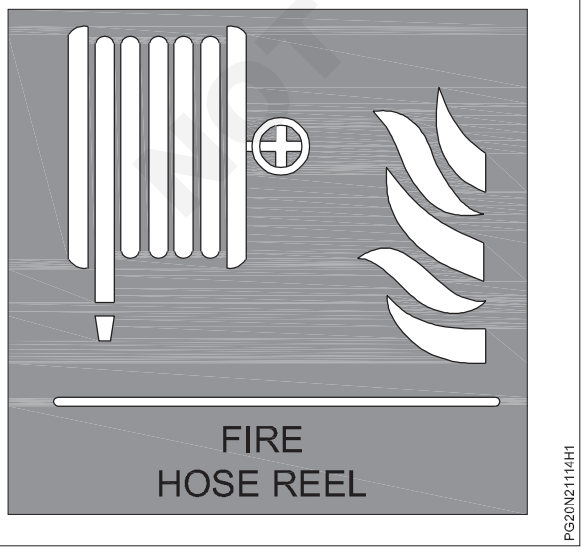



Fig 2

# Practice on make a lettering / image / symbol design for instruction board by computers graphics

**Objectives:** At the end of this exercise you shall be able to
- **draw a lettering, symbol, image design by using graphic software**
- **cut the drawn letters, symbol, images by using plotter cutter and desktop**
- **select the instruction board and paste the instruction letters, images, symbol.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.

**Equipments**

- Computer system - 1 No.
- Plotter cutter - 1 No.

**Materials**

- Radium sheet - as reqd.
- Vinyl sheet - as reqd.
- Sun mica sheet - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.

PROCEDURE

TASK 1: **Make a lettering/ image/ symbol design by using a computer graphics software**

1 Read and study the instruction board lettering/ image/ symbol designs to be develop in computer graphic system.

2 You think about design the lettering size and colour.

3 You have to think and decide the image and symbol design, size and colour to be developed in computer graphic system

4 Gather the design knowledge about lettering/ image creation/ symbol draw by using computer graphic software.

5 Open the computer system and install the graphic software.

6 Select the graphic design tools in computer tool bar box

7 Study the each graphic design tools function before use it.

8 Before operate the graphic system to create lettering/ image/ symbol designs, you ask the instructor to show the demo on computer system

9 Use the letter draw pen tool to draw the instruction board sustenance letters in different designs as in manuscript

10 Ensure your drawn computer graphic sentence lettering design is as customer choice.

11 Draw computer graphic sentence lettering file should be store in separate folder

12 Draw the graphic image as sample given to you and save the file in separate folder

13 Draw the symbol by using graphic design tools and save it separate folder.

14 Copy the lettering, image and symbol and paste it altogether in one separate new folder

15 Compare the lettering designs, image designs, symbol designs with original sample manuscript of instruction board

16 Align the letters, image and symbol with in boarder line.

17 Align the space between lines, image and symbol of instruction board information's prepared by you.

18 Ensure complete file is aligned and save it properly

— — — — — — — —

TASK 2: **Graphic developed materials printing and cutting it with plotter culter (Fig 1)**

1 A vinyl / radium letter machine may be large or small and can be used to cut vinyl sign lettering, image symbol graphics to make everything from bumber stickers to instruction board.

2 Radium/ vinyl cutter plotter can be used with desktop computer and printer

3 Vinyl cutter hardware is similar to traditional plotter except that the ink pen is replaced by very sharp knife to each shape and may have a pressure control to adjust hard the knife presses down into the vinyl/ Radium film.

4 So set the plotter cutter knife pressure.

6 The plotter cutting knife is usually shaped like a plotter pen and it also mounted on a survival head so that knife edge self rotates to face the correct direction as the plotter head moves.

7 Vinyl cutters are used to print and cut the graphic design letters, image and symbol signs.

8 Select the prepared instruction board live in computer system.

9 Ensure plotter cutter is properly connected with desktop system and vinyl/Radium paper is properly loaded in plotter cutter.

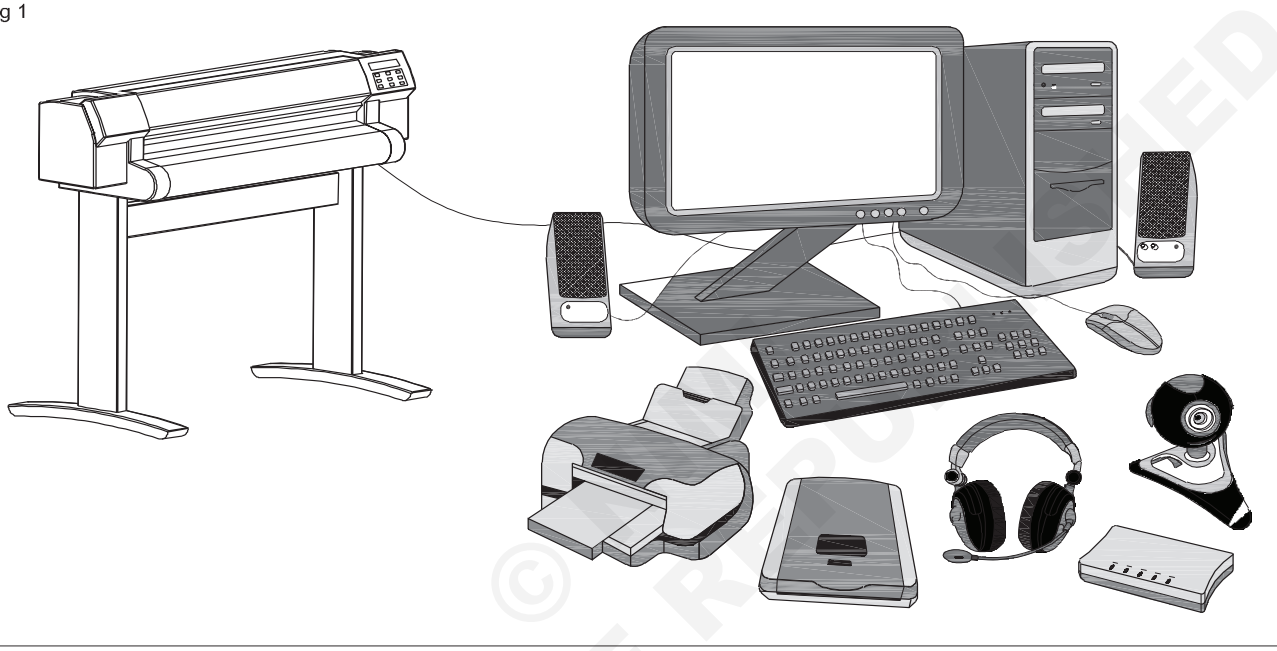
10 Select the folder and right click the mouse and select the print and cut option.

11 Check the print and cut materials after cutting the vinyl material outside of the design is peeled away leaving the design on backing material, which can be applied using self-adhesion glue lamination or heat press.

12 Carefully handle the print and cutting materials.

— — — — — — — — —

Fig 1



PG20N21115H1

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TASK 3: **Paste the instructions materials on instruction board (Fig 1)**

1 Select the instruction board material like glass/ acrylic/sunmica or any other materials as your preference.

2 Measure and mark the board size.

3 Cut the correct size of instruction board.

4 Clean the board surface with cleaning solvent to remove dust formation on the surface. Make a border line on the board.

5 Take symbol and image remove the back sheet and paste it on the board. Where location is marked on the board.

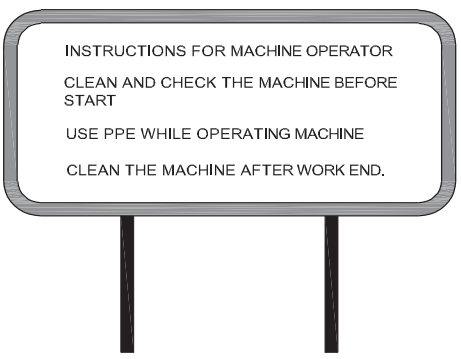
6 Take the instruction letters and sentences materials, remove the back safety sheet.

7 Carefully paste it as manuscript line order one by one.

8 Ensure the instruction board is properly paste the letter/symbol/images design as customer (preferred) choice.

**Note: Instructor should be give demo on design letter, images symbol developing method by using a computer graphic software desktop system. Save the file print option, plotter cutter setting and adjusting, vinyl/ Radium cut material collection and paste it on the instruction board and sequance of work.**

Fig 1




PG20N21115J1

# Practice to create a design for wall decoration by computer in graphics

**Objectives:** At the end of this exercise you shall be able to

- **create a graphic design for wall decoration by using a compter graphic**
- **print and cut the graphic design on multi colour vinyl sticker sheet**
- **paste, the graphic design on the wall for decoration.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.

**Equipments**

- Computer system - 1 No.
- Plotter cutter - 1 No.

**Materials**

- Vinyl sticker sheet - as reqd.
- Clearing solvent - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.

PROCEDURE

TASK 1: **Create a graphic design for wall decoration by using computer graphic software**

1 Select the graphic designs for wall decoration.

2 Open the computer system with graphic software file

3 Choose window menu and select the tool bar and study the each tool function of graphic design tools

4 Position the pointer over a rectangle tool that has hidden tool and hold down the mouse button and select rectangle tool

5 Position the crusor page area within the margins

6 Draw the rectangle

7 Change the rectangle with 100mm and height 50mm in the control option.

8 Change the rotation angel shear angle. Select the stroke weight, select the stroke style. Think and thin stroke, change stroke color in red and fill colour in green

9 Choose selection tool, to select and move entire object from one position to another position by dragging the mouse and also move the object in the specific position

10 Select the direct selection tool, place the cursor top corner points on a path of object drag down the cursor

11 Release the cursor and see the figure will get reshape of this object

12 As it is select one by one of the tools to draw different shape of lines

13 Select the pencil tool to draw the different shape of figure

14 Select Erase tool to delete the points on a path

15 Change the different shape, size, stroke weigh, stroke color and fill colour in the object to be pasted on the wall

16 Select rectangle frame tool, hold down the shift key and draw a square shape in the page area

17 Change the object size width and height

18 Choose the file menu and click place. The place dialog box will appear.

19 Select the wall picture in the particular drive and folder

20 Click ok button, the selected wall picture will appear in the rectangle frame

21 Choose object menu filling fill frame propositionally

22 The picture size will be change in frame size in propositionally.

23 Select object menu filling fit content propositionally

24 The original picture size will appear in the centre place of the frame.

25 Select object menu → fitting → fit control to frame to content

26 The Square frame will be change in the original picture size

27 Select object menu→ fitting → fit control to frame

28 The original picture size will be change in frame size

29 Select object menu → fitting → centre

30 Place the curser on the picture within the frame the curse will appear in hand simple

31 The picture will appear in centre in the frame

32 Select the pen tool to draw different size and shape of lines to decorate wall picture in the graphic design

33 Set the picture size, width, and color to be print out on multi colour vinyl sheet. (Fig 1)

TASK 2: **Print and cut it on multi colour vinyl sheet with help of plotter cutter. (Fig 1)**

1 Check the picture design is as customer need wall picture

2 If need edit the picture shape, size, width, length and colour

3 Set and adjust the vinyl multicolour sheet on the printer and plotter cutter

4 Adjust the printer knife pressure to cut the sheet accurate

5 Check the desk top and printer plotter cutter wire connections

6 Open the picture saved folder and select the picture and hold it for print and cut mode.

7 Check the print cut wall picture and place it in shape mode.

Fig 1

PG20N21116H1

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TASK 3: **Paste the graphic designed wall picture on the wall (Fig 1)**

1 Select wall to paste the picture.

2 Clean the wall with cleaning solvent.

3 Let allow the wall to dry before paste wall design picture.

4 Mark the wall to fix the graphic design.

5 Remove the back safety sheet of multicolour vinyl sheet.

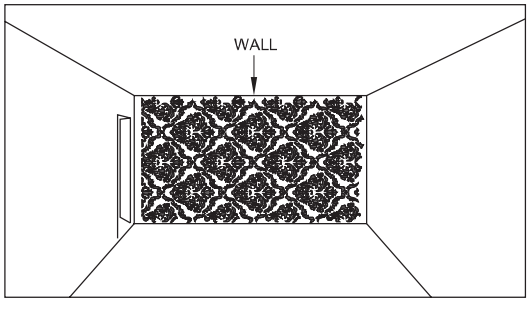
6 Paste the graphic design picture on the wall.

7 Give light pressure on the pasted picture evenly with help of soft cloth or sponge or hand to avoid our bubbles between single sheet and wall surface.

8 Ensure the wall graphic designed picture is properly pasted on the wall.

**Note: Instructor should be show demo on creat a design for wall decoration by computer graphic system vinyl sheet cutting, wall pasting display the latest technology vedio for computer system to direct wall decoration by lasers printing system.**

Fig 1




PG20N21116J1

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# Practice on wood cleaning, sanding, knotting, stooping, staining and wooden surface preparation for polish

**Objectives:** At the end of this exercise you shall be able to
- **wood cleaning, sanding, knotting, stooping and staining**
- **wooden surface preparation for polish.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Wooden jack plane - 1 No.
- Try square - 1 No.
- Marking gauge - 1 No.
- Combination set - 1 No.

**Equipments**

- Work bench - 1 No.
- Carpenter vice - 1 No.

**Materials**

- Wood - as reqd.
- Wood polish - as reqd.
- Sand paper - as reqd.
- Baniyan cloth - as reqd.
- Paint brush - as reqd.
- Soap oil - as reqd.



PROCEDURE

TASK 1: **Wood surface preparation for varnishing**

1 Set the smoothing plane for planing (Fig 1)

Fig 1

PG20N2117H1

2 Place the job on the work bench and using with bench stop.

3 Nail and screw should be just below the wooden surface for varnishing.

4 Set the gap between cap iron and cutting iron as 2mm in the smoothing plane.

5 The cutting edge is sharpened slightly oval across the cutting iron.

6 The edge of the cutting iron placed 0.001mm extended from the base of the smoothing plane. (Fig 2)

Fig 2

PGN32117H2

7 Start planing from one end to other end.

8 Apply the pressure evenly.

9 Plane along the grain.

10 Adjust the plane to make finishing cuts to remove the stooping and scallops left by initial cuts.

11 Initial cuts should be wide about 3/4 of the width of two-inch - wide blade

12 The thickness of the shaving should be in the range of 0.005 thick

13 Now job is ready with smoothing plane to make finishing cuts.

14 For finishing cuts setup 1/2” wide shaving should come from the middle of the blade and it should be transparent 0.001” to 0.002” thick

15 Cover the entire surface twice laterally between cuts by only 1/2”. At this point the surface will be incredibly smooth.

16 You can actually look at the surface at an oblique angle see a reflection in the wooden surface.

17 Finish wooden surface for polishing. (Fig 3)

Fig 3

PGN32117H3

— — — — — — — —

TASK 2: **Knotting and interlocked cross grained surface preparation**

- Set the smoothing plane for planing
- Place the job on the work bench by using holding device
- Set the gap between cap iron and cutting iron as 1mm in the smoothing plane
- The cutting edge is sharpened slightly oval across the cutting iron
- The edge of the cutting iron placed 0.001mm extended from the base of the smoothing plane
- Start planing diagonally on the interlocked grain. (Fig 1)
- Apply less pressure for painting.
- Planing the knot to use smoothing plane gives short stroke. (Fig 2)

Fig 1

PGN32117J1

- Readjust the smoothing plane to make finishing touch.
- Repeat the same procedure until you get the fine glossy finish.

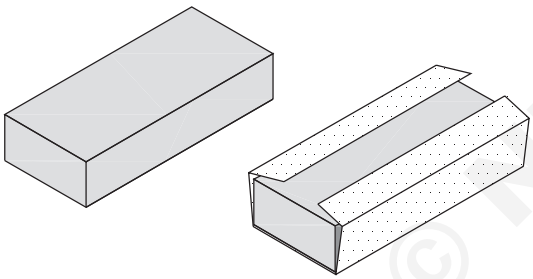
Fig 1

PGN32117J1

TASK 3: **Wood surface preparation by scraping with sand paper**

- Rub the surface of the plank and the top with a wet cloth.
- Take cork or rubber block and fold the sand paper around the block. (Fig 1)

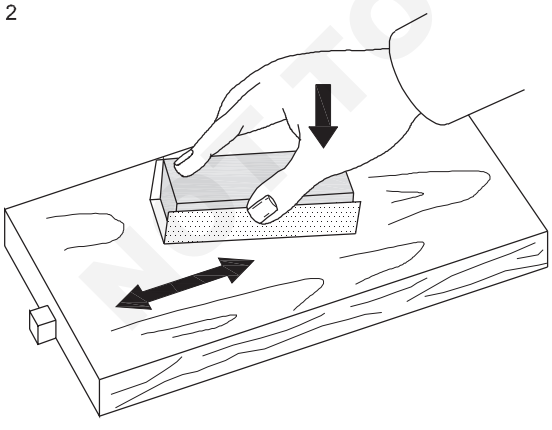
Fig 1



PG20N22117X1

- Fasten the work piece on the work bench.
- Start with coarse abrasive sand paper No 36, 50 grit for rough finish. (Fig 2)

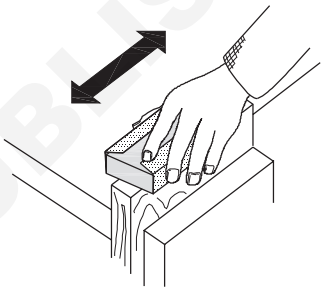
Fig 2



PG20N22117X2

- Use thin medium sand paper (80-100) for smoothening the surface. (Fig 3)

Fig 3



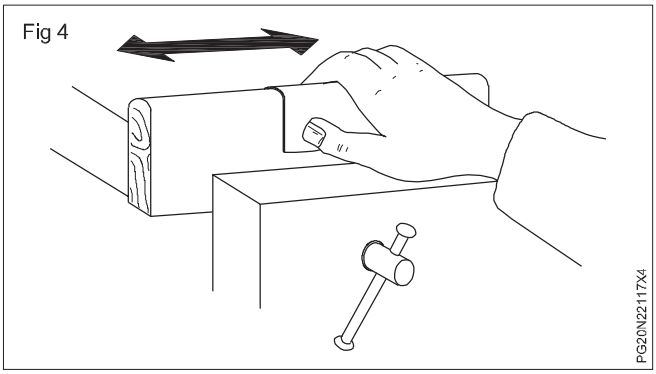
PG20N22117X3

- Then use fine sand paper 100 - 120 grit for smoothening the surface. Use little pressure and move the block to and for in the direction of grain. Remove the dust caused while sanding by blowing or wiping it away.

**Avoid circular movement or sanding across the grain. This will injure the wood fibres.**

- Sand the rounded edges, by cupping the sand paper in the hand. (Fig 4)

Fig 4



PG20N22117X4

- Move the sand paper in the direction of the grain.
- Ensure the wooden surface is ready for polishing work.

# Practice to make and apply putty for wooden part for varnishing & polishing

**Objectives:** At the end of this exercise you shall be able to
- **apply putty on wooden surface gaps**
- **apply varnish on fine finish wooden surface**
- **sanding the wooden surface with hand sanding and power disc sander.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Painting brush | - 1 No. |
| • Wooden plane | - 1 No. |
| • Try square | - 1 No. |
| • Marking gauge | - 1 No. |
| • Combination set | - 1 No. |

**Equipments**

| | |
|---|---|
| • Work bench | - 1 No. |
| • Carpenter vice | - 1 No. |

**Materials**

| | |
|---|---|
| • Sand paper | - as reqd. |
| • Varnish | - as reqd. |
| • Cotton waste | - as reqd. |
| • Sponge | - as reqd. |
| • Soap oil | - as reqd. |

PROCEDURE

**Fill the putty on wooden surface gaps and varnish on fine finish wooden surface**

1 Sand the wooden surface by using No 38 and 50 grit sand paper for rough surface and repeat the same sanding process using the sand paper No 80 and 100 grit for fine finishing. Clean the wooden surface with clean cloth.

2 Select the wooden putty and prepare it for apply.

3 Apply wooden putty to cover screw, nail heads and all other gaps on the wooden surface

4 again sanding the wooden surface by using No 120 sand paper to get the smooth surface

5 Apply wood filler by using cotton waste on the finished surface of the wood. The wood filler should be same color of wood.

6 Remove the extra filler dust by using fresh fine cotton.

7 again sanding the wood by using the sand paper No-120 grit

8 Clean the wooden surface and ensure the surface is fine glossy finish.

9 Clean all the surface of the job using dusting brush.

10 Rub the surface using wet cloth before varnish. (Fig 1)

Fig 1

PGN32118H1

# Practice on apply polish on prepared wooden surface with cotton rags

**Objective:** At the end of this exercise you shall be able to
- **apply polish on wooden surface with cotton rag.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Wood surface plane - 1 No.
- Soft bristle brush - 1 No.
- Buffing pad - 1 No.

**Equipments**

- Carpenter bench wise - 1 No.
- Work bench - 1 No.

**Materials**

- Wooden polish - as reqd.
- Cotton rag - as reqd.
- Sand paper - as reqd.

## PROCEDURE

**Polish on wooden surface with cotton rags**

1 clean the wooden surface by using wet cloth.

2 Prepare the polishing pad using cotton rags.

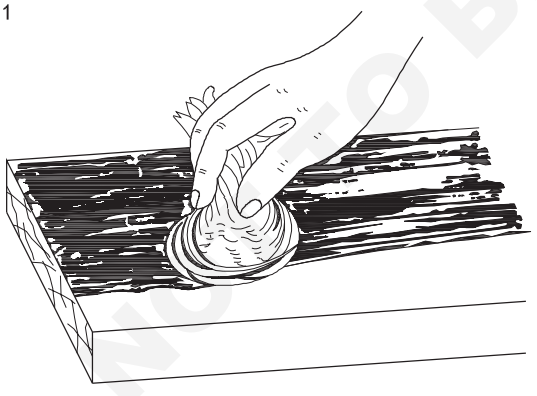
3 Select the wood polish and prepare it for apply on wooden surface.

4 Apply coat of wood filler on the surface with a piece of rag and allow it dry.

5 Clean the surface with dusting brush to remove the excess filler.

6 Hold the pad in right hand and dip it in polish, apply first coat on wooden surface (Fig 1)

Fig 1




7 Apply wood polish directly onto the clean cotton rag.

8 Begin wiping with the grain.

9 Dab the wood polish directly with a soft bristled brush and continue to use a circular motion. (Fig 2)

10 If wooden surface needs more wood polish apply another layer and wait for it to saturate fully.

11 Use soft buffing cloth to remove any excess wood polish.

12 Let allow the time to dry the polish on wooden surface.

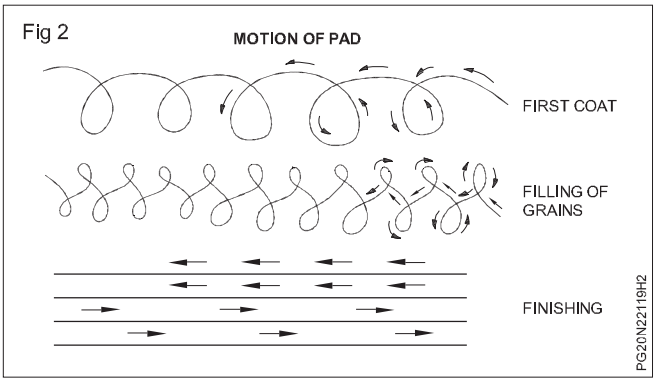
13 Ensure the wooden polish is properly applied on wooden surface without any erratic.

14 if found any erratic polished and match the polish with wooden surface.

**Note**

- **Do not polish on rough surface**
- **Do not apply a second coat of polish, when the first coat polish is wet**
- **Do not use wet pad for finishing**
- **Do not stop the rubbing process in between polish apply process**

Fig 2



# Practice on wooden surface preparation for varnish

**Objectives:** At the end of this exercise you shall be able to
- **wood surface cleaning, sanding, knotting, stooping & staining**
- **wood surface preparation for varnish.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Wood surface plane | - 1 No. |
| • Try square | - 1 No. |
| • Combination set | - 1 No. |
| • Marking gauge | - 1 No. |

**Equipments**

| | |
|---|---|
| • Carpenter vice | - 1 No. |
| • Work bench | - 1 No. |

**Materials**

| | |
|---|---|
| • Wood | - as reqd. |
| • Sand paper | - as reqd. |
| • Varnish | - as reqd. |
| • Paint brush | - as reqd. |
| • Baniyan cloth | - as reqd. |
| • Soap oil | - as reqd. |

PROCEDURE

**Prepare the wooden surface**

Fig 1

PG20N22120H1

1 Select the wood for surface preparation.

2 Check the wood knotty, stoops and wood stains.

3 Place the wood on the work bench and using with bench stop for planning the wood.

4 Set the smooth plane for planning.

5 Set the gap between cap iron and cutting iron as 2mm in the smoothing plane.

6 The cutting edge is sharpened slightly oval across the cutting iron.

7 The edge of the cutting iron is placed 0.001mm extended from the base of the smoothing plane.

8 Start the planning form one end to other end of wood. (Fig 1)

9 Start planning diagonally on the knotty and interlocked wood grain. (Fig 2)

Fig 2

PGN32120H2

10 Apply the pressure evenly on the plain wood.

11 Apply less pressure for knotty planning.

12 Planning the knot to use smoothing gives short stroke.

13 Readjust the smoothing plane to make knotty and interlock wood to make a wooden finishing touch.

14 Always plane along the wood grain.

15 Adjust the plane to make a plain wood finishing cuts to remove the stoops and scallops left by initial cuts.

16 Initial wood cut should be wide about ¾ of the width of two inch – wide blade.

17 The thickness of the shaving should be in the range of 0.005 inch thick.

18 For finishing wood cuts setup ½" wide shaving should come from the middle of the blade and it should be transparent 0.001"to 0.002" thick.

19 Rub over the plane on entire surface of wood twice latterly between cuts by only ½". At this point the surface will be incredibly smooth.

20 Check the wooden surface at an oblique angle for reflection of wooden surface.

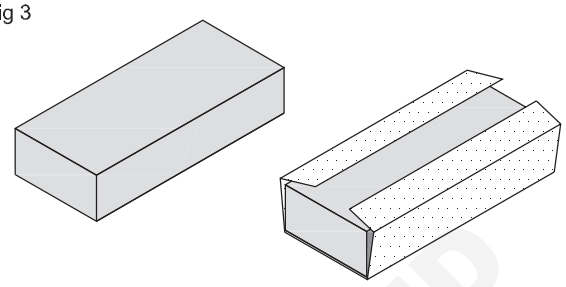
21 Repeat the same procedure until get the fine finishing of wooden surface.

22 Sanding with rubber block manual operation

23 Rub the wood surface with a wet cloth.

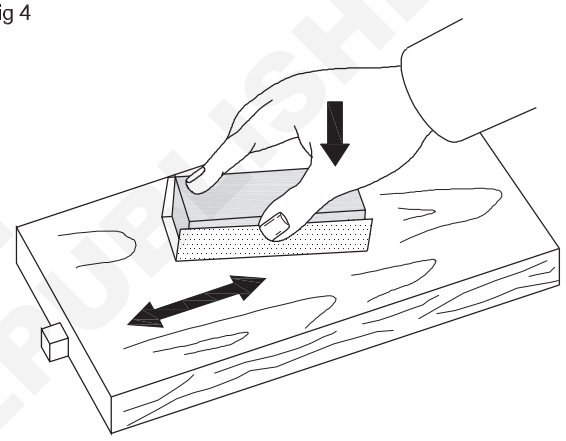
24 Use the rubber block to fasten the sand paper around block. (Figs 3,4,5)

Fig 3



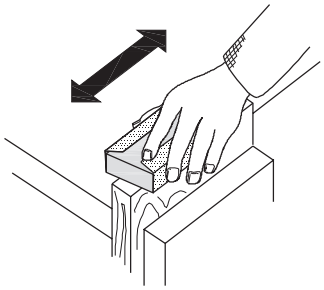
PG20N22120H3

Fig 4



PG20N22120H4

Fig 5



PG20N22120H5

25 Start with coarse abrasive sand paper, medium and smooth sand papers for smoothening the wood surface.

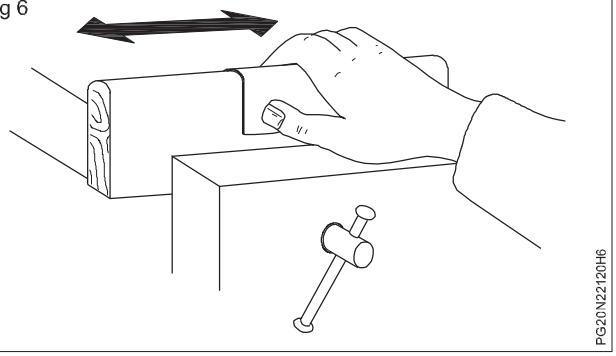
26 Use the fine sand paper for smoothening the wood surface.

27 Sand the rounded edges by cupping the sand paper in the hand. (Fig 6)

28 Avoid the circular movement of sanding across the grain. This will injure the wood fibers.

29 Always sand the wood in the direction of the grain. sanding with power sanding disk sander (Fig 7)

Fig 6



PG20N22120H6

30 Select the portable disk sander machine

31 Fix the disk sand paper No:80 in part of the disk on sander machine

32 Start the machine

33 Move the disk sander in the direction of the wood grain

34 Use little pressure on the machine.

35 Move the disk sander evenly (Fig 1).

36 Sand the surface for rough finish.

Fig 7

PGN32120H7

37 Sand again using the disk sand paper No 120. to get fine glossy finish surface.

38 Clean the sanded wooden surface with wet cloth.

39 Select wooden primer.

40 Preper it for apply.

41 Apply wooden primer on the wooden surface and let it allow to dry.

42 Finish the wooden surface preparation for varnish process..

# Practice on apply varnish on prepared wooden surface with brush

**Objective:** At the end of this exercise you shall be able to
- **apply varnish on the wooden surface by brush.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint brush - 1 No.

**Equipments**

- Work bench - 1 No.

**Materials**

- Varnish - as reqd.
- Baniyan cloth - as reqd.
- Sand paper - as reqd.
- Paint brush - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Apply varnish on the prepared wooden surface**

1 Place the wood on work bench stop.

2 Clean the surface of wood by using dusting brush.

3 Rub the surface by using wet cloth before apply varnish.

4 Prepare the brush to be use for varnish the wooden surface.

5 Dip the brush tip with varnish.

6 Apply the varnish on the wooden surface by using brush.

7 Avoid forming fume or air bubbles on the varnishing surface.

8 Allow the dry time between first and second coat of varnish.

9 Apply the varnish with full brush evenly with light and short strokes. (Fig 1)

10 Apply the varnish vertical should be crossed and recrossed by brush movement on the wooden surface and then laid off the varnish lightly on the surface.

11 Use the upward brushing for eliminate brush marks on the wood surface.

12 Apply the varnish horizontally in every direction with light quick strokes.

13 Ensure the brush mark should not showing on the varnished surface.

14 Apply the varnish final coat for fine line glossy surface.

15 Allow the time for dry the varnish on the wooden surface.

16 Ensure the wooden surface varnish is in good glossy finish. (Fig 2)

Fig 1

PGN32121H1

Fig 2

PGN32121H2

# Prepare the wooden article and apply varnish with spray

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wooden article for varnish**
- **apply varnish with spray gun.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint brush - 1 No.
- Spray gun - 1 No.

**Equipments**

- Work bench - 1 No.
- Air compressor - 1 No.
- Wooden article - 1 No.

**Materials**

- Sand paper - as reqd.
- Cotton rags - as reqd.
- Varnish - as reqd.
- Soap oil - as reqd.

## PROCEDURE

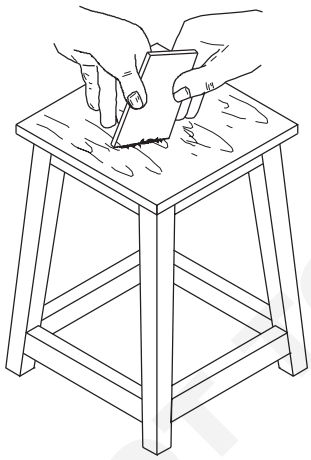
**Prepare the wooden article for varnish by spray gun**

1 Select the wooden furniture for varnish spray.

2 Clean all the surface of the furniture by using wet cloth.

3 Scrap and remove the polish from all the surfaces of the furniture by using sharpened scraper. (Fig 1)

Fig 1



PG20N22122H1

4 Smooth all the surfaces of the furniture using smoothing plane.

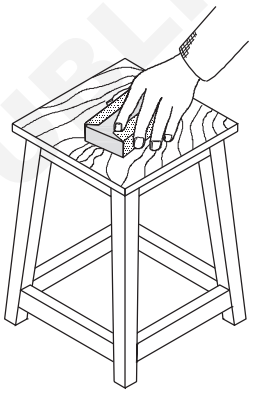
5 Sand all the surfaces of the furniture using rough sand paper (No.50). (Fig 2)

6 Repeat the same procedure to smooth all the surfaces of the furniture using No.100 sand paper.

7 Apply putty to cover the gaps on the surfaces of the furniture.

8 Sand again using No.120 grit sand paper to get the smooth surface. (Fig 2)

Fig 2



PG20N22122H2

9 Apply wood filler by using cotton waste on the surface of the furniture.

10 Wood filler should be same colour of the woods.

11 Remove the excess filler dust by using fine cotton rags.

12 Sand again using the sand paper no-120 grit.

13 Finish the furniture surface to fine glossy finish.

14 Apply suitable colour stain on all over the surface of the furniture.

15 Finish the surface of the job cleaning with fine white cotton cloth.

16 Prepare the spray gun and connect the air hose with spray gun.

17 Fill the oil based varnish in spray gun siphon cup.

18 Set the spray gun air pressure as per manufactures recommendations.

19 Apply spray test on test panel.

20 Place the wooden article on the work bench.

21 Evenly apply varnish on the article with help of paint spray gun.

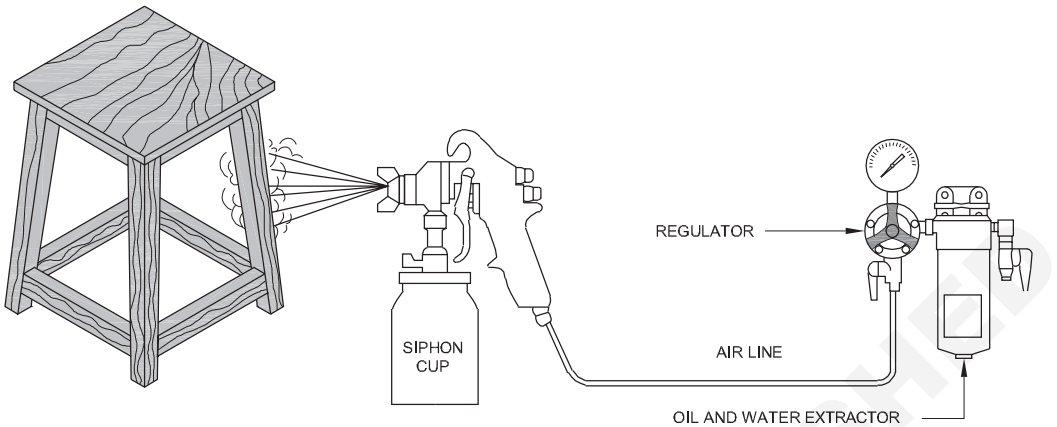
22 Apply varnish first, second and final coat.

23 Maintain the specified distance between paint spray gun and wooden article surface. (8")

24 Allow time to dry the varnish between each coating of varnish.

25 Ensure the wooden article varnished surface in fine glossy finish. (Fig 3)

Fig 3



# Prepare the wooden article for apply melamine or PU wooden finish with spray

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wooden article surface**
- **apply melamine on wooden surface.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Paint brush | - 1 No. |
| • Spray gun | - 1 No. |

**Equipments**

| | |
|---|---|
| • Work bench | - 1 No. |
| • Air compressor | - 1 No. |

**Materials**

| | |
|---|---|
| • Gel stain | - as reqd. |
| • PU strain | - as reqd. |
| • PU thinner | - as reqd. |
| • Wood chalk powder | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Weather coating solution | - as reqd. |
| • Sand paper | - as reqd. |
| • Hardener | - as reqd. |

PROCEDURE

TASK 1: **Prepare the wooden article surface for apply wood gel stain**

1 Select the wooden article and clean it by dry/wet cloth.

2 Sanding the wooden article by sanding paper grit no-80.

3 Evenly sanding the article and clean the surface of article with clean cloth.

4 Select the wooden gel stain and prepare it with mixing hardener and thinner.

5 Clean the wooden surface by wood cleaning solvent by using wet cloth and wipe the wooden surface by the wet cloth.

6 Use the rags to apply wood gel stain.

7 Touch the clean cloth ball on mixed wood gel stain.

8 Apply the wood gel on the wooden surface evenly.

9 Let it allow to dry with atmosphere air.

10 Check the wooden surface and again sanding the wooden surface for further polishing with sanding with grit sand paper no 100, 120 150.

11 Now mix the wooden colour power with gel strain.

12 Clean the wooden article surface with clean cloth and then apply the gel mix with help of rags or brush on the surface of wooden article in one direction.

13 Let it allow the article surface and clean the wooden surface for fine glossy. If need more shinning follow the above steps.

14 If uneven surface on the article use the wood chalk power putty to levelling the wooden surface.

— — — — — — — —

TASK 2: **PU wooden finish with spray**

1 Clean the wooden article with dry and wet cloth.

2 Sanding the article surface with sand paper grit –No. 100.

3 Clean the article surface with clean cloth.

4 Prepare the wooden putty by mixing water to apply on the knotting surface of the article.

5 Apply the putty and allow it to drying time.

6 Sanding the wooden surface evenly and clean it with clean baniyan cloth.

7 Prepare the PU stain by adding hardener, PU thinner and wood colour powder.

8 Mix it with paint mixing stick in tin.

9 Prepare the paint spray gun.

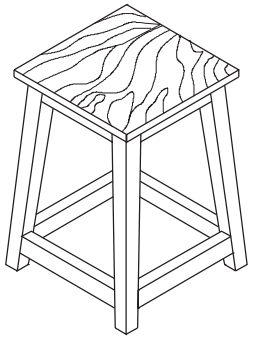
10 Pour the PU stain mix in a gun cup container.

11 Connect the air hose with paints spray gun.

12 Operate the paint spray gun operating lever to spray the cup stain on the wooden article surface.

- Apply PU stain spray evenly on the wooden surface.
- Allow drying time PU stain for applied on the wooden surface. (Fig 1)

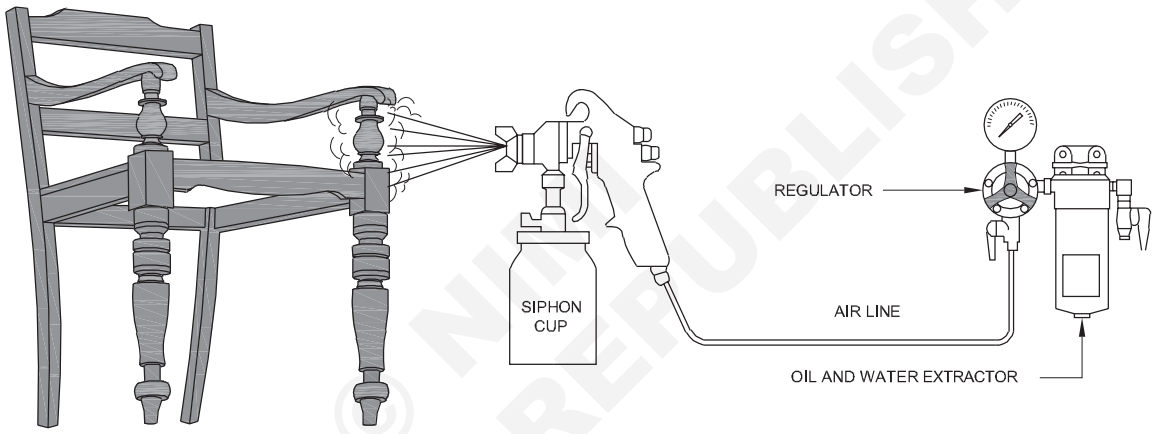
Fig 1



PG20N22123H1

- Again sanding stain applied surface with abrasive grit 100 to150 sending paper.
- Clean the sanded area with clean cloth.
- Apply wood weather coat on the surface.
- Sanding and clean the surface with clean cloth.
- Apply PU strain on wooden article surface by spray with help of paint spray gun.
- Again sanding, cleaning and PU stain spray process is continue until shine gloss is not yet up to standard.
- Consult your instructor to continue the PU stain spraying process.
- Take safety precaution while spraying the PU stain on the wooden article surface.
- Ensure the PU stain application and shine gloss is satisfiled. (Fig 2)

Fig 2




PG20N22123H2

# Painter (General) - Wooden Surface Preparation and Painting

## Practice on make a wooden top with thick layer of melamine wax polish

**Objectives:** At the end of this exercise you shall be able to
- **wooden top surface preparation**
- **apply thick layer of melamine wax polish on the wooden top.**

### Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Scraper - 1 No.

**Equipments**

- Work bench - 1 No.
- Air compressor - 1 No.

**Materials**

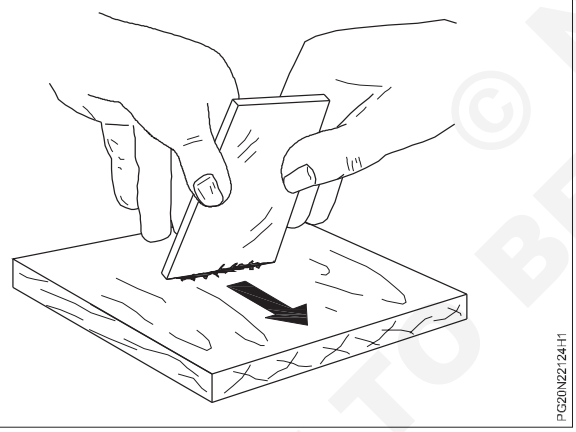
- Melamine wax polish - as reqd.
- Cotton rags - as reqd.
- Weather coating solution - as reqd.
- Sand paper - as reqd.

PROCEDURE

**Make a wooden top with thick layer of melamine wax polish**

1 Select the wooden top for polishing work.
2 Clean the wood surface with dry and wet cloth.
3 Smoothen the wooden top surface by using plane.
4 Scrape the wooden top surfaces by using sharpened scraper to remove old paint on the top. (Fig 1)

Fig 1



PG20N22124H1

5 After scraping the wood, clean the top surface of wood with help of clean cloth.
6 Again sanding the wooden surface by using sand paper grit no-100. (Fig 2)
7 Clean the surface with clean cloth.
8 Damp the surface of the wooden top to rinse the grains.
9 Fill the gaps with wood putty or any other filler material as per your instructors guide line given to you.
10 Stain the wooden top surface by using staining solution.
11 Smoother the wooden top surface by using 120 grits sand paper, clean the surface with clean cloth.

Fig 2

PGN32124H2

12 Apply several coats of melamine wax polish on the surface. (Fig 3)

Fig 3

PGN32124H3

13 Rub the surface with even pressure using coconut fibre.
14 Allow the melamine wax polish to dry.
15 Remove the excess wax polish to dry.
16 Remove the excess wax by using pure cotton cloth.
17 Repeat the above same procedure until you yet get the fine glossy finish.
18 Finally clean the wooden top polished area with clean white cotton cloth
19 Ensure the wooden top melamine wax polish is fine gloss as high standard.

# Prepare the wooden surface properly for painting

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wooden surface for painting**
- **painting the wooden surface.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint brush - 1 No.
- Paint roller - 1 No.
- Scraper - 1 No.
- Sand rubber pad - 1 No.

**Equipments**

- Work bench - 1 No.
- Air compressor - 1 No.

**Materials**

- Wood chalk powder - as reqd.
- Sand paper - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.

## PROCEDURE

**Wooden surface preparation for painting**

1 Clean the wooden surface by using wet cloth before smooth plaining.

2 Select the smoothing plane for plaining the surface.

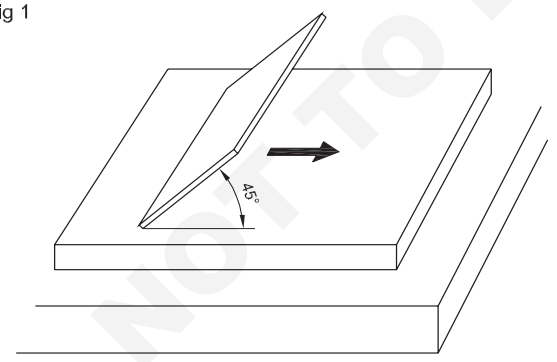
3 Nail and screws head should be just below the wooden surface for plaining.

4 Set the gap between cap iron and cutting iron as 0.5mm in smoothing plain.

5 Plaining from along the grains surface

6 Scrap the wood surface along the grain with scraper. (Fig 1)

Fig 1




7 Clean the wooden surface painting

8 Take a cork or rubber block and fold the sand paper around the block (Fig 2)

9 Sand all the surface using No 80 sand paper for rough finishing (Fig 3)

10 Repeat the same procedure using sand paper No 100 and 120 for fine finishing. Clean the wooden surface with clean dry cloth.

Fig 2

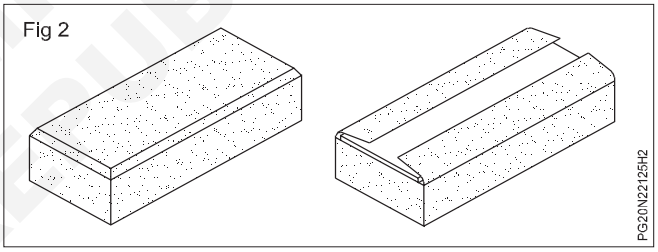
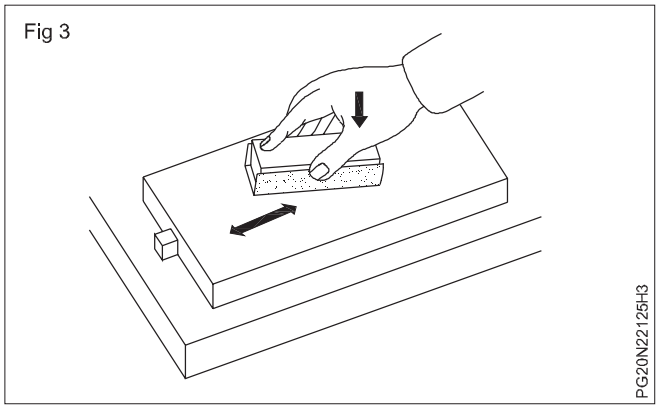



Fig 3




11 Clean the wooden surface with wet clean cloth.

12 If need apply wooden putty for levelling the wooden surface.

13 After apply putty or filler material or sealer allow the drying time and wipe out the excess filler on the wooden surface.

14 Rub the wooden surface with selected sand paper for smoothening the wooden surface.

15 clean the sanding surface with clean cloth and ensure the wooden surface is ready for painting.

# Practice on apply wood primer on the wooden surface by brush

**Objective:** At the end of this exercise you shall be able to
- **apply primer on wooden surface by brush.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Paint brush | - 1 No. |
| • Rubber pad | - 1 No. |

**Equipments**

| | |
|---|---|
| • Work bench | - 1 No. |
| • Carpenter vice | - 1 No. |

**Materials**

| | |
|---|---|
| • Wood primer | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Sand paper | - as reqd. |
| • NC thinner | - as reqd. |
| • Hardner | - as reqd. |

## PROCEDURE

**Apply wood primer on wooden surface**

1 Clean the wooden surface with wet cloth and inspect the wooden surface.

2 Apply putty or wood filler material to cover the screw heads and all gaps on the surface and remove the excess putty.

3 Sanding the putty applied area with sanding paper grit no 20 to150 for smoothing the wooden surface.

4 Ensure the wooden surface is ready for priming work.

5 Clean the surface with clean cloth.

6 Prepare the wood primer by apply NC thinner and hardener.

7 Apply primer on the wooden surface with help of brush.

8 Wet the brush tip with water and clean it with clean cloth.

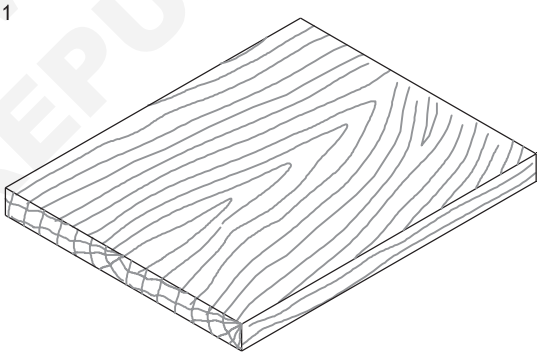
9 Dip the brush tip on the prepared primer.

10 Apply primer on the surface of wood by brush.

11 Brushing the primer in one direction of wood grain.

12 Use the several coats of primer on wooden surface as required for painting (Fig 1)

Fig 1




**Note:**

**Always use the thin primer to apply by brush**

**Do not use the thick primer on wooden surface**

13 Ensure the primed wooden surface is ready for painting.

— — — — — — — —

# Practice on make putty for wood finishing

**Objective:** At the end of this exercise you shall be able to
- **prepare putty for wood finishing.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Bowel | - 1 No. |
| • Rubber pad | - 1 No. |

**Equipments**

| | |
|---|---|
| • Work bench | - 1 No. |

**Materials**

| | |
|---|---|
| • Putty | - as reqd. |
| • Water | - as reqd. |
| • Linseed oil | - as reqd. |
| • Baniyan cloth | - as reqd. |
| • Soap oil | - as reqd. |
| • Sand paper | - as reqd. |
| • Scrabing blade | - as reqd. |

## PROCEDURE

**Make a putty for wood finishing work**

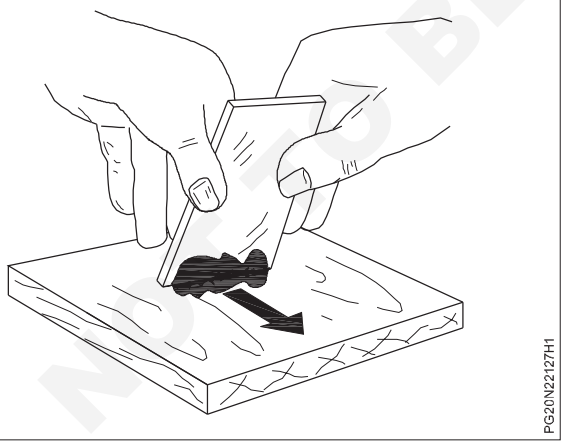
1 Take a paper plate, wood glue with sawdust

2 Place the sawdust on the paper plate and mix a wood glue withsaw dust to prepare the wood putty. Well mix the mixing items to work soft and flexible apply on wooden surface.

3 There are two types of method used to make a putty, based on water and other is oil based compound.

4 Before mixing the sawdusk with carpenter glue, remember that this water soluble,(Fig 1)

Fig 1




5 It gives colour of its own and gives the unappealing greyish tinage.

6 Clear expoxy glue is a better choice for mold the filler around the edge of piece of wood. It also suitable for filling cracks and gouges in flat wood which is plan to clear coat.

7 Lacquer based wood filler is mixing sawdust with nitrocellulose lacquer makes a resilent, durable filler that you can use for small projects as well as large one.

9 Use the wood chalk powder and linseed oil. Pour the oil in a bowl and add lime and calcium carbonate incrementally in equal parts stirring it as you do until you have a putty to that of the paint.

10 Use the titanium dioxide putty water proof and flexible enough to move with the wood under changing condition it is good for exterior application.

**Note: wood filler is sand able and wood putty is not sand able and is used for finished wood surface**

# Practice on prepare the wood surface and apply putty on wood surface

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wooden surface for apply putty**
- **apply putty on the wooden surface.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Metal blade for putting | - 1 No. |
| • Plastic blade for putting | - 1 No. |

**Equipments**

| | |
|---|---|
| • Work bench | - 1 No. |

**Materials**

| | |
|---|---|
| • Putty | - as reqd. |
| • Sand paper | - as reqd. |
| • Water | - as reqd. |
| • Linseed oil | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Wooden surface preparation and putty apply on it**

1 Select the wooden article to apply putty on it.

2 Place the wooden article on the work bench stop.

3 Clean the wooden article with clean cloth.

4 Wipe the wooden article with wet cloth.

5 Use the sand paper grit no 80 to sanding the surface.

6 Clean surface with clean cloth.

7 Apply wood filler on wooden surface crack, gaps gouges.

8 Sanding the filler filled area with sand paper grit no 100. (Fig 1)

9 Clean the sanding area of wooden surface with sand paper no-120 for smoothen the area.

11 If need again sanding the wooden surface.

12 Clean the wooden surface sanding area with clean cloth.

13 Prepare the putty weather it is water based or oil based.

14 Well mix the putty, for flexibily and movable.

15 Clean the wooden surface for apply putty on the surface.

16 Apply putty on the wooden surface with the help of putty wiping blade (Fig-2) or fine cotton cloth.

17 Remove the excess putty on the wooden surface before it hardens.

18 Ensure the wooden surface is ready for apply paint.

Fig 1

PGN32128H1

Fig 2

PGN32128H2

# Painter (General) - Wooden Surface Preparation and Painting

## Practice to painting on wooden surface with brush

**Objectives:** At the end of this exercise you shall be able to
- **clean the wooden surface**
- **paint the wooden surface by brush.**

### Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint brush - 1 No.

**Equipments**

- Work bench - 1 No.

**Materials**

- Paint - as reqd.
- NC thinner - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.

PROCEDURE

**Painting on prepared wooden surface with brush.**

1 Clean the wooden surface with wet cloth.

2 Check the flatness of wood surface.

3 Ensure there is no cracks, lines, knotty or gouges on the wooden surface.

4 If any defects found on the surface rectify the defects before start the painting.

5 Select the wood paint colour which is suitable to selected wood.

6 Select the paint brush.

7 Clean the paint brush tip.

8 Open the paint tin and mix the thinner with paint.

9 Match the paint colour wood colour. Dip the paint brush tip with water and clean the brush tip with clean cloth.

10 Dip the paint brush tip in paint tin and wipe the paint to avoid the paint drops flow.

11 Apply paint on wooden surface in the direction of wood grained. (Fig 1)

Fig 1

PGN32129H1

12 Ensure the painting is evenly applied on the wooden surface, allow it to dry for 48 hours.

13 If need apply multi coat paint on the wooden surface for shine gloss. (Fig 2)

Fig 2

PGN32129H2

14 Finishing coat is applied straight line of wood grained by brush.

**Note:**

**Do not use very old paint.**

**Use only wood paint.**

**Do not paint on humid condition.**

**Add paint with turpentine so that the brush will move smoothly.**

**Avoid painting on wet surface, raining season and winter period.**

**When brushes are not in use keep them in a solvent. which is a thinner for the finish being applied.**

# Practice to spray painting on different furniture taking with all precautions

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wooden surface for painting**
- **prepare the paint for spray painting**
- **spray painting on different furniture**
- **taking all safety precaution while painting the furniture.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Paint spray gun | - 1 No. |
| • Sanding rubber pad | - 1 No. |
| • Scraper | - 1 No. |

**Equipments**

| | |
|---|---|
| • Work bench | - 1 No. |
| • Different type of furniture | - 1 No. |
| • Air compressor | - 1 No. |
| • Face mask & PPE | - 1 No. |

**Materials**

| | |
|---|---|
| • Wooden paint | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Sand paper | - as reqd. |
| • Wood filler | - as reqd. |
| • Wood putty | - as reqd. |
| • NC thinner | - as reqd. |
| • Soap oil | - as reqd. |

PROCEDURE

TASK 1: **Prepare the wooden furniture surface for painting**

1 Select the wooden furniture for painting work. (Fig 1)

2 Select the tools for prepare the furniture surface. (Fig 2)

3 Clean the wooden furniture surface by wet cloth.

4 Clean and rub the furniture surface with help of emmery sheet.

5 Clean the surface by clean cloth.

6 Sanding the wooden furniture by sand paper grid no 80. (Fig 3)

7 Clean the furniture wooden surface by dry clean cloth.

8 Check the wooden surface of furniture.

9 Once again sand the surface of furniture by using a sand paper grit No 100, 120, 150 for smoothen the furniture surface.

10 Apply wood filler on the wood surface gap, crack, gouges.

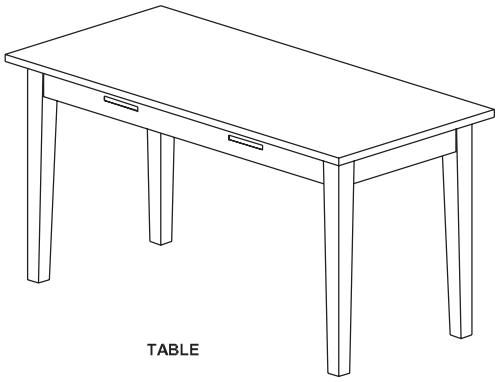
11 Again sand the wooden surface by fine sand paper.

12 Prepare the wood putty by mixing water or thinner as per manufacture recommendation.

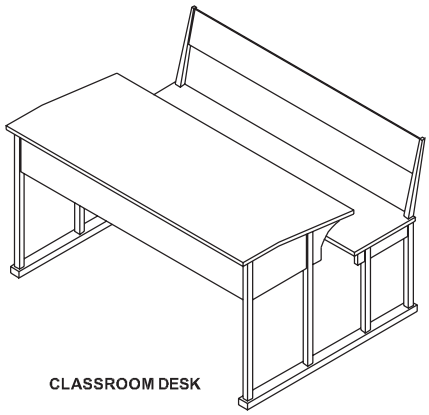
13 Apply wooden putty to cover the screw heads and all gaps which is not covered by wood filler and wipe the excess putty on the surface and sand the surface with fine sand paper clean the surface with clean cloth.

14 Ensure the furniture is wooden surface is fine smooth and ready for painting work.

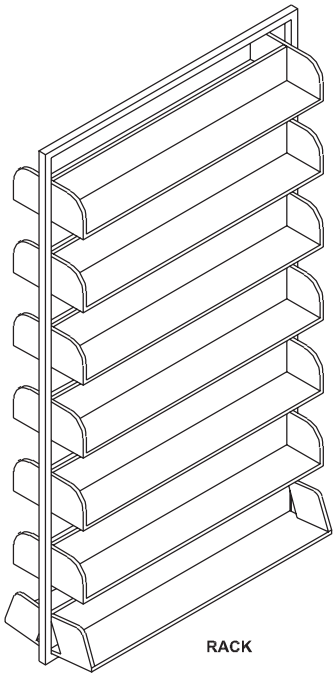
Fig 1



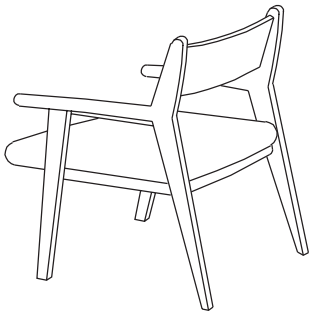
TABLE



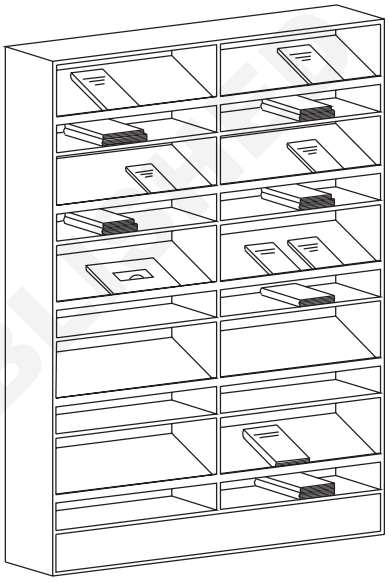
CLASSROOM DESK



RACK



CHAIR



MAGAZINE SHELVING

PG20N22130H1

**MODERN FURNITURE (OFFICE FURNITURE)**



Fig 2

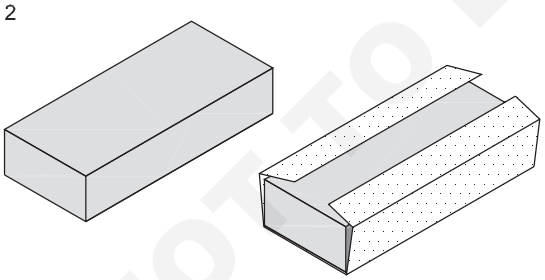


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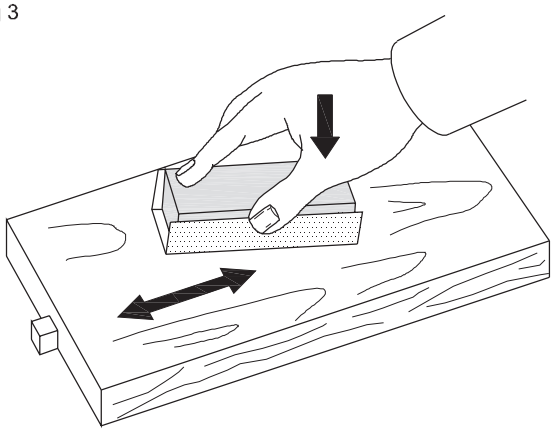
Fig 3



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TASK 2: **Spray painting the different furniture**

1 Prepare the primer with mixing thinner and hardener as per specified ratio.

2 Clean the furniture fine smooth surface.

3 Apply the wood primer, on the furniture surface by using brush for first coating.

4 Sanding the furniture primer surface by using sand paper grit no 120,150 to get smooth surface.

5 Clean the sanding surface by clean cloth.

6 Apply weather coat on the surface of furniture, to protect from weather from on it.

7 Apply second and final coat of primer on the furniture's surface.

8 Don't use the thick primer.

9 Let allow the primer to dry before painting on it.

10 Select the paint for wooden furnitures.

11 Prepare the wooden paint for spray painting, if need mix the wood color with paint. Filter the paint with a help of strainer.

12 Ensure the prepared paint thickness is suitable for spray painting.

13 Pour the paint in spray paint gun cup.

14 Connect the air hose with spray gun.

15 Adjust the spray gun air pressure.

16 Test the spray pattern on test panel.

17 Clean the wooden surface dust before painting on it.

18 Position the spray gun towards the furniture and triggers the spray gun lever to spray the paint on the furniture surface.

19 Evenly spray the 1st coat paint on the surface, if need adjust the spray gun spray level. (Fig 4)

20 Apply the 2nd coat and final coat paint on the furniture's.

21 Surface each spray coating should have a slightly different distance that seems to best work.

22 Follow the above steps until get the paint shine gloss.

23 Allow dry time between furniture paint coating.

**Note:**

**Avoid painting on wet surface or remaining season or winter period**

**Use face mask and hand gloves while spray painting work**

**Do not smoke during painting work**

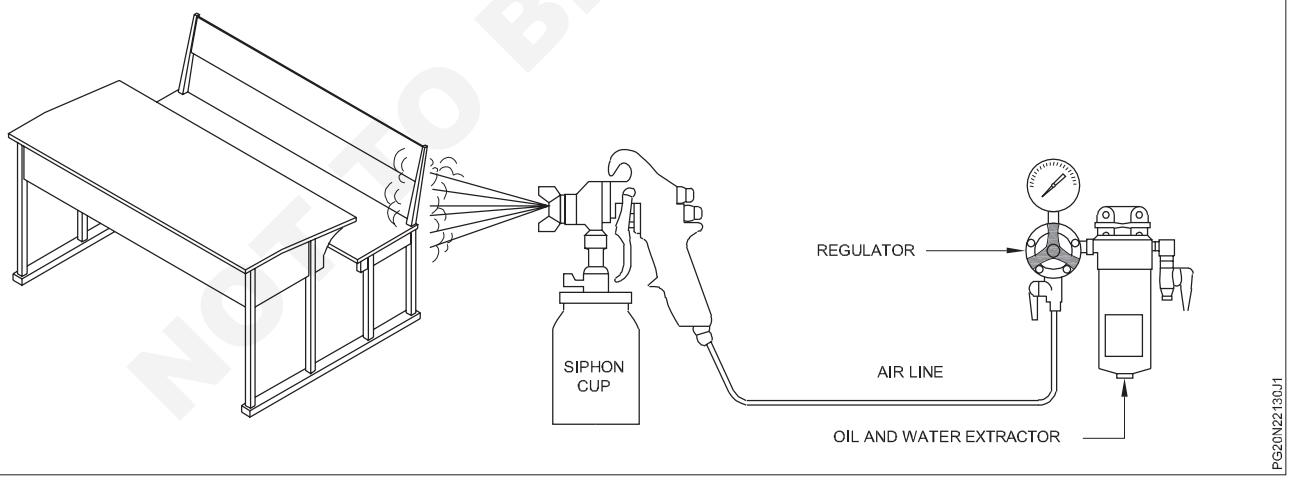
**Maintain the recommended gun distance from the wooden surface.**

**Paint spray gun speed is too slow it may cause sags and runs**

**Don't use more paint material an necessary**

24 Clean the painted surface and inspect the surface if found any defects rectify the paint defects.

Fig 1



# Practice to prepare ceiling surface for lime wash

**Objective:** At the end of this exercise you shall be able to
- **prepare the ceiling surface for lime wash.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Wooden float - 1 No.
- Trowel - 1 No.
- Wire brush - 1 No.
- Folding ladder - 1 No.

**Equipments**

- Bucket - 1 No.
- Air compressor - 1 No.
- Air pressure gun - 1 No.
- Water spray gun - 1 No.
- Face mask - 1 No.

**Materials**

- Cotton waste - as reqd.
- Soap oil - as reqd.
- Sand paper - as reqd.

## PROCEDURE

**Building ceiling surface preparation for lime wash (Fig 1)**

1 Check the condition of building ceiling surface.

2 Sanding the ceiling surface with sand paper.

3 Clean the ceiling surface with pressure air spray.

4 Mask the electrical parts and switch board before apply water spray cleaning.

5 Wash the ceiling with pressure water spray cleaning.

6 Ensure the ceiling is well cleaned if need sanding the ceiling and clean it by brush or air spray.

7 Use the folding ladder to claimb up reach the height of ceiling surface.

8 Use the head cap and face mask to protect from the lime dust while cleaning the ceiling.

9 Check the surface of the ceiling for damage.

10 If found any damage on the ceiling, mark the damaged area for repair.

11 Analysis the damage type and cause for damage.

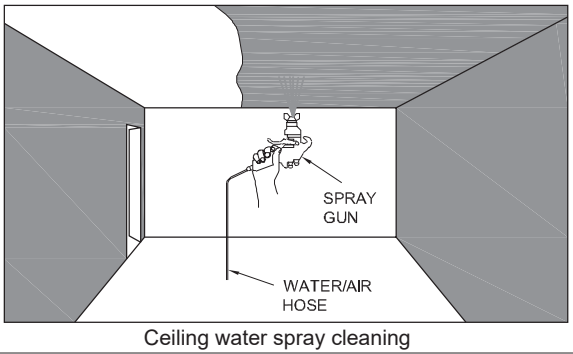
12 Repair the damage spot with help of cement work or by apply putty. Prepare the cement mix or putty for apply.

13 Level the repaired ceiling surface.

14 Let allow it for dry.

15 Ensure the building ceiling is ready for lime wash.

Fig 1




Ceiling water spray cleaning



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# Prepare the building wall surface for lime wash

**Objective:** At the end of this exercise you shall be able to
- **prepare the wall for lime wash.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Wooden float - 1 No.
- Trowel - 1 No.
- Wire brush - 1 No.
- Straight edge - 1 No.

**Equipments**

- Air compressor - 1 No.
- Water spray gun - 1 No.
- Air spray gun - 1 No.
- Power sender - 1 No.

**Materials**

- Cleaning solvent - as reqd.
- Lime powder - as reqd.
- Dr fixt - as reqd.
- Sand paper - as reqd.
- Soap water - as reqd.

## PROCEDURE

**Building wall surface preparation for lime wash**

1 Select the wall for surface preparation.

2 Clean the wall with pressure air by using air pressure gun.

3 Clean the wall by applying pressure water spray on the wall by using jet water spray gun.

4 Let it allow the wall to dry by room temperature.

5 Inspect the wall surface for damages on it.

6 Mark the damaged area for repair work.

7 Scraped the damaged area of the wall by scraper tool.

8 Analysis the cause for damages and method of repair.

9 If need apply water on the damaged part and apply element and sand mix mixer on the scraped spot of the wall. With help of masson towel.

10 Level the cemented spot by using wooden float.

11 If damage is small, apply wall care putty on the scraped area of the wall. And level it to match previous level of the wall.

12 Let it allow to well cure.

13 Check the wall surface for level with help of straight edge.

14 Sanding the wall surface, with sand paper manual operation or by using power sanding machine.

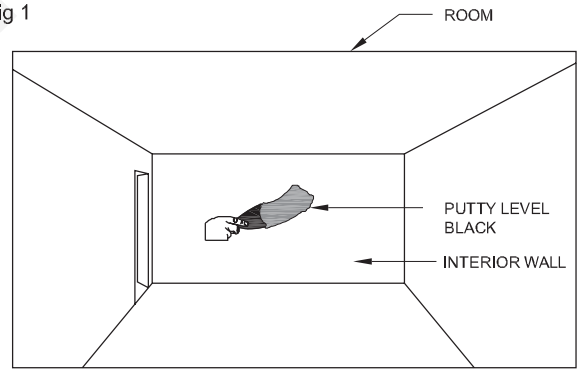
15 Clean the wall by nylon brush or air pressure.

16 Prepare the wall putty by mixing water.

17 Apply wall care putty by brush on wall evenly and level the wall putty with help of putty level plate.

18 Ensure the wall putty is applied evenly on the wall surface as specified thickness.

Fig 1




19 Sanding the wall to prepare the wall surface.

20 Clean the wall for remove the dust particles of sanding by emery sheet.

**Note: Use the hand gloves and face mask**

**Apply mask on the electrical parts and switch board.**

# Practice on apply POP on wall for lime painting

**Objective:** At the end of this exercise you shall be able to
- **apply POP on wall for lime painting.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Straight edge - 1 No.
- Trowel - 1 No.
- Marker pen - 1 No.
- Wooden floater - 1 No.
- Straight edge - 1 No.

**Equipments**

- Bucket - 1 No.
- Ladder - 1 No.

**Materials**

- POP - as reqd.
- Cotton waste - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.
- Sand paper - as reqd.
- Water brush - as reqd.
- Water - as reqd.

## PROCEDURE

**Apply POP on wall surface for lime painting.**

1 Select the interior walls for apply POP on it.

2 Clean the wall with help of brush/pressure air/ pressure water.

3 Inspects the wall for damage and mark the damaged wall spot.

4 Sanding the damage marked spot of wall.

5 Clean the sanding area of the wall.

6 Prepare the pop as required quantity and well mix the pop with stick or machine.

7 Take POP and apply on the sanded area and level it by patti plate.

8 POP curing time is 10-15 minutes.

9 Sanding the POP applied area for levelling the wall.

10 Check the wall level by straight edge and apply if need POP on the wall for levelling the wall surface.

11 Start to apply POP on the wall from one side and level it immediately, while because it's curing time is 10-15 minutes.

12 POP is used for interior walls only. It is very soft and suitable for decorating works and creating design works on the wall.

**Note:**

1. **Protect the walls from dampness**
2. **Ensure the wall is well plastered**
3. **Apply POP for a smooth wall finish and decoration of wall only**
4. **Use primer before apply POP paint**
5. **Paint with premium acrylic emulsion**
6. **Keep the surface clean before apply POP**
7. **Apply corner guards, before apply POP on the wall**

# Practice on mixing of lime and stainer

**Objective:** At the end of this exercise you shall be able to
- **mixing the stainer with lime fluid.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint mixing stick - 1 No.

**Equipments**

- Bucket - 1 No.

**Materials**

- Lime powder - as reqd.
- Stainer - as reqd.
- Soap oil - as reqd.
- Painting brush - as reqd.
- Cotton waste - as reqd.

## PROCEDURE

**Mixing the stainer with lime powder liquid**

1 Select the quality lime powder as required.

2 Select the stainer colour.

3 Place the bucket and drop the lime powder in it.

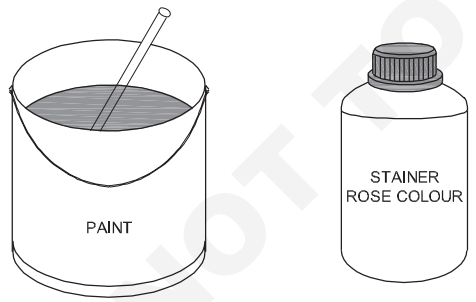
4 Pour the water in the bucket as required quantity to mix the lime powder.

5 Mix the lime powder with water and make it as lime liquid well mix the lime powder with water by using stick.

6 Well shake the stainer pet.

7 Open the stainer tin or bottle and drop the strainer in lime liquid as required.

Fig 1




8 Mix the stainer drops with lime powder liquid to bring it colour lime powder liquid.

9 Ensure the stainer is well mixed with lime powder liquid. (Fig 1)

10 Match the wall colour with lime powder with lime powder stainer mixed liquid colour.

11 Apply lime liquid painting on the wall with help of brush. (Fig 2)

Fig 2

# Practice on apply lime on ceiling and wall by brush

**Objective:** At the end of this exercise you shall be able to
- **apply lime on ceiling and wall by flat brush.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Scraper - 1 No.

**Equipments**

- Ladder - 1 No.
- Bucket - 1 No.

**Materials**

- Lime powder - as reqd.
- Stainer - as reqd.
- Soap oil - as reqd.
- Painting brush set - as reqd.
- Cotton waste - as reqd.

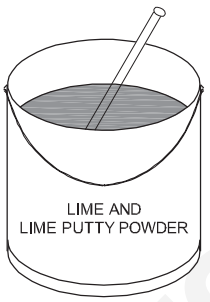
## PROCEDURE

**Apply lime powder liquid on ceiling and wall with brush**

1 Clean the ceiling and wall surface of the building.

2 Select the lime powder and mix the lime putty powder with water in the ratio of 15 to 20% with 80 to 85% of water. (Fig 1)

Fig 1

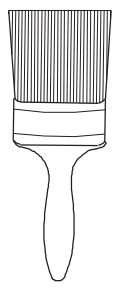



3 Mix it well as lime wash liquid.

4 Select the natural colour stainer for mix with lime liquid to achieve the design colour the design colour.

5 Select the paint brush for lime wash. (Fig 2)

Fig 2




6 10 by 3inch brush is right for apply the lime on ceiling and wall.

7 Lime wash can be used indoors and out side.

8 Lime sinks in wall/ceiling, so it is best applied to previous surface such as plaster, stone and bricks.

9 Use the primer on the wall before apply the lime wash.

10 Applied primer creates a surface the lime wash can bond to tight.

11 Prepare the brush for lime wash.

12 Dip the brush tip with well shacked lime mixer.

13 Apply lime wash with brush on the surface of the ceiling.

14 Brushing the lime wetted brush on the ceiling and wall from one end to other end to complete the lime wash on the ceiling and wall.

15 Lime wash should be applied in several thin coats by using masonry paint brush that created feathered strokes.

16 Never use roller to apply lime wash on the wall.

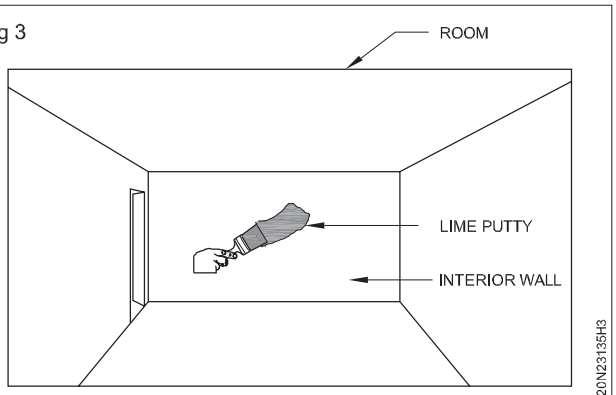
17 Apply proper lime thickness on the plaster, stone and bricks wall as per your instructor's guideline.

18 Keep in mind that lime wash becomes much lighter as it dries it is up to 10 times darker when it is wet. So it's colour should be test before apply lime on the wall.

19 Ceiling and wall lime wash colour opacity depends on the number of coats are applied.

20 Normally three coats are recommended to achieve the lime wash paint colour. (Fig 3)

Fig 3




21 Colour may be vary depending on the pigments used with lime the composition and porosity of the surface being painted and all application of the paint.

22 Inspect the lime washed ceiling and wall.

23 Ensure lime washed spaces are properly applied.

# Practice on prepare ceiling and wall for distemper painting

**Objective:** At the end of this exercise you shall be able to
- **prepare the ceiling and wall for distemper painting.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Wall scraper | - 1 No. |
| • Straight edge | - 1 No. |
| • Wooden floater | - 1 No. |
| • Brush | |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1 No. |
| • Car jet washer | - 1 No. |

**Materials**

| | |
|---|---|
| • Wire brush | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Soap oil | - as reqd. |
| • Wall care putty | - as reqd. |
| • Water | - as reqd. |

PROCEDURE

**Prepare the ceiling and wall for distemper painting**

1 Inspects the ceiling and wall condition

2 Mask the electrical parts and switch board fixed on the ceiling and walls of building.

3 Use the air gun to apply air pressure for clean the dust on ceiling and walls.

4 Use the brush to clean dust on the wall and ceiling.

5 Use the cleaning solvent mix with water.

6 Apply pressure water spray on the ceiling for clean the dirt deposit on the ceiling.

7 Apply pressure water on the wall to remove the dirt deposit on the wall.

8 Ensure the building ceiling and wall is well cleaned.

9 Inspect the ceiling and wall for damage.

10 Mark the damaged part of ceiling and walls.

11 Scrap and remove the damaged cemented spot.

12 Select the wall care putty.

13 Prepare the wall care putty and apply on scrapped spot of the wall.

14 Apply the putty up to level of ceiling and wall.

15 Check the ceiling and wall level with help of straight edge.

16 If any uneven level apply wall care putty on required space of ceiling and wall.

17 Level the putty with help of putty leveler blade.

18 Allow the putty to dry and fasterning with wall.

19 Sanding the wall and ceiling with sand paper.

20 Clean the level of ceiling and wall.

21 Apply wall care primer on the wall and ceiling.

22 Ensure the ceiling and wall is ready for distemper painting.

## Practice on make wall care putty for distempering

**Objective:** At the end of this exercise you shall be able to
- **prepare the wall care putty.**

### Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.

**Equipments**

- Bucket - 1 No.
- Rotator - 1 No.

**Materials**

- Wall care putty - as reqd.
- Hardnery - as reqd.
- Water - as reqd.
- Cotton cloth - as reqd.
- Putty plate - as reqd.
- Soap oil - as reqd.

PROCEDURE

**Make a wall care putty for distempering of wall (Fig 1)**

1 Select the wall care putty and collect the required quantity of putty.

2 Prepare the plastic bucket for prepare the putty.

3 Pour the limited quantity of putty powder in the bucket.

4 Pour the water in the bucket in the ratio of 2:1 water and putty powder.

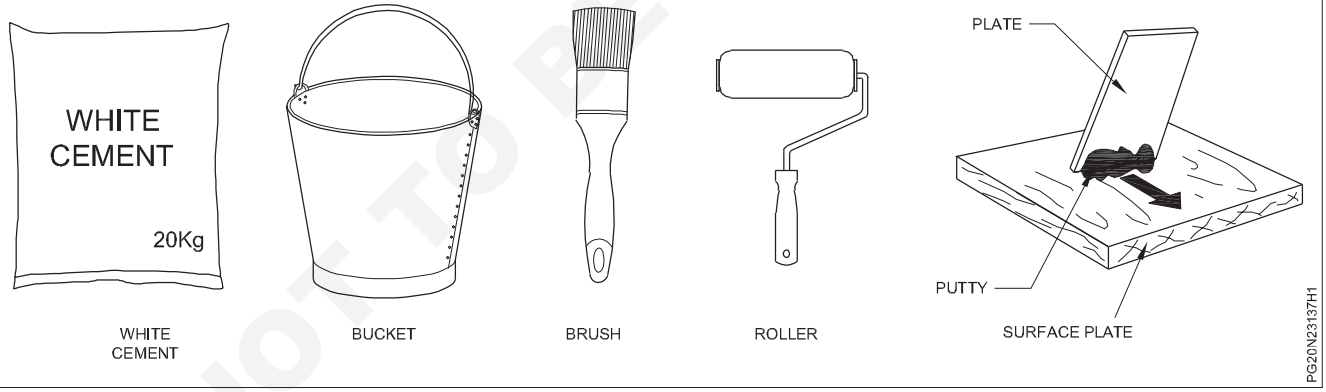
5 Mix the putty with help of rotator.

6 If need mix the wall colour powder with putty before pour the water with powder.

7 Well mix the putty and match colour with wall painting.

8 Ensure the prepared putty thickness is suitable for apply on the wall.

Fig 1



# Practice on apply wall putty for fine wall surface finishing

**Objectives:** At the end of this exercise you shall be able to
- **apply wall care putty on the wall**
- **make a fine surface finishing of wall.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Putty blade | - 1 No. |

**Equipments**

| | |
|---|---|
| • Bucket | - 1 No. |

**Materials**

| | |
|---|---|
| • Putty powder | - as reqd. |
| • Water | - as reqd. |
| • Emery sheet | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

PROCEDURE

**Apply wall care putty on the surface of wall**

1 Clean the wall to be apply the wall care putty

2 Remove all loosely adhering material from the wall surface.

3 Use the sand paper for levelling the wall surface.

4 The wall should be clean and free from dust, grease and other unwanted materials.

5 Wet the wall before application of primer on the wall.

6 Apply wall care primer on the wall.

7 Apply wall care primer before apply the wall putty for better adherence.

8 Apply first coat of primer before you start for applying putty on wall and dry it overnight minimum 12 hours and 24 hours prepared for proper setting.

9 Apply the first coat of putty in vertical bottom to top manner by using a putty blade/spatula/towel or any other suitable finishing tool.

10 Allow the putty to dry enough time.

11 Sanding the putty with help of sand paper for make a surface finishing of wall.

12 Clean the wall surface and inspect wall surface for levelling.

13 If need apply more primer and putty coat where it need again level the surface and sanding it for proper levelling the wall.

14 Ensure the putty applied wall surface is ready for distempering.

# Practice on mix and apply a distemper on a wall

**Objectives:** At the end of this exercise you shall be able to
- **mix a distemper with water**
- **apply the distemper on the wall.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Putty blade | - 1 No. |
| • Ladder | - 1 No. |
| • Wall cleaning tool | - 1 No. |

**Equipments**

| | |
|---|---|
| • Bucket | - 1 No. |
| • Rotatory equipment | - 1 No. |

**Materials**

| | |
|---|---|
| • Distember | - as reqd. |
| • Stainer | - as reqd. |
| • Water | - as reqd. |
| • Emery sheet | - as reqd. |
| • Soap oil | - as reqd. |
| • Cotton cloth | - as reqd. |

PROCEDURE

**Preparation of distemper for wall painting.**

1 Mix whiting and water, set aside.

2 Follow the directions on the pack to prepare glue.

3 Heat to glue to soapy consistency.

4 Combine whitening and glue.

5 Colour with tints after mixing the mixture is stirred with a flat spatula until the paint is uniform.

6 Filter through fine muslin.

7 Check the wall for primer application.

8 Apply first coat of distemper paints with help of brush or roller. Uniformly on the wall.(Fig 1)

9 Leave it to dry for minimum for 12 to 16 hours.

10 After drying 1st coat distemper apply second coat paint and allowed to dry overnight.

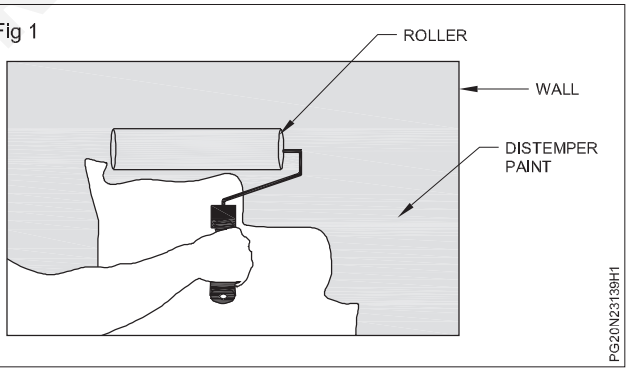
**Note: The entire surface should be coated with proper distemper brushes in horizontal strokes uniformly followed by vertical ones immediately**

11 The subsequent coats should be applied only after the previous coats are dried.

12 The finished surface should be even and uniform showing no brush marks on the wall painting.

13 Ensure the distemper applied wall is properly finished and distemper colour is evenly matched with all wall surface.

Fig 1



# Prepare the ceiling and wall for apply interior emulsion paint

**Objectives:** At the end of this exercise you shall be able to
- **prepare the ceiling and wall surface**
- **apply wall care putty and resurfacing the wall**
- **apply interior emulsion paint.**

## Requirements

| Tools/Instruments | | Materials | |
|---|---|---|---|
| • Trainee's tool kit | - 1 No. | • Paint | - as reqd. |
| • Paint roller | - 1 No. | • Thinner | - as reqd. |
| • Paint brush | - 1 No. | • Emery paper | - as reqd. |
| • Putty blade | - 1 No. | • Putty | |
| • Spatula | - 1 No. | • Water | - as reqd. |
| **Equipments** | | • Colour | - as reqd. |
| • Bucket | - 1 No. | • Cotton cloth | - as reqd. |
| • Rotatory equipment | - 1 No. | • Soap oil | - as reqd. |

## PROCEDURE

**Application of interior paint on ceiling and wall**

1 Clean the wall or ceiling surface.

2 Remove the loose particles, dust, dirt, grease, wax, mortar, dropping by using wire brush or knife.

3 Wipe off the wall/ceiling surface using a dry cloth.

4 If old painted wall, sand the wall and ceoling with the sand paper to get a smooth surface and wipe off the dust with dry cloth.

5 Apply primer coat before apply putty and allow it to dry.

6 Apply wall care putty coat in a vertical bottom to top manner by using a putty blade.

7 Allow it to dry for 6 to 8 hours.

8 After drying the first coat of putty gently rub the surface with sand paper to remove the loose particle and uneven surface.

9 Start applying the second coat of wall putty.

10 Leave the surface dry completely for 8 to 12 hours and the rub surface very gentle to remove unevenness by using sand paper.

11 The minimum thickness of the coats should be limited to minimum 1.5mm, if it is thicker it may peel off or crack later on.

12 Apply the primer coat to ensure a good bond between interior emulsion paint and surface to create a better finish. The primer provides the foundation for the paint job and increase the coverage of the paint.

13 Apply the primer by using brush or roller and leave it for dry. After 1st coat of primer apply second coat let it dry and leave for dry 8 to 12 hrs.

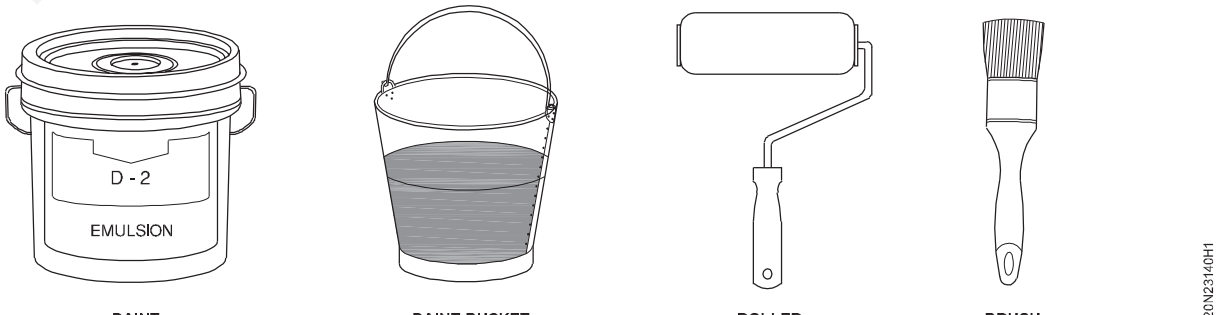
14 Ensure the ceiling and wall is primer and putty is applied properly and ready for painting process.

15 Dilute the interior emulsion paint as recommended by the manufacture.

16 Apply the first coat of interior paint with help of brush or roller and allow it for dry as per manufacturers instructions. Printed on the paint packing label.

17 Apply second and top coat paint as you need.

Fig 1



# Practice to prepare the office & workshop interior surface with putty and apply enamel or luster paint

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wall surface**
- **apply wall putty on the wall surface**
- **apply enamel or luster paint on the wall.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Putty plate - 1 No.
- Paint brush - 1 No.
- Paint bucket - 1 No.
- Paint mixing rotator - 1 No.
- Paint roller - 1 No.

**Equipments**

- Ladder - 1 No.
- Paint spray gun - 1 No.
- Air compressor - 1 No.

**Materials**

- Enamel paint - as reqd.
- Wall putty - as reqd.
- Luster paint - as reqd.
- Cotton waste
- Water - as reqd.
- Soap oil - as reqd.

PROCEDURE

TASK 1: **Prepare the office and work shop wall surface for painting**

1 Select the walls for surface preparation.

2 Remove the stickers, charts, boards, photos, fitting on the wall.

3 Clean the dust deposited on the wall with air pressure.

4 Mask the electrical points fitted on the wall.

5 Apply pressure water on the wall for cleaning the wall.

6 Sand the wall paints with wire brush and remove the loose paint and cement depended on the wall.

7 Use the sand paper to clean the well surface.

8 Ensure wall surface is well cleaned.

9 Inspect the wall surface and identify the wall crack and wall lifting and mark the area, where is need the wall care putty to be applied.

— — — — — — — —

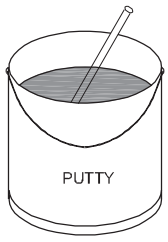
TASK 2: **Apply wall care putty on the wall surface (Figs 1,2,3)**

Fig 1


WHITE CEMENT

PG20N23141H1

Fig 2




WALL CORE PUTTY MIX

PG20N23141H2

Fig 3

BRUSH

PG20N23141H3

1 Prepare the wall care putty to make a paste for apply on the wall.

2 Mix the 40% of clean water with wall care putty as per direction given on putty packing.

3 Wall care putty should be mixed for 10 to 15 minutes until it comes as a uniform paste.

4 Ensure wall care putty is ready for apply.

5 Wet the wall before apply putty.

6 The mixing process makes the white cement putty obtain a smooth uniform shade.

7 You should only prepare a quality putty in limited quantity which can be used within 2-3 hours.

8 Wall care puttyshould be higher bonding strength of wall care and easy workability and higher coverage of the wall surface.

9 Pre wetting the wall surface before apply the first coat of thoroughly mixed Birla white wall care putty on the moistened wall surface from bottom to upward direction uniformly with the aid of putty blade.

10 After the first coat of putty let it allow to dry for few hours.

11 Rub the surface gently with water proof emery paper in order to remove loose particles.

12 Apply second coat putty on wall surface and let allow the wall to dry for 3 to 4 hours.

13 Remove any type of marks on the wall with moist sponge or rub the wall with water proof emery grit above 500.

15 Rub the surface with a rough emery paper as it breaks the film formed over it. Which decreased its water resistant properties.

17 Dry it off and allow to dry for minimum 10-12hours

18 Apply base coat and wall primer.

**Note:Putty and primer makes it strong enough to work for painting.**

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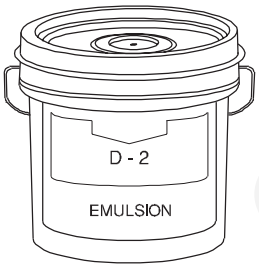
TASK 3: **Wall surface painting process**

1 Select the wall paint color. (Fig 1)

Fig 1



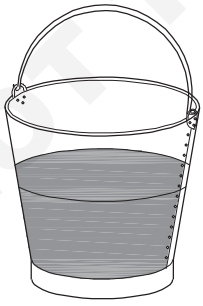

PAINT

PGN33141J1

2 Estimate the wall paint quantity and buy correct quantity of enamel or luster paint

3 Prepare the paint with mechanical rotator (Fig 2)

Fig 2



PAINT BUCKET

PG20N23141J2

4 Prepare the wall surface for painting

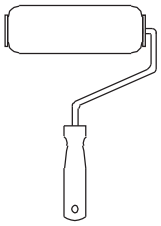
5 Select the painting tools for wall painting. (Fig 3)

6 Make a pilka dots on the wall by paint.

7 Transforms the wall in to a worth of arts.

8 Use the paint stips on the wall and use the tape to create the straight line. (Fig 4)

Fig 3



ROLLER

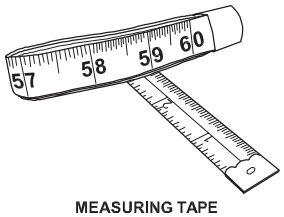
PG20N23141J3

9 Use the different colour for different room walls.

10 Try to use chalkboard paint to create an accent wall.

11 Apply first coat paint by brush or roller or spray gun.

Fig 4




MEASURING TAPE

PG20N23141J4

12 Apply second or top coat if necessary

13 Ensure the workshop and office interior surface walls are properly painted.

# Practice on make scaffolding for exterior wall painting

**Objectives:** At the end of this exercise you shall be able to
- **make scaffolding for exterior wall painting.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.

**Equipments**

- Suspended scaffolds - 1 set.
- Supported scaffolds - 1 set.
- Artial lifts - 1 set.
- Croddle scaffold - 1 set.

**Materials**

- Wooden planks - as reqd.
- Aluminium rods - as reqd.
- Steel pipes - as reqd.
- Pipe clips
- Timber - as reqd.
- Bamboo - as reqd.

## PROCEDURE

**Scaffolding for exterior wall painting**

1 Inspect the wall for painting.

2 Measure the height and width of exterior wall for painting work.

3 Select the suitable scaffolding for exterior wall painting work.

4 Check the ground capacity to support standards for scaffolding.

5 Check the wall is to be freeze from traffic (in the case of ground is near to traffic area).

6 Use the ladder or trestle scaffolding upto a height of 5 meters and it used for the light work and it is usually portable. This type of scaffolding is used for various purpose like for paintings and wall repair works.

7 Adjust the adjustable legs depend upon the wall height.

8 Before select the scaffolding system ensure the security, easy access and position advantage of scaffolding.

9 Install the scaffolding before start the wall painting work.

10 Use the wood or steel scaffolding materials to support workers and other construction and painting materials placed on it.

11 Maintain the 1.5 to 2 meters vertical intervals during construct the wood or steel scaffolding.

12 Use the standard vertical posts.

13 Use the horizontal members parallel to the well ledgers.

14 Use the bracing system for tight criping.

15 Horizontal members normal to the wall.

16 Putlegs whose both ends are supported on ledgers in double scaffolding.

17 Member used to bridge openings.

18 Planks should be strong for work man stand on it.

19 Guard rail should be provided at about 1 meter level to. Guard the men working on the boarding.

20 Scaffolding boards placed parallel to boarding near the wall to give protection to workers.

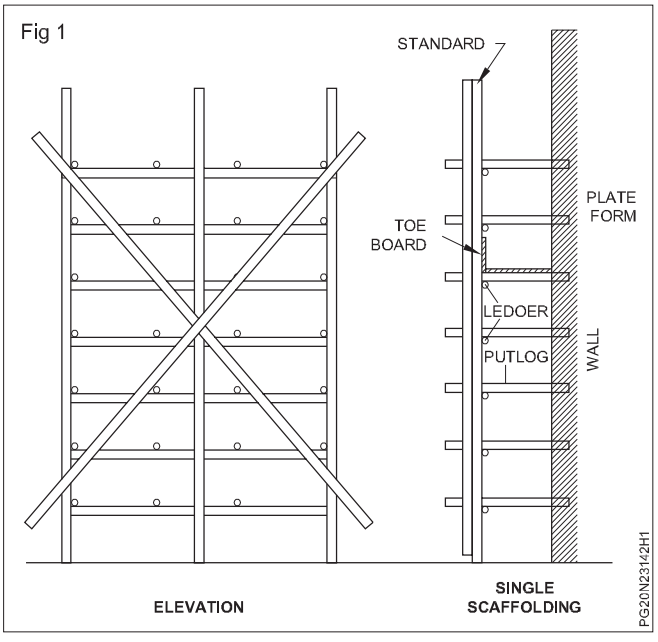
21 Base plate or sole plate on ground supporting should be standard

22 Scaffolding raker should be inclined support

23 According to nature of work, you select any one of following type scaffolding.

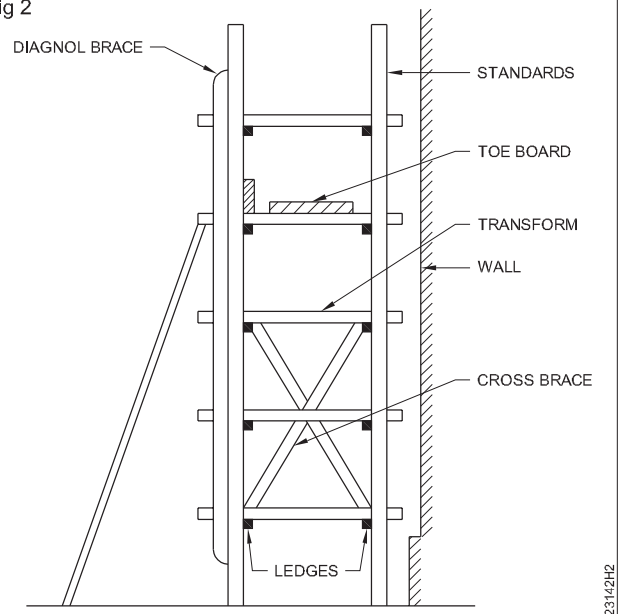
1 Single scaffolding (Fig 1)

Fig 1



2 Double scaffolding (Fig 2)

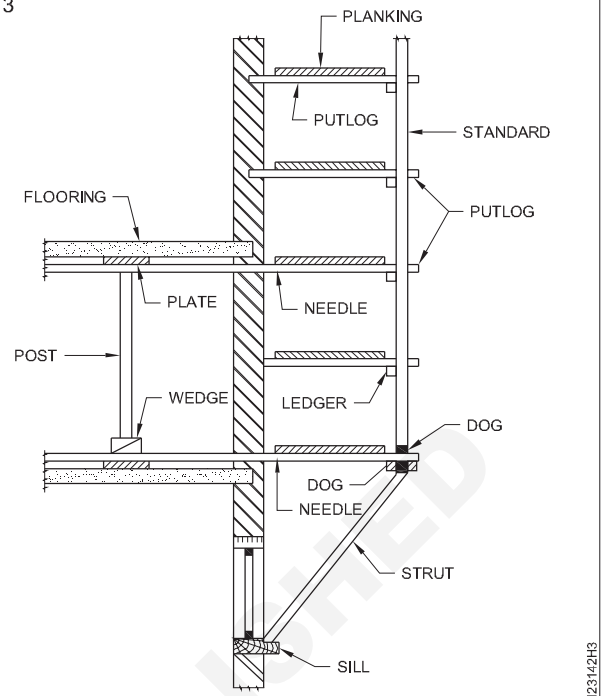
Fig 2




DOUBLE SCAFFOLDING

3 Cantilever (Fig 3)

Fig 3




CANTILEVER SCAFFOLDING

4 Suspended scaffolding

5 Trestle scaffolding

6 Steel scaffolding

7 Patented scaffolding

# Practice on exterior wall cleaning

**Objective:** At the end of this exercise you shall be able to
- **clean the exterior wall with a cleaning process.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Wire brush - 1 No.

**Equipments**

- Car jet washer - 1 No.
- Ladder - 1 No.
- Scaffolder - 1 No.
- Air compressor - 1 No.

**Materials**

- Dust remover - as reqd.
- Soap oil - as reqd.
- Wall putty - as reqd.
- Pulley leveler - as reqd.

## PROCEDURE

**Exterior wall cleaning process**

1 Inspect the building exterior wall to be cleaned.

2 Select the cleaning materials like scrub brush, sand paper air/water cleaner.

3 Use the scaffolding or ladder near the wall.

4 Scrub the siding to remove the grime and dirt.

5 Rinse the siding with the air hose and clean it again by using a fresh cleaning solution.

6 Apply high pressure water to remove the remain deposited dust on the wall.

7 Repeat the process on each section of wall, then move onto the next wall.

**Cleaning the wall by hand**

1 Scrub every square foot of the siding by hand rubbing with a brush.

2 Hand rubbing with brush can scour off dirt better than water pressure alone.

3 Use the brushes for cleaning the wall.

4 Use the bucket to mix the wall cleaning solvent.

5 Use the hose to air pressure cleaning the wall.

6 Use the scrub pad for rubbing the wall surface to remove the dirt and dust particle.

7 Uniformly rubbing the wall to remove the dust deposited on the wall.

**Cleaning the exterior wall with water pressure**

1 Select the wall cleaning solution.

2 Mix the cleaning solution with clean fresh water.

3 Use the cleaning solution mixed water for pressure water spray.

4 Clean the wall with pressure air before water spray.

5 Prepare the high pressure car jet washer.

6 Fill the cleaning solution mixed water with car jet washer water dub.

7 Start the car jet washer and apply high water pressure on the wall evenly.

8 Check the wall surface whether wall dusts are removed by water pressure.

9 If not removed the dust, increase the water pressure to apply on wall.

10 Continually apply even pressure on the wall, cover the water pressure complete wall.

11 Once complete the wall, move to next wall cleaning.

12 Let allow the wall to dry after water cleaning process.

13 Inspect the wall for painting work. If need any repair work on the wall, repair the wall before painting

# Prepare the exterior wall with white cement for painting

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wall for white cement wash**
- **apply white cement on the wall.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Painting brush - 1 No.
- Bucket - 1 No.
- Paint mixing stick - 1 No.

**Equipments**

- Air compressor - 1 No.
- Car washer - 1 No.

**Materials**

- White cement - as reqd.
- Soap oil - as reqd.
- Water - as reqd.

## PROCEDURE

**Apply white cement on exterior wall**

1 Inspect the wall to be painting.

2 Clean the wall dust by applying rubbing by scrub or high pressure water spray.

3 After cleaning inspect the wall for damage, cracks and other defects.

4 If found any damage on the wall, apply wall care putty on damaged spot.

5 Prepare the wall surface by hand sanding or power sanding.

6 Ensure the wall surface is matched with remain surface.

7 Apply weather coat on the wall before white cement wash.

8 Select white element brand to apply on the wall.

9 Open the white cement bag and take out the element as you required. Close the cement bag, store it in safe place.

10 Drop the white cement in a bucket and mix the water with white cement at appropriate ratio and add a feviquick.

11 Well mix the white cement with water.

12 Take the suitable painting brush to apply white cement on the wall.

13 Set the scaffolding near the wall to comfortable white cement wash on the wall.

14 Use the painting brush or roller to apply white cement wash on the wall.

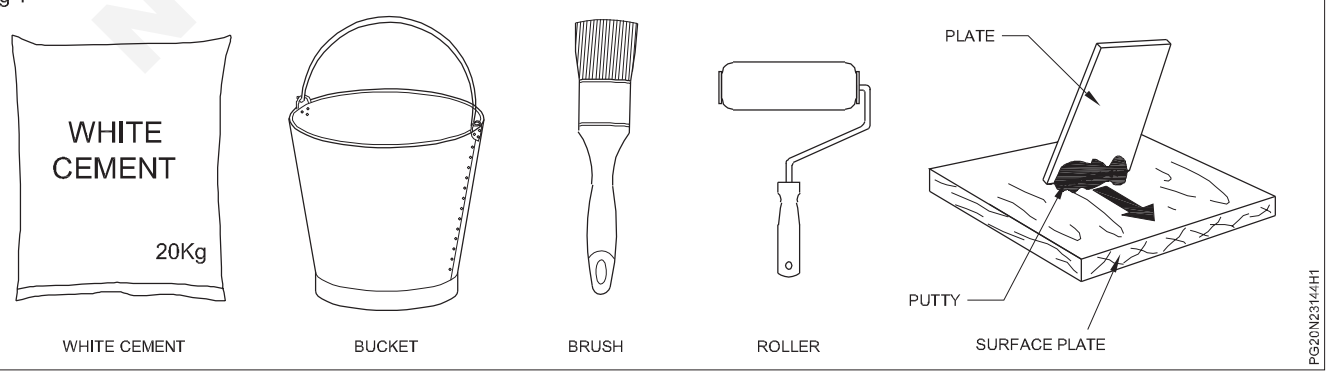
15 Wet the paint brush or roller in the white cement mixer.

16 Apply while cement on the wall top to bottom and bottom to top evenly, there after apply in parallel line on the wall surface.

17 Start the white cement wash from one side to end side.

18 Ensure the white cement is applied evenly on the building exterior wall. (Fig 1)

Fig 1



# Paint the prepared wall by brush with cement paint

**Objective:** At the end of this exercise you shall be able to
- **apply cement paint on the wall with brush**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint brush - 1 No.
- Bucket - 1 No.
- Paint mixing stick - 1 No.
- Water cup - 1 No.

**Equipments**

- Paint mixing rotator - 1 No.
- Air compressor - 1 No.
- Car jet washer - 1 No.

**Materials**

- Cement paint - as reqd.
- Water - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.
- Cleaning solvent - as reqd.
- Thinner - as reqd.

## PROCEDURE

**Cement paint painting procedure (Fig 1)**

1 Inspect the prepared wall for painting.

2 Clean the wall before paining.

3 Select the paint material for painting.

4 Select the painting brush for wall painting.

5 Prepare the cement paint as per instruction given on the paint packing.

6 Ensure the cement paint is ready for painting.

7 Prepare the scaffolding and set it near the wall.

8 Ensure the ladder or scaffolding is safe for working with paint.

9 Apply water on the wall for wet the wall surface.

10 Wet the brush tip on the water and clean the brush tip with clean cloth.

11 Wet the brush tip in paint and wipe brush tip to avoid the paint drops.

12 Start the painting from top of the wall to towards downward of the wall.

13 Apply paint by brush top to bottom and bottom to top the paint brush stroke.

14 Ensure the paint brush stroke is evenly applied on the wall.

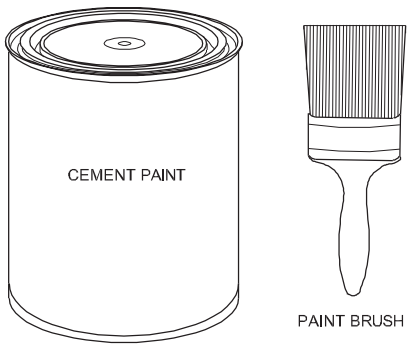
15 Cover the all walls with cement paint by brush stroke evenly.

16 Ensure the paint thickness is evenly applied on all walls.

17 Ensure the paint dry off time between paint coatings

18 Ensure the even paint brush pressure while painting on the wall.

Fig 1



# Practice to prepare the exterior wall with exterior priming for painting

**Objectives:** At the end of this exercise you shall be able to
- **prepare the exterior wall for priming**
- **prepare the wall primer and exterior wall priming for painting.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint brush - 1 No.
- Painting roller - 1 No.

**Equipments**

- Car jet washer - 1 No.
- Air compressor - 1 No.

**Materials**

- Primer - as reqd.
- Baniyan cloth - as reqd.
- Soap oil - as reqd.
- Cleaning solvent - as reqd.
- Emery paper - as reqd.

## PROCEDURE

TASK 1: **Standard procedure for exterior wall preparation for priming (Fig 1)**

1 Clean the building exterior walls.

2 Inspect the wall condition.

3 If found any major damage, scrap the damaged spot and then do wall plaster by cement mix with sand, ratio of 1:4 and then apply it for plastering the damaged area with suitable mason tools.

4 Ensure the plaster area surface is matching with remain surrounding wall surface.

5 Let it allow to dry cement plaster applied on the wall.

6 Wash the exterior wall with high pressure water spray on the wall surface.

7 Exterior walls should be thoroughly cleaned and over hanging foliage cut back before you begin priming.

8 Fill and level the minor undulation of wall by applying wall care putty.

9 If there is no irregularities on the wall, putty apply is not necessary. You can use cement plaster to finish the exteriors of the wall.

10 In case of major undulations on the wall, apply cement plaster then apply putty and allow it to dry for 3-4 hours. (don't apply POP outer wall opened to sky rain can damage the POP surface) and then allow it dry for 10-12 hrs.

11 Use 220 grit sand paper to wall smoothing. This helps to level the wall surface.

TASK 2: **Priming the exterior wall for painting (Fig 1)**

1 Select the suitable primer sealing the wall surface, blocking stains and preparing surface to take on a new paint.

2 Select the primer for exterior wall care primer at best budget.

3 Choose the best oil based primer or latex-based primer which is suitable for your exterior wall.

4 The oil based primer require harsher chemicals like paint thinner for clean-up and require more care full disposal.

5 Latex- based primers are fantastic for surface breathability and flexibility.

6 Open the primer packing and well mix the primer.

7 Clean the paint brush and dip the paint brush tip and apply the primer on wall top to bottom and bottom to top.

8 Applying one coat of exterior primer to the wall and let it allow to dry off for 3 to 4 hours.

9 After applying the first coat of primer inspect the wall surface.

10 If need again apply the 2nd coat of exterior primer on wall and let it allow to dry for 3 to 4 hours.

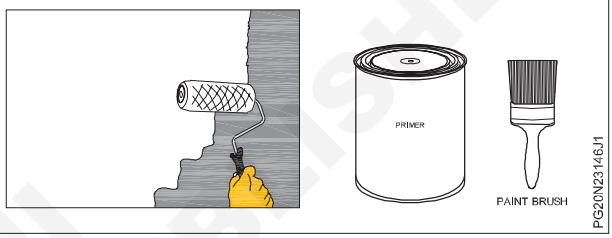
11 The primer painted wall increase the durability of the paint and sake a great deal of paint cost savings.

12 Ensure the exterior wall prime is properly applied on the wall at even thickness.

13 Clean painting tools with cleaning solvent after work has completed.

**Note: Use the personal protective equipment while work with paint.**

Fig 1

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# Practice on emulsion painting on exterior wall by brush

**Objective:** At the end of this exercise you shall be able to
- **emulsion painting on prepared exterior wall.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Painting brush - 1 No.
- Bucket - 1 No.

**Equipments**

- Car jet washer - 1 No.
- Paint mixing rotator - 1 No.

**Materials**

- Emulsion paint - as reqd.
- Baniyan cloth - as reqd.
- Thinner - as reqd.
- Cleaning solvent - as reqd.

## PROCEDURE

**Emulsion painting on the exterior wall (Fig 1)**

1 Inspect the exterior wall to be painted.

2 Arrange the suitable scaffolding near the wall to be painted.

3 Clean up the wall surface for remove the excess dirt and debris by using high pressure water jet.

4 Select the painting brush.

5 Clean the paint brush with cleaning solvent and dry it with clean cotton cloth.

6 Well mix the readyemade emulsion paint with stick or rotator.

7 Ensure emulsion paint is well mixed as per direction given by paint manufacturers.

8 Dip the paint brush tip in paint and wipe the excess paint to avoid the paint drop.

9 Apply the 1st coat paint on the wall in the direction of top to bottom evenly.

10 Paint application on wall should be uniform thickness.

11 Let it allow the wall to dry for 10-12 hours.

12 After drying the wall inspect paint plastered on the wall.

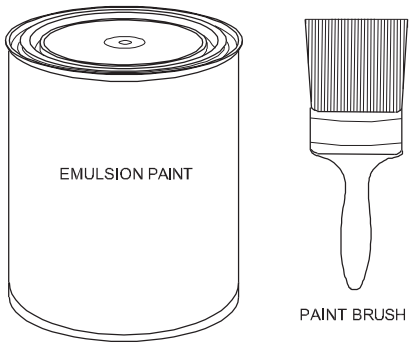
13 If you are not satisfied with paint shine on the wall.

14 Applying the 2nd coat paint and left it for dry up 10 to 12 hours.

15 Two coats of paint always look better and more professional than just one. The two coat painting system get longer warranty or life.

16 Ensure the two coat emulation painting of exterior wall gives very good shinning.

Fig 1



# Practice on decorate the projection with emulsion dark colour shades

**Objectives:** At the end of this exercise you shall be able to
- **decorate the projection with dark shade by emulsion colour.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Painting brush | - 1 No. |
| • Bucket | - 1 No. |

**Equipments**

| | |
|---|---|
| • Scaffolding set | - 1 No. |
| • Paint mix rotator | - 1 No. |

**Materials**

| | |
|---|---|
| • Emulsion paint | - as reqd. |
| • Water | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Soap oil | - as reqd. |
| • Baniyan cloth | - as reqd. |

## PROCEDURE

**Projection with emulsion dark colour shades on the wall**

1 Select and arrange the suitable scaffolding and set it near the wall.

2 Clean the building exterior wall by low pressure water spray on the wall before painting it.

3 Prepare the emulsion paint for painting the wall.

4 Prepare the brush for painting work.

5 Apply paint on wall with painting brush.

6 Let it allow for dry approximately 3 to 4 hours.

7 Select the emulsion colour paint for dark shading on the wall projection with different colours.

8 Select the places to be apply special dark shade design on exterior wall.

9 Select the emulsion readymade colour paints.

10 Well shake the paint tin before open it.

11 Apply different colour paints on selected wall projection.

12 Don't mix the one colour to another colour paint.

13 Apply the 1st coat paint of emulation colour shades if you are not satisfied, you can apply 2nd coat for achieve the special dark shades on the wall designs.

14 Ensure the dark shade emulsion colour application is right design as customer's choice.

15 Study the wall projection for dark shade colour.

16 Access the paint colour needs to darken the shade in different colours.

17 Compare the paint colour selection with customer choice colour.

18 Ensure building walls projections are fine dark colour shaded. (Fig 1)

# Practice to decorate the wall with design roller / stamp /stencil

**Objectives:** At the end of this exercise you shall be able to
- **decorate the wall design with stencil**
- **decorate the wall design with stamp**
- **decorate the wall design roller.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Design roller - 1 No.
- Design stamp - 1 No.
- Design stencil - 1 No.
- Paint brush set - 1 No.

**Equipments**

- Paint spary gun - 1 No.
- Air compressor - 1 No.
- Painting knife set - 1 No.

**Materials**

- Colour paint - as reqd.
- Cleaning solvent - as reqd.
- Thinner - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.

PROCEDURE

TASK 1: **Decorate the wall design with roller and stencil**

1 Select the wall for decorate the design.

2 Clean the wall before apply decorate design on the wall.

3 Ensure the selected wall is properly painted in colour.

4 Select the stencil design as your choice. (Fig-1A)

5 Measure the stencil length and width.

6 Mark the stencil measurement on the wall vertical and parallel position.

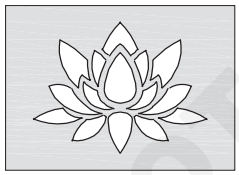
7 Select the roller for stencil size. (Fig 1B)

8 Prepare the stencil design colour paint.

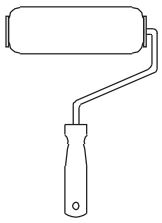
9 Arrange and set suitable ladder (Fig2) or scaff folder near the wall to easy apply stencil design by roller on marked area of the wall.

10 Fix the stencil on marked area of wall with adhesive tape. (Fig IC)

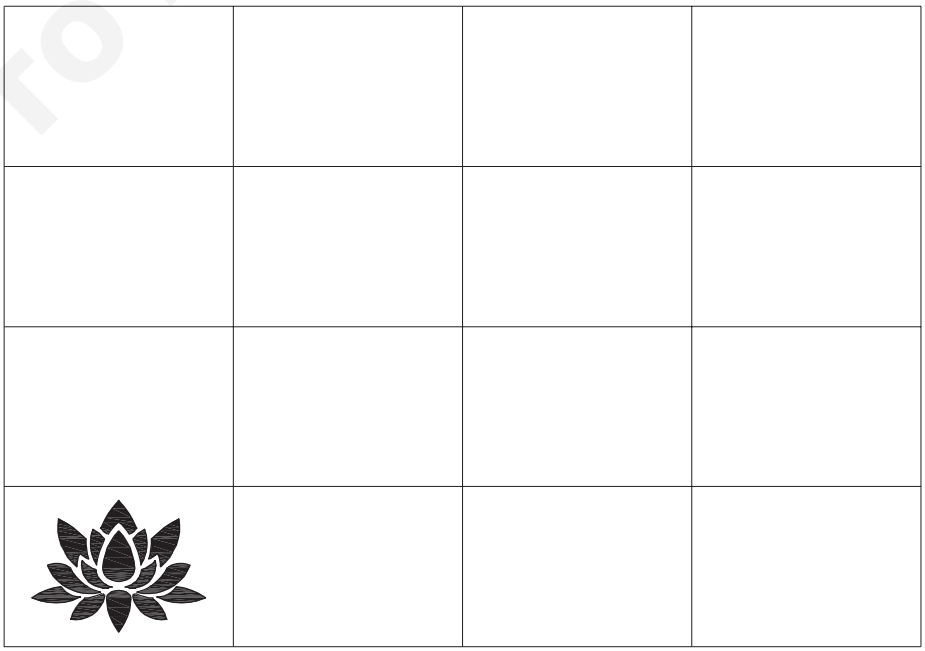
Fig 1



(1A) STENCIL



(1B) ROLLER



(1C) DESIGNED WALL

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11 Wet the roller with prepared colour paint

12 Apply and roll over the roller on the stencil to flow paint through the stencil for decorate the design on the wall.

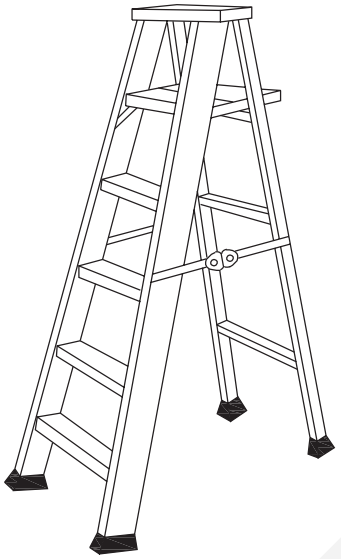
13 Remove the stencil and fix it on another marked area of the wall to complete the design on full area of the wall.

14 Ensure the stencil fixing on wall and roller operating method should be as per standard procedure / instruction given by roller stencil manufactures.

15 Ensure the wall is decorated by stenciling with colour paints on the walls.

16 Remove the marking tape and touch up the paint where is need to touch up on the wall.

Fig 2



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TASK 2: **Decorates the wall with stamping design (Fig 1)**

1 Select the design for the wall painting.

2 Select the materials for stamping design.

3 Design the materials for stamping pad.

4 Prepare the wall for painting with stamp design.

5 Select the paint colour for apply on the stamp.

6 Different types of rubber stamp designs are available in the market for wall decoration by stamping systems.

7 Select the suitable stamp designs size and pattern to apply paint on the stamp design and prepare the paint for apply on the design.

8 Select the small size dessigned for stamping on the wall.

9 Dip the stamp design on the paint and apply paint on the wall for stamp design.

10 Ensure the applied paint is fully covered on the stamping design.

11 Before apply on wall make trail stamping on the paper and ensure the stamped design is fine print on the paper.

12 Mark the distance between the designs stamping on the wall with help of straight edge.

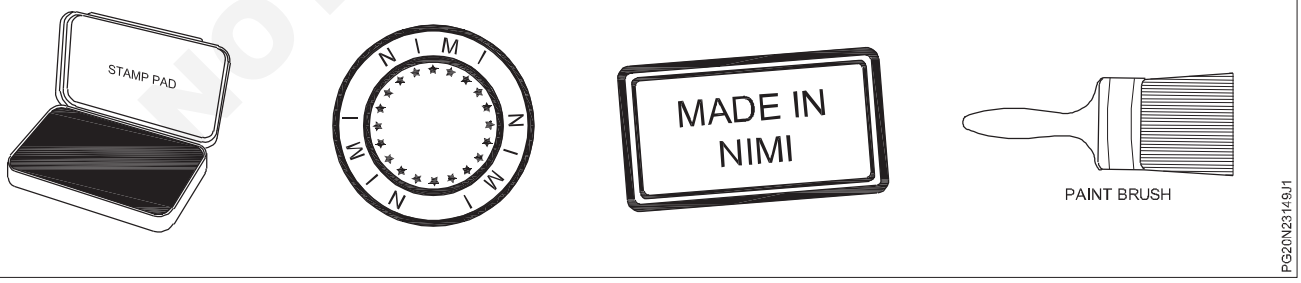
13 Stamping the design and adhesive type as measurement marked on the wall.

14 Ensure the even pressure applied on the stamp at each stamping operation.

15 Ensure the full wall is designed with stamping properly as designs selected by a customer.

16 Erase the marking lines and touch up the paint by brush where ever touch up paint required.

Fig 1

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TASK 3: **Wall design with roller**

1 There are different type design rollers are available in the market.

2 Select the designs to be decorate the wall.

3 Select the roller design to be used for the wall decoration.

4 Clean the wall before decorate by selected designs.

5 Mark the measurements between two design painting on the wall. Use the adhesive tape between design markings.

6 Select the design colour and prepare it for apply design roller.

7 Select the different paint colours.

8 Prepare the paint for apply in different colours.

9 Use the different roller for each colour separately before dry the paint.

10 Remove the marking line tape and clean the posted area.

11 Touch up the paint on damaged area of the wall designs stamped on the wall with help of painting brush.

7 Take trail painting design print by rolling the roller on the paper.

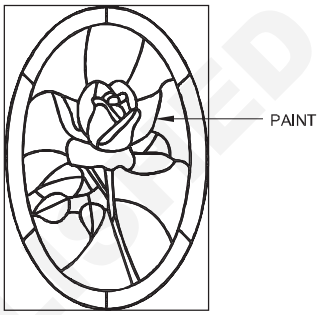
8 Ensure the design is properly printed as original rollers rolling pad design.

9 Apply the design as measurement marked on the wall by rolling the roller.

10 Step by step cover the wall decorate design by using the roller.

11 Ensure the complete wall is decorated by design. (Fig 1)

Fig 1

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# Practice to prepare wall & create texture by using different medium

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wall for create texture**
- **use the different medium colour**
- **make different design textures.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Texture design tool kit | - 1 No. |
| • Texture painting tools | - 1 No. |
| • Paint stirrers | - 1 No. |
| • Paint mixing stick | - 1 No. |

**Equipments**

| | |
|---|---|
| • Masion equipment | - 1 No. |
| • Wall texture equipment | - 1 No. |
| • Ladder | - 1 No. |

**Materials**

| | |
|---|---|
| • Texture powder | - as reqd. |
| • Water | - as reqd. |
| • Texture design plate | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Soap oil | - as reqd. |
| • Cotton towel | - as reqd. |
| • Texture colour | - as reqd. |
| • Stencils | - as reqd. |
| • Sponge | - as reqd. |
| • Rollers | - as reqd. |

PROCEDURE

TASK 1: **Prepare the wall for create texture**

1 Clean the walls with sponge, water and mild detergent and allowing them completely dry.

2 Combine the joint compound with water according to proportions listed in the manufactures instructions given on the material packing.

3 Joint compound mixture texture material should have the consistency of a thick better.

4 Use a towel or wide putty knife to speed it on the wall.

5 For a UCCO like texture, dip a sponge into the compound mixture and pat it on to wall unit, until you reach your design texture.

6 For ridged texture use a notched towel to draw lines into the paint compound.

7 For knock down texture, apply the joint compound by stamping it on to the wall or cleaning with a stamp brush and then use a putty knife to scrape away the peaks the brush leaves behind be careful not to apply to much pressure to the putty knife as you can accidentally.

8 Smooth away too much texture.

9 Once texture the whole wall look at it from a distance and do spot touch-ups. Add or remove joint compound as needed.

10 Allow the joint compound to dry for at least a full 24 hours before painting.

— — — — — — — —

TASK 2: **Texture a wall with a texture sprayer**

1 Clean the wall with water spray and allow them to dry completely. Select the texture design for each wall.

2 Combine the joint compound with water according to the manufactures instruction. Note that the texture sprayer may require a higher water content in the joint compound mix that, what is recommended by the compound manufactures instructions and the sprayers instruction and add more water as need.

3 Cover the doors, furniture floors and walls you don't want texture with plastic drop sheets. Texture sprayers are imprecise and can be messy

4 Select the texture spray hopper and add the joint compound to the texture sprayers' hopper. Connect the air hose with hopper.

5 Adjust the spray nuzzle and air flow for your design texture

6 Increasing the air flow will decrease the amount of compound sprayed onto the wall decreasing the air flow will increase the amount of compound spraying on to the walls.

7 In slow, even motion to sprays the compound onto the walls.

8 Complete one wall at a time so that you can take breaks and maintain a uniform texture on each wall.

9 Allow the joint compound to dry for at least a full 24 hours before painting.

**Note: Provide texture compounds are best for heavy duty textering jobs always strip the existing texture before applying new texture**

— — — — — — — —

TASK 3: **Texture a wall with a sponge**

1 Clean the walls with water spray and allow them to dry completely

2 If you want to change the under lying colour of the wall paint it as normally would and let it dry

3 Soak a sponge as under lying in paint the paint can either be the same colour as the under lying layer of paint or it can be contrasting colour for more striking effects

4 Dab the sponge onto the wall covered to your choice

5 Sea sponges create irregular more natural pattern while synthetic sponge create uniform, rectangle patterns.

6 This technique can be done with regular or textured paint

7 Cut a sponge into narrow strips to paint in corners

8 As above the method you texture a wall with a roller

9 Power the joint compound into a paint tray then use a paint roller to roll it on to the wall

10 Wait for the joint compound on the wall to partially dry then roll over the wall again, doing so will pull up the partially dried compound to create a pleasing 3 dimensional texture.

11 Use a brush to texture corners.

12 Once the compound has completely dried after 24 hours you can paint the walls

13 For more defined texture use a thick nap roller cover.

— — — — — — — —

TASK 4: **Texturing with paint for a finish**

1 Prepare and clean the walls as you normally would for painting.

2 Select the paint for paint as base colour.

3 Prepare the paint and apply paint as base colour and allow it to dry.

4 Using either a thick – NEP roller cover or a stencil roller, roll a complementary glaze or second paint colour over the base coat.

5 After the base coat is applied, dip a rag into your accent paint wring out the excess wad into a ball and roll it along the wall.

6 Try with different rag materials such as cheese cloth, lace liner or burlaps for different looks you can change directions as you roll to create a random pattern or cover areas multiple times for deeper impact. (Fig 1)

7 This rerolling technique can be done with regular or texture paint.

Fig 1


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# Prepare the wall and design wall paper pasting on wall

**Objectives:** At the end of this exercise you shall be able to
- **prepare the wall for design wall paper pasting**
- **pasting the design wall paper on the wall.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Wall cleaning tool | - 1 No. |
| • Brush | - 1 No. |
| • Wall paper remover | - 1 No. |
| • Paint bucket | - 1 No. |

**Equipments**

| | |
|---|---|
| • Steamer | - 1 No. |

**Materials**

| | |
|---|---|
| • Texture powder | - as reqd. |
| • Wall paper liner | - as reqd. |
| • Wall paper | - as reqd. |
| • Soap water | - as reqd. |
| • De-glossing solution | - as reqd. |
| • Acrylic primer | - as reqd. |
| • Alkyd oil primer | - as reqd. |
| • Cotton cloth | - as reqd. |

## PROCEDURE

TASK 1: **Preparation wall and pasting the design paper on the wall**

1 Prepare the painted walls that are already is good condition, simply wash them with multi-surface soap and then let it allow to dry.

2 Add on acrylic primer and allow that to dry fully before hanging wall paper.

3 If the painted walls have holes, dents or cracks fill them vinyl spackle.

4 Let it allow applied spackle has dried completely.

5 Smooth it with wet sand paper before applying an acrylic primer.

6 If walls are lightly textured, need to sand the entire surface lightly before washing and priming.

7 If new wall has not yet been painted or primed, use a alkyd oil primer. Alkyd primer protecting the dry wall from mold and mildew.

8 Apply one coat of acrylic primer and then the dry wall wipe down your wall with a damp cloth 24hours prior to installing wall paper. New wall is ready for wall paper pasting on the wall.

9 If wood panelled walls you wash the walls with grooves a de-glossing solution.

10 Fill the grooves with spackls and sanded it evenly.

11 Wash the walls and let dry it.

12 After drying the wall apply primer on the wall and pasting the wall paper. After drying the wall primer.

13 If the wall is with old wall paper, remove it by stripping it away. Or you can use a wall paper steamer for hard to remove paper.

14 Once wallpaper is removed, fill in holed and smooth damaged area with sanding block wrapped 120 grit sand paper. Create a smooth surface and then apply the appropriate primer based off the type of wall thats underneath.

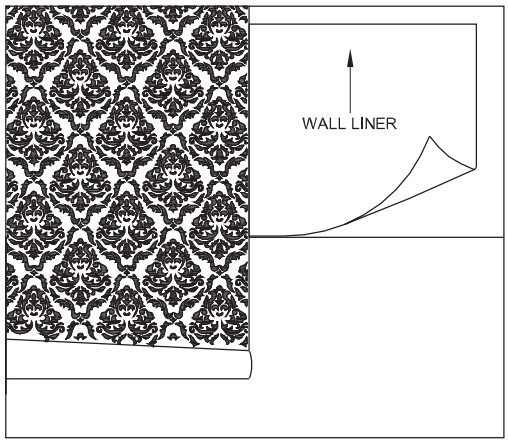
15 If the walls are specially textured and sanding is not sufficient, you can use lining paper to create a smooth surface for your wall paper.

16 Prepare the wall in much the same way before hanging your liner paper.

17 Hang the wall liner and then hang the wall paper over the liner. (Fig 1)

18 Press the wall paper with soft cloth or sponge at even pressure to avoid air bubble between wall and wall paper.

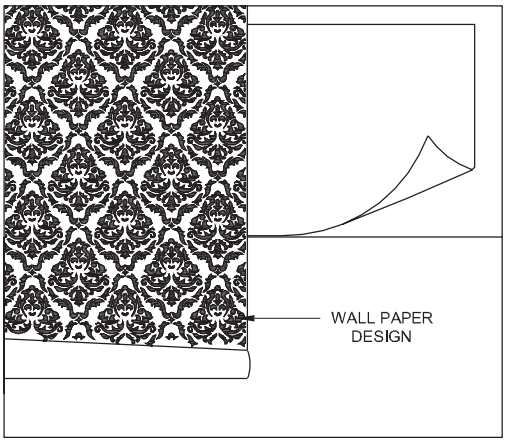
Fig 1



19 Clean the wall paper for remove the dust and glue layer on the wall paper. (Fig 2)

20 Ensure designed wall paper is properly posted on the wall.

Fig 2



# Practice to find the defects on wall before painting and remove it

**Objectives:** At the end of this exercise you shall be able to
- **find the defects on the wall**
- **remove the wall defects before painting.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Scraper - 1 No.
- Wall sanding machine - 1 No.
- Putty plate - 1 No.
- Paint brush set - 1 No.

**Equipments**

- Scaffolder - 1 No.
- Wooden ladder - 1 No.
- Spray gun - 1 No.
- Air compressor - 1 No.

**Materials**

- Putty - as reqd.
- Paint - as reqd.
- Brush - as reqd.
- Sand paper - as reqd.
- Wall primer - as reqd.
- Rag - as reqd.
- Soap oil - as reqd.

## PROCEDURE

TASK 1: **Practice to find the defects on the wall**

1 Clean the wall before finding the wall defects.

2 Find the categories of wall defects whether a structural defect or non-structural defect.

3 Check the wall surface for try and out abnormalities of individual squares, regardless of whether they are of stones or blocks.

4 Find the peeling paint effects on the wall due to rain and suddenness.

5 Find the defects of wall cracking and leaning walls.

6 Find the wall unstable foundation due disseminates loads from rooftops, dividers and floors on to the earth beneath.

7 Check and find the building roof defects due to climate effects.

8 Find the honey combing defects on the wall due alludes to voids in cement caused by the mortar not filling the spaces between the coarse total particles.

9 Check and find the dampness of wall defects due to water entering in a wall and spilling canals, faulty channels, brush pipes and build up because of lacking ventilation.

10 Check the plumbing defects on the wall.

11 Check the defects on the wall due to improper electrical wiring.

12 Check the wall defects due to non-functional heating and air conditioning system.

13 Check the defects of flooring in the building.

— — — — — — — —

TASK 2: **Practice to rectify the wall defects**

1 Clean the wall before carried out the wall defects.

2 Identify the wall defects and mark it on the effected area.

3 Prepare the repairing material according the categories of defect

4 If wall surface is abnormalities clean the wall and sanding on the wall surface and then apply wall care putty and make a proper surface on the wall.

5 Check the paint if the wall paint is effected by rain and had weather remove the peeling paint and prepare the surface for repainting.

6 If the wall is crack, mark the cracked area and make 'v' shape cut on the wall cracked surface. Fill the wall care putty on the cavity up to level of wall surface let it allow for dry it for few hours. Ensure wall care putty is dry and then sanding the surface for levelling the surface of the wall.

7 If any building foundation found defects on the base of the building find the cause for the foundation defects, in case defects is happen due to overload on the building reduce building gravity load and than repair the building foundation according the size of defects carried out the defects by cement, iron rods or iron rod insert support with cement plantering.

8 If building roof is affected by weather, remove the damaged roof area and re-plaster on the defected area of the roof.

9 If any defects found on the wall due to improper plaster and re-plaster it by cement and sand mixture.

10 If damping defects on the wall find the cause for defects rectify the cause first and then clean and remove the affected paint or cement plaster. Clean the defective spot and then apply cement mixture or wall care putty on the effected area. After that sand it for leveling the wall surface.

11 Find the cause for plumbing defects weather pipe joint leak, pipe crack, pipe rusty or improper pipe laying. If need replace the all concealed pipe line and ensure pipe line fittings are properly fitted and plastered on it. Apply wall care putty and let it allow to dry. Sand it for levelling the surface before painting.

12 Find the cause for electrical concealed wiring effect of the wall and rectify the defects and correct the damping area.

13 Find the cause for air conditioning unit heating effect on the wall, rectify a/c unit excess heat production and change the outer unit location. Clean the wall and remove the damaged paint and cement plaster. Apply fresh cement plaster and level it and then apply wall care putty on it let it allow enough time to dry between the various operation. Sanding the wall before painting.

14 Replace the damaged flooring to match the previous laying flooring material.

15 Ensure all wall defects are carried out and ready for wall painting process.

16 Prepare the wall for painting and paint the wall as per learned processor with proper painting tools and equipment.

— — — — — — — —

# Practice to find the defect on the wall after painting and rectifying the defects

**Objectives:** At the end of this exercise you shall be able to
- **find the defects on the wall after painting**
- **rectify the defects of the wall painting.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Scraper - 1 No.
- Painting brush - 1 No.
- Painting roller - 1 No.
- Putty plate - 1 No.

**Equipments**

- Paint spray gun - 1 No.
- Air compressor - 1 No.
- Power sanding machine - 1 No.

**Materials**

- Paint - as reqd.
- Water - as reqd.
- Thinner - as reqd.
- Rag - as reqd.
- Soap oil - as reqd.
- Emmery sheet - as reqd.

## PROCEDURE

TASK 1: **Procedure to find the defects on the painted wall**

1 Find the paint blistering on the painted wall.

2 Find the paint peeling on the wall.

3 Find the paint griming on the painted wall.

4 Find the paint chalking defects on the painted wall.

5 Find the paint running the painted wall.

6 Find the paint sagging on the wall.

7 Find the paint flaking on the painted wall.

8 Find the paint blooming on the painted wall.

9 Find the paint wrinkling on the wall.

10 Find the paint flashing on the wall.

11 Find the paint saponification on the wall.

12 Find the paint alliga toring on the wall.

13 Find the paint checking on the wall.

14 Find the mildew defects on the painted wall.

— — — — — — —

TASK 2: **Practice to rectify the defects on the painted wall**

1 Paint blistering and peeling defect is caused by the formation of air bubble under the paint film. And due to the presence of mixture or oil or grease matter if it is due to mixture then it is called peeling and if it is due to oil and grease matter then it is called blistering. These defects can be eliminated by using porous paints like emulsion paints instead of non porous paints such as oil paints, enamel paints.

2 Paint fading is mainly due to atmospheric agencies such as sun light and moiture. To prevent fading or discoloration, weathering resistant pigments should be used in the paint.

3 To avoid griming on the painted wall the paint film should be opaque enough to cover the back ground surface.

4 Checking is the formation of powder on the painted surface. This is due to the use of insufficient oil in the primer it can be prevented by using sufficient oil in the primer applying paint at recommended spreading rate.

5 When a thin layer of paint is coating on a glossy and smooth surface the paint may run back and sometimes leaves small areas of surface uncovered. To avoid this paint running defect use the proper paint viscosity.

6 The thin paint film may run downwords and forms sagging of paint. To avoid this defect use the proper paint viscosity as per manufacturers recommendation or instructions given on the paint packing.

7 To avoid paint flaking the painting surface should be cleaned and rubbed with paper before applying paint.

8 To avoid blooming paint defects provide proper ventilation and weathering in the building.

9 Paint wrinkling defects can be prevented by allowing the under coat to dry completely prior to the application of the final coat

10 Flashing paint defect is caused due to poor quality of paint weathering action and bad workmanship. To prevent the paint flashing defect use the quality paint.

11 Paint saponification defects occurred due to painted surface is exposed to chemicals such as alkalis. To prevent the defects safe the wall from the chemical spry and soap water drops on the wall.

12 To prevent paint checking defects use the high quality oil based primer should be used as prime coat.

13 To prevent the paint checking defects apply the paint during hot weather and after drying of under coat.

14 Mildew defects can be prevented by keeping the surface dry and clean before applying paint on the wall. If there is any trace of mildew growth, then wash the wall surface with solution of bleach before apply paint on the wall. (Fig 1)

Fig 1

# Practice to prepare the paint and paint the windows, grill, doors, safety doors and gate by brush

**Objectives:** At the end of this exercise you shall be able to
- **prepare the building windows, grill, doors, safety doors and gate for painting**
- **prepare the paint and paint the building windows, doors, grill and gate.**

## Requirements

| Tools/Instruments | | Materials | |
|---|---|---|---|
| • Trainee's tool kit | - 1 No. | • Paint | - as reqd. |
| • Brush set | - 1 No. | • Varnish | - as reqd. |
| • Scraper | - 1 No. | • Thinner | - as reqd. |
| **Equipments** | | • Rag | - as reqd. |
| | | • Cotton cloth | - as reqd. |
| • Sanding machine | - 1 No. | • Soap oil | - as reqd. |
| | | • Emery sheet | - as reqd. |

## PROCEDURE

TASK 1: **Prepare the building window, doors, grill, safety doors and gate**

1 Clean the building window, doors, gate, grill and safety doors with soft cloth.

2 Remove the debris on it by using scraper, emmery sheet.

3 Clean the parts after sanding on it and ensure there is no debris on it.

4 Inspect the above mentioned opening ventilators of the building.

5 It need prepare the putty and apply on the windows, doors and grill. Use the putty for wooden doors, windows and metal grill, gate separately as per manufacture's recommendation.

6 Read the instructions given on putty packing label (wood, metal)

7 Open the door and grill putty and mix the putty with a required amount in a pan as per manufacturers instruction.

8 Use the putty mixer tool to mixing the putty.

9 Mix the putty throughly to get creamy, paste like consistency.

10 Make sure that it does not create lumps while mixing.

11 Prepare the putty mix in such a way so that you can use it within the next two hours.

12 Sanding the parts to be painted-(wood and metal) use the different grit paper for sanding and smoothing.

13 After sanding apply putty for leveling the surface to be painted.

14 Let allow to dry the putty applied parts as per putty manufacturer instruction.

15 Sanding the putty applied area to level the surface for painting.

16 Ensure the all wood and metal parts surface is even level.

17 Apply wood primer on the wood surface of door and windows.

18 Apply metal primer on the metal parts of grill and gate and other metal parts to be painted.

— — — — — — — —

TASK 2: **Prepare the paint for painting the wooden door, window and metal grill and gate**

1 Prepare the paint for painting the wooden door, window and metal grill and gate.

2 Select the paint color and quantity of paint.

3 Read instructions on paint packing.

4 Open the paint packing and mix the paint with paint mixing rotator.

5 Ensure the paint is well mixed and ready for painting work.

6 Select the painting brush and clean it.

7 Use the separate brush for separate colors.

8 Apply wooden paint for wooden parts by brush. Use the paint brush up and down stroke to apply even paint on the wooden surface.

9 Use the small brush to paint the small and narrow spaces of wooden door and windows. (Figs 1 & 2)

Fig 1

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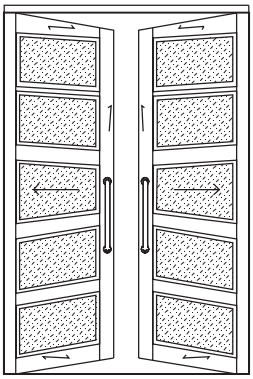
Fig 2



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10 For apply the different colors use masking method to avoid the one color to another color mixing.

11 Apply first coat of paint on wooden parts and let it allow to dry for 3 to 4 hour's minimum and then if need apply top coat and clear coal for get more shining.

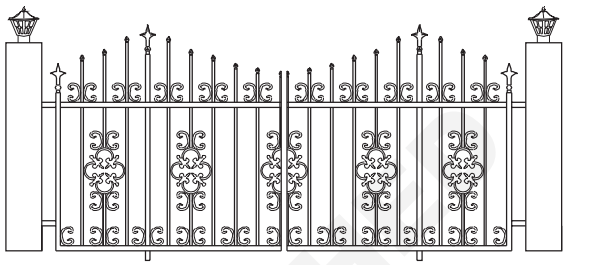
12 Apply metal conditioner and metal primer on the metal parts.

12 Check whether metal primer is dry on the grill and gate.

13 Dip the brush tip on the paint and apply paint on metal part, by even paint brush strokes use one or two coat for paint shining.

14 Mask the unwanted surface before painting the grill and gate. (Fig 3)

Fig 3



PG20N24154H3

15 Use the different color to decorate the window grills and gate let allow to dry the paint as per manufacturers instructions if need apply second and final coat paint to get more shining.

16 Clean the debris on pained parts and visual inspect the painted parts.

17 Clean the paint on the unwanted spaces of doors, windows grills and gate safety gate.

18 Remove the mask, if applied and touch up the paint wherever need.

19 Ensure all painted surface is painted properly.

— — — — — — — —

# Practice to paint a ceiling and wall with dip feed roller / pad or airless spary

**Objectives:** At the end of this exercise you shall be able to
- **prepare the ceiling and buliding for painting**
- **paint a ceiling and wall dip feed roller**
- **paint a ceiling and wall with airles spray gun.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Dip roller - 1 No.
- Bucket - 1 No.
- Paint scraper - 1 No.
- Putty knife - 1 No.
- Roller screen - 1 No.

**Equipments**

- Spray gun - 1 No.
- Air compressor - 1 No.

**Materials**

- Paint - 1 No.
- Primer - 1 No.
- Water - 1 No.
- Painter tape - 1 No.
- Thinner - 1 No.
- Paint brush - 1 No.
- Cotton cloth - 1 No.

## PROCEDURE

TASK 1: **Practice to prepare the buliding celiing and wall surface for painting**

1 Clean the ceiling and wall surface to be painted.

2 Interior walls and ceiling should be throughty cleaned any over hanging foliage cut back before you begin painting.

3 Inspect the celing and wall surface.

4 If surface is uneven, coat a interior wall care putty.

5 Fill and level the minor undulations of wall and celiing by apply putty.

6 Wall care putty is used after buliding the wall and before begin the painting. So you can apply wall care putty on the interior conterminous walls and celiing if there is no irregularties, then it may not be necessary.

7 Apply 1st and 2nd coat wall putty incase of major undulation on the ceiling and wall apply cement plaster then apply putty.

8 Let allow to dry the wall 10-12 hours, between each process

9 Use 220 grit sand paper to wall and celing surface smoothing.

10 Apply one coat of interior primer to the wall and celing to protect them.

11 Ensure the celing and wall is ready for painting.

— — — — — — — —

TASK 2: **Practice to painting a wall and celing with dip- roller / pad**

1 Select the paint for buliding celing and wall.

2 Paint the celing first and then paint the wall.

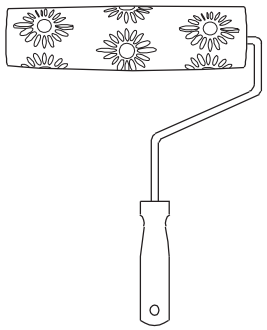
3 Paint faster and smoother with the right rolling techniques.

4 Prepare the paint for painting the celing.

5 Load the paint roller cover with paint by dipping into the paint about ½ inch and then roll in it against the screen.

6 Filling a dry roller cover with paint will require five or six repetitions. (Fig 1)

Fig 1



PAINT DIP FEED ROLLER

PG20N24155H1

7 After that two or three dips are need and leave the roller almost dipping with paint.

8 It is easy to cover a bucket with a damp cloth to prevent the paint from drying out.

9 Bring out roller from the paint bucket.

10 Lay the paint on the celing with sweeping stroke and roll up ward at a slight angle using liught pressure.

11 Stop few inches from the wall. Now roll up and down back toward the corner to quickly spread the paint.

12 Leave paint build and roller marks at this step.

11 Roll up and down from the wall to wall move over about the quaters of roller with each time.

12 Always slightly overlapping the previous stroke. When reach the corner, roll as close to the adjacent wall without touching it.

13 Repeat the above steps untill the entire celing is painted.

14 Smooth the paint along the celing using a long horizantal stroke without reloading the roller with paint.

**Note : dont taking too long to apply the paint**

14 Brush the celing corners and moldings or carefully rolling up close to inside corners molding and ceiling.

**Wall painting procees**

1 Lay the paint on the wall with sweeping stroke start about a foot from the bottom and 6 inch from the corner and roll the roller upward at a slight angle using light pressure.

2 Stop few inches from the ceiling. Now roll up and down back toward the corner to quickly spread the paint.

3 Roll up and down from the floor to ceiling and move over about three quarters of roller with each time. Slighty over laping the previous paint stroke on the wall.

4 When you reach the corner roll as close as you can the adjacent wall without touching it. Repeat the above steps untill entire wall is painted.

5 Use the quality rollers sleeve for rolling setup it is the important part of paint roller.

6 Don't stop for a break in middle of a wall and then start painting after this section has dried and likely see a lap mark where the two areas joint. Avoids this problem by allowing to quickly cover a large area with paint and then return to smooth it out.

7 Cover the painting at a time only about 3 or 4 ft of wall before smoothing the whole area off. If you find the paint is drying slowly you can an entire wall before smoothing off.

8 Rolling up the roller close to inside corners, molding and ceilings.

9 Keep the roller away from the floor where it might pick up bits of debris that are lates spreed against the wall.

10 Unload excess paint from the open and of the roller before roll back over the wall smooth it out do this by tilting the roller and applying a little extra pressure to the open side of the roller, while rolling up and down in the area you have just painted.

11 Don't submerge the roller in the paint to load it paint can supply inside the roller cover and leak out while you are rolling. Try to dip only the nap. Then spin it against the screen and dip again untill it is loaded with paint.

12 Don't press too hard when yor are smoothing out the paint.

— — — — — — — —

TASK 3: **Walls and ceiling spray painting with an airless sprayer (Fig 1)**

1 Spray painting walls and celing is a lot faster than using a brush and a roller paint to them.

2 Using a sprayer to paint the walls also eliminates the task of having to climp up and down a ladder to cut in corners with a brush and a sprayer produces a smoother finish.

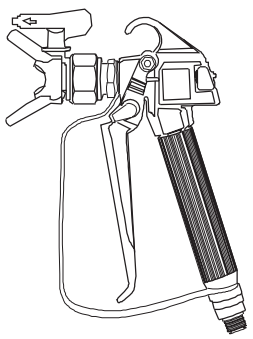
3 A quality airless sprayer is need to spray paint walls and celing inside the buliding.

4 Spray top to bottom and then spray at right angle side to side.

5 Squeeze the trigger while the gun is off to the side and then move it onto the work.

5 Move the gun parellel to the surface not in an arc.

Fig 1



AIRLESS PAINT SPRAY GUN

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6 Keep the gun perpendicular to the surface, not tilted.

7 Move fast to prevent runs several thin coats are better than one thick one.

8 Overlap your strokes about 30 to 50 seconds.

9 If the paint stops flowing or sputters from the gun, the tip may be clogged. Twist the tip 120 degress. Point the gun at a scrap of paper and sqneeze the trigger to clear the clog. Rotate the tip 180 degress to point it forward again and spray a test strip on to the scrap.

10 Follow the airless sprayers safety while you paint up the airles spray gun.

11 Keep the trigger locked and follow the pressure relife procedure when you stop spraying before cleaning and before servicing the sprayer or installing tips never put your hand in front of the sprayer tip, unless the unit is off and depressurized. The high pressure spray can injects paint under your skin, causing a serious poisioning hazard, if you do puncture your skin with the spray get to a doctor immediatly.

12 Wear safety glasses and approved respirator when you are spraying paint on the wall or ceiling.

13 Work in well ventilated area.

**Note:Read the spray gun mannual instructions before use for painting work.**

**Mask the wall boundaries with tape before painting and after painting remove the mask tape and touch up the paint to match the painted colour on wall and ceiling.**

14 Ensure the wall and ceiling is properly painted if need retouch the defective painted area by brush or spray gun with personal care.

— — — — — — — —

# Practice on paint the GI pipe with safety precautions

**Objectives:** At the end of this exercise you shall be able to
- **prepare the pipe surface for painting**
- **follow the safety precautions while painting.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Brush | - 1 No. |
| • Bucket | - 1 No. |

**Equipments**

| | |
|---|---|
| • Spray gun | - 1 No. |
| • Air compressor | - 1 No. |
| • Circular power sander | - 1 No. |

**Materials**

| | |
|---|---|
| • Paint | - as reqd. |
| • Thinner | - as reqd. |
| • Cotton Cloth | - as reqd. |
| • Soap oil | - as reqd. |
| • Emery Sheet | - as reqd. |
| • Metal Primer | - as reqd. |

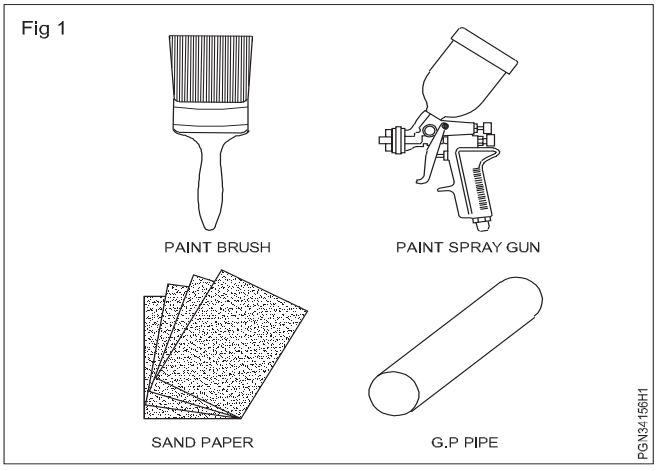
## PROCEDURE

TASK 1: **GI pipe painting procedure (Fig 1)**

1 Select the GI pipe for painting.
2 Inspect the pipe condition.
3 Clean the dust, oil, rust on the pipe.
4 Sanding the pipe by sand paper.
5 Use the moister a rag with either solvent and thoroughly wipe down the area you intended to paint. Use solvent with care.
6 Wear a respirator while working.
7 Avoid open sources of flame such as gas, heaters or lighter while painting on the pipe.
8 If you are painting very old pipes, like oil water pipes in your basement. Use wire brush to remove any rust or powdery deposit on it.
9 Wash the pipe surface with a degreasing soap solution.
10 Use the warm water with detergent does the cleaning job
11 Let allow the pipe surface to dry and then rub it down with a rag soaked in vinegar. Vinegar is a mild acid that etches the passivator and allows it to bond with a primer.
12 Treat the metal pipe with rust inhibitor.
13 Use the steel wool or a wire brush to remove scrub with paste made from salt and lemon juice or vinegar.
14 Usually don't have to strip old paint from pipes before repainting, but when that becomes necessary use a stripper than can handle the paint. Most indoor and outdoor latex paints will dissolve with one or two applications of an environment friendly soy or citrus based strippers.
15 When removing alkyd or urethane enamels may need to a product that contains methylene chloride wipe down the surface of the pipe with acetone or lacquer thinner after stripping, and then sand off any remaining flakes with 120 grit sand paper.
16 Ensure the pipe surface is ready for painting
17 Apply a single coat of metal primer and one or two top coats, if painting pipes with 360 degree exposure, simply spray a single wet coat of primer on the metal and wait for it dry at least 10 minutes.
18 When spraying is impractical use a brush on single coat of brush able metal primer with an appropriate paint brush choose a primer that contains a rust inhibitor.
19 Usually pipe painting takes two coats to get complete coverage of pipe apply the paint by brush or spray gun.
20 Apply first coat as soon as the primer has dried. Wait for coat to dry.
21 Then sand lightly with 220 grit sand paper and apply the second coat paint.
22 You can apply the paint for your choice in the way that is most convenient. Spraying generally gives the most appealing results.

**Note: Select the paint as per ISO standard colors for each pipe**

Fig 1



# Practice on paint the saintary pipe with precautions

**Objectives:** At the end of this exercise you shall be able to
- **prepare the sanitary pipe for painting**
- **paint the sanitary pipe with precautions.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Brush - 1 No.
- wire brush - 1 No.

**Equipments**

- Power sander - 1 No.
- Paint spray gun - 1 No.
- Air conpressor - 1 No.

**Materials**

- Paint - as reqd.
- Thinner - as reqd.
- Sand paper - as reqd.
- Soap oil - as reqd.
- Cotton rag - as reqd.
- Primer - as reqd.

## PROCEDURE

**Saintary pipe painting with take all precaution**

1 Ensure all test are performed on piping system before starting painting work.

2 Clean the saintary pipe painting surface to remove oils, grease, dirt and rust on the pipe surface.

3 Ensure proper room temperature and humidity levels.

4 Use hand sanding tools, Power sanding tools, shot blasters to clean surface as per relevant standards and project, requirmants.

5 Clean the sanded pipe surface and apply metal conditioner on the metal pipe and apply primer within 4 hours of surface preparation of pipe. Let it allow to dry off time.

6 Select the suitable paint for selected pipe line and prepare the paint as per instructions given on the paint packing label.

7 Apply paint coats after previous coats have dired up as per instructions of paint manifacturers.

8 Painting of markings over insulation cladding is required on all sanitary piping for identification of lines.

9 Plastic or plastic coated components do not required to be painted, various marking may be done on plastic piping for identification purpose.

10 Stainless steel saintary piping is not painted identification marking may be done on this piping.

11 Paint quantity estimation required to achieve particular dry film thickness.

12 Follow the types of painting methods.

1 Painting by brush

2 Paint by using paint spray gun

3 Paint by using airless spray gun

**Note: Non-ferrous materials of saintary pipes are not required to be painted. Also other surfaces like valve stem etc. After painting check out this complete list of surface that should not be painted**

13 Use the various types of primers and paints as per requirements of saintary pipe.

14 Proper weather conditions surrounding the place of painting work is essential (humidity levels and room temperture).

15 Wear the personal protective equipment while painting the saintary pipe.

16 Ensure the saintary pipe is properly painted as per instructor's instruction.

# Practice on paint the M.S square & round pipe

**Objectives:** At the end of this exercise you shall be able to
- **prepare the M.S square and round pipe for painting**
- **paint the M.S square and round pipe.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Wire brush | - 1 No. |
| • Paint brush | - 1 No. |
| • Scraper | - 1 No. |

**Equipments**

| | |
|---|---|
| • Spray gun | - 1 No. |
| • Power sander | - 1 No. |
| • Air compressor | - 1 No. |

**Materials**

| | |
|---|---|
| • Paint | - as reqd. |
| • Thinner | - as reqd. |
| • Emery sheet | - as reqd. |
| • Cotton rag | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Painting method of M.S square of round pipe (Fig 1)**

1 Clean the MS square and round pipe to be painted.

2 Clean the dust, rust, oil, grease, foreign matters on the pipe shall be removed by scrapers, wire brushes and cleaning solvents or sanding method.

3 All finished M.S square and round pipe surface shall be free from runs, drops, riges, waves, taps brush marks and variations in color texture and finish.

4 Clean the sanded pipe surface for apply metal conditions.

5 Select the metal conditioner and prepare the metal conditioner.

6 Applymetal conditioner on the pipe surface for protect from the rust formation on the pipe surface.

7 Select the primer and paint and prepare it for painting work.

8 Apply metal primer single and double coat, coverage shall be complete and each coat shall be applied as to produce a film of uniform thickness.

9 Special attention should be given to ensure that all surfaces including edges, corners, crevices, welds and rivets receive a film thickness equivalent to that of adjacent painted surfaces.

10 Adjacent areas and installations shall be protected by the use of masking tape, drop cloths or other approved precautionary measures.

11 First and final coat paint should be uniform color and uniform thickness.

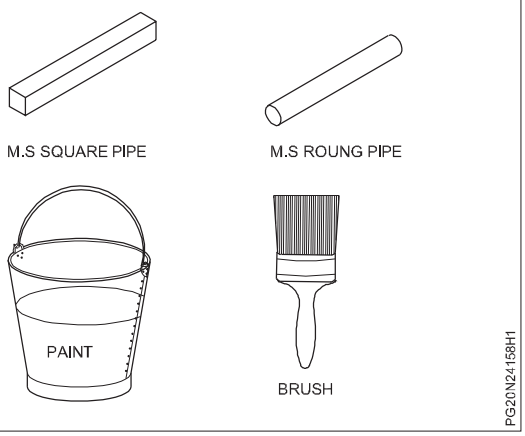
12 Paint only in a ventilated area for avoided poisoning with thinner.

13 Attention to all material and floor on the painting area for avoid paint dropping and damages.

- Wear personal protective equipment while painting the M.S square and round pipes.
- Clean the painting tools before and after painting job.
- Store the painting tools with in safe guard place for feature use.

14 Ensure the M.S square and round pipe outer surface is properly painted as per painting norms.

Fig 1



# Practice on painting the different pipe lines with ISI colour code

**Objectives:** At the end of this exercise you shall be able to
- **prepare the pipe line for painting**
- **select the ISI colour code paint for different pipe lines**
- **paint the pipe line asper ISI colour code.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Paint brush set | - 1 No. |
| • Paint ISI colour code manual | - 1 No. |
| • Wire brush | - 1 No. |
| • Scraper | - 1 No. |
| • PPT kit spray | - 1 No. |

**Equipments**

| | |
|---|---|
| • Paint spray gun | - 1 No. |
| • Air compressor | - 1 No. |
| • Bucket | - 1 No. |

**Materials**

| | |
|---|---|
| • Square pipe | - as reqd. |
| • Round pipe | - as reqd. |
| • Emmery sheet | - as reqd. |
| • Colour paint | - as reqd. |
| • Metal primer | - as reqd. |
| • Soap oil | - as reqd. |
| • Metal cleaning solvent | - as reqd. |
| • Cotton rag | - as reqd. |

## PROCEDURE

TASK 1: **Prepare the pipe line for painting**

1 Clean the pipe lines to be painted.

2 Use the cleaning solvent to remove the oil grease salt and rust formation on the pipe.

3 Clean the pipe with wet cloth after removing oil and grease deposite on the pipe.

4 Use the emery paper (120/220 grit) to clean the pipe and inspect the pipe surface after cleaning the pipe.

5 Select the metal conditioner, prepare it and apply metal conditioner on the metal pipe surface.

6 Select the metal primer, p v c primer to apply on the metal / p v c pipe line.

7 Prepare the primer and apply it on the surface of the pipe line.

8 Ensure the primer applied as produce a film of uniform thickness on the pipe line surrounding surface including edge, corners, welds, unions, nuts etc.

— — — — — — — —

TASK 2: **Select the I S I colour code paint for different pipe line**

| Types of pipe | Use of pipe | paint colour |
|---|---|---|
| Water pipe line | Raw water | Olive green |
| | Finished or potable Water | Dark blue |
| | Alum or primary Coagulate | orange |
| Chemical line | Ammonia | white |
| | Carbon, slury | black |
| | Caustic | yellow green band |
| | Fluoride | light blue w/red band |
| | Lime slury | Light green |
| | Ozone | yellow w/ orange band |
| | Phosphate compound | Light green w/green band |
| | Potassium permanganate | Violet |
| | Soda ash | Light green w/orange band |
| | Sulfuric acid | Yellow w/red band |
| | Sulfur dioxide | Light green w/yellow band |

| | | |
|---|---|---|
| | Back wash waste | Light brown |
| | Sewer | Dark gray |
| | Compressed air | Dark green |
| | Gas | Red |
| | Other pipes | Light gray |

**Water and other treatment plant pipe line colour coding**

| Types of pipe | Use of pipe | Colour of pipe |
|---|---|---|
| Sludge lines | Raw sludge | Brown w/black band |
| | Sludge recireculation or suction | Brown w/yellow band |
| | Sludge draw off | Brown w/orange band |
| | Sludge recirculation | Discharge - brown |
| Gas lines | Sludge gas | Orange (or red) |
| | Natural gas | Orange (or red) w/black band |
| Water lines | Non potable water | Blue w/ black band |
| | Potable water | Blue |
| | Water for heating digestors or buildings | Blue with a 6 inch (150mm) red band space 30 inch (750mm) a park |
| Other lines | Chlorine | Ywllow w/red band |
| | Sulfur dioxide | Gray |
| | Sewage (waste water) | Green |

TASK 3: **Paint the pipe line as per ISI colour code**

1 Pipe colour code and pipe line painting, tag, bands are standard.

2 There are two type of colour code used. They are a american standard pipe and pipe line colour code and british standard pipe and pipe line colour code.

3 Before painting the pipe or change the pipe line you should know the following information.

- ASME/ANSI – A 131 – scheme for identifications of piping system.
- BS 1710 – Specification for identification of pipe lines and services.
- IS 2379 – pipe lines identification colour code.
- PFI ES, 22 – Recommended practice for colour coding of piping materials.

**Standard HTML colours (16nos)**

Black, white, gray, silver, maroon, red, purple, fushisia, green, lime, olive, yellow, navy, blue, teal, aqua.

**24 Colours standard colour code**

Yellow, blue, brown, orange, green, red, violet, black, carnation pink, yellow orange, blue green, red violet, red orange, yellow green, blue violet, white, violet red, dandelion, cerulean, apricot, scarlet, green yellow, indigo and gray.

4 Select the paint colour according previous colour applied on the pipe.

5 Ensure pipe circumbrance surface is very clean, if need clean it before start the painting on it.

6 Read instruction printed on the paint packing label.

7 Select the painting tools and clean it before use.

8 Prepare and apply the paint on the particular pipe with suitable painting tools. (brush or spray gun).

9 Ensure the paint colours for the water and chemical pipe colours as mentioned in task-2.

10 Apply paint thickness evenly on the pipe surface. If need apply one or two coats of paint for good shine.

11 Clean the debris of paint on the pipe lines.

12 Compare the paint colour with ISI colour code of pipe paints.

**Note:**

**1 Don't change the pipe colour and paint colour.**

**2 Don't paint the unwanted parts fitted between the pipe line lay out.**

**3 follow the safety precautions while painting on the pipeline like- chemical and gas pipe lines.**

**4 Wear the personal protective equipment while painting pipe lines.**

**5 Different countries use different types of pipe colours. So refer the particular country pipe line colour standard.**

# Practice on safety procedures in industrial pipe line painting

**Objective:** At the end of this exercise you shall be able to
- **follow the safety procedure in industrial pipe line painting.**

## Requirements

**Tools/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1 No. |
| • Safety chart | - 1 No. |
| • PPE kit | - 1 No. |
| • Scraper | - 1 No. |

**Equipments**

| | |
|---|---|
| • Spray gun | - 1 No. |
| • Air compressor | - 1 No. |
| • Computer system with net connection | - 1 No. |

**Materials**

| | |
|---|---|
| • Paint | - as reqd. |
| • Thinner | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |
| • Emery paper | - as reqd. |

## PROCEDURE

**Safety procedures in industrial pipe line painting**

1 Read the safety data sheet about products, information with in on SDS generally includes physical properties, chemical properties, instruction for safe handling, emergency control measures clear about the following safety measures.

1 Product identification

2. Hazard identification

3. Information about ingredients

4. First aid measures

5. Fire fighting measure

6. Accidental release measures

7. Handilng and storage

8. Exposure controls/personal protection.

- Physical and chemical properties
- Stability and reactivity
- Toxicological information
- Ecological information
- Disposal information
- Transport information
- Regulatory information

2 Other facts including date of preparation or last painting date.

3 Use the PPE depend upon job condition and special attention should be taken while painting the industrial pipe line.

4 When you are work in trenches or deeper place must have ladders, steps, ramps or other safe ingress and egress for painter.

5 The temporarily supporting a building pipes are danger of collapse during painting or repair. So take safety measures during painting.

6 Wear proper personal protective equipment

7 Implement, enforce and follow a comprehensive written safety program.

8 Abide by all posted procedures and avoid unsafe conditions

9 Report all hazards and unsafe conditions to designated personal.

10 Before start the painting select and apply appropriate anti-corrosion products to pipe in above or below grade environments requirement.

11 Follow the paint application procedures to safety measures published in technical data by manufacturer.

**Note: Instructor should be demonstrate the safety procedures in industrial pipe line painting by video and charts display in a class room.**

# Practice to identify colour code wise pipe lines and valves

**Objectives:** At the end of this exercise you shall be able to
- **identify the colour code wise pipe lines**
- **Identify the colour code wise valves fitted between the pipe lines.**

## Requirements

**Tools/Instruments**

- Trainee's tool kit - 1 No.
- Paint ISI colour code manual - 1 No.
- Pipe line layout chart - 1 No.

**Materials**

- Cleaning solvent - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.

## PROCEDURE

**Identify the pipe line with help of paint colour code**

1 Refer the pipe line paint colour code table given by the paint manufactures.

2 Identify the olive green raw water pipe line.

3 Identify the dark blue clean water pipe line.

4 Identify the brown with black bonds raw sludge water pipe line.

5 Identify the brown with yellow bonds water sludge section pipe line.

6 Identify the brown with orange bonds water sludge draw off pipe.

7 Identify the brown colour water sludge recirculation discharge pipe line.

8 Identify the blue with black bonds non-potable water pipe line.

9 Identify the blue with a 150mm red band water for heating digestors pipe.

10 Identify the sludge gas pipe line with orange or red colour line.

11 Identify the orange with black band natural gas pipe line.

12 Identify the orange colour alum chemical pipe line.

13 Identify the white colour ammonia chemical pipe line.

14 Identify the black colour carbon and slury chemical pipe line.

15 Identify the yellow with green band caustic soda pipe line.

16 Identify the yellow with red band sulferic acid pipe line.

17 Identify the light green with yellow band sulferic dioxide pipe line.

18 Identify the light brown black wash waste pipe line.

19 Identify the dark gray sever pipe line.

20 Identify the dark green compressed air pipe line.

21 Identify the domestic gas red colour pipe line.

22 Identify the soda ash light green with orange band pipe line.

23 Identify the pipe line valves fitted with pipe line.

**Note: Instructor should be guide to the trainee's to identity method with pipe line colour code manual.**

**Display the video of industrial pipe lines identical method by colour code system.**

# Practice to scrap the corrode metal surface

**Objective:** At the end of this exercise you shall be able to
- **scrap the corrode metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Scraper - 1No.
- Wire brush - 1No.
- Hand sander - 1No.

**Equipments**

- Power sander - 1No.
- Air compressor - 1No.

**Materials**

- Emery sheet - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Scrap the corroded metal surface**

1 Clean the metal surface with cotton cloth.

2 Use the abrasive tools to scrap the corroded metal surface. (Fig 1,2,3)

3 Use an electric sander to remove rust on large metal surface. Always start with the roughest grain and slowly move to finer grains to minimize the roughness of the metal.

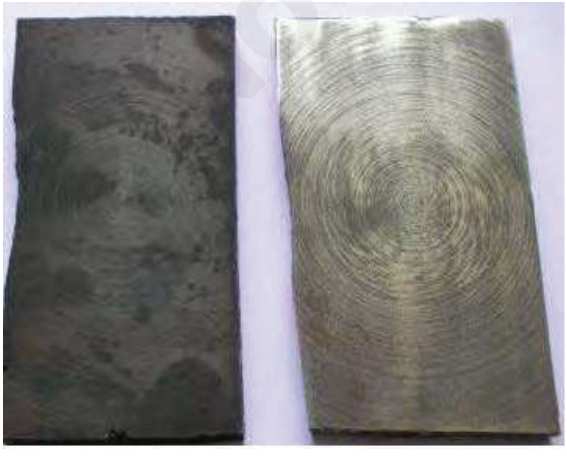
4 Any metal tool can be used to scrap metal, but use a fine grain sand paper after words try to remove any marks of the scraping may have made.

5 Use some citric acid in a plastic container and pour in hot water, enough to cover the item being cleaned. Watch the bubbles reacting on metal surface.

6 Leave overnight then rinse and dry it.

7 For heavier fabric with a worst rust stain you can also apply salt the area in addition to lemon juice.

Fig 1



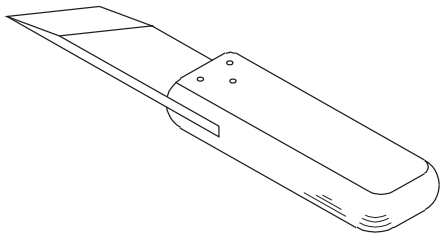
8 If metal is a stainless steel use a very fine grain sand paper and rub down the stainless steel with it in a circular motion. Follow this by rubbing it down with a slice of onion and rinse with hot water.

9 If heavy rust corroded on a thick metal surface apply costic soda paste on it and allow it to stay for few hours use a personal protective equipment. While apply costic soda paste and sanding the corrode metal surface.

10 After sanding clean the metal surface with hot water to remove caustic soda particles on metal surface.

Fig 2

Fig 3




11 Ensure the corrode metal surface is cleaned well.

# Practice to clean the metal surface by wire brush or orbital wire brush

**Objective:** At the end of this exercise you shall be able to
- **scrap the corrode metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Wire brush - 1No.

**Equipments**

- Power sander - 1No.
- Air compressor - 1No.

**Materials**

- Sand paper - as reqd.
- Cotton cloth - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Clean the corroded metal surface with wire brush**

1 Clean the metal surface by cotton cloth.

2 Apply soap water on the surface of corroded metal surface.

3 Apply clean hot water on the surface of metal.

4 Let it allow to dry.

5 Inspect the metal surface and mark the corroded area on the metal surface.

6 Select the metal wire brush or orbital wire brush according to the job need. (Fig 1,2)

7 Evenly rub the metal surface by metal wire brush until corrode rust completely remove from the surface.

8 Clean the sanded surface with cotton rag and clean water spray on the sanded metal surface.

9 Clean and let it allow to dry for few hours.

10 Again inspect the corroded surface. If need use the orbital wire brush to remove deep corroded surface. Give little more pressure on the orbital wire brush to rub the deep fitted area to make a clean surface.

11 Clean the metal surface and ensure the complete rust is removed and ready for metal priming.

Fig 1

PG20N25163H1

Fig 2

PG20N25163H2

# Practice to burn the paint from metal surface by blow lamp or gas flame

**Objective:** At the end of this exercise you shall be able to
- **burn the old paint on metal surface by blow lamp or gas flame.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Wire brush - 1No.
- Hand sander - 1No.
- Sander - 1No.

**Equipments**

- Oxygen and acetylene gas unit - 1No.
- Blow lamp - 1No.

**Materials**

- Cotton waste - as reqd.
- Emery paper - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Burn the paint on the metal surface by blow lamp or gas flame**

1 Clean the metal painted surface and select the necessary tools and materials include blow lamp gas torch, wire brush medium grit sand paper and lacquer thinner.

2 Protect the wire, rubber and glass items fitted with metal part.

3 Prepare the blow lamp or gas plant to apply flame on the metal surface.

4 There are many ways that you can use to remove paint. Mainly one extreme way to remove paint is by using blow lamp flame or propane torch.

5 Apply blow lamp fire flame on the painted area, the intense heat causes the paint to soften.

6 Ensure the paint is fully soften by heat.

7 Scrape away the paint with help of scraper or cotton cloth.

8 Apply blow lamp flame heat also softens the surface underneath the paint as wall.

9 If the surface is made from flammable material such as wood then a fire could easily break out.

10 That is why it is better only to use a torch flame for paint removal, if the material underneath the surface is non-flammable.

11 Painting is the best material to have underneath paint because it can with stand intense flames.

12 If the surface you are working on is flammable (like wood) it is better to use alternatives like heat gun.

13 Light the torch or gas flame and maintain distance of at least six inches from the metal surface.

14 Gently move the flame along the metal surface continuously.

15 Don't keep the flame in one area because it could cause over heating.

16 Turn off the flame if the blister from the surface.

17 Take the scraper tool and scrape away the paint that has how soften.

18 You must be quick because the paint will turn hard fast.

19 Heat the different area of the surface once you have scraped off the paint from the first area.

20 Keep repeating this pattern until you get to other end of the surface, and then scraped away all the paint possible then go back to the beginning again.

21 Repeat the process by softening the paint and scraping it away until there is no paint left any where.

22 Use a wire brush if some of the paint does not scrap off with the other tool.

23 Wait a couple of minutes for the surface to cool down.

24 Take wire brush and soak its bristles into the lacquer thinner solvent.

25 Use the bristle brush to brush off the residue that remains.

26 Be carefull of the solvents because they are flammable.

27 That is why the surface must be cool before you start apply the brush and lacquer.

28 Grab the medium grit sand paper and sand the surface manually.

29 Any residue that still remains should get taken off easily by the sand paper.

30 If the paint gets removed completely then you can start painting the surface.

Fig 1

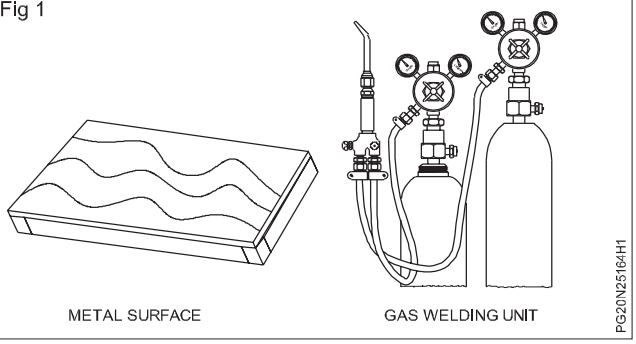
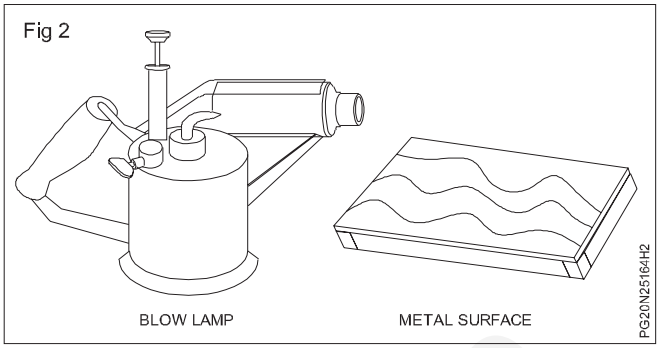



Fig 2



# Practice on dry sanding with help of emery paper/cloth

**Objective:** At the end of this exercise you shall be able to
- **sanding the metal surface with help of emery paper.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Scrub pad - 1No.
- Brush - 1No.

**Equipments**

- Air compressor - 1No.
- Woodbuffer - 1No.

**Materials**

- Cotton waste - as reqd.
- Emery paper - as reqd.
- Soap oil - as reqd.
- Cleaning solvent - as reqd.

## PROCEDURE

**Sanding the metal surface with help of emery paper**

1 Clean the metal surface with help of cotton cloth.

2 Emery cloth and sandpaper are man made abrasives that contain natural minerals and elements. The rough outer layers of each creates friction against a metal surface so that smoothing the surface to the desired texture.

3 Sanding is a part of metal surface restoration and doing it properly makes the difference so and so stellar refinishing job.

4 Sanding remains a part of the job even after applied the finish, graduate the different range of grits according the nature of metal surface.

5 Most sanding job involve a progression from coarse to finer grades of sand paper rough sanding to finish or stripper residue and smooth defects 50 of grit 80 grit paper enough for most materials.

6 Second pass with the next highest grit either 100 or 120 grit smooth the paint scratch marks and final pass by hand using 150 grit paper 160 grit, 220 grit and above grade grit sand paper use for further make a neat surface.

7 The best sand paper for metal sanding sand paper comes in grit sizes that range from 12 to 1200 grit.

8 Sanding with sand paper is used for stripping bulk sanding and shaping, medium grits are for smooth sanding metal or polishing finishes.

9 When you are sanding the metal surface wear the eye protection and breathing protection against the saw dust.

10 Use the 400-600 grit sand paper between coats of varnish or paint.

11 Fine sand paper used for final sanding and grit 60-100 is used for primary sanding.

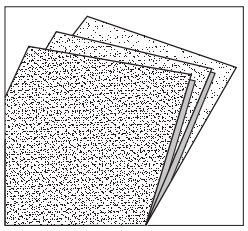
12 Sand paper or sanding cloth is used for removing old finishes.

13 Sand paper and sanding cloth is different each other.

14 After final sanding clean with soft cloth and then clean the metal surface with light hot water with mixing a detergent solution.

15 Ensure the metal surface is ready for apply the metal conditioner and metal primer on it.

Fig 1



EMERY SHEET

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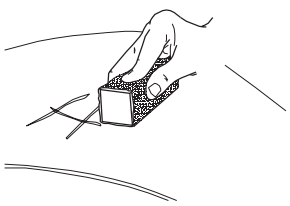
Fig 2



HAND SCRUB PAD

PG20N25165H2

# Practice on apply wet sanding on old painted object

**Objective:** At the end of this exercise you shall be able to
- **apply wet sanding on old painted surface.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Scrub pad | - 1No. |
| • Bucket | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Power sander | - 1No. |

**Materials**

| | |
|---|---|
| • Wet sand paper | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Wet sanding on old painted metal surface**

1 Select the object to remove old paint by wet sanding.

2 Clean the metal surface with clean cotton cloth.

3 Select the sanding tools and materials for wet sanding the metal surface.

4 Wet sand the surface by using water and emery sheet.

5 Wipe down the surface to be sanded by spray water on the surface and wipe it again spray metal degreaser on the surface and wipe with a clean rag, spray the surface with water once again and wipe with a new clean rag.

6 Use the 180 grit sand paper designed specifically for wet sanding to an orbital sander. Fill a small bucket with water and dip the attached sand paper in to the bucket do not under any circum brances dunk the sander in water as there is a chance of electrical shock. Wet just the paper.

7 Water spray the area to be sanded thoroughly and stop as necessary to apply more water. Sand the surface in a slow steady motion.

8 Replace the 180 grit sand paper with 320 grits sand paper, dip the attached paper in the bucket of water. Spray the entire surface with water before sanding the area again maintain the same slow, steady peace. Apply water to the surface as necessary do not let the surface go dry.

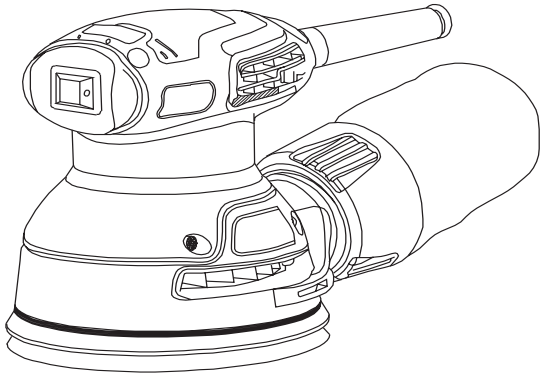
9 Spray the surface with water and wipe again with clean cotton cloth. Spray metal degreaser on the surface and wipe the area using a clean rag.

10 Replace the 320 grit sand paper with 460 grit sand paper dip it into the bucket of water spray, the surface of metal until covered with water before sanding.

11 Spray water on the surface again and wipe with a cotton cloth spray metal degreaser on the surface and wipe with clean rag.

12 Replace the 460 grit sand paper with 600 grit sand paper dip it into the bucket of water and spray the surface with more water, sand the area longer with this grit paper to remove sanding marks and to achieve a high shine, clean first with water then metal degreaser to finish the job.

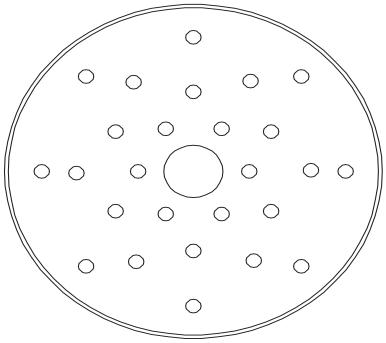
Fig 1



POWER SANDER MACHINE

PG20N25166H1

Fig 2



SANDER DISC

PG20N25166H2

# Practice to clean the metal surface by sander machine

**Objective:** At the end of this exercise you shall be able to
- **clean the metal surface by sander machine.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.

**Equipments**

- Hand sander machine - 1No.
- Power sander machine - 1No.
- Air compressor - 1No.

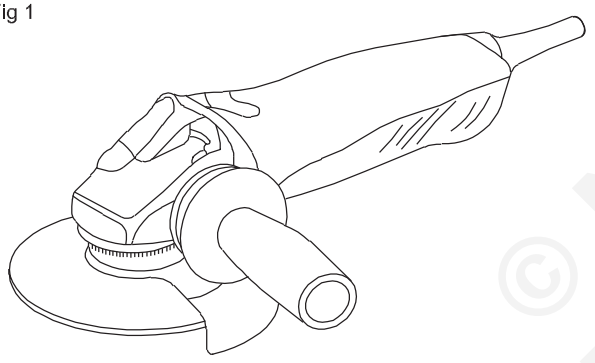
**Materials**

- Emery sheet - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Metal primer - as reqd.

## PROCEDURE

**Metal surface cleaning by sander machine (Fig 1)**

Fig 1



SANDER MACHINE

PG20N25167H1

1 Select the metal to clean the surface.

2 Select the tool and equipments for metal surface cleaning.

3 Prepare the sander machine and fix the suitable sanding disc on sander machine.

4 Clean the metal surface with clean cloth.

5 Clean the metal surface with clean water.

6 Clean the metal surface with clean cotton cloth.

7 Sanding the metal surface with sanding machine at even speed on metal surface.

8 Sanding the complete metal surface to remove the old paint and dust, deposited on the metal surface.

9 After sanding the rust metal surface clean the rubbed metal particles layered on the metal surface by applying compressed air on the metal surface.

10 Clean the sanded area of metal surface with clean cloth.

11 Apply water pressure on the sanded dust particles and clean the surface with clean cotton cloth.

12 Inspect the sanded metal surface if you are not satisfied on metal surface again follow above steps still your satisfaction for fine metal surface for further process.

— — — — — — — —

# Practice to level the different metal surface by portable hand grinder

**Objective:** At the end of this exercise you shall be able to
- **grind and level the different metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.

**Equipments**

- Portable hand grinder - 1No.
- Air compressor - 1No.

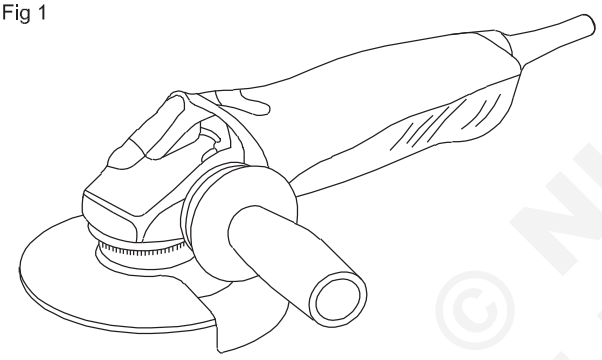
**Materials**

- Emery sheet - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Metal cleaning solvent - as reqd.

## PROCEDURE

**Different metal surface preparation by sanding with portable hand grinder (Fig 1)**

Fig 1




PORTABLE HAND GRINDER

1 Surface preparation is the essential before the application of any coating.

2 Scrapers and wire brushes is relatively ineffective in removing mill scale and adherent rust so power tools offer a slight improvement over manual methods.

3 Select the different metals for surface preparation by portable hand grinder.

4 Select the portable hand grinding machine for sanding the metal surface.

5 Clean the metal surface before sanding it.

6 Follow the safety precautions when using a portable hand grinder.

7 Guards must be provided and adjusted properly as per the manufactures manual instructions.

8 Replace the damaged guards because if an abrasive wheel breaks, while rotating it can cause a serious injury.

9 Before use the grinder, check the grinder running speed as specified limit.

10 Follow the manufacturer's manual instructions for the safe use of grinder wheel guards.

11 Clean and service the grinder before use for sanding.

12 Wear safety goggles to protect against flying particles.

13 Use gloves, aprons, safety boots depending on the work.

14 Ensure the floor ground the work area is clean.

15 Don't use wheels that are cracked or those that excessively vibrate.

16 Don't operate the grinder on wet floors.

17 Keep the power cord away from the grinding wheel and the material being ground.

18 Never exceed the grinder wheel speed limit.

19 Ensure the grinder wheel face is contact with metal grinding surface.

20 Stand away from the wheel when starting grinder and warn co-workers to do the same.

21 Ensure the wheel mounting flange surface are clean and flat.

22 Use the mounting blotters supplied by manufacturers.

23 Use a appropriate ventilation exhaust system to reduce inhalation of dusts, debris and coolant mists.

**Note:**

**Don't use grinder near flammable materials.**

**Don't use any liquid coolants with portable hand grinder.**

**Don't use the wheel with a maximum RPM that is lower than the RPM rating of the grinder.**

**Don't wear loose clothing or dangling jewellery as they may get caught in the moving parts of the grinder.**

24 Use the portable hand grinder to sanding the metal surface.

25 Select the hand grinder wheel according to metal types and quality.

26 Clean the metal surface with water detergent solution.

27 Clean the metal surface with clean cloth and allow the metal surface to dry.

28 Switch on the hand grinder and set the wheel speed.

29 Run the grinding wheel on metal surface even pressure and speed.

30 Sanding should be cover on complete metal surface.

31 After sanding clean the metal surface to remove the dust and debris deposited on the metal surface.

32 Apply low pressure water spray on sanded metal surface.

33 Clean the metal surface with clean cotton cloth.

34 Inspected the sanded metal surface and ensure the surface level is ready for further painting process.

35 Clean the portable grinder and store it in proper safety place.

— — — — — — — —

# Practice on apply de-greasing process on metal surface

**Objective:** At the end of this exercise you shall be able to
- **grind and level the different metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.

**Equipments**

- Spray gun - 1No.
- Air compressor - 1No.

**Materials**

- Cotton cloth - as reqd.
- Degreasing solution - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Method of de - greasing process on metal surface**

1 Select the metal object to de- greasing.

2 Select the de-greasing solution to apply on metal surface to remove the grease and dust deposited on the metal surface.

3 Select the cleaning chemical solution depend up on the base metal quality.

4 The chemical may be apply by the method of wiping and spraying.

5 Clean the metal surface with clean cloth.

6 Put a little rubbing alcohol on a soft cloth and rub the metal part until the grease disappears.

7 You may need to apply more alcohol to the cloth and keep rubbing for a few minutes to remove stubborn grease layered on the metal surface.

8 Knock off degreasing 60-70°.c for 3 minutes.

9 Apply degreasing chemical at 60-70°c and allow it for 8 minutes and then clean with soft cloth. (Fig 1)

10 After cleaning, inspect the metal surface and ensure there is no grease layer on the surface.

11 After degreasing apply low pressure cold water and rinse with soft cloth for 1minutes. (Fig 2)

12 Water dry off at 80°c atleast 3-4 minutes

13 After water dry off, check the metal surface, whether deep grease deposits are removed or no.

14 If still grease or oil layer is there follow the above steps until remove the grease oil from the metal surface.

Fig 1


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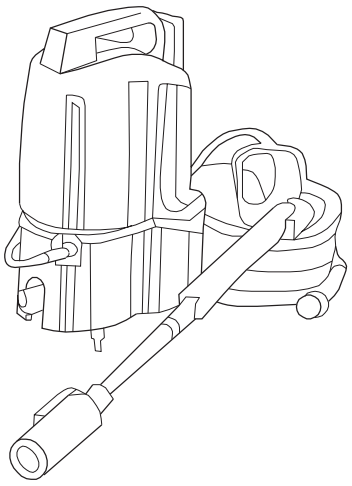
Fig 2



PG20N25169H2

# Practice on apply de-rusting process on corrode metal

**Objective:** At the end of this exercise you shall be able to
- **de-rusting the corrode metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Wire brush - 1No.
- Scraper - 1No.

**Equipments**

- Sanding machine - 1No.
- Air compressor - 1No.
- Spray gun - 1No.

**Materials**

- Metal condioner - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.
- Emery sheet - as reqd.

## PROCEDURE

**De-rusting process on corrode metal surface**

1 Select the corrode metal for de-rusting process. (Fig 1)

2 Select the sanding materials and tools.

3 Wear the safety PPE before start the de-rusting process.

4 Clean the corrode metal surface with clean cloth.

5 Apply water wash on the metal surface before de-rusting process.

6 Dry off the wet surface and inspect the metal surface.

7 Use the wire brush to remove the rust deposited on the metal surface and clean it by air pressure.

8 If any heavy rust is formed on the metal surface use the scraper to remove it.

9 If any deep rust is formed, use the chemical solution to remove the rust.

10 Apply the selected acidic chemical solution on the metal surface for remove the deep rust deposited on the metal surface.

11 After the specified limit time sanding the metal surface.

12 Clean the metal surface with pressure water spray on sanded area to remove rust and sanded dust particles.

13 Clean the metal surface with soap water solution.

14 Wipe the metal surface with clean cloth.

15 Inspect the metal surface for identify the rust deposited on the metal surface.

16 If found any small rust formation use sand paper or grinder sanding to remove the rust

17 Ensure there is no any rust on metal surface and it is ready for next painting process.

18 Apply metal conditioner on the prepared metal surface to avoid rust formation.

Fig 1

# Practice on treated phosphating on metal surface with pre-treatment process

**Objective:** At the end of this exercise you shall be able to
- **prepare the metal surface by using pre-treatment phosphating on metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Hand sander - 1No.
- Wire brush - 1No.
- Scraper - 1No.

**Equipments**

- Sanding machine - 1No.
- Air compressor - 1No.
- Spray gun - 1No.

**Materials**

- Cotton cloth - as reqd.
- Sand paper - as reqd.
- Soap oil - as reqd.
- Antirust solution - as reqd.

## PROCEDURE

**Phosphating on metal surface with pre treatment process**

1 Select the metal for phosphate treatment on the metal surface.

2 Clean the metal surface with cotton cloth.

3 Clean the metal surface with soap water and apply low pressure water spray on surface.

4 Clean the surface with clean cloth and allow it to dry well in room temperature.

5 Inspect the metal surface and mark the area to be sanding with sanding tools.

6 Sanding the marked area and clean it by air pressure.

7 Ensure the metal surface level is in uniform position.

8 If found any rust on the metal surface use the hand power grinder for sanding and removing the rust formed on the metal surface.

9 Incase rust formed on full metal surface apply the rust removing chemical solution on the metal surface and allow it for few minutes on it.

10 Sanding the chemical solution applied portion of the metal surface and clean it with water pressure spray.

11 Clean the surface with dry cloth and allow it for dry.

12 Apply phosphate to remove degreasing, water rinsing, protecting oiling and then drying in that sequence.

13 Phosphating is the most widely used to pretreatment.

14 It serves as an excellent paint base.

15 Increases corrosion resistance of metal paint.

16 Aids cold forming steel and increases the lubricant power of the oils applied to the pieces subjected to friction and wear.

17 Normally phosphating baths use a zinc phosphate, magnese phosphate or iron phosphate base. Among these the zinc phosphate is the most utilized mainly as a base for paint on the metal surface.

18 Magnese phosphate serve as an excellent paint base.

19 Phosphate treatment is crystalline and their gain size influences in an inverse way the resistance to corrosion resistence.

— — — — — — — —

# Practice on different types of industrial painting system

**Objectives:** At the end of this exercise you shall be able to
- **surface preparation of an industrial machineries**
- **apply the different type of paint coating**
- **inspect the drying of paint coating**
- **play video on different types of painting system.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Scraper - 1No.
- Abrasive pads - 1No.
- Chisels - 1No.
- Knives - 1No.
- Chipping hammer - 1No.

**Equipments**

- Power sander - 1No.
- Sealer - 1No.
- Needle guns - 1No.
- Impact cleaning tools - 1No.
- Rotary impact cleaning kit - 1No.
- Spray gun - 1No.
- Paint booth - 1No.
- Water jet sprayer - 1No.

**Materials**

- Emery sheet - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.

## PROCEDURE

TASK 1: **Surface preparation**

1 Remove oil, grease and other contamination with a suitable detergent, followed by high pressure water washing, automatic solvents can also be used to remove the contaminants on the articles surface.

2 Remove all weld spatters and round off all the sharp edges prior to further surface preparation.

3 In case you find any soap/alkali deposits on weld joints, remove the same by fresh water washing and scrubbing with stiff nylon brushes.

4 Apply grit blasting to sa 2 1/2 to sa 3 of swedesh specification. Use severe exposure conditions. Grit blasting to sq 3 is recommended for optimum results. The surface profile after blast cleaning shall be 50 – 75 microns.

5 Substrate temperature should be 3°.c to 50°.c but not above 50°.c and relative humidity should be above 50%.

6 If need apply putty on the surface and allow to dry. There after sanding it for leveling the surface.

**Note:**

**1) Use steel grits, aluminum oxide grits or similars_harp edged abrasives free of foreign matters and soluble salts**

**2) Steel grit with particle of 0.2 – 1.0 mm or aluminium oxide of 0.4 – 1.8 mm should generally help to achieve the surface profile of 50 – 75 microns 100 PSI pressure application**

**3) In organic zinc silicate coatings should be applied by spray application only, brush application can be used only for touch up areas.**

7 After sanding the metal surface, clean the sanding dust by apply air pressure, water wash and dry off method.

8 Inspect the surface, and ensure it is in shining level and ready for painting process.

— — — — — — — —

TASK 2: **Industrial painting process**

1 Clean the industrial articles surface to be painted.

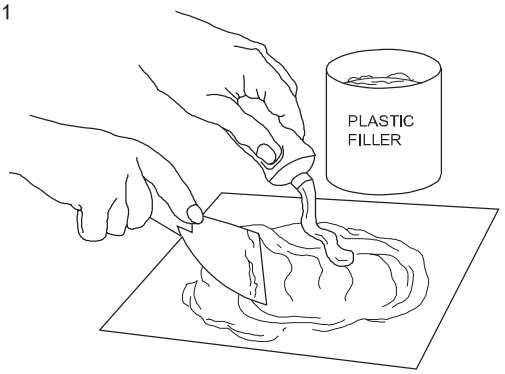
2 Inspect the metal surface and apply the metal conditioner and metal primer on the surface at even thickness of layers. (Fig 1)

3 Allow it to dry off time atleast 3 to 4 hours between coats. (Fig 2)

4 Note high deposition of primer film thickness can be result in mud. Cracking while lower dry film thickness

can affect the performance of coating incase one needs to augment the draft, apply one more coat of over thinned primer within 24 hours.

Fig 1




MIXING PLASTIC BODY FILLER AND HARDNER

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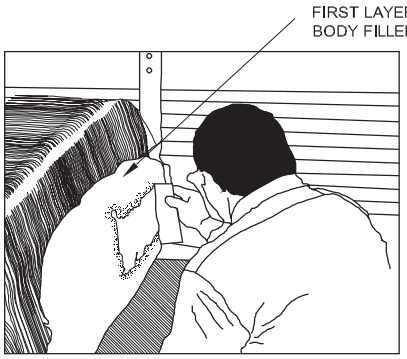
Fig 2




APPLYING A SECOND COAT OF PLASTIC BODY FILLER OVER THE FIRST COAT

PG20N25172H2

5 Incase recoating of zinc silicate with epoxy / chloro /polyurethane coatings, use a suitable tie coat to avoid formation of white rust.

6 Ensure that the primed surface is thoroughly dry before over coating.

7 Painter should wear adequate personal protective equipments air fed mask, safety glass, gloves.

8 Select the paint materials.

9 Prepare the paint under your instructor's guide line.

10 Check the viscosity of the paint before apply the paint on the surface.

11 Select the paint coating method which is suitable to object paint match with previous painting. Select the any one of the following painting method. Low volume high pressure (LVHP), High-volume low pressure (HVLP) Air spray, air less spray, Electrostatic spraying, powder coating, rotary atomizing, paint dip coating, paint flow coating, paint curtain coating, paint roll coating, electro coating, auto deposition method.

12 Filter the paint mixture through a wire screen of 30-60 mesh, keep the mixture continuously stirred during application and ensure that it is used within 4 hours.

13 Avoid part mixing of the paint.

14 Before start the paint check the primer coat curing by rubbing the coating with cotton cloth soaked in thinner. If the coating remains unaffected, the curring is complete.

15 Painted structures should be kept at least 4 inches above ground.

16 Good ventilation is essential in confined areas.

17 Apply first coat paint on the object surface.

18 Reduce the amount of over spray and reduce the VOC (Volatile organic compound) and HAP emissions while paint spraying.

19 Maintain the specified distance between spray gun and object.

20 Keep the gun perpendicular to the surface being painted, angling the gun leads to some of spray being too far from your product surface and a decrease in transfer efficiency

21 Allow the dry off time before apply 2nd coat or top coat.

22 Apply second coat or top coat paint and allow it for dry over night.

23 Clean the painted surface with soft cloth and inspect the painted surface.

24 After painting of 1st, 2nd and top coat's each inspection shall be documanted and at the end of the job, if any defect deviation detected during inspection shall be rectified to the full satisfaction of inspection.

**Note:**

**1 Instructor should be display the video in smart class room about different type of industrial painting system**

**2 Trainees should be practiced on above mentioned different type of painting systems as per video display in class room.**

— — — — — — — —

# Practice on make a proper thin metal primer by brush application

**Objective:** At the end of this exercise you shall be able to
- **apply thin metal primer by brush application.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint brush - 1No.
- Paint bucket - 1No.
- Scraper - 1No.
- Paint mixing rotator - 1No.

**Equipments**

- Air compressor - 1No.
- Power grinder - 1No.
- Sander blaster - 1No.

**Materials**

- Metal primer - as reqd.
- Metal care putty - as reqd.
- Emery sheet - as reqd.
- Soap oil - as reqd.
- Anti rust solution - as reqd.

## PROCEDURE

**Metal primer application method**

1 Clean the industrial object by clean cloth.

2 Inspect the metal surface if need sanding, sand it by sanding tool.

3 Clean the sanded area and inspect the sanded surface.

4 Prepare the metal conditioner. Before apply metal conditioner read the instructions printed on the metal conditioner packing label.

5 Apply metal conditioner on the cleaned metal surface by brush at even thickness.

6 Inspect the metal surface for defects deep cavity cracks, gaps, dent etc.

7 If need apply putty for level the metal surface, after apply putty let allow to dry for 6 to 8 hours and then sanding it.

8 Clean the metal surface and ensure surface is in proper level.

9 Select the metal primer and mix the thinner with primer as per given direction on the primer packing label.

10 Select the suitable paint brush to primer application.

11 Clean the paint brush with clean cloth.

12 Dip the paint brush tip in primer container and wipe the paint brush tip to wipe the excess primer on the brush tip.

13 Apply primer coat on the metal surface by given even pressure on the brush. Use the brush stroke in one direction to cover all the metal surface.

14 Ensure the metal primer layer is even in whole surface.

15 Allow it to dry for 12 hours for good result.

16 Inspect the primer applied area. If need apply primer one more coat for better quality.

17 Clean the primer applied area, ensure primer is properly applied as a thin coat on the metal surface.

18 Clean the paint brush and primer container and store it safety place.

19 Store the primer with air tight condition.

— — — — — — — —

# Practice on metal surface preparation and apply ready primer by brush

**Objectives:** At the end of this exercise you shall be able to
- **prepare the metal surface**
- **apply primer on the metal surface by brush.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Paint brush | - 1No. |
| • Sanding pad | - 1No. |
| • Scraper | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Jet car washer | - 1No. |
| • Power sander | - 1No. |
| • Sand blaster | - 1No. |

**Materials**

| | |
|---|---|
| • Metal primer | - as reqd. |
| • Thinner | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Putty | - as reqd. |
| • Emery sheet | - as reqd. |
| • Soap oil | - as reqd. |
| • Antirust solution | - as reqd. |

## PROCEDURE

TASK 1: **Metal surface preparation**

1 Clean the metal surface throughly with a wax and grease remover.

2 Throughly sand the metal by using grit wet or dry sand paper.

3 Re-clean the sanded metal surface with wax and grease remover.

4 Inspect the metal surface, if need apply putty on the metal surface where it is needed.

5 Let it allow the putty to dry off for few hours as per direction given on the putty packing.

6 Select the sanding tool and sanding it.

7 Clean the sanded area with clean cloth.

8 Inspect the sanded area and ensure it is ready for priming. Apply any one metal treatment before apply primer.

— — — — — — — —

TASK 2: **Method of primer application by brush**

1 Clean the metal surface with clean cloth.

2 Brush on a full wet coat of self etch primer to any exposed bare metal surface to improve adhesion and add to corrosion protection.

3 Only apply selfitch or epoxy primer to bare metal not on body filler or plastic parts.

4 Apply the first coat over the whole repair area. Then apply additional coat to smaller areas to build up the primer and fill the repair area.

5 Apply primer surface over the whole repair area (body filler, self itch primer, spot putty). If needed to help build and smooth the heavy sanded repair area up level with original paint surface.

6 Apply an under coat or sealer. If a self itching primer, filler is used, this step might not be necessary.

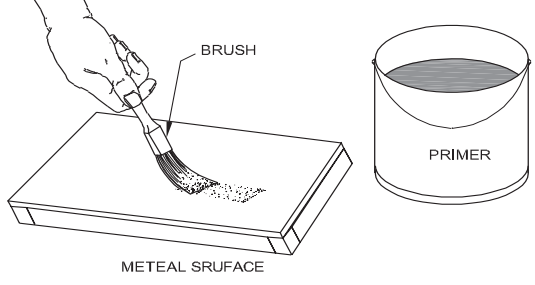
7 Once under coat refinish system in dry and then sanding it.

8 Wipe the sanded area with a tack cloth. The surface is ready for painting work.

9 Ensure the brushed primer coating is applied properly on the metal surface as specified thickness recommended by the primer manufacturersv.

**Note:Use the personal protective equipment while apply the primer with brush application.**

Fig 1

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# Practice on apply enamel/polyester putty or filler on primed surface

**Objective:** At the end of this exercise you shall be able to
- **apply anamel / polyster putty on primed metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint brush - 1No.
- Sanding pad - 1No.
- Scraper - 1No.
- Painting knife - 1No.

**Equipments**

- Air compressor - 1No.
- Power sander - 1No.

**Materials**

- Polyester putty - as reqd.
- Body filler - as reqd.
- Enamel paint - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Method of apply enamel / polyster putty on primed metal surface**

1 Clean the primed metal surface.

2 Select the enamel/polyester putty according to the type of repair.

3 Correct the pre-surface preparation with a grit sand paper between P-80 – P-120 and 5mm orbit depending. On the repair.

4 Correct the putty preparation of the mix. Check that the working tools have no trace of putty or hardener used in previous repairs, in order to make a smooth and regular application on the surface.

5 Try to minimize air inlet by stirring the putty mixture.

6 Making sure that the color obtained is uniform without color change or differences.

7 Calculate the amount of putty to be mixed according to room temperature.

8 Mix the putty with the hardener until the mixture hardens. (Fig 1)

9 Apply putty on the metal surface spread evenly, making even coats from one end to the other end and exerting appropriate pressure on the spatula.

10 This will enable removing air occurrent during application in order to obtain a smooth and regular surface.

11 Applying it in small amounts whenever possible, in curved areas. Use the rubber spatulas as they are more flexible.

12 Excessive putty apply is risk of having surface stiffness problems.

13 Insufficient amount of putty can also lead to adherence problems and to poor leveling of the surface to be sanded.

14 Always allow the putty drying time between 20 and 30 minutes at a temperature close to 20.c (it can vary depending on the type of putty) refer the putty manufacturers instruction printed on the putty packing label.

15 Excessive drying time will cause harden further making sanding difficult.

16 In sufficiant drying time, lead to clogging problems during sanding.

17 Sanding the putty applied area and clean it.

18 Inspect the putty applied area if need you can reapply putty in the more irregular areas.

19 Apply seam sealer to newly welded panels to prevent the water leakage.

20 Use the caulk gun to apply the seam sealer to panel joints. (Fig 2,3)

Fig 1

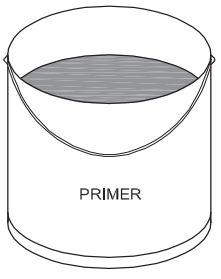


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Fig 2

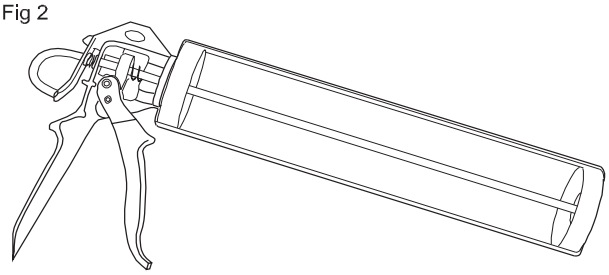

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Fig 3

TUBE

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21 Refer the manual instructions or computer based data to find out where and how seam sealer should be applied.

— — — — — — — —

# Practice on apply enamel paint on primed metal surface

**Objectives:** At the end of this exercise you shall be able to
- **prepare the metal surface**
- **priming the metal surface**
- **enamel paint on the prepared metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Scraper - 1No.
- Sanding pad - 1No.
- Paint mixing stick - 1No.
- Painting brush - 1No.

**Equipments**

- Power sander - 1No.
- Air compressor - 1No.
- Paint-spray gun - 1No.
- Buffer - 1No.

**Materials**

- Enamel paint - as reqd.
- Reducer - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.
- Sponge - as reqd.

## PROCEDURE

TASK 1: **Metal surface preparation**

1 Clean the metal surface with clean cloth.

2 Apply degreasing solution on the metal surface.

3 Clean the metal surface with pressure water and rinse with sponge or cotton cloth to remove the grease, oil and dust deposited on the metal surface.

4 Clean the metal surface with dry cloth.

5 Inspect the metal surface and mark the area to be sanding.

6 Select the sanding materials and tools.

7 Use sanding tool according the condition of metal defects.

8 Use the sand paper or hand sander or power or blast sanding system on the metal surface to remove the rust or dust formation on the metal surface.

9 Sanding the metal surface even pressure.

10 Level the surface on evenly.

11 If deep rust formation layer is on the metal use acid to remove the deep formed rusts.

12 Wear the personal protective equipments before apply the acid on the metal surface.

13 Sanding/scrapping the rust formed area.

14 Clean the dust and rust by air pressure apply on the metal surface.

15 After that apply water spray on the metal surface to clean the rust dust on the metal surface.

16 Clean the surface with clean soft cloth and then inspect the sanded area.

17 Ensure the complete rust and old paint dust is removed.

18 Ensure the surface is ready for metal priming process.

— — — — — — — —

TASK 2: **Method of metal priming**

1 Clean the metal surface before start the priming process.

2 Select the metal primer according the metal type.

3 Prepare the metal primer to apply on the surface.

4 Before applying primer carefully read the instructions, directions printed on the primer container label while because each manufacturer has specific formulations for their products.

5 Use proper reduction viscosity of primer material.

6 Use the primer spray application techniques and allow it drying time as specified by the manufacturers.

7 Apply one or two coating of primer as the condition of the metal surface.

8 If need putty application on the metal surface to cover the deep cavity, prepare the putty to apply.

9 Apply putty on the metal surface where it is needed.

10 Let it allow dry off time.

11 After the said dry off time sanding the surface to level the metal surface.

12 Clean the metal surface with clean cloth.

13 Apply low pressure water spray on the metal surface and clean it.

14 Wipe the water and dust on the surface, let it allow to dry for few hours and inspect the metal surface level.

15 Once again apply metal primer on the metal surface.

16 Apply sealer on the metal joints to cover the gab between the joint.

17 Ensure the metal surface is ready for enamel painting work.

— — — — — — — —

TASK 3: **Enamel painting on the primed metal surface**

1 Select the enamel paint.

2 Carefully read the manufacturers directions printed on the paint container label.

3 Use the proper reduction viscosity of paint material as per direction and instructions given on the paint container label.

4 Add paint additions when necessary.

5 Use the paint mixing sticks to easily convert ingredients percentages into part proportions and well mix the paints before start the painting process (Fig 1&2). Filter the paint before pour in the paint spray gun cup.

Fig 1

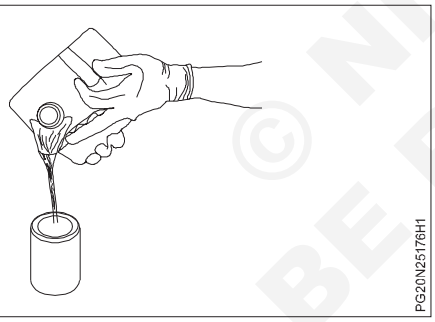
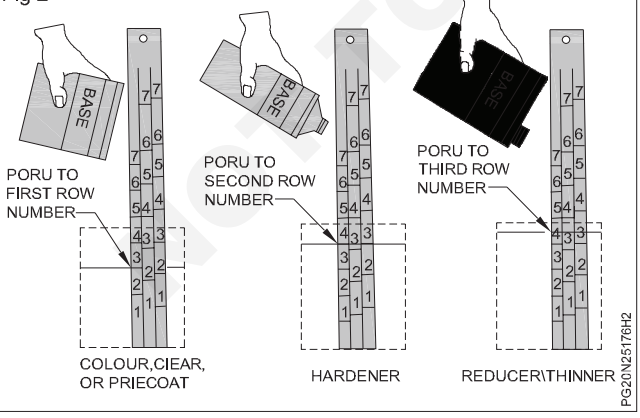



Fig 2




6 Use only the proper paint mixing ratio as per directions given on the label.

7 Clean the metal surface to be painted.

8 Prepare the painting tools to be used for painting work.

9 Ensure the proper painting environment of following (1) Cleanliness (2) Temperature / Humidity (3) Light (4) Compressed air (Spray gun) (5) Controlled ventilation (6) Fire safety in the painting shop floor.

10 Wear the personal protective equipment before start painting work.

11 Adjust the spray gun paint spray pattern.

12 Check the test spray pattern.

13 Maintain the distance of spray gun nozzle to the surface being painted (203 to 254 mm).

14 High spray gun pressure result in excessive paint loss through over spray and poor flow due to high solvent evaporation before the paint reaches the surface.

15 Low spray gun pressure produce poor drying characteristics due to high solvent retention and makes the paint film prone to bubbling and sagging.

16 Paint proper stroke is important in obtaining a good paint.

17 Spray gun should be kept aimed straight at flat surfaces job all the way across the metal surface.

18 Ensure the enamel paint is covered on all the metal surface.

19 Let it allow to dry off time. Then clean the painted surface and inspect base coat.

20 Once again apply second and top coat for more shining.

— — — — — — — —

# Practice on prepare the metallic article surface and paint by brush

**Objectives:** At the end of this exercise you shall be able to
- **prepare the metallic article surface**
- **priming the metallic article**
- **painting the prepared metallic article by brush.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Sanding pad - 1No.
- Scraper - 1No.
- Wire brush - 1No.
- Paint mixing stick - 1No.

**Equipments**

- Air compressor - 1No.
- Power sander - 1No.
- Water jet washer - 1No.

**Materials**

- Paint - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Thinner - as reqd.
- Emery paper - as reqd.
- Sander disc - as reqd.

## PROCEDURE

TASK 1: **Surface preparation of metallic article**

1 Clean the selected metallic article.

2 Water wash the metallic article with soap foam.

3 Clean the metallic surface with clean cotton cloth.

4 Inspect the metallic surface and mark the deep sanding required area.

5 Select the sanding tool according to need of sanding work.

6 Use the hand sander for light sanding work and use the power sander to remove the deep rust on the article.

7 Use the scrapper to remove heavy rust formed area on metallic part use the wire brush to stripping large surface rust and old paint and then use the sandpaper to get in the nooks and crannies.

8 After sanding, dust off by compressed air and by apply low pressure water spray with foam rinsing on the metallic surface.

9 Clean the metallic article by clean cotton cloth.

10 Ensure the metallic article rust and dust is removed.

11 Ensure there is no any damage on the metallic article if found any damage or crack repair it by suitable welding process.

12 After welding sanding/grinding the welded surface to make a level matching with remain metallic surface.

13 Failure to clean the metal properly will result in a lousy paint job. Then paint won't stick to the metal properly and will peel off easily.

— — — — — — — —

TASK 2: **Apply primer, putty, sealier on the metallic article**

1 Clean the sanded metallic article surface to be painted.

2 Spray the zinc-chromate before apply primer on the metallic to protect from the corrosion.

3 Prepare the metal primer, putty, scale with specified time gap.

4 Use the proper reduction viscosity of primer material.

5 Apply primer on the metallic surface by spray gun.

6 Ensure the primer is applied evenly on the surface.

7 Inspect the primed metallic surface and mark the area to be apply putty.

8 Apply putty on the marked area and let it allow drying for 3to 4 hours and more.

9 Sanding the putty applied area to make a level surface.

10 Clean the sanded area of the article and apply prepared sealer on the article's joints gap with help of caulk hand gun.

11 Clean the excessively applied sealers by using with help of putty whipping (plate) tool.

12 Apply one more coat of metal primer surfacer on the metalic articles surface. Allow the primer to dry throughly. Primer drying times vary from product to product.

13 Ensure the metal primer surfacer is applied evenly on the metallic surface.

14 Inspect the metallic surface, if found any defects, carried out before start the painting process.

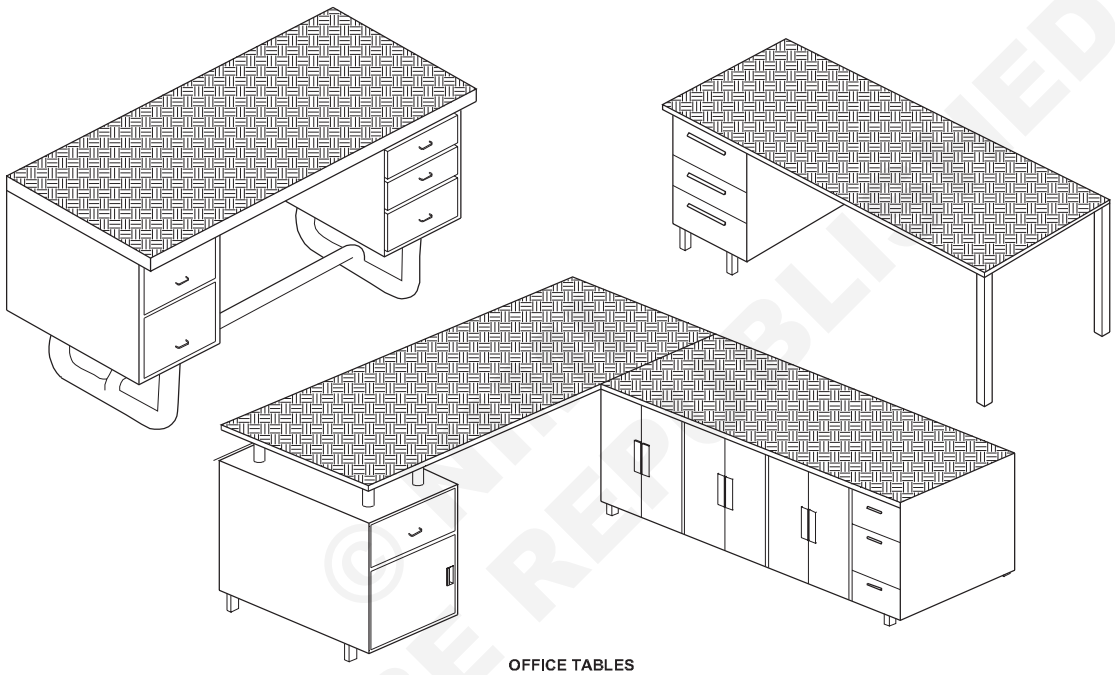
— — — — — — — —

TASK 3: **Metallic article painting with brush**

1 Clean the metallic article before start the painting process. (Fig 1)

2 Select the paint color to match with previously applied on the metallic article.

Fig 1



OFFICE TABLES

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3 Select the paint materials to protect the metallic article body substrate from the elements and moisture in the air would cause it to Rust.

4 Select the paint brush and clean it with clean cloth.

5 Use proper paint material reduction viscosity to apply paint on the metallic article by brush.

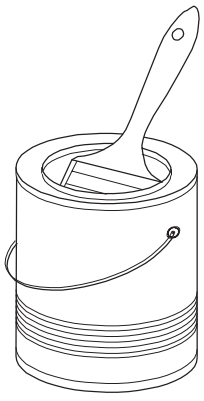
6 Carefully read the instruction and directions printed on the paint packing label before start the paint with brush.

7 Wet the paint Brush tip with water and clean it with clean cloth.

8 Dip the paint brush tip in paint and wipe the excessive paint on the brush tip. (Fig 2)

9 Apply paint on the metallic surface by brush stroke.

Fig 2



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10 Don't overload the bristles with paint, since this can be messy and create an overly thick first coat.

11 Allow the first coat to dry completely. The drying time will be vary product to product. Follow the instructions of paint manufacturs and instructions printed on the paint packing tin/plastic pet.

12 If you don't allow the first coat to dry completely the painted finish won't last as long (most acrylic paints dry quickly).

13 Apply a second coat of paint and make sure to apply the paint as evenly as possible.

14 Ensure the second paint coat, that the finished surface looks the best upon completion and provide additional protection and last longer on the metal surface.

15 It is possible to do first coat with one color of paint allow it to dry thoroughly and then paint a second coat with another color. This method is perfect for lettering or applying a logo to an object.

16 If use the acrylic paint, it is water resistant paint which means multiple layers can be applied to achieve different effects.

17 When you applying multiple layers, you must let the paint of each layer dry completly before applying the next one.

18 Allow the final coat of paint to dry for 36-48 hours before using metallic article.

19 Don't make the painted metallic article until painted coat dry. If you move article before paint dry this will cause for accidental damage to the finished surface.

**Note: Wear protective equipment when using a sanding, cleaning and painter work.**

20 Clean the painted surface with soft cloth and ensure the painted surface shining, if need do the polish on the painted surface as per your instructer guide line.

— — — — — — — —

# Practice on paint preparation and color making for deep painting

**Objective:** At the end of this exercise you shall be able to
- **paint preparation and color making for deep painting.**

## Requirements

### Tool/Instruments

- Trainee's tool kit - 1No.
- Paint mixing stick - 1No.
- Paint mixing rotator - 1No.
- Paint bucket - 1No.

### Equipments

- Paint color mixing machine - 1No.

### Materials

- Paint - as reqd.
- Paint solvent - as reqd.
- Paint pigment - as reqd.
- Thinner - as reqd.
- Reducer - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.

## PROCEDURE

TASK 1: **Paint preparation and color making for deep painting**

1 Select any two primary color and mix with each other then you will get secondary colors.

2 If you mix red and blue you will get violet color.

3 If you mix yellow and red become orange color.

4 If you mix all the primary color together you get black color.

5 For further practice to making different color refer the color wheel chart and practice to make different color paint in your paint shop lab (Fig 1-6).

6 Check it with your instructor.

Fig 1

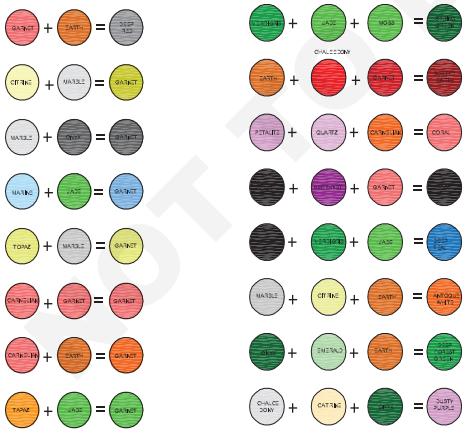

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Fig 2

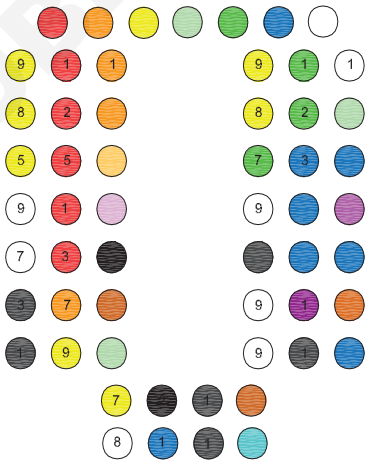

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Fig 3

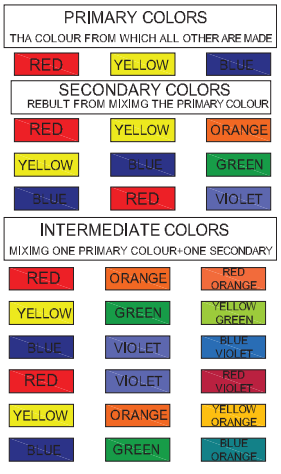


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Fig 4

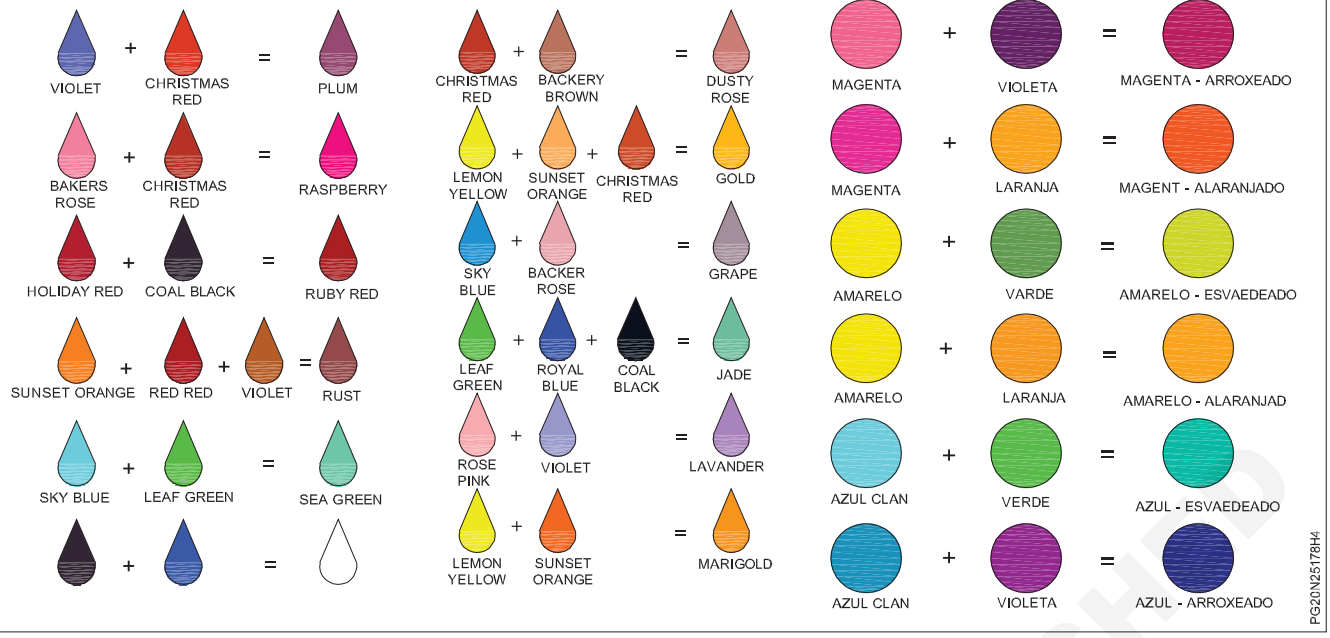



Fig 5

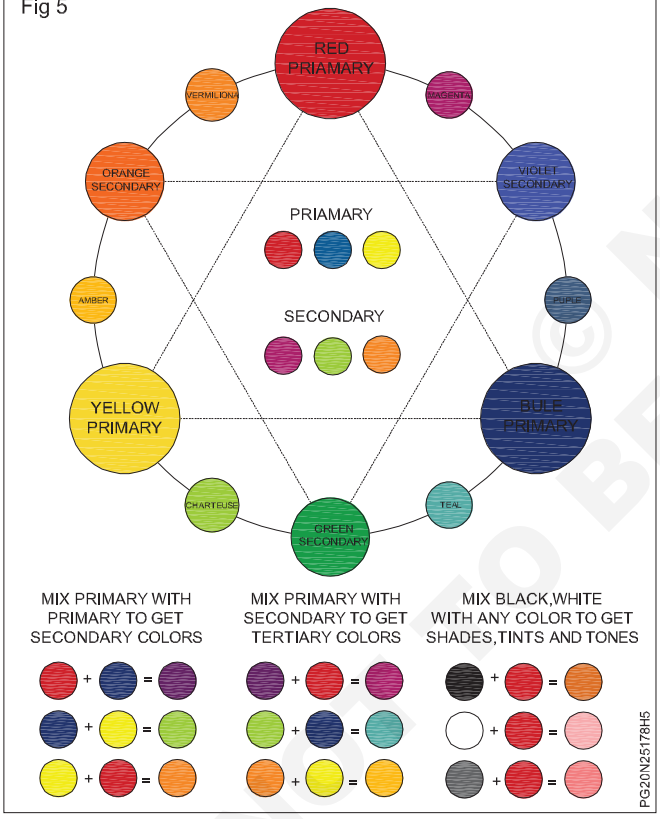
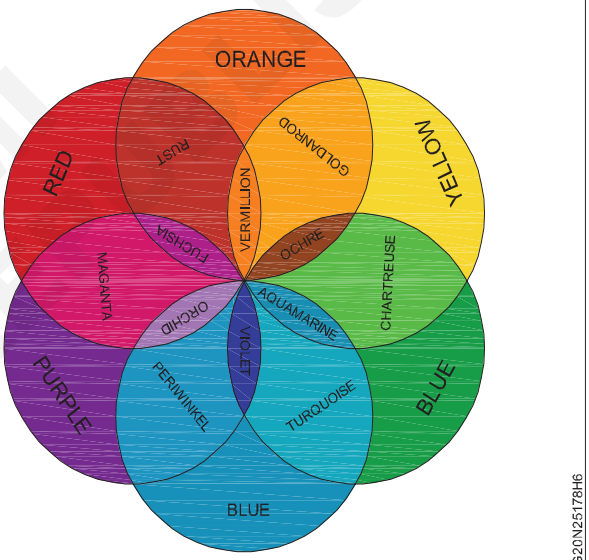



Fig 6




TASK 2: **Surface preparation guides for deep painting**

1 Use the soap and water emulsion as degreasing agent for cleaning any surface.

2 Remove any loose feeling paint and dents.

3 After sanding rinse the surface with fresh water to remove any grime, dust and dirt left on the surface.

4 Let it dry completely before priming.

5 Even if surface preparation is carried out appropriately improper environmental circumstances might effect the paint results. So it is recommended to check environmental conditions before painting.

6 Priming the metal surface it creates the strong foundation needed to bond with paint for last-longer.

7 Apply top coat on the primed surface.

8 If need recoat the paint.

# Practice on prepare the article for deep painting

**Objective:** At the end of this exercise you shall be able to
- **prepare the article for deep painting.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Sanding pad - 1No.
- Wire brush - 1No.
- Scraper - 1No.

**Equipments**

- Power sander - 1No.
- Air compressor - 1No.
- Water washer - 1No.

**Materials**

- Emery sheet - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Cleaning solvent - as reqd.
- Metal primer - as reqd.
- Anti Rust solution - as reqd.

## PROCEDURE

TASK 1: **Prepare the article for deep painting**

1 Select the article for painting job.

2 Find the material used for make a article.

3 Find its how many types of materials are used to make a article.

4 Clean the selected article by cleaning solvent.

5 Select the different type of sanding tool and materials.

6 Use the sand paper to clean the light Rust and old paints.

7 Use the scraper to remove the deep rust and thick paint on the article surface.

8 Don't use scrapper on the plastic parts.

9 Throughly sand the entire part with recommend grit abrasive paper.

10 Clean the surface with prepainting cleaning solvent.

11 Use any one of way to strip paint from the surface of article.

1) Chemical stripping

2) Media blasting

3) Sanding or grinding

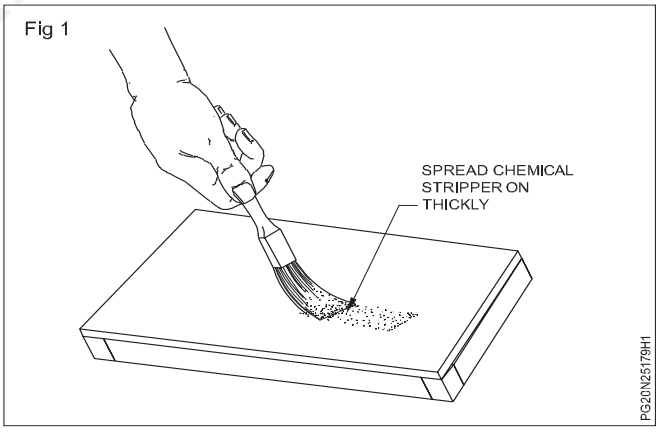
12 Use the chemical paint remove for striping large areas of paint (if environmental regulations allow chemical stripping is that there is no danger of the metal warping which is happen with media blasting).

13 Pay attention to warnings regarding ventilation, smoking and use of protective clothing such as pvc or rubber gloves, long sleeved shirt and safety gogles while using chemical paint remover.

**Note: Chemical paint remover will cause irritation and burning of the skin or eyes.**

14 Apply the chemical paint remove by brush a heavy coat in one direction only on to the area being treated. (Fig 1)

Fig 1




15 Use a soft bristle brush, but do not brush the material out. (Fig 2)

16 Allow the paint remover to sand until the finish is softened.

17 Remove the old paint with a Squeegee or scraper. (Fig 3)

18 Rinse off any residue that remains on the surface by using cleaning solvent and steal wood.

19 Rinsing operation is essential, while because many paint removes contain wax, which will prevent the finish paint from properly adhering, drying and hardenning.

Fig 2

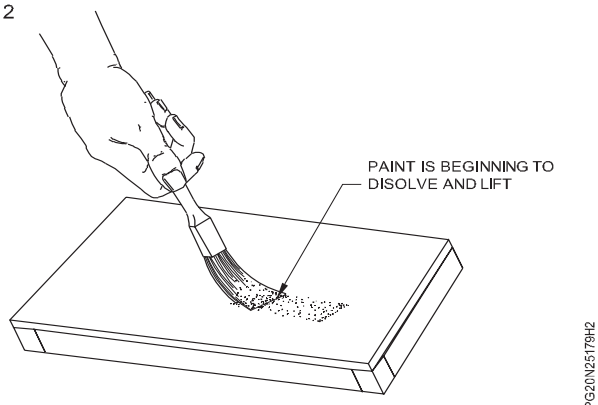
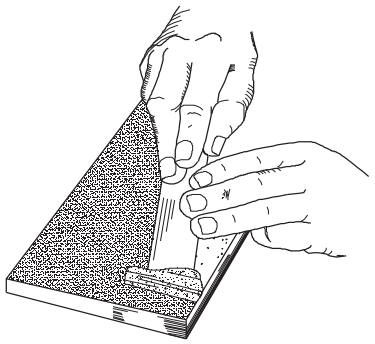



Fig 3




20 The least amount of Rust can be a hazard to the performance of a finish job.

21 Use the metal conditioner on the sanded metal surface; depend on the types of rust and substrate. Layered before sanding.

22 Use the any one of blasting media to blast paint off -(plastic media, sand and caustic media).

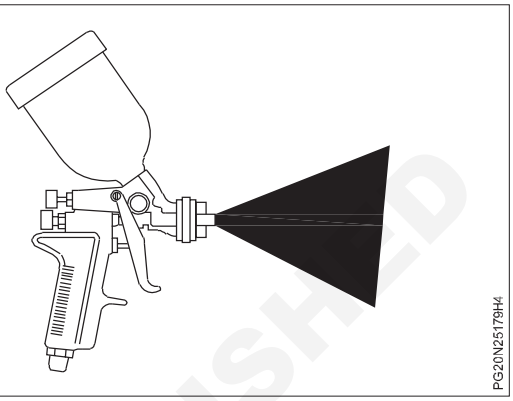
23 Media blasting is a fast and effective way to remove paint from smaller areas.

24 After sanding and before painting use the metal conditioner.

25 To use a metal conditioner, mix the appropriate amount of conditioner with water in a plastic bucket according to the instructions on the packing label.

26 Apply the metal conditioner on the metal surface with a cloth, sponge or spray guns spray. (Fig 4)

Fig 4

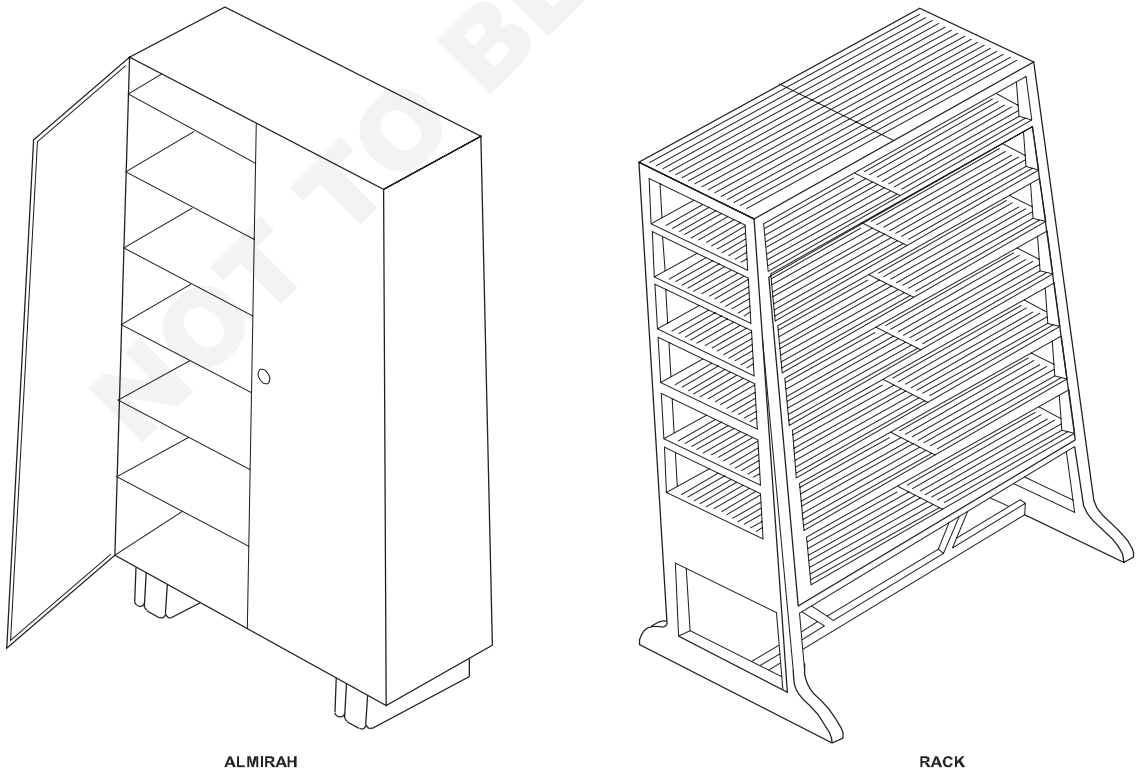



27 Before the conditioner dries, wash the conditioner off the body with clean water. (Fig 5)

**Note: Follow the manufacturers instruction, because product to product vary the procedures.**

**Metal conditioner with phospheric acid reducer not only cleans it also etches the metal and promotes the adhesion of the paint film and it helps to pervent the occurrence of rust and also eases sanding marks.**

Fig 5



# Practice on electro coating by deeping process and conveyor system

**Objectives:** At the end of this exercise you shall be able to
- **clean the metal surface**
- **pretreatment the metal**
- **electro coating by deeping method**
- **electro coating by conveyor method.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Scrapper - 1No.
- Sanding pad - 1No.
- Hand sander - 1No.
- Wire brush - 1No.

**Equipments**

- Power sander - 1No.
- Air compressor - 1No.
- Electro plating plant - 1No.
- Cure oven - 1No.

**Materials**

- Electro coating powder - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Cleaning solvent - as reqd.

## PROCEDURE

TASK 1: **Electro coating by deeping process (Fig 1,2)**

1 Select the part to be electro coating by deeping process.

2 Clean the part in one or more stages.

3 Degrease the part to be electro coating.

4 Soak and clean the part with soap water

5 Thoroughly rinse the part with cleaning solvent.

6 Apply phosphate to prepare the surface for application of the electro coating.

**Note: choose the most appropriate chemicals for cleaning and phosphating**

7 Prepare the electro paint coating plant to coating the paint color applied to the pretreated metal in electro coat bath.

8 Calibrate the electro coating thickness by using precisely calibrated process control system equipment.

9 Ensure the coat bath consists of 80-90% delonized water and 10-20% paint solids.

10 Ensure the delonized water acts as carrier for the paint solids.

11 Ensure the electro coat bath is under constant agitation. (Fig 1,2)

12 Ensure the solid paint consist of resin-the backbone of the final paint film.

13 Ensure the electrocating provides corrosion protection, durability and toughness.

14 Ensure the pigments contribute color and gloss.

15 Regulate the amount of voltage to achieve the desired paint film thickness.

16 Apply metal primer on the job to prevent corrosion as well as its compatibility with a wide range of liquid and power top coat material.

17 Hang the electro coating parts on hanger.

18 Dip the part into the electro coating tank for electro coating of paint.

19 Ensure once the coating reaches the prescribed thickness the part insulates and the paint coating reaches to slow down.

20 As the part exits the bath, paint solids that cling to the surface are rinsed off to maintain application efficiency and aesthetic.

21 After the E-coated parts exits the post rinse phase.

22 Place the part in a bake oven that cures and cross links the paint film to maximize performance properties.

23 Allow the minimum bake time is 20 minutes with a part temperature at 375°F. for most e-coat technologies.

**Note: ED-coating process is (1) Pretreatment (2) Dip the part in electro coat tank (3) Post rinse the underposted paint solids (4) Bake oven provide the paint thermally cured.**

**Products used for electro paint despite coating are as following (1) Anodic epoxy (2) anodic acrylic (3) Cathodic epoxy (4) Cathodic acrylic**

24 The ED coating parts are transported through the system hung from a continuous moving monorail alternatively programmed hoists or similar indexing devices are used to move the parts from stage to stage and in and out of tanks. This type of transport method is dependent on the part size, type and coated surface area requirement per minute.

Fig 1

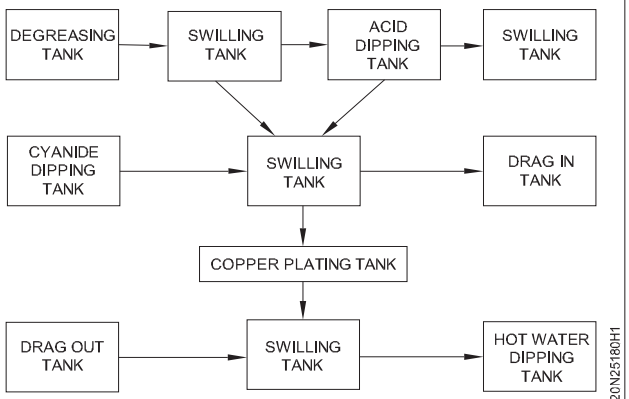
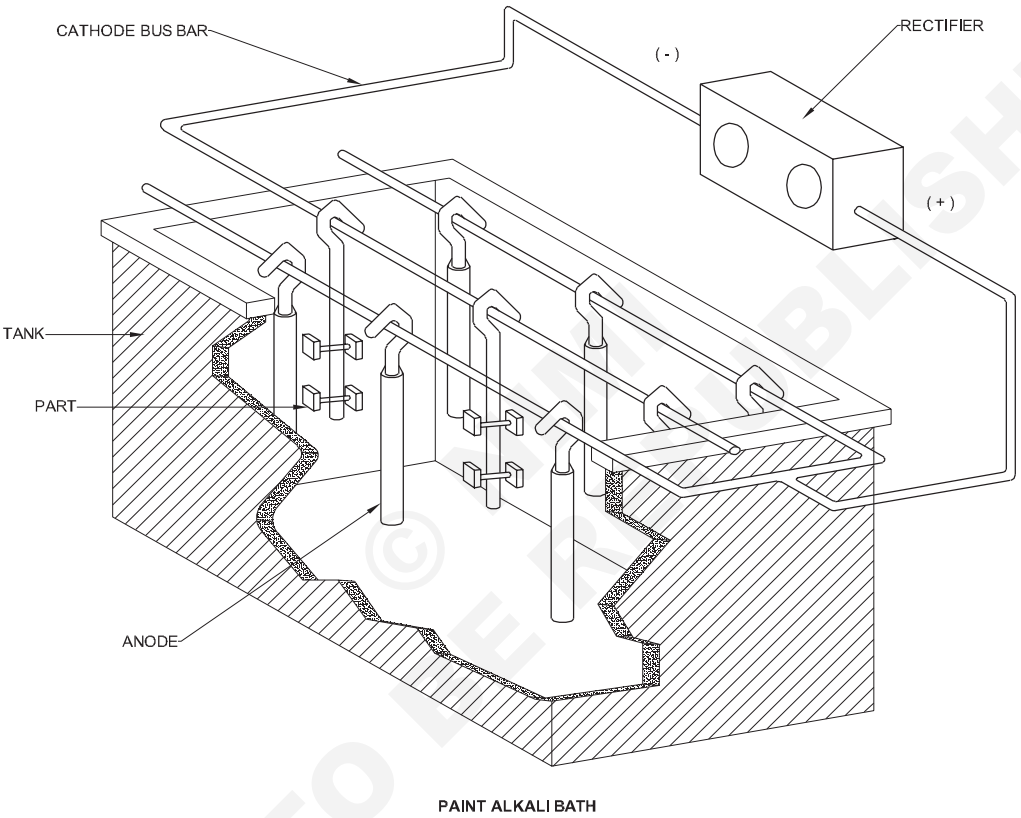



Fig 2

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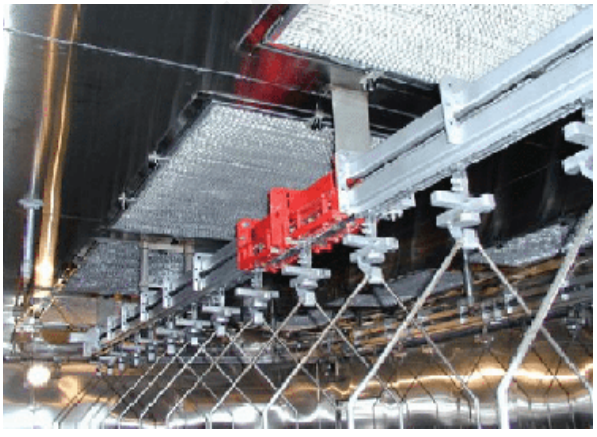
TASK 2: **Conveyor electro coating and plating system (Fig 1)**

Fig 1



1 Select the part to be painted.

2 Clean the parts surface by using hand and power tools.

3 Remove the loose and feeling paint.

4 Remove the rust and repair small holes.

5 Apply anti-rust solution on the surface.

6 Apply primer on the surface of interior and exterior immediately after cleaning the surface is imperative to prevent dust or dirt from accumulating and flash rust from forming.

7 Prepare the electro-paint coating plant and set the current regulation on the regulator to control the paint deposition of paint on the object.

8 Prepare the conveyor to move the object for E.D paint coating.

9 Check the electrical cathode and anode connections of ED paint coating plant.

10 Overhead conveyor are used to auto make many ED- coating operations handling a wide range of products through all stages of the process from pretreatment dip tank application, rinses and find curing, customs racking and hangers to transport the items for complete electro paint coating process.

11 Place the parts on the conveyor and operate the electro paint coating plant. (Fig 2)

12 Ensure the function of conveyor, plant and time for each above mentioned process. (Fig 3)

**Note: Instructor should be display the video of hanger type electro deposition coating method and conveyor type electro coating method in their smart class room**

13 Instructor should be explain the both type of ED paint coating process through vedro step by step at easy understandable language .

Fig 2

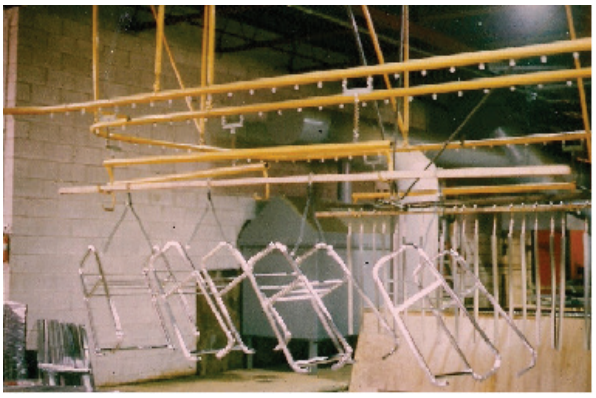
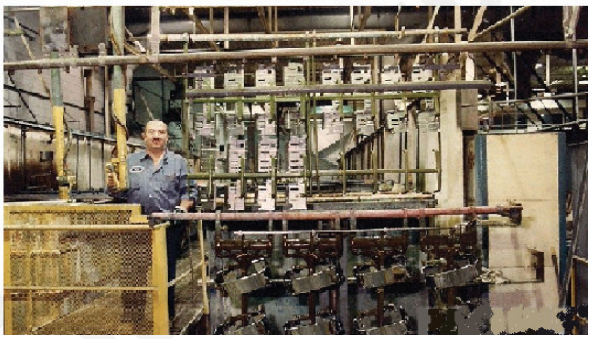


Fig 3



# Practice to identify the pneumatic parts of air compressor

**Objective:** At the end of this exercise you shall be able to
- **identify the parts of air compressor.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Air compressor manual - 1No.

**Equipments**

- Air compressor - 1No.

**Materials**

- Cotton waste - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Identify the air compressor pneumatic parts (Fig 1,2,3)**

Fig 1

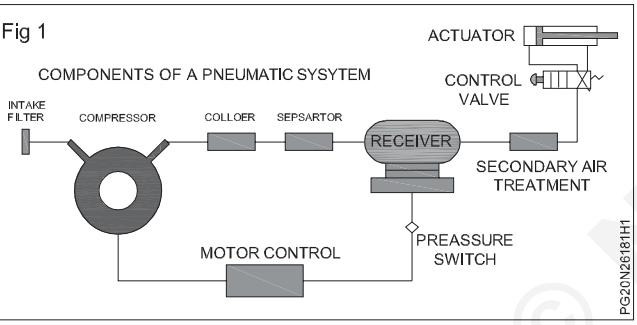



Fig 2

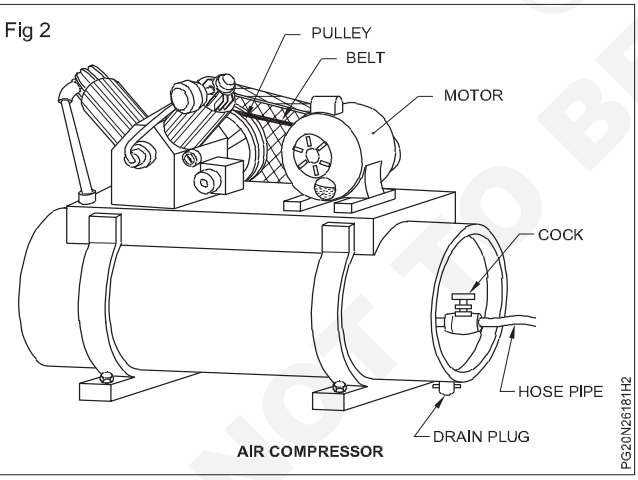
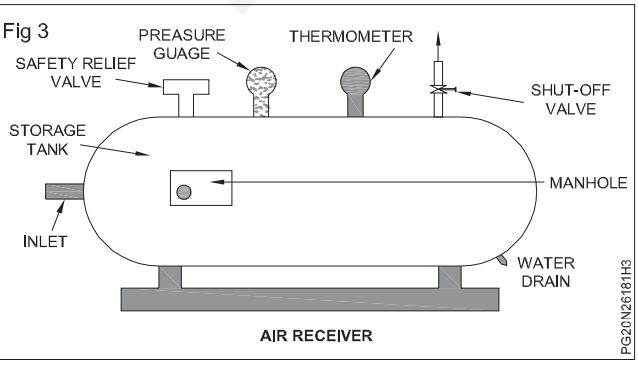



Fig 3




1 Identify the air compressor unit.

2 Identify the intake air filter.

3 Identify the air cooler.

4 Identify the water separator.

5 Identify the air receiver.

6 Identify the motor control switch.

7 Identify the pressure switch.

8 Identify the secondary air filter (FRL).

9 Identify the actuator.

10 Identify the air pressure gauge.

11 Identify the thermometer filter on the reservoir.

12 Identify the shut- off valves.

13 Identify the safety relief valve.

14 Trainee's identify the air compressor parts and write the functions of each parts in the following table.

**Note: Instructor should be lay out the air compressors pneumatic components and explain the function of each part.**

Table- 1

| S.No | Components name | Function of component | Location of parts |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

— — — — — — — —

# Practice to follow the safety procedures in paint spray system

**Objective:** At the end of this exercise you shall be able to
- **use the personal protective equipment in paint shop.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- PPE - 1Set.

**Equipments**

- Air compressor - 1No.
- Spray gun - 1No.

**Materials**

- Cotton waste - as reqd.
- Soap oil - as reqd.

## PROCEDURE

TASK 1: **Personal protective equipment's (PPE) and it's importance in paint spray systems**

1 Use the overalls with a head to safe the human body.

2 Use the goggles to protect your eyes.

3 Use the half mask respirators to protect from dust moisture breath.

4 Use the single use nitride gloves to protect your hands.

5 Use the cum boot to protect your legs.

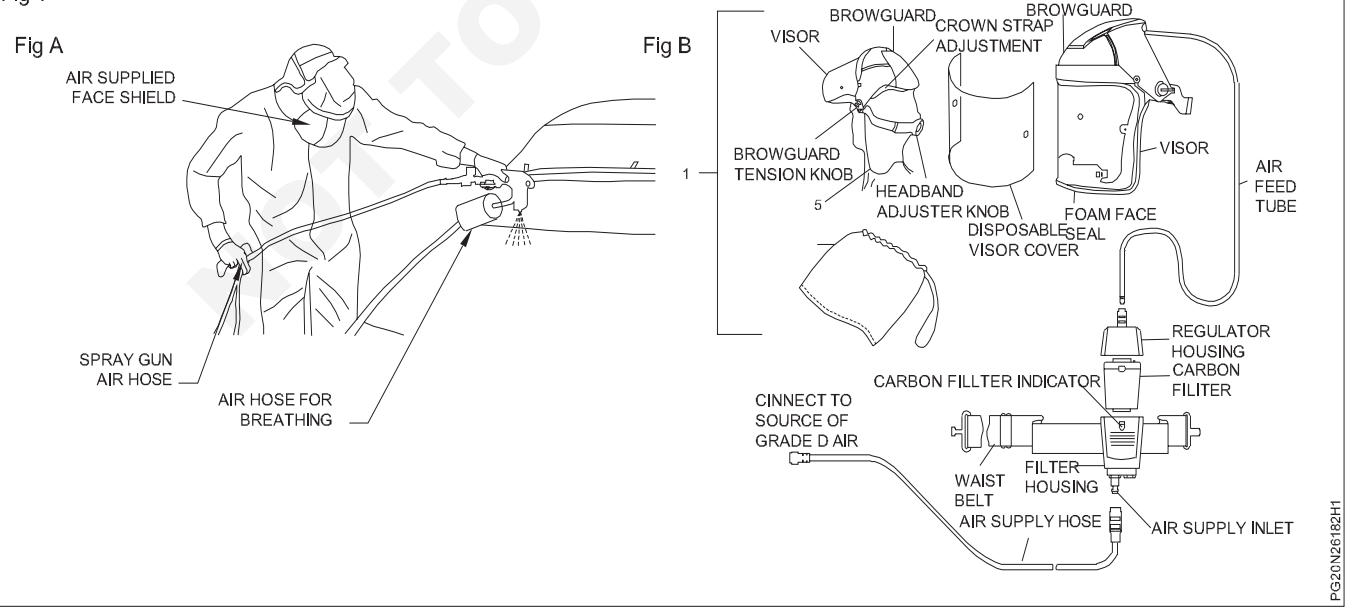
6 Use the air fed respiratory protective equipment to extra attention on breathable air to the user it is prevent contamination of the air supply.

7 Test your urine once in year to avoid the development of illnesses (Painter's only).

TASK 2: **Safety procedures in paint spray system**

1 Use the PPE before start the paint preparation. (Fig 1)

Fig 1



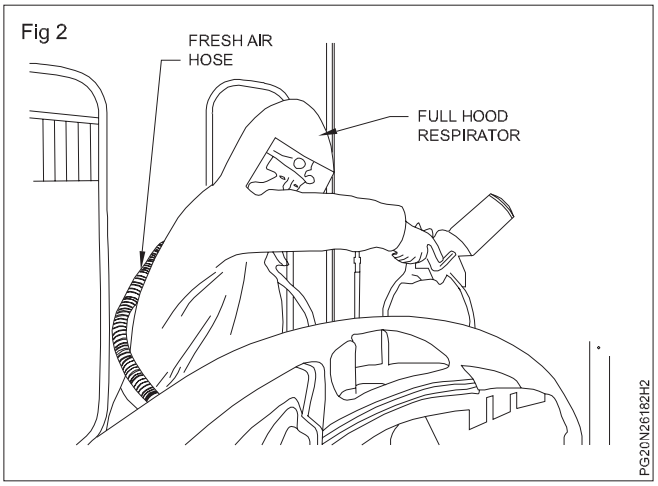
2 Take extra care on paints and thinner usage while because paints and thinners are fire hazards.

3 Follow the fire safety when storing paint in the shop floor.

4 Follow the safety procedures of occupational safety and health administration (OSHA) for the proper storage of flammable materials.

5 Keep the paint spray distance from the spray gun nozzle to painting surface (15cm). (Fig 2)

Fig 2




6 Keep the painting area clean to avoid risk of dust explosions when finely divided paint particles become air borne.

7 Keep the maintenance record updated health records of personnel handling spray paint products.

8 Updated testing also important to avoid accidents like regular testing of air quality testing, testing of air pressure system, electrical system, and testing of compressor reservoir air filters.

**Note: Instructor should be demonstrate safety procedures in paint spray system and importance of personal protective equipment usage when painting with HVLP and LVLP gun or automated linear spray system, automated flatline spray system, booth system, electrostatic spray painting system etc.**

9 Instructor should be display video on different type of painting systems and safety procedures while display video, simply explain about each activities of painting system by orally in easy understandable language.

# Practice on maintenance, trouble shooting and safety aspects of pneumatic painting instruments

**Objective:** At the end of this exercise you shall be able to
- **Follow the maintenance of pneumatic painting instruments**
- **Carried out the trouble shooting of painting instruments.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No

**Materials**

- Cotton waste - as reqd.
- Soap oil - as reqd.
- Thinner - as reqd.
- Paint - as reqd.

## PROCEDURE

TASK 1: **Maintenance of pneumatic painting instruments**

1 Periodically check air gauges and pressure relief valve during start up and operation.

2 Drain air filters periodically.

3 Lubricate and adjust the spray gun paint needle packing daily.

4 Clean the air cap and fluid nozzle as needed to determine the quality of paint spray pattern.

5 Use only the proper wrenches and cleaning brushes.

**Note:-**

**1 Don't use the steel brushes, channel locks, which will damage the cap or nozzle.**

**2 Follow the paint and equipment manufactures recommendation**

**3 Use the properly sized equipment and instruments**

**4 Follow the paint spraying maintenance, clean up and safety procedures described as above.**

6 Clean the spray gun pointers.

7 Cleaning the used spray gun with a pressure air open vent on tank and loosen air nozzle. Hold a piece of cloth wedded in the hand over the air nozzle and pull the trigger.

8 Put enough clean thinner or cleaning solvent into the tank to wash the interior of the hose and spray gun throughly and spray this through the spray gun until it runs clean.

9 Don't place the entire spray gun in solvent.

10 Wash down the outside of the equipment with solvent dampened rags.

11 Lubrication of spray gun should be done daily with light machine oil.

12 Never use lubricants containing silicone it will be contaminated. The following parts (1) fluid needle packing (2) air valve packing (3) side port control packing (4) trigger pivot points (5) coat the needle valve assemble spraying with petroleum jelly.

13 All parts reference sheet packed with spray equipment should be retained for future reference for the purpose of ordering spray gun parts and performing maintenance operation.

14 Lubricate trigger pivot of paint spray gun.

15 Lubricate the needle packing of paint spray gun.

16 Lubricate the air valve packing.

17 Lubricate the fluid needle spraying.

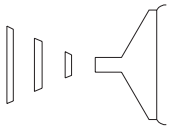
18 Lubricate the side port control packing.

19 Ensure all parts of air compressor pneumatic components and paint spray gun parts are lubricated and maintained as per instructions given by manufacturer's.

TASK 2: **Trouble shooting of faulty air nozzle spray patterns**

**Note: Instructor should be demonstrate pneumatic and painting instruments maintenance and trouble shooting practically on the shop floor and play the animation video on demonstration the pneumatic and painting instruments functions and trouble shooting procedures**

**Faulty air nozzle spray patterns**

| Pattern | Cause | Correction |
|---|---|---|
|  | 1 Dried paint in one of the side port holes of air nozzle. | 1 Dissolve paint in side port hole with thinner; do not probe in any of the holes with a tool harder than brass. |
|  | 1 Fluid buildup on side of fluid nozzle.<br>2 Damaged fluid nozzle because spray gun was dropped. | 1 Remove air nozzle and wipe off fluid nozzle.<br>2 Replace damaged fluid nozzle. |
|  | 1 Air pressure too high.<br>2 Spray pattern too wide.<br>3 Fluid pressure too low. | 1 Reduce air pressure.<br>2 Reduce fan width.<br>3 Increase fluid supply. |
|  | 1 Air pressure too low<br>2 Excessive fluid velocity or too much fluid. | 1 Increase air pressure.<br>2 Use smaller fluid nozzle orifice, lower fluid pressure. |
|  <br>SPITTING | 1 Air entering the fluid supply could be caused by:<br>a Loose fluid nozzle, or not seating properly due to dirt.<br>b Loose or missing packing nut or dried fluid packing.<br>c Fluid connection loose. | a Tighten fluid nozzle, or clean fluid nozzle seat area.<br>b Tighten packing nut, or replace missing or dried fluid packing.<br>c Tighten all fluid supply connections leading to spray gun. |

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# Practice on spray gun inspection, holding and spray stroke adjustment techniques

**Objectives:** At the end of this exercise you shall be able to
- **inspect the paint spray gun and paint spray system**
- **spray gun holding and spray adjustment.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Spray gun manual - 1No.
- Nozzle cleaning needle - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.
- Work bench - 1No.
- Tray - 1No.

**Materials**

- Cleaning solvent - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Spray gun accessories - as reqd.

## PROCEDURE

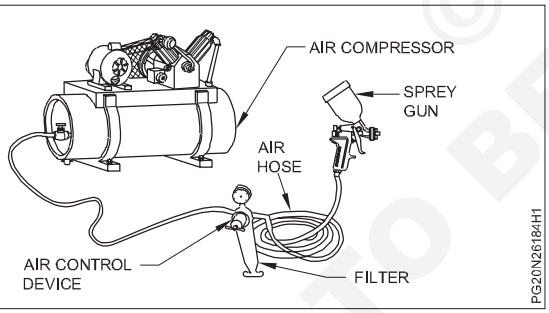
TASK 1: **Inspection of air spray Equipment**

1 Check the air compressor function.

2 Check the air compressor air filter and FRL unit.

3 Check the air compressor air supply hose from compressor to paint tank or pump. (Fig 1)

Fig 1




4 Check the function of regulators with gauge.

5 Check the container for the coating pressure feed tank or pot, gravity / siphon cup or paint pump.

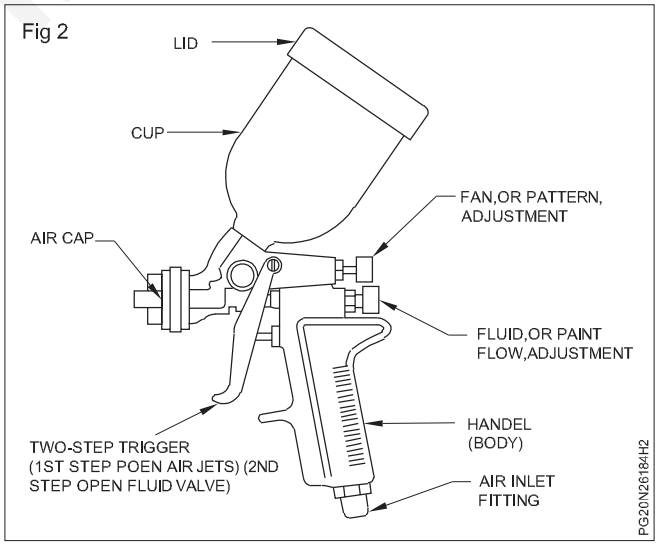
6 Check the paint agitator if necessary.

7 Check the fluid flow to supply paint coating to the spray gun (if using pressurised gun).

8 Check the air hose to supply atomizing air to the spray gun and air spray paint gun.

9 Check the spray nozzle condition. (Fig 2)

Fig 2

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TASK 2: **Spray gun holding and paint stroke adjustments**

Fig 1

Fig A

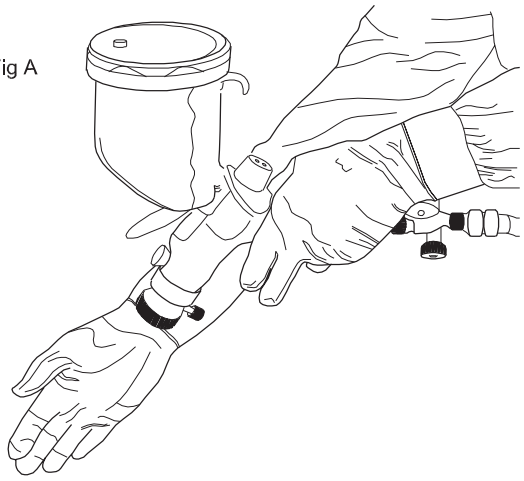
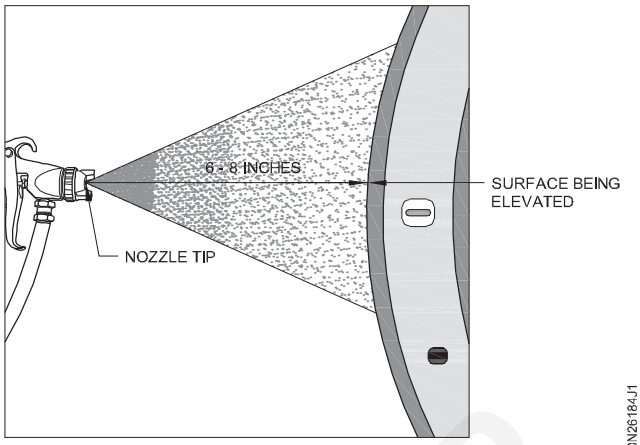


Fig B



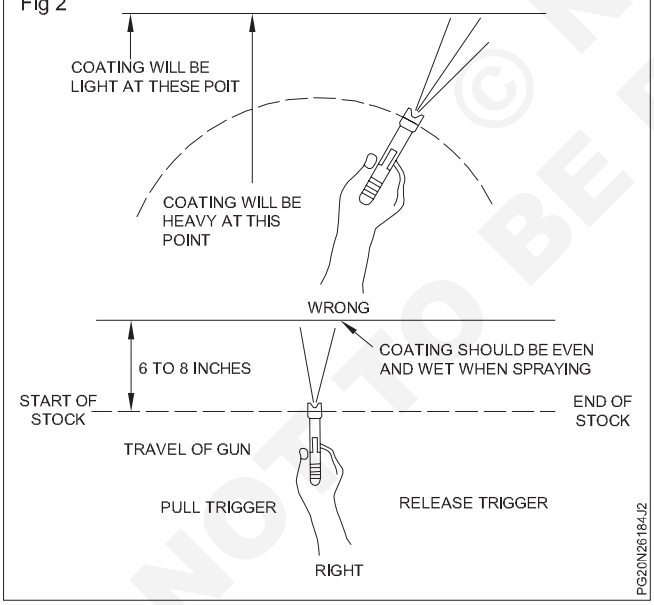

1 The spray gun should be hold perpendicular to the surface being covered and moved even stroke parallel with the surface. (Fig 1).

2 Ensure the stroke should be started after the trigger is pulled and released before stroke is finished.

3 Easy way gives accurate control of the spray gun held from surface is determined by the materials and atomization pressure.

4 Maintain the distance 6 to 12 inches depend upon the type of spray gun (Fig 2).

Fig 2



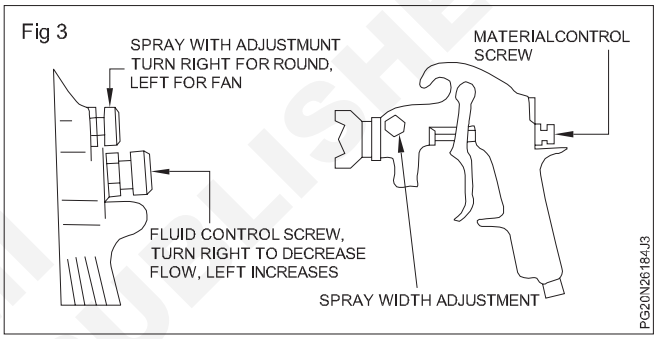

5 Ensure the material deposit on the surface should always be even and wet.

6 Overlap each stroke should be 50 per cent over the preceding stroke to obtain a uniform finish.

7 The proper adjustment of spray gun controls permit a spray operator to control the size of the spray pattern and the amount of material coming out of the spray gun.

8 Adjust the following three position of the spray gun shown in the figure - 03.

Fig 3




9 Set atomization pressure at approximately 25 PSI and test spray pattern with fluid control knob opened.

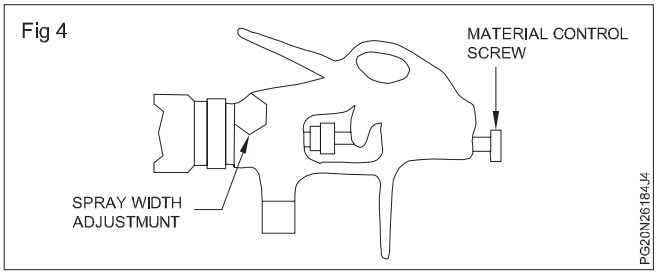
10 If the material atomization is to increase air pressure by 10 psi and test spray pattern again.

11 Continue this process until you have 50 to 60 psi at spray gun.

12 If material atomization is still to coarse close the fluid control knob on the spray gun slightly.

13 Adjust the spray pattern and repeat Adjustment until a proper spray pattern achieve, by using the lowest possible air pressure that will produce the desired finish.(Fig 4).

Fig 4




14 Use the thin fluid material to achieve the desired finish.

15 Select the correct fluid nozzle orific size using the previous fluid nozzle selection charts.

16 Set fluid pressure for required material delivery.

17 Adjust desired spray pattern width, repeat spray gun adjustments and fluid pressure setting if necessary.

18 Keep fluid control screw in open position.

19 Use correct fluid nozzle size and proper fluid pressure setting to obtain proper fluid delivery.

**Note: Top reduce overspray and obtain maximum efficiency, always spray with the lowest possible atomization air pressure and the lowest possible fluid pressure that will give you the required finish.**

20 If need adjust the spray pattern of an external mist nozzle on a spray gun equipped with a fan control is variable from round to fan (Fig 5,6)

Fig 5

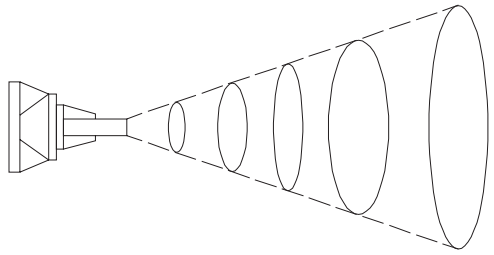


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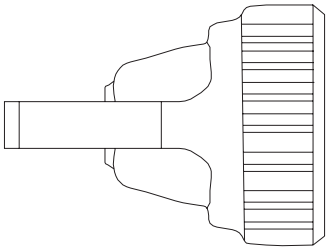
Fig 6



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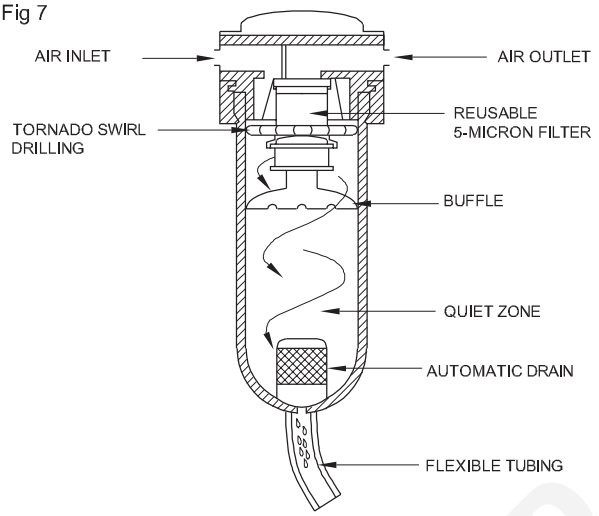
21 Check and replace oil and water filter and trape on regular basis to avoid air supply and painting problem.

22 If the air supply system is not automatic. Drain moisture from filter daily. Drawing the system in the morning allows more moisture to be removed because it is cool and has condensed (Fig 7)

Fig 7




AUTOMATIC AIR LINE LUBRICATOR

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23 Replace air hoses if necessary, deteriorated air hoses can also introduce dirt into the paint spray system.

24 Adjust the air pressure as shown in table – 1 to 3

With today's low-pressure, high-transfer efficiency spray guns, accurate inlet air pressure adjustment is critical to a consistent, quality paint job. (A) A small air pressure regular and gauge assembly fits between the spray gun and air hose. This will let you maintain ideal spray gun feed pressure with changes in pressure in the main shop air line. The gun should be set to the manufacturer's recommendations or what works best for your painting technique. (B) Note the effects of gun pressure on spray pattern and atomization. Note how high pressure improves dispersion of the paint mist and enlarges the spray pattern size. To protect the Earth's atmosphere from overspray pollution, use the lowest pressure that produces good atomization (Fig 8).

Fig 8

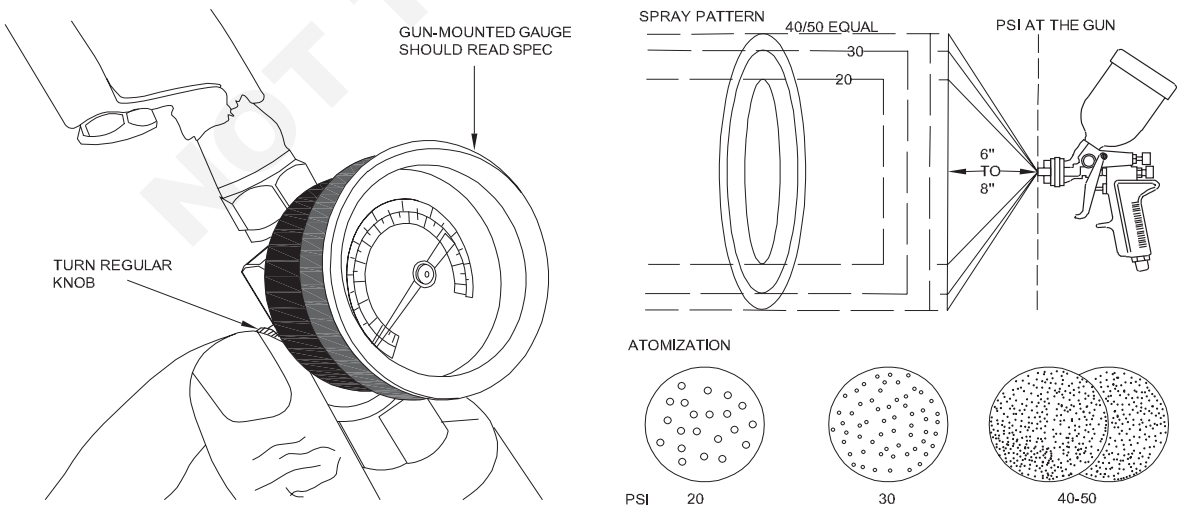


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**Table 1**

| Typical air pressure ranges | | | | | |
|---|---|---|---|---|---|
| **Topcoats** | **HVLP Gun Feed Pressure** | **Conventional Gun Pressure (psi)** | **Undercoats** | **HVLP Gun Feed Pressure** | **Conventional Gun Pressure (psi)** |
| Polyurethane enamel | 18-20<br>20-30 | 50-55 (solids)<br>60-65 (metallic) | Lacquer primer-surfacers | 15-18<br>16-20 | 25-30 (spot)<br>35-45 (panel) |
| Acrylic lacquer | 12-18 | 20-45 | Multipurpose primer-surfacers | 16-20 | 30-40 as primer-surface |
| Acrylic enamel | 18-20 | 50-60 | Multipurpose primer-surfacers as nonsanding | 17-20 | 35-40 |
| Alkyd enamel | 18-30 | 50-60 | Nonsanding primer-sanders | 18-20 | 45 |
| Flexible finshes | 14-28 | 35-40 | Enamel primer-surfacers | 18-20 | 45 |
| Basecoat | 14-16 | 30-35 | Epoxy primer | 18-20 | 45 |
| Clearcoal | 18-20 | 35-40 | Zinc chromate primer | 18-20 | 45 |

**Table 2**

| **Sealers** | **HVLP Gun feed pressure** | **Conventional Gun Pressure (PSI)** | **Miscellaneous** | **HVLP Gun Feed Pressure** | **Conventional Gun Pressure (psi)** |
|---|---|---|---|---|---|
| Acrylic lacquer | 12-16 | 25-30 | Uniforming finishes | 12-14 | 15-20 |
| Universal sealer | 14-18 | 35-45 | | | |
| Bleederseal | 14-16 | 35-40 | | | |

**Table 3**

**Estimated air pressures at the gun**

| **Pressure Reading (lbs.) at Gauge** | | **Pressure at the Gun for Various Hose** | | | | | |
|---|---|---|---|---|---|---|---|
| | | **5 feet** | **10 feet** | **15 feet** | **20 feet** | **25 feet** | **50 feet** |
| **1/4-Inch Hose** | **30** | **26** | **24** | **23** | **22** | **21** | **9** |
| | **40** | **34** | **32** | **31** | **29** | **27** | **17** |
| | **50** | **43** | **40** | **38** | **36** | **34** | **22** |
| | **60** | **51** | **48** | **46** | **43** | **41** | **29** |
| | **70** | **59** | **56** | **53** | **51** | **48** | **36** |
| | **80** | **68** | **64** | **61** | **58** | **55** | **43** |
| | **90** | **76** | **71** | **68** | **65** | **61** | **51** |
| **5/16-Inch Hose** | **30** | **29** | **28½** | **28** | **27½** | **27** | **23** |
| | **40** | **38** | **37** | **37** | **37** | **36** | **2** |
| | **50** | **48** | **47** | **46** | **46** | **45** | **40** |
| | **60** | **57** | **56** | **55** | **55** | **54** | **49** |
| | **70** | **66** | **65** | **64** | **63** | **63** | **57** |
| | **80** | **75** | **74** | **73** | **72** | **71** | **66** |
| | **90** | **84** | **83** | **82** | **81** | **80** | **74** |

# Practice on paint spray on the surface of edges, corner, square, round and curved area

**Objective:** At the end of this exercise you shall be able to
- **paint spray on the surface of edges, corner, square round and curved areas.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No
- Paint spray gun - 1No
- Sanding tools - 1No
- Scrapper - 1No

**Equipments**

- Air compressor - 1No

**Materials**

- Paint - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.
- Emery sheet - as reqd.

## PROCEDURE

TASK 1: **Prepare the metal surface of edges, corner ,square, round and curved area**

1 Clean the metal surface area with cotton cloth.

2 Clean the metal surface with detergent solution and rinse with wet foam.

3 Throughly clean the surface, edges, corners, squares, round and curved areas of the metal surface.

4 Apply low pressure water on the metal surface to clean the dust, grease, oil deposited on the metal parts.

5 Use the degreasing solvent to remove oil and grease deposited on the metal surface.

6 Allow dry off time before sanding it.

7 Select the sanding tools and material depend up on required for sanding the surface area.

8 Use the correct size grit sand paper or hand sanding disc.

9 Sand the surface evenly

10 After sanding the above said area, clean the area with air pressure and then use the high pressure water spray on the surface and above said areas for perfect cleaning.

11 Ensure the all the area of metal surface is cleaned

12 Clean the surface with dry clean cloth.

13 Select the suitable metal conditioner and prepare it as direction given on label.

14 Apply metal conditioner on the metal surface by brush evenly.

— — — — — — — —

TASK 2: **Priming the metal surface**

1 Select the suitable metal primer and reducer or thinner

2 Prepare the primer for specified thickness

3 Read the instructions printed on the primer packing before apply the primer on the metal surface.

4 Apply metal conditioner and allow it for dry off time 4 to 6 hours.

5 Apply primer on the metal surface by brush or spray gun.

6 Ensure the primer is applied on the metal surface evenly.

7 Allow dry off time before apply putty

8 Inspect the metal surface if need apply putty where ever need.

9 Sanding the putty applied area to make a level to match the surface level.

10 Apply one more coat of primer on the surface.

11 Let dry off time before apply metal surfacer or filler.

12 Prepare the filler and apply the filler with help of caulk gun on the corner joint of metal to cover the gap between two part.

13 Remove the excess filler by wiping with painting knife.

14 Ensure the corner joint surface is matched with remain metal surface.

15 Prepare the metal surfacer and apply on the metal surface if required.

16 Ensure the metal surface, edges, corners, squares and curved area of metal is ready for painting process.

TASK 3: **Painting the metal surface (Fig 1,2)**

1 Clean the metal surface with clean cloth.

2 Check the metal surface for any scratches and damages.

3 If found scratch and repair it before start painting work.

4 Select the paint colour and quantity of paint need for metal surface finishing.

5 Read instruction printed on packing label and then open the cap of paint packing tin.

6 Well shack the paint before open the cap of packing.

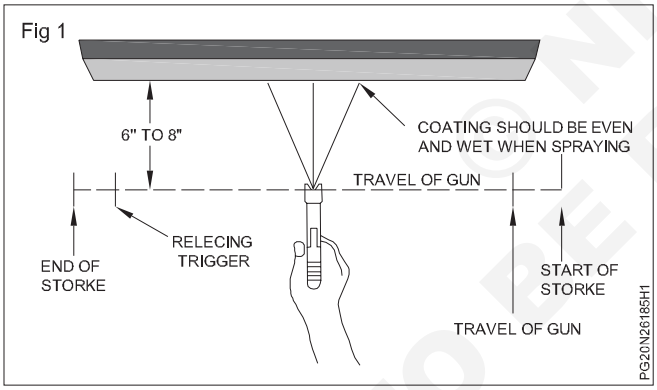
7 Use the paint mixing stick to mix the paint for small quantity and use the paint mix rotator to mix the large quantity of paint.

8 Prepare the paint spray gun and connect hose connections with paint spray gun

9 Adjust the air pressure and carried out the paint spray test and prepare the paint spray gun for ready to apply the paint mask the unwanted metal surface (not to be painted).

10 Apply paint stroke on the metal surface evenly cover the whole metal surface. The spray pattern must be uniform.

Fig 1




11 Maintain the gun angle and spray distance properly as per paint manufacture given direction.

12 Cover the paint spray on metal surface, corners, edges, curved and square surfaces.

13 Remove the mask if applied and allow the paint dry off time .

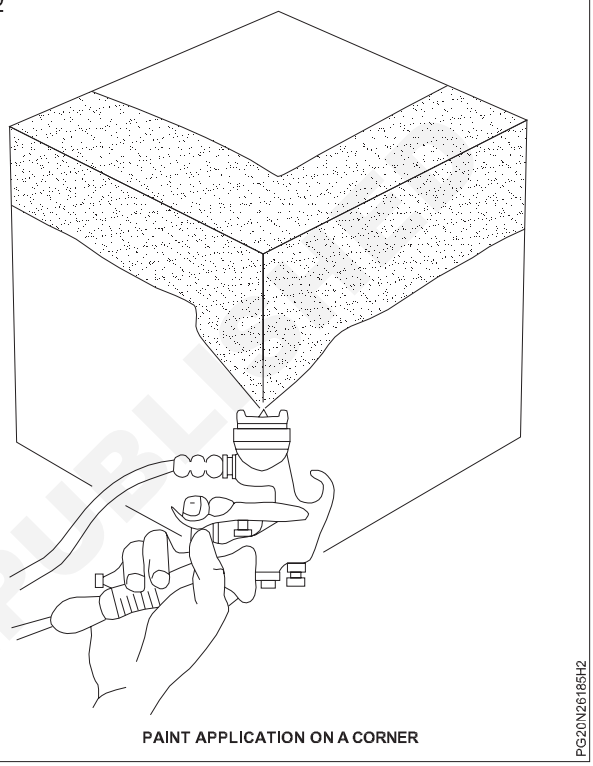
14 Inspect the painted surface , if found any damage repair it before second and top coat painting.

15 Apply clear coat paint on the metal surface.

16 The spray gun be triggered before the pattern reaches the part and released after the pattern leaves the part to avoid a heavy area.

17 The size of the spray pattern should be related to the part being coated square shaped part should be coated, on the corner first and then the flat surfaces are covered.(Fig 2)

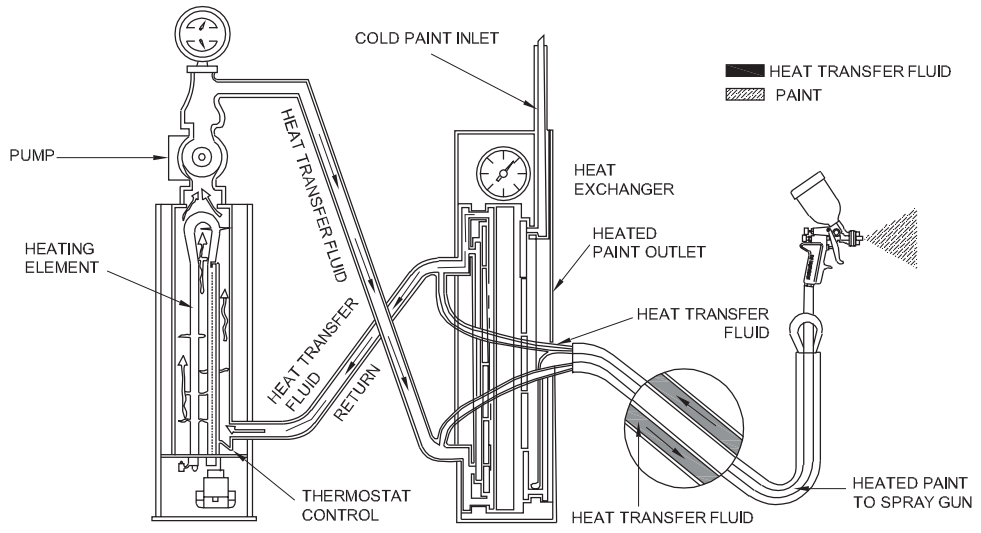
Fig 2




18 Coating the edge of the metal surface with parallel stroke only paint heating system particularly considering the high solids content of a compliant liquid coating. (Fig 3)

**Note: The addition of an in line paint heater can provide several advantages, particularly considering the high-solids content of a compliant liquid coating. The heater will not only help to achieve a correct spray viscosity, but will also provide consistency.**

Fig 3



# Practice on paint spray booth maintenance, operation, trouble shooting and safety precaution

**Objectives:** At the end of this exercise you shall be able to
- **maintenance of the paint spray booth**
- **operate the paint spray booth**
- **trouble shooting the paint spray booth**
- **use the safety precautions.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- PPE kit - 1No.
- Soap oil - 1No.
- Hand sander - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray booth - 1No.
- Paint spray gun - 1No.

**Materials**

- Paint - as reqd.
- Cleaning solvent - as reqd.
- Reducer - as reqd.
- Thinner - as reqd.
- Cotton cloth - as reqd.
- Masking material - as reqd.
- Soap oil - as reqd.



## PROCEDURE

TASK 1: **Maintenance of the paint spray booth (Fig 1)**

Five regular essential tips to paint booth maintenance

a Prevent overspray

b Service the fan

c Maintain the air unit

d Remove the contaminants

e Clean the debris in the booth

1 Clean the paint debries by using the scrubbing brush with a solution of water and paint remover, or use the air with water pressure to clean the paint spray booth debries and contaminants.

2 Disconnect the main power supply to the paint booth and make sure all areas are properly sealed.

3 Close the all vents and turn off all fan.

4 Remove the exhaust filter and clean it separately and keep them in working order.

5 Use safety wear, and gloves, face mask, before starting the maintenance of paint booth.

6 Rinse with the water cleaning solvent, once you have sufficiently cleaned paint from the booth. Use a pressure washer to properly clean it.

7 Regularly sweep and tidy up your paint booth to prevent debris from building up inside.

8 Check the intake filter daily.

9 Change the air intake filters as soon as the manometer indicate when dust and dirt start to log filters and restrict airflow.

10 You should also change the air filter regular basis to ensure your booth continues to properly filter out the contaminants.

11 Ensure the balance input air pressure against the exhaust air to provide slightly positive pressure in the both

12 Clean the paint booth walls and floors and lights starts with keeping them protected from overspray.

13 3m06839 is a liquid that sprays on and dries to a clean film deposited on the wall use it with water.

14 Thin control floor coat can be sprayed on paint booth every day the floor coat neutralizes the electrical charge of air particals so that upto 50% of contamiants fall to the floor and don't get stuck to whatever you are painting.

15 Check the paint booth control station knobs, indicators for air flow and booth temperature

16 Ensure paint booth is well cleaned and dry.

17 Use a compressed air to dry the water spot on the paint booth wall or floors.

18 Connect air hose, fluid line and fan and filters.

19 Connect electric power to the booth and provide the suppression system.

20 Check the paint mixing rooms and paint preparation station.

21 Check booth opening and closing door.

22 Ensure the paint booth connections are properly connected and properly functioning.

A The booth pressure gauge serves the same function as a manometer. If pressure is high, you might have clogged filters or a partially open booth door. (Fig 2A)

B Indicator lights on a diagram of a booth control station show whether the blowers and heating element are working.

C To keep dirt and dust out of a paint booth, always keep the doors completely shut.

23 Check the paint booth control station will have knobs and indicators for airflow, lights, and temperature. (Fig 2B,2C)

Fig 1

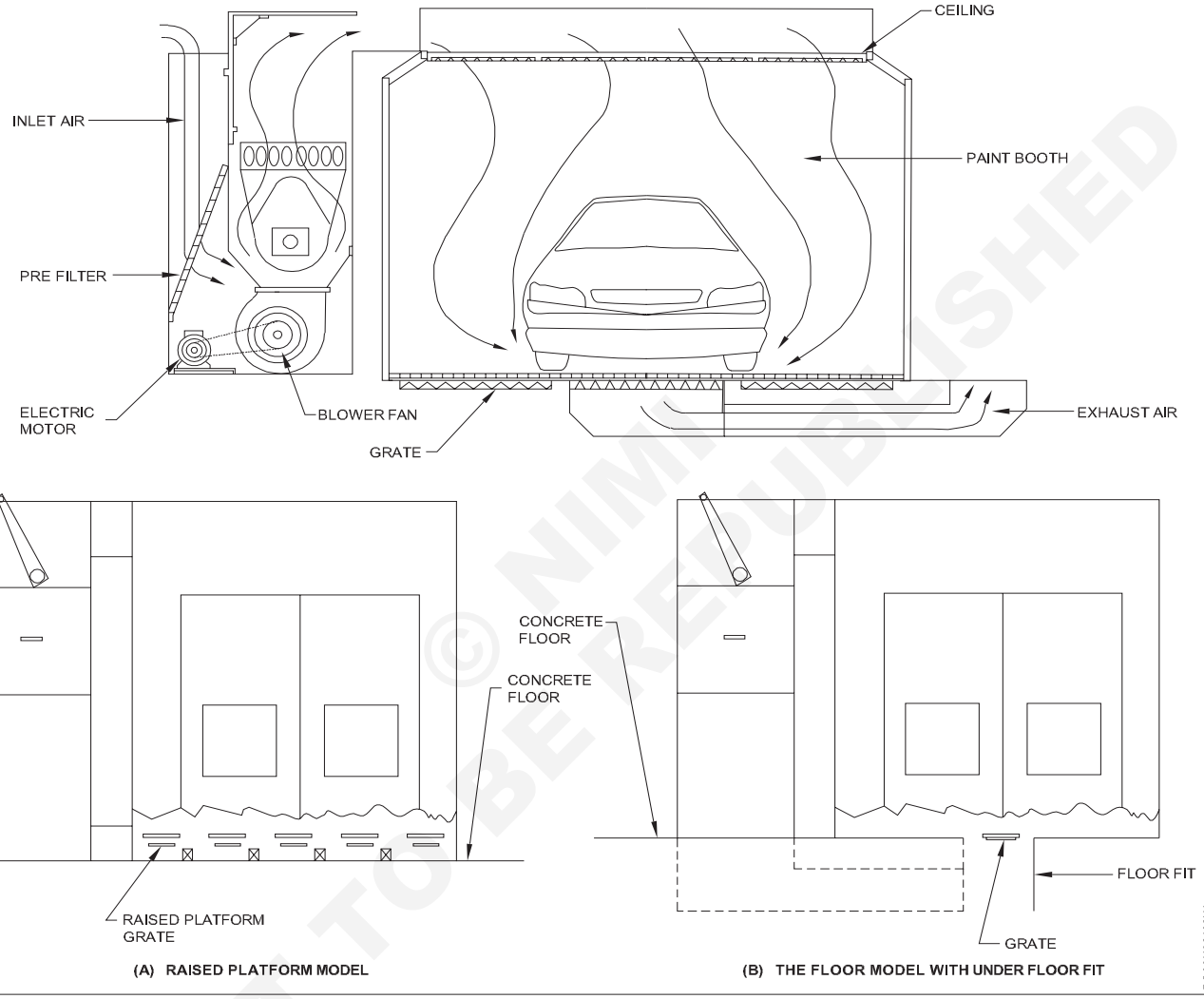



Fig 2

Fig A

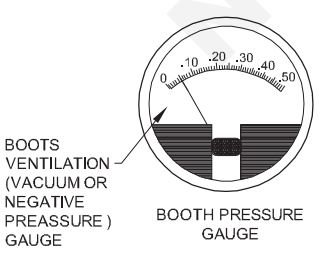



Fig B

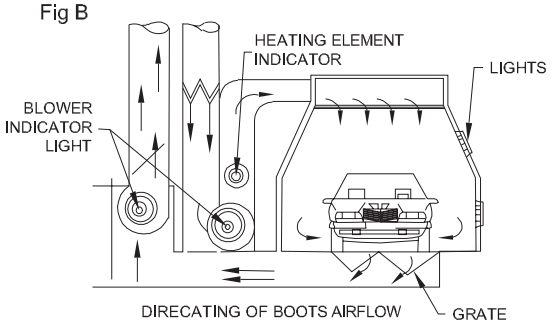
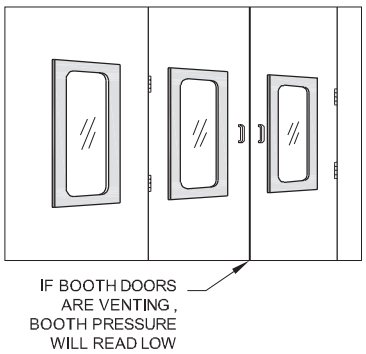



Fig C



24 A paint spray booth should be like a clean room in a hospital. It provides clean, filtered air so that no airborne dirt or dust can get into the fresh paint. (Fig 3&4)

Fig 3


Fig 4




TASK 2: **Method of paint spray booth operating system**

1 Follow the manufacturer's recommendations for the minimum velocity needed to properly exhaust spray vapors. If that recommendation is exceeded, turbulence cancels out the screening performed by the filters. If the velocity is too low, the air will not move fast enough to remove overspray and airborne dirt before they cause defects.

2 Paint arresters are a high-consumption item requiring frequent changing. Check filter resistance daily on the manometer. When paint accumulation builds up, velocity goes down, and air movement is too slow.

3 In a dry filtration system, the filters must be periodically inspected and replaced (Fig 1). And when they are replaced, the multistage filters designed for the booth should be used.

4 Be sure the water level in a wet filtration system is kept at its proper working level and that the correct water additive is used.

In order to get the best results from any type of spray booth, it is important to follow a good housekeeping program that addresses the following items:

Fig 1


6 Maintain air line filters. Unbelievable as it might seem, dirt from compressed air lines often causes blemishes in paint jobs. Air transformers, with properly cleaned and regularly drained filters, keep booth air clean and dry. Oil and water separators are absolutely necessary to eliminate dirt and contamination. Drain them of water and replace them periodically (Fig 2).

Fig 2


7 If they do not have automatic drain valves open the filter and dryer drains to remove condensed moisture, These are for the fresh-air supply to the respirator.

8 Periodically wash down the booth walls, floor, and any wall-mounted air controls to remove dust and paint particles. Many shops require that floors and walls be wiped down after every job (Fig 3)

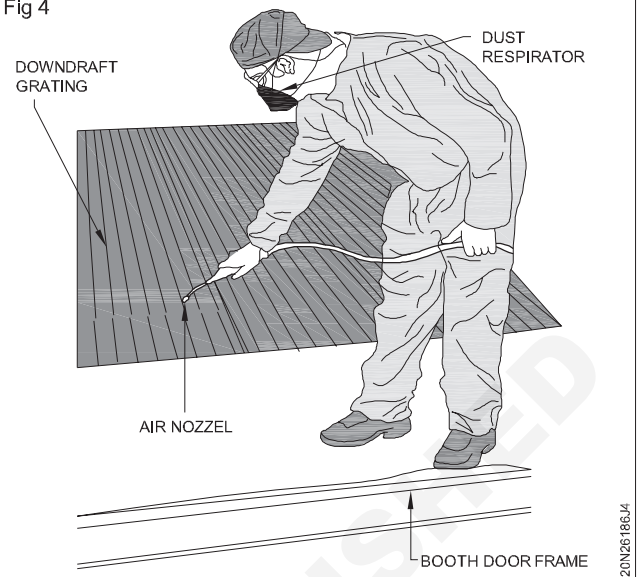
Fig 3

9 Pick up all scraps, rags, and so forth. Blow dust out from around the walls and seals on the bottom of the booth door frame (Fig 4).

10 A spray booth is no place to store parts, paint, trash cans, or workbenches because dirt will accumulate on these things and will eventually land on the vehicle. Keep these items in a sealed, ventilated storage area.

11 Be sure that all bodywork and most paint preparation procedures are done outside of the spray booth. Make certain no sanding or grinding operations are performed in or near the spray booth. The dust created will spread all over and ruin not only a present job but many future jobs.

Fig 4




12 Water is most often used to contain dirt. It is relatively inexpensive and very effective at trapping dirt, but it can splash on a vehicle midway through the job or, in a heated booth, dry out before the paint job is finished. If water is sprayed on the floor to keep any stray dust down, eliminate all puddles to prevent splashes. Water can also rust the walls of a spray booth, resulting in premature deterioration.

13 Spray guns, masking paper, paint cans, tape, wheel covers, air transformers, hoses, respirators, coveralls, tack rags, and various other supplies can all collect dirt if stored in a dirty environment. All of these items should be kept in a filtered, ventilated storage/mix room. If subject to sanding dust, they will quickly ruin a paint finish. Avoid using dirt-collecting cloth wheel covers. It is better to back mask the wheel wells with masking paper or cover them with plastic film wheel covers.

14 Oil the fan pulley and motor bearings of the spray booth regularly, if required. Always switch off the main fan power supply before oiling the fan. If the spray booth is not properly maintained, it can cause finish problems.

TASK 3: **Paint spray booth trouble shooting**

| Sl No. | Fault | Cause for fault | Indication | Remedies |
|---|---|---|---|---|
| 1 | Dirty filters | - Hot air drawn from oven<br>- Low air movement and dirty air drawn in from preparation area | - Poor build<br>- Over loading<br>- Popping<br>- Over spray<br>- Uneven application<br>- Recoat failure<br>- Dirty job<br>- Thin coat<br>- Poor opacity<br>- Paint sags<br>- Uneven application | - Cold air forced into oven<br>- Replace the filters |
| 2 | Damaged filters | - Turbulence<br>- Air over pressurized | - Dirty paint spray<br>- Over spray<br>- Uneven application<br>- Paint sag<br>- Over loading<br>- Paint popping<br>- Paint over spray<br>- Uneven application<br>- Recoat failure | - Replace the filter<br>- Adjust the air flow rate |
| 3 | Water level low | - Increased extraction | - Paint overloading<br>- Paint popping<br>- Paint softness<br>- Paint uneven application<br>- Recoat failure<br>- Water splashier | - Maintain proper water level |
| 4 | Water level high | - Restricted extraction | - Paint thick coats<br>- Poor opacity<br>- Paint sags<br>- Paint over spray<br>- Paint uneven spray<br>- Water splashes | - Maintain proper water level |
| 5 | Water level empty | - Increased extraction with build up of dry paint in reservoir | - Dirty paint spray<br>- Fire hazard | - Maintain proper water level |
| 6 | Incorrect use of water additive | - Blocked water jets and filter<br>- Formation of dry powder on anti splash panels<br>- Bacteria cultivation | - Dirty paint spray<br>- Recoat failure<br>- Water splashier<br>- Unpleasant smell<br>- Corrosion of paint<br>- Paint deposits difficult to remove<br>- Fire hazard | - Use proper water additive |
| 7 | Rags, masking paper old cans and so on in booth | - Dirt accumulation | - Dirty job<br>- Fire hazards | - Make neat or clear the booth |

| Sl No. | Fault | Cause for fault | Indication | Remedies |
|---|---|---|---|---|
| 8 | - Paint spraying on booth walls | - Poor light reflection | - Uneven application | - Avoid paint spray test on the booth walls |
| 9 | - Paint dry spray paint loose | - Dirt in atmosphere | - Dirty job | - Use clean atomspheric air |

**Safety aspect of paint spray booth**

1 Use the paint hangers to secure individual components or small parts for spray painting, paint hanger keep painting parts from dropping during painting

2 Use small paint drying ovens to dry for test pieces.

3 Wear a full hood air supplied respirator.

4 Use the electric heater, vent fan and timer for controlling the temperature and drying time.

5 Use the paint shaking tool to mix the paint before refinishing job.

6 Use the blade agitator where ever need.

7 Use the proper size of blade agitator (agitator, usually cone in 1 and 4 quart size)

8 Use the chiming knives to stir paint

9 Use clean, dry cloths folded into a pad

10 When using cleaning solvent, be sure to pour enough onto the pad being using to thoroughly with the surface to be cleaned

11 Do not wait for the solvent to dry wipe it dry with a second clean cloth

12 Refold the cloth often to provide a clean section

13 Change cloth often

14 Once an area is clean, do not touch it with the hands as it might affect adhesion.

**Note: Tack cloths are pourous choose cloth fabric coated with stricky varnish for wiping dust off the metal surface right before spraying tack cloth should be stored in an airtight container to conserve their tackiness.**

15 Use the masking paper to cover surrounding areas that will not be painted. So that mist does not settle on them.

16 Masking paper must be capable of preventing solvent in the paint mist from bleeding through to the surface of the object.

17 Use the masking tape to stick the masking paper to the areas to be covered.

18 Use the PPE as per instructions given by the paint spray booth manufactures.

— — — — — — — —

# Practice on safety aspects of oven temperature and timing setting

**Objectives:** At the end of this exercise you shall be able to
- **set the paint spray booth temperature**
- **set the paint spray booth drying time.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray booth - 1No.

**Materials**

- Tack cloth - as reqd.
- Paint - as reqd.
- Sealer - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.
- Masking paper - as reqd.

## PROCEDURE

**Set the paint spray both temperature and paint drying time.**

1 Properly maintain the preventive maintenance of paint booth to remaining in peak conditions by selecting the correct temperature setting of paint both (Fig 1)

Fig 1

2 A paint booth must be a minimum of 55 degrees faren heat for automotive paint with a catalyst to dry.

3 For paint booth with an air heater, the rule of thumb in the automotive industry paint booth have controls for heat and airflow.

4 Every 15 degrees above 70 degree a coating will cure about twice as fast (assuming 50 relative humidity) for every 15 degrees below 70 degrees, a coating will take about twice as long as to cure.

5 Below 55 degrees, the catalyst becomes document and does note cross link.

6 If warmer than 70 degrees paint companies have different catalysts and reducers to compensate for the rapid increase in cure times use a small thermometer to check both temperature as shown. (Fig 2)

Fig 2

Fig A

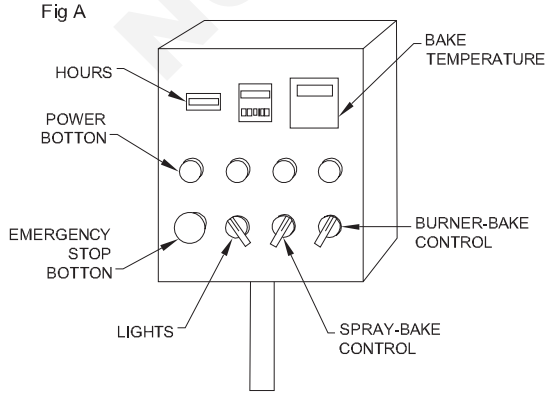



Fig B

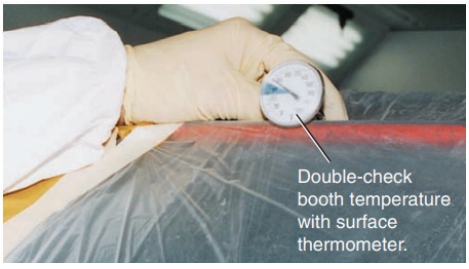
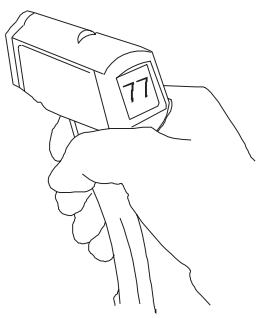



Fig C

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7 Note the readings and controls on the booth Fig 2A.

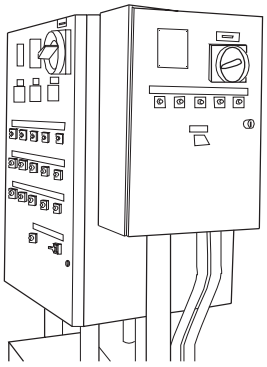
8 A small thermometer can be used to check booth temperature if needed. The temperature rating of the reducer must match the actual temperature of the object being painted (Fig 2B).

9 An infrared thermometer is handy because you can aim it all surfaces to read temperature (Fig 2C).

10 If you are spraying products that takes 30 minutes at 70 degrees to flash before it can be coated with the next step a shop could cut that time in half by raising the temperature in the spray both to 85 degrees

11 If booth is controlled with logic control panels automatically accplish this through smart flash mode. (Fig 3)

Fig 3



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12 A paint booth control station will have knobs and indications for ai flow lights and temperature.

13 Heat exponentially increases paint shop through out more than twice the amount of work can be put through heated booth verses a non-heated booth.

14 If you have a non-heated booth you have to be mind full of the amount of heated air, that is exhauster from a heated building for example if the outside temperature is 25 degrees and your shop contains 1,50,000 cubic feet of heated air a non – heated paint that moves 12,000 cubic feet per minute will exhaust all of the heated air in only 12 ½ minutes requiring the building heated system to replace it (Fig 4,5,6)

Fig 4

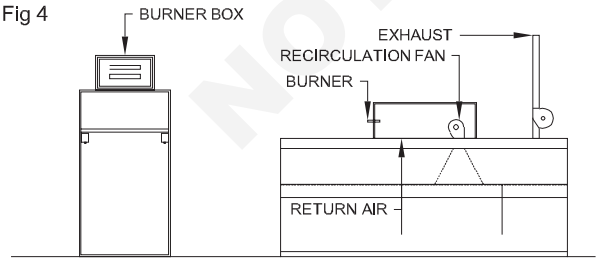


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Fig 5

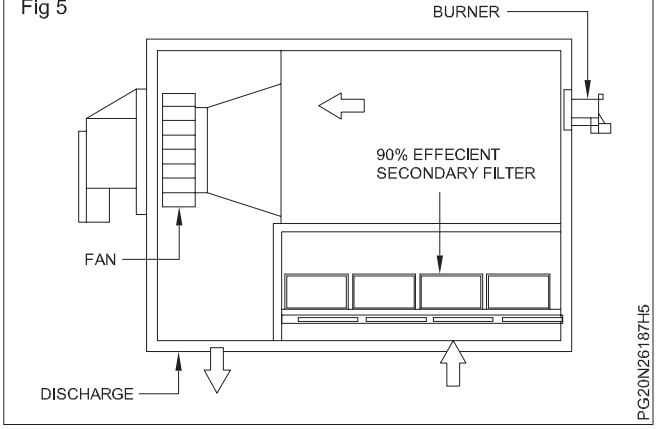


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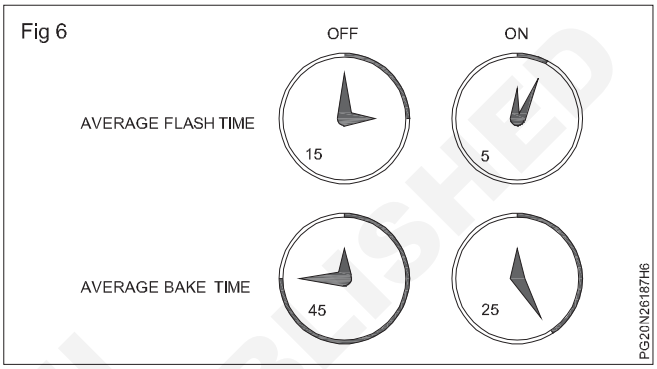
Fig 6

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15 In industrial paint booth average temperature takes to cure paint is between 65 and 70 degrees (However determining the right temperature for each paint job is a complicated process)

16 Examine the what type of coating to be used for painting.

17 Examine the size of objects and how long it takes to dry and set the oven temperature and drying times as per paint manufactures given instructions on the paint packing label.

18 Examine the factor needing consideration is humidity because of humidity, the temperature in one location is not identical to the same temperature in another location.

19 When it takes longer to dry paint on the same object with the same coating on a humid, 70 degree day in chennai than on a day 60 degree day in jammu.

20 So it is impossible to identify a single recommended temperature setting.

21 So best bet is to check with paint manufacturers temperature setting instructions tell you what is the exact temperature your paint booth should be set at to properly dry and cure your paint coating. (Fig 7)

**Note: For water borne paint the recommended booth temperature is between 70 and 75 degree or 5 degrees above ambient temperature which ever is greater.**

**If it is 90 degrees in Delhi when you are painting you should set your booths temperature at 95 degree. That will cause the burner to intermittently turn on, burning the humidity out of the air. This allows water bone paint to dry about twice as fast.**

**When using solvent based paint, it is critical to not exceed ambient temperature.**

**If it is 90 degrees outside temperature, you want to keep the temperature of the booth at 90 degree. You should also select a slower hardener and reducer for that temperature than do not want the burner kicking on, The paint is going to naturally dry fast. If you accelerate the process to much the paint will dry too quickly, causing problems such as splotchy paint, adhesion issues or dirty paint jobs for base coat and brittle, hazy or dull clear coats.**

22 Paint booth pressure gauge serves the same function as a monometer if pressure is high you migh have clogge filters or partially open booth door (Fig 7).

23 Paint booth lights on a diagram of booth control staton shows whether blowers and heating element are working.

24 To keep dirt and dust out of paint booth always keep the door completely closed. (Fig 7)

Fig 7

Fig A

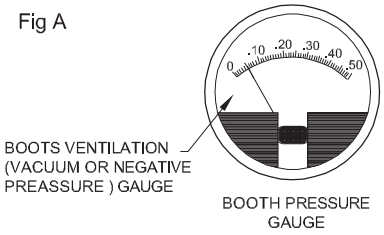



Fig B

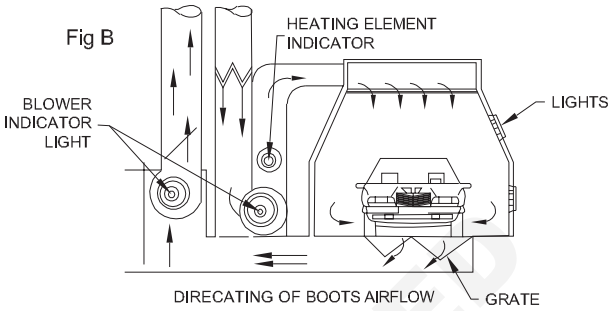
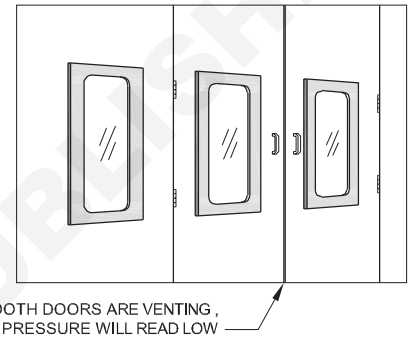



Fig C

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# Practice on apply sealent on metallic joints

**Objectives:** At the end of this exercise you shall be able to
- **prepare the sealant**
- **apply sealant on the metalic joints.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Coulter gun | - 1No. |
| • Knives Painting | - 1No. |
| • Wire brush | - 1No. |
| • Putty mixing board | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Sanding machine | - 1No. |
| • Vacuum cleaner | - 1No. |

**Materials**

| | |
|---|---|
| • Sealant | - as reqd. |
| • Hardener | - as reqd. |
| • Sand paper | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Apply sealant on metallic joints**

1 Clean the metal surface with clean cloth.

2 Use the cleaning solvent to remove the grease, oil deposited on the surface of the metallic joints and metal surface

3 Clean the metal joints with help of standard cleaning tool

4 Inspect the metal surface and metallic joints

5 Use the sandpaper to remove the old paint and rust formed on the metal surface (Fig 1)

Fig 1

6 If any deep rust formed on the metal surface use the power sander.

7 Clean the metal surface and metallic joints after sanding

8 Use the compressed air to remove dust particles between the metallic joints. Ensure complete dust and rust particles are removed between metallic joints.

9 Apply soap water with low pressure water spray and rinse the surface with soft sponge or cloth

10 Let it allow to dry off time before apply metal conditioner

11 Clean the metal joints with pressure air to remove remain dust particles between two metal joints

12 Select the metal conditioner and prepare the metal conditioner to apply on metal surface (metal conditioner coating prevented from the rust formation on the metal)

13 Apply metal conditioner on the metal surface and metallic joints by brush or spray gun as per direction given on the metal conditioner packing label.

14 Use the safety PPE while you sanding and paint spray

15 After 4-5 hours clean the metal surface and joints

16 Select the putty or body filler and prepare it as per manufacturers given direction

17 Apply body filler between the metal joint to seal the gap between joint of two pieces and apply putty on the metal surface wherever needed.

18 Use the caulking gun to apply sealant between the metallic joints

19 Let allow to dry off time for 6-8 hours or overnight.

20 Sanding the sealant applied area on the metallic joints

21 Clean the sealant area and ensure metal surface and metallic joints level are as same proper level of surface

22 Prepare the metal primer and apply on the metal surface by spray gun

23 Let allow dry off time for 8-12 hours before painting.

— — — — — — — —

# Practice on Paint Preparation & Mixing for Spray Painting

**Objective:** At the end of this exercise you shall be able to
- **prepare the paint for spray painting.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Safety goggles - 1No.
- Face mask - 1No.
- Sprayer tips - 1No.
- Bucket - 1No.

**Equipments**

- Paint mixing rotator - 1No.
- Paint sprayer - 1No.
- Test board - 1No.

**Materials**

- Paint - as reqd.
- Thinner - as reqd.
- Reducer - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Water - as reqd.

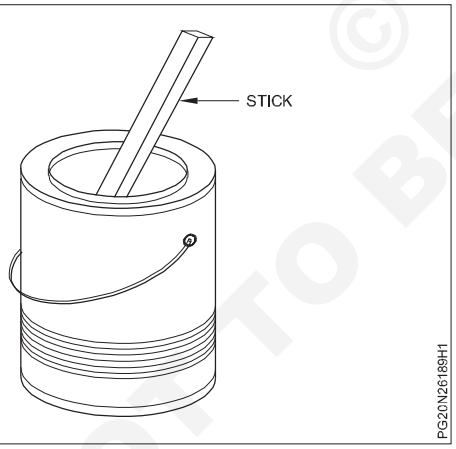
## PROCEDURE

**Paint preparation for spray painting**

1 Choose the right paint for the job

2 Choose the paint mixing materials there are many ways to mix the paint by manual and by machine with paint mixing stick (Fig 1)

Fig 1




3 Choose the paint whether it is water based or oil based paint to be sprayed on object

4 Wear the PPE when working with paints, whether you are spraying or mixing the paints (harm full chemicals present on the paint that get to your lungs)

5 Shake well the paint before use

6 Straining the paint is essential part of mixing paint

7 While because paints settled down at the bottom of the container.

8 Use the strainer to transfer the paint from the container and remove the excess pieces that gather on the filter

9 Using a strainer ensures your work flow since you do not need to clear clogs in the middle of spraying.

10 Before applying paint any surface you need to test it on the test board.

11 You can check the quality of the paint by spraying little amount on the test board.

12 You gather the information by spray paint test board whether you need to mix your paint or not

13 If paint sprayed shows the right colour and consistency you need not to mix it with a thinner for instance

14 If you see some inconsistency, you need to mix it properly or you end up losing the perfect texture.

15 First you get your bucket and fill it with the desired amount of paint.

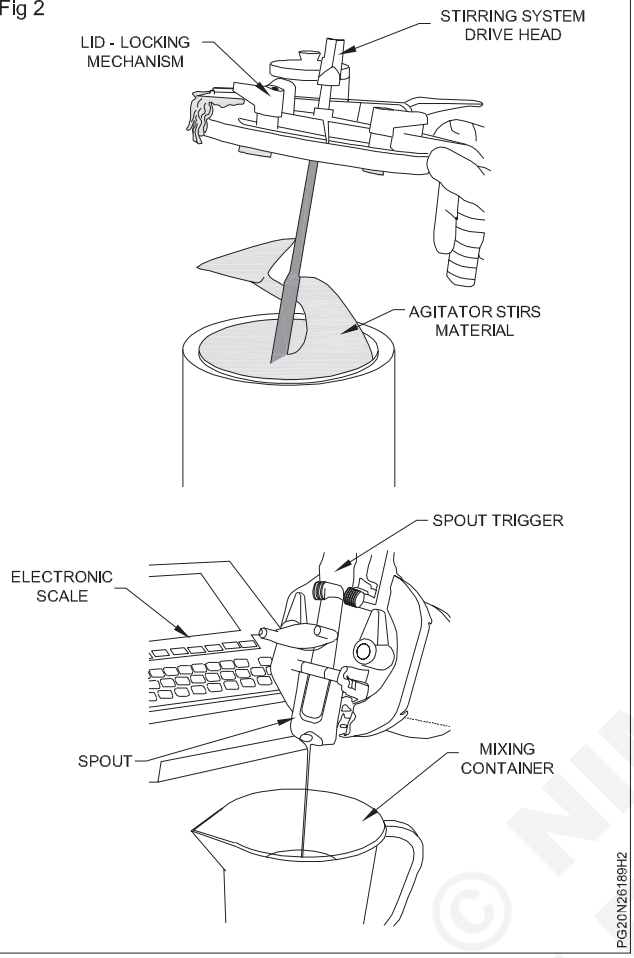
16 Then add a small amount of material as required based on your paint type, it will help to dilute the paint colour.

17 There is no hard and fast rule about how much material you need to mix. It depends on your judgement and tests, if you want thick paints you need add more materials and vice versa. For mixing latest paint you could use ¼ cup of water per gallon of paint.

18 If oil based paints start by adding just a small amount of thinner to see the result, since thinner works more aggressively compared to water, you need to take things slow and steady.

19 A blade agitator is a stirring paddle used with paint mixing system. The blades of the agitator are dipped into the paint and the paint can is sealed by the agitator cover (Fig 2)

Fig 2




20 The cover locks over the can opening by spring action.

21 These agitators usually come in 1 to 4 quart sizes and are the types of mixer used by colour mixing centres.

22 Churning knives are also used to stir paint and also used scale the measuring paint or hardening agents.

**Note: Ensure the paint properly stirred or mixed and paint properly reduced with correct temperature solvent to the desired viscosity for location temperature and humidity conditions**

# Practice to measure the viscosity of paint

**Objective:** At the end of this exercise you shall be able to
- **measure the viscosity of paint.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.

**Equipments**

- Paint viscosity test kit - 1No.
- Work bench - 1No.

**Materials**

- Paint - as reqd.
- Thinner - as reqd.
- Reducer - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Use the viscosity cup to measure the viscosity of paint**

1 Place the paint container to be viscosity tested.

2 Check the paint temperature.

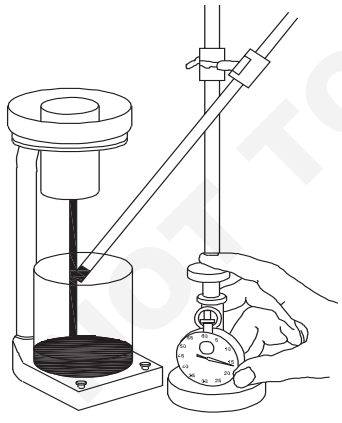
3 Paint temperatures should be at room temperature.

4 If vary the temperature allow to come down to room temperature before testing.

5 Place the paint viscosity test kit along with viscometer, stop watched bottom, paint storage cup on work bench.

6 Place the viscosity cone shaped 100cc cup with hole 4mm (or fine) at bottom.

Fig 1



USING THE VISCOSITY CUP

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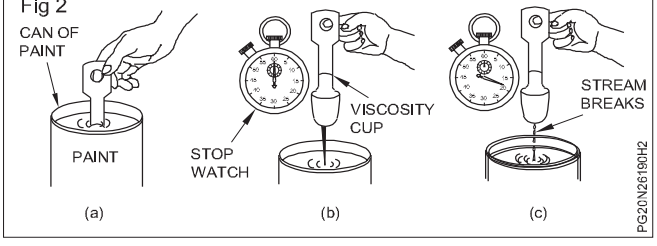
Fig 2




PG20N26190H2

7 Check the paint temperature, it should be approximately 70°F (Fig 1&2)

8 Read the instructions and directions of manufacturer for proper reduction. Add the reducer stirring until the thinner and material are well mixed with paint mixing stick.

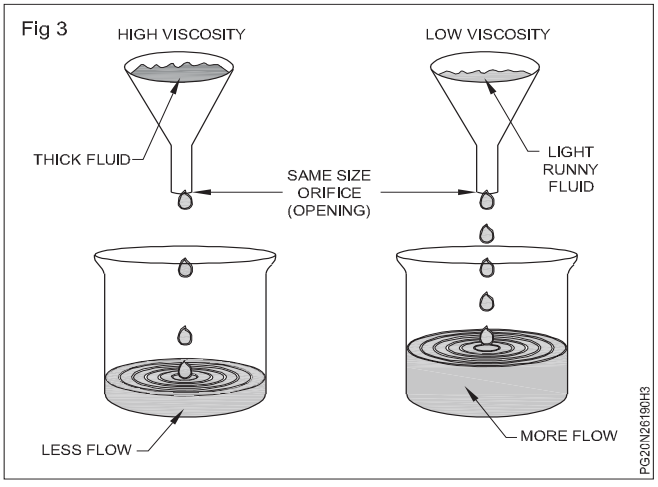
9 Place finger over the orifice in the bottom of the cup and fill with paint at hand. A stop watch is used to time, the number of seconds it takes the cup to empty or flow of paint to break.

10 Different types of material have different spraying viscosity.

11 For example lacquer will spray best and give good hiding and flow out at 18 to 22 seconds. Alkyd enamel will show its best qualities at 20 to 23 seconds. Acrylic enamel at 18 to 21 seconds and polyurethane enamel at 18 to 22 seconds

12 Use the different type of paints to check the viscosity of paint as per your instructor guide line with reference of paint guide book.

Fig 3




PG20N26190H3

13 Viscosity refers to thickness of liquid if poured through the same size orifice or hole, a high viscosity liquid will pour out much more slowly. primer and paint materials must be the right viscosity to spray out properly onto surfaces.

**For example: -** When using Zhan cup, these are general viscosities in seconds for various materials.

- Very thin materials – was primers, dyes and stains 14 to 16 seconds
- Thin materials – sealer, primers, Zinc chromates and acrylic – 16 to 20 seconds
- Medium materials – synthetic enamels, primer surfaces, epoxies, urethanes base coat/clear coat, and so on 19 to 30 seconds.

— — — — — — — —

# Practice on ornamental objects spray painting with different types of paints

**Objectives:** At the end of this exercise you shall be able to
- **cleaning the ornamental objects**
- **priming the objects**
- **painting the objects with different types of paint.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Scraper | - 1No. |
| • Painting knives | - 1No. |
| • Painting Brush kit | - 1No. |
| • Bucket | - 1No. |

**Equipments**

| | |
|---|---|
| • Ornamental objects | - 1No. |
| • Paint spray gun | - 1No. |
| • Air compressor | - 1No. |
| • Work bench | - 1No. |

**Materials**

| | |
|---|---|
| • Paint | - as reqd. |
| • Thinner | - as reqd. |
| • Reducer | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |
| • Emery sheet | - as reqd. |

## PROCEDURE

TASK 1: **Prepare the ornamental object for spray painting**

1 Select the ornamental object for painting work.

2 Identify the type of material used for make a objects.

3 Clean the object with clean cloth.

4 Note the how many colours used on the objects

5 Note the type of the paint used on the object.

6 Inspect the ornamental object to be painted.

7 Mark the paint damaged area on the object.

8 Select the sanding tool.

9 Sanding the damaged paint on the objects.

10 After sanding clean the sanded area surface with compressed air and clean cloth.

11 Apply metal conditioner on the metal surface to prevent rust formation on it.

12 If need apply putty to make a level surface.

13 After sanding the putty applied surface, clean it with soft cloth.

14 Prepare the metal primer.

15 Apply metal primer on the ornamental objects surface.

16 Let it allow to dry off time before painting.

— — — — — — — —

TASK 2: **Painting the ornamental objects with different colour and different paints**

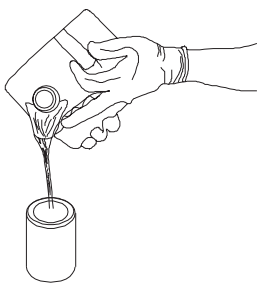
1 Clean the object before paint to prevent dust particles mix with paint while painting the objects.

2 Select the different type of paint to match with previously applied on it.

3 Well mix the paints and filter the paint as shown in Fig 1&2 ensure the viscosity of the paint to be painted many shops now use on electronic or computerised scale when mixing paint materials the scale will prompt you to add each introduce and also show you how much of each ingredient to add.

4 If ornamental objects is small place it on the work bench.

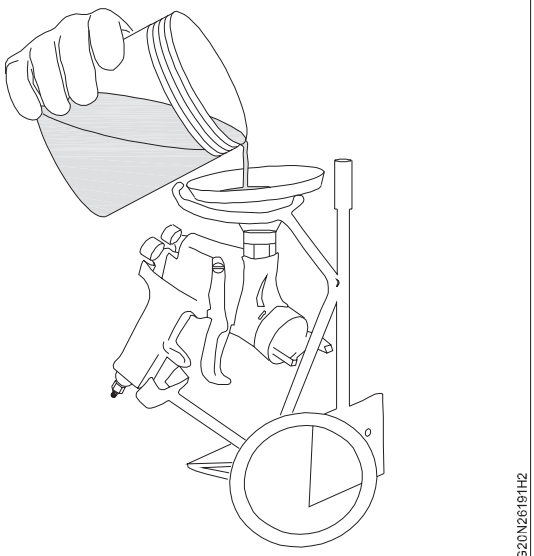
Fig 1




5 If ornamental object is big one use the paint shop.

6 Masking the paint unwanted area of the object.

Fig 2




7 Apply any one colour on the objects and let it allow to dry.

8 Remove the masking material and clean the paint buries.

9 Let it allow to dry off time.

10 Clean the ornamental objects to be painted.

11 Masking the unwanted area of object.

12 Apply other prepared colours on the objects one by one as mentioned above steps.

13 After dry off time clean the object and inspect the painted surface if need apply one more paint coat.

**Note: Paint mixing sticks are sometimes used to add the correct amount of ingredients: paint reducer, and hardener. (Fig 1)**

**Paint must be mixed correctly before being sprayed. Here the technician has mix and filtered a small amount of paint ,a small plastic cup on the gun prevents waste of paint materials when only a tiny amount of colorcast is needed. (Fig 2)**

— — — — — — — —

# Practice to spraying metallic primer on metal surface

**Objectives:** At the end of this exercise you shall be able to
- **prepare the metal surface and metalic primer**
- **spraying metallic primer on metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Scraper - 1No.
- Wire brush - 1No.
- Paint mixing stick - 1No.
- Bucket - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.
- Paint mix rotator - 1No.

**Materials**

- Paint - as reqd.
- Thinner - as reqd.
- Reducer - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Emmary sheet - as reqd.

## PROCEDURE

**Method of the metallic primer spraying on metal surface**

1 Clean the metal surface with clean cloth.

2 Clean the metal surface with soap water.

3 Apply degrease solvent on the metal surface and clean it with high pressure water spray.

4 Dry off the metal surface.

5 Sanding the metal surface to remove old paint and rust format on it compressed air and clean cloth.

6 Clean the metal surface.

7 Ensure the metal surface is clean and level surface.

8 Select the metal conditioner and prepare it to apply.

9 Apply metal conditioner on the metal surface.

10 Apply self-etch primer or epoxy primer over all bare metal surface to improve adhesion and add to corrosion protection.

11 Apply putty or body filler let it allow to dry and sanding it for make a level surface.

12 Only apply epoxy primer to bare metal.

13 Apply primer and surfacer over the whole repair area (body filler, self-etch primer, spot putty) if need to help build and smooth the heavily sanded repair area. Up level with original paint surface.

14 Apply first coat over the whole repair area. Then apply additional coats to smaller areas to build up the primer and fill the repair area.

15 Apply sealer over all primers and putties to keep them from showing or bleeding in to the top coats of paint if possible the sealer should be tinted to about the same colour as the previous paint colour

16 The application of these prime coats will ready the area for top coats. You can then spray on the colour coats and clear coats primer is generally the first prime coat in any finishing systems primers are designed to prepare the base substrate (steel, alum mum, smc, fiberglass, or plastic) to accept and hold colour top coat.

**Note:**

1) **Primer should be selected to match the substrate**

2) **Always read the printed label directions on paint materials before using them the directions are specific to product and include detailed application, mixing and safety information use primer sealer for covering dissimilar materials and for preventing bleeding through in the new paint .**

3) **Use a primer, surfacer or primer - filler to help smooth and level surface with a large area of minor surface imperfections or to help featheredge repair area.**

# Practice to apply car patch, putty, filler on metallic surface and prepare it for painting

**Objectives:** At the end of this exercise you shall be able to
- **identify the car patch repairing spots**
- **prepare the repair area and apply putty body filler on the metal surface**
- **prepare the metallic surface for the prime and top coat.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Putty wiper | - 1No. |
| • Wire brush | - 1No. |
| • Scraper | - 1No. |
| • Paint knife | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |

**Materials**

| | |
|---|---|
| • Putty | - as reqd. |
| • Body filter | - as reqd. |
| • Primer | - as reqd. |
| • Thinner | - as reqd. |
| • Hardener | - as reqd. |
| • Reducer | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Method of apply the car patch putty, Filler on metallic surface**

1 Park the car on the paint shop floor

2 Clean the car with soft clean cloth

3 Inspect the car body for any patch work seen on it (paint chips pits sanding marks imperfections)

4 Mark the paint damaged area and find the cause for damage (it can be difficult see of the flow, so make sure the surface is well tilt, use shop held light foryour inspection if needed.)

5 Analyses the cause for paint work (damage).

6 Select the sanding tools for sanding the patch marked on the metallic surface.

7 Use the sanding tool depend on the patch size and depth of defect

8 Clean the sanded area with clean cloth and use the soap water to clean the metallic surface.

9 Select the putty and hardener

10 Prepare the putty for apply on the car body patch

11 Well mix the putty and hardener as per proper ratio and follow the instruction and direction given by putty manufactures or given instructions on the putty packing label.

12 Apply putty on the prepared patch marked on the metallic surface use only two part putty

13 Place the small amount of mixed putty on to a clean rubber squeegee or tiny putty spreader wipe a thin coat over the sanded patching spot on metallic surface use single strokes and a fast scrapping motion putty dries very quickly use a minimum number of strokes when applying putty repeated passes of the putty spreader might pull the putty away from the primer

14 Some spot putties can be used on painted surface, use your finger to scuff the paint chip before putty application after through curing , you can featheredge putty into existing paint with less sanding. (Fig 1)

15 it is difficult to see small dimples or depressions in dull primer look closely. Use a small flexible mini – spreader or rubber squeegee to apply spot putty. (Fig 1a)

16 Wipe putty in two directions only Do not rubbing spot putty because it will tend to dry and not bond properly resulting in imperfections. (Fig 1b)

17 Some spot putties can be used on painted surfaces use your finger to scuff paint chip before putty application, after through curing you can featheredge putty into existing paint with less sanding. (Fig 1c)

**Note: spot putty should be applied only to small surface imperfections never use it like plastic body filler (Fig 2)**

15 After curing the putty block sand the putty flash with surrounding surface make a level surface to match with remain metallic surface use the 220 to 600 grit sand paper to featheredge spot putty.

Fig 1

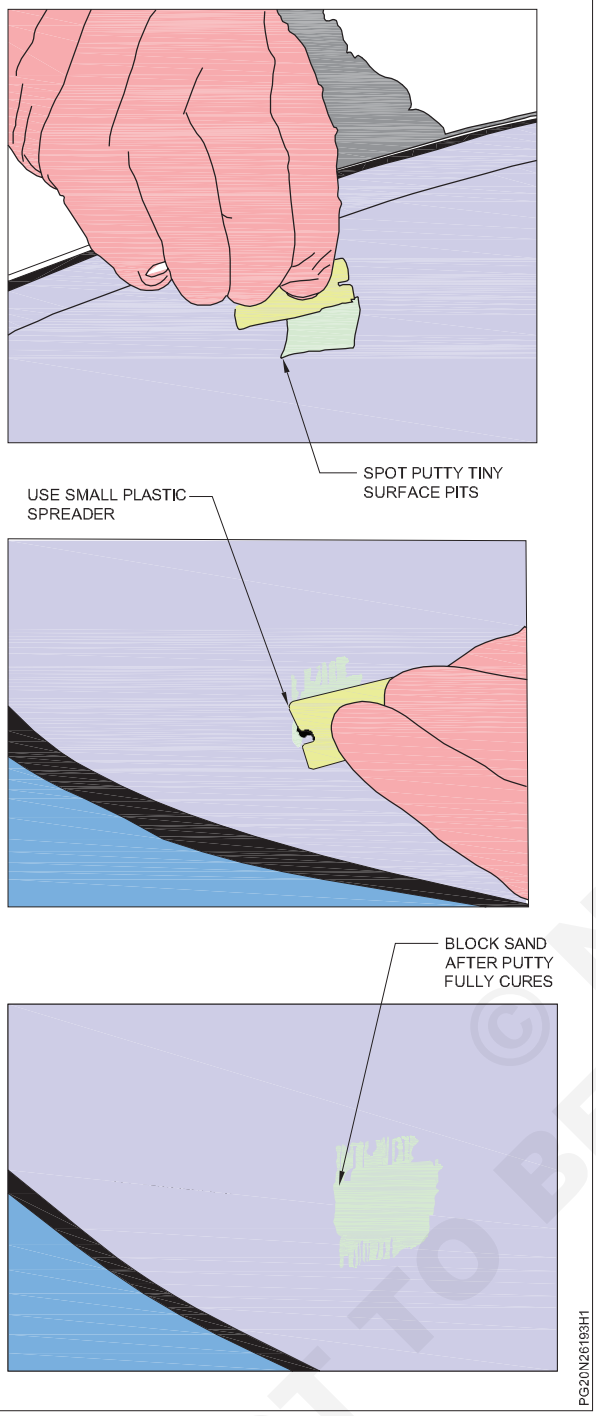
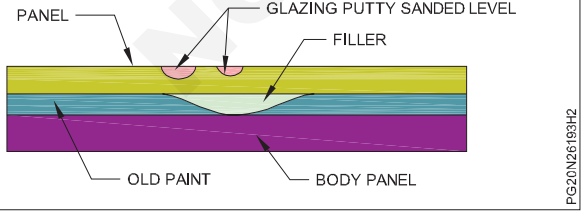



Fig 2




16 Ensure the metallic surface level is matched with putty applied area of patching work.

17 Inspect the metallic surface for cracks, pin holes on the panel.

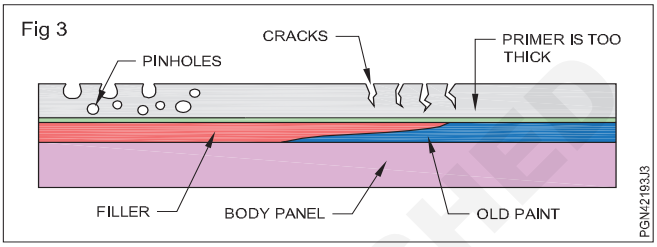
18 Select the body filler and hardener

19 Prepare the body filler to apply on the metallic surface to cover the imperfections.

20 Apply body filler on the pinhole and cracks marked on the metallic surface.

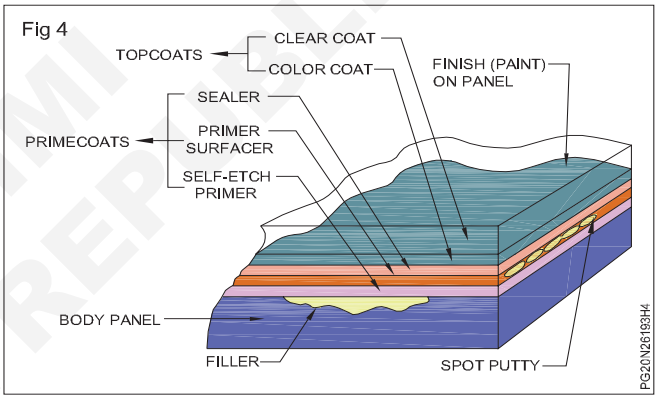
21 Wipe out excess filler on the pin holes and metal cracks (Fig 3)

Fig 3




22 Make sure filler is filled with pinholes, cracks and scratches on the metallic surface. (Fig 4)

Fig 4




23 Place a small amount of mixed body filler on to a clean rubber squeegee or tiny spreader wipe a thin coat over the primer imperfections.

24 After curing body filler sanding it with suitable grit sand paper use fine grit of 150 to 180 normally used to continue smoothing body filler fine grits are also used to final body filler and to featheredge filler.

25 Use the very fine grit ranges from 220 to 600 are used for smoothing and final leveling of body filler.

26 Ensure the filler applied metallic surface is ready for painting.

**Note: putty filler is applied to fill deep dents and to obtain a smooth finish, wherever necessary it improves the flatness of surface thus enhancing the aesthetic appearance of the painted object.**

# Practice on spraying surfacer on primed or putty finish metallic surface

**Objective:** At the end of this exercise you shall be able to
- **spraying surfacer on putty finish metallic surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Hand sander pad - 1No.
- Paint stainer - 1No.
- Bucket - 1No.
- Viscosity cup - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.

**Materials**

- Surfacer - as reqd.
- Thinner - as reqd.
- Sandpaper - as reqd.
- Soap oil - as reqd.
- Sponge - as reqd.
- Cotton cloth - as reqd.

## PROCEDURE

**Method of surfacer spraying on putty / filler finished surface**

1 Thoroughly clean the surface to be spraying surfacer on putty finished surface.

2 Use the wax and grease remover for surface cleaning.

3 Grind or sand the surface for fine finish of the surface.

4 Clean the surface before applying surfacer on the putty / filler finished surface.

5 Select the surfacer and read instructions given on the label and prepare the surfacer packing for apply. (Fig 1)

6 Prepare the spray gun and top up the surface on spray gun and apply surfacer on the metallic surface.

7 Select the con-ventional suction gun at 350-400KPa.

8 Apply 2-3 coats allowing 5-9 minutes between coats (longer at lower temperature).

9 Apply primer surfacer and it is effect a primer to which has been added a surfacing material. The surfacer fills in small scratches, nicks and other minor surface imperfections.

10 Allow 2-4 hours drying time (depending on air temperature and film thickness)before sanding.

11 Sanding the surfacer applied area with p400 or finer grit dry sand paper.

12 Apply primer sealer after the process of primer surfacer applied. (Fig 2)

13 Primer sealer provides sealing film between the primed surface and the top coat.

14 Ensure the suracer is properly applied in even thickness on the mettallic surface.

Fig 1

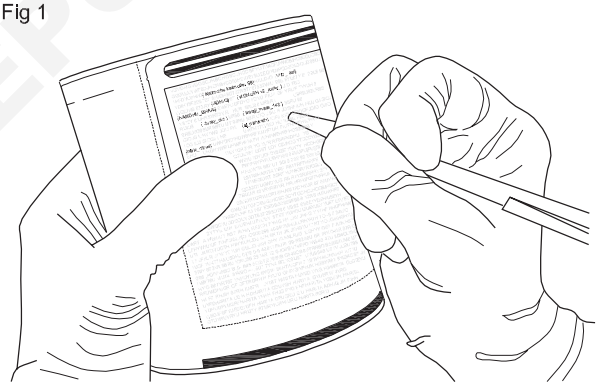
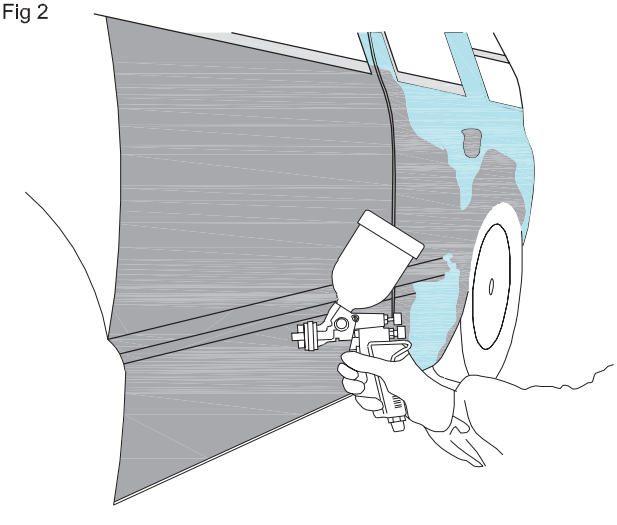



Fig 2



# Practice on spraying top coat on prepared job

**Objectives:** At the end of this exercise you shall be able to
- **apply enamel to coat on prepared job**
- **apply NC/latest paint on prepared job.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Paint mixing stick | - 1No. |
| • Bucket | - 1No. |
| • Paint strainer | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |
| • Paint viscosity tester | - 1No. |
| • Paint spray test board | - 1No. |

**Materials**

| | |
|---|---|
| • Paint enamel | - as reqd. |
| • Thinner | - as reqd. |
| • Abrasive | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Soap oil | - as reqd. |
| • Clean cotton cloth | - as reqd. |
| • N C paint | - as reqd. |

## PROCEDURE

**Top coat enamel paint spraying on prepared job**

1 Clean the prepared object to top coat painting

2 Select the enamel color paint which is matched with old paint color

3 Mix the solvent to make a proper viscosity and use the paint mixing stick or paint mixing rotator

4 Filter the paint before top up the paint spray gun

5 Check the paint viscosity and temperature before use to spray top coat

6 Check the paint property of adhesion, tensile strength moisture permeability, gloss, imperfect resistance and cost

7 Top coat enamel paint would be free flowing during spray application and flow evenly over the work surface, stabilize quickly and remain in place

8 The solvent used must have sufficient dissolving power for the resin in paint

9 Maintain the room temperature and paint temperature

10 Ensure the temperature for baking enamels range from 280to350°'F for 10-30 min

11 Top coats are the final coats for use over primers or filler the tops coat give additional protection from the weather and aid in other performance requirements

12 Always use sprayed on top of a color is as a base coat a clear coat is a transparent glossy.

13 Top coat must be durable enough to resist abrasion and chemically stable enough to with stand the combination of UV light as well as chemical aggression

14 Maintain the gun distance from the metallic surface as manufacturers recommendation at least 6 inches from surface to spray gun nozzle

15 Use the same paint spray pressure and set spray pressure before start top coat paint application

16 Spray the even thickness of paint on the object surface.

17 Allow to dry off time between one coat to another coat

18 Use the second coating if need only.

**Note: Wear the personal protect equipment while spray painting like face mask, respirator, goggles, gloves, combos, overall, combination with cap**

19 Ensure top coat enamel paint is applied even thickness on surface.

20 Clean the painted surface with soft cloth if need buffing the painted surface for more shining.

# Practice to prepare the surface of home appliance

**Objective:** At the end of this exercise you shall be able to
- **prepare the surface of home appliance.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Hand sander pad | - 1No. |
| • Scraper | - 1No. |
| • Painting knife | - 1No. |
| • Nylon brush | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |
| • Air cooler | - 1No. |

**Materials**

| | |
|---|---|
| • Cleaning solvent | - as reqd. |
| • Abrasive material | - as reqd. |
| • Soap oil | - as reqd. |
| • Cotton cloth | - as reqd. |

## PROCEDURE

**Surface preparation of home appliance (Fig 1,2,3)**

Fig 1

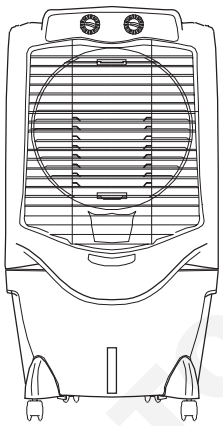


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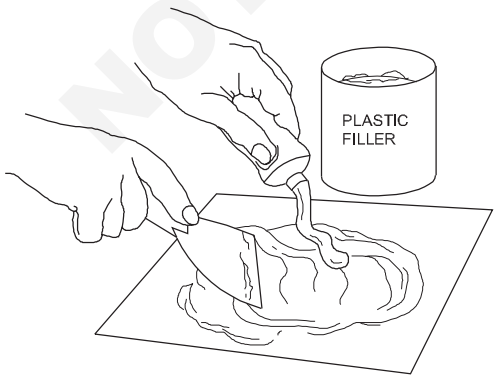
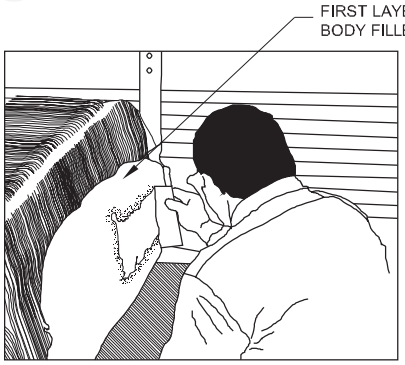
Fig 1




MIXING PLASTIC BODY FILLER AND HARDNER

PG20N26196H2

Fig 3




APPLYING A SECOND COAT OF PLASTIC
BODY FILLER OVER THE FIRST COAT

PG20N26196H3

1 Select any one of home appliance like fan, air cooler fridge, washing machine etc.

2 Place the selected home appliance on the workbench

3 Suppose you are selected the air cooler, study parts fitted on it. (Fig 1)

4 Ask the customer, which type of painting is required whether complete painting or out side parts painting

5 Dismantle the parts of air cooler.

6 Separate the metal plastic, electronic, glass, rubber and electric parts (wire, switch, motor etc.)

7 Select the sanding tools

8 Clean the parts for degreasing and oil deposited on the surface

9 Use the chemical stripping to remove the oil paints or use the sand papers for sanding

10 After sanding clean the metal parts surface with compressed air and clean by cloth

11 Inspect the metal surface and mark the pinhole, cracks and dented area.

12 Select the putty , hardener reducer

13 Prepare the putty to apply

14 Well mix the putty with hardner on glass surface

15 Ensure the putty is well prepared and ready to apply

16 Apply metal conditioner on the sanded area to prevent corrosion

17 Apply primer on the metal surface and then apply putty on the metal surface

18 Sanding the metal surface for leveling

19 Clean the metal surface and ensure it is even level

20 Clean the plastic parts with cleaning solvent and soap oil

21 Use the cold water with hose rather than a bucket of water to wet and rinse the plastic parts surface

22 Use sponge or soft cotton cloth to clean the plastic parts

23 Let it allow to dry in room temperature

24 Inspect the plastic parts for damages, cracks, scraches

25 If found any major damage replace the parts.

26 If any minor cracks, scratches, sanding the plastic parts and clean it with compressed air and low pressure water spray.

27 Inspect the part and mark the damaged spot to be repair

28 Note the color of plastic part

29 Select the putty and hardener and color

30 Well mix the plastic putty and hardener with color

31 Maintain the viscosity of putty and apply putty on the plastic parts, let allow to dry

32 Sanding it for leveling the surface matching with remaining surface

33 Clean the sanded area and ensure plastic parts surface is evenly matched with repair area

34 Prepare the plastic primer surface as per instructions given on the primer packing label. (Fig 2)

35 Apply primer on the prepared surface and allow it to dry off time. (Fig 3)

36 Ensure the air cooler parts are ready for painting works

**Note: Do practice on any type of home appliance to prepare the surface for painting under your instructor's guide line.**

37 Write steps of surface preparation of the three door bridge in your practical note book.

— — — — — — —

# Practice on priming and surfacing the prepared home appliance

**Objectives:** At the end of this exercise you shall be able to
- **apply primer on the metal and plastic parts**
- **apply surfacer on the prepared job surface.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Scuffing pad | - 1No. |
| • Scraper | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |
| • Air cooler | - 1No. |

**Materials**

| | |
|---|---|
| • Primer | - as reqd. |
| • Primer surfacer | - as reqd. |
| • Emery sheet | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Priming and surfacing on prepared home appliance**

1 Clean the already prepared home appliance metal parts.

2 Inspect the metallic surface level and ensure the surface level is even level.

3 Clean the surface for degreasing and oil and dust layered on the surface

4 Clean the surface with low pressure water, spray and rinse with soft sponge to remove remain dust deposited on the surface.

5 Dry off it with room temperature and clean it with soft cotton cloth.

6 Select the metal primer and read the instruction given on the packing label.

7 Before opening the packing of primer shack well to mixing the layer deposited under part of primer.

8 Primer is special type under coat material it prevents the rusting and corrosion and also help bond the top coat to bare metal sheet.

9 Prepare the primer to spray by adding reducer or thinner.

10 Check the viscosity of the primer and filter the primer before fill the cup of spray gun.

11 Apply primer on the surface with help of suitable paint spray gun.

12 Apply even thickness of primer on the surface.

13 Let it allow to dry off time before apply second coating of primer.

14 Primer itself does not fill and cover sand scraches on the surface to be painted.

15 Select the metal primer surfacer and prepare it for spray.

16 Apply primer surfacer, it is effect a primer to which has been added a surfacing material. This prepare the surface to paint stick well on it.

17 The primer surfacer fills in small scratches, nicks and other minor surface imperfections .

18 Apply the primer sealer after the process of primer surfacer sprayed.

19 Primer sealer provides sealing film between the primer surfacer and the top coat.

20 Clean the plastic parts which is repair and prepared for priming work.

21 Inspect the parts and ensure complete dust is removed, if need clean it with soap water by apply low pressure water spray and rinse cleaning with sponge.

22 Let it allow to dry off time. Ensure the plastic part is completely dryed before apply plastic primer.

23 Select the plastic primer and prepare it as per instructions given on the packing label.

24 Filter the primer and apply primer on the surface along even spray pressure and paint thickness.

25 Allow it for dry off time before sanding.

26 Clean the primed surface for apply primer surfacer to cover the small scratches, nicks and other minor surface imperfections.

27 Select the suitable plastic primer surfacer and prepare it for apply on the prepared primed surface.

28 Use the paint spray gun to apply primer surfacer. (Fig 1)

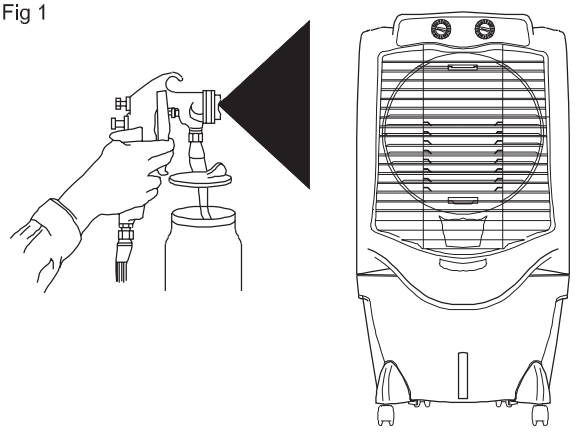
29 Apply primer surfacer on the primed surface at even thickness layer on the surface.

30 Let it allow to dry off time clean the surface for inspection. If need reapply one more coat as following above steps.

**Note: Do practice to apply primer and primer surfacer on high speed tower fan under guide line of your instructor.**

**Only use the suitable primers for metal and plastics separately.**

Fig 1



SPRAYING SOLVENT TO FLUSH ALL PAINT FROM THE GUN

PG20N26197H1

# Practice on apply under coat and top coat paint on the selected home appliance

**Objectives:** At the end of this exercise you shall be able to
- **apply base coat paint on the surface of home appliance**
- **apply top coat paint on the surface of home appliance.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint touchup brush set - 1No.
- Scuffing pad - 1No.
- Paint mixing stick - 1No.
- Paint knives set - 1No.
- Scraper - 1No.

**Equipments**

- Air cooler - 1No.
- Air compressor - 1No.
- Paint spray gun - 1No.
- Power sander - 1No.
- Buffer machine - 1No.

**Materials**

- Paint - as reqd.
- Reducer - as reqd.
- Thinner - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Emery sheet - as reqd.



## PROCEDURE

**Apply under coat/base coat paint on the home appliance**

1 Clean the primer surfacer applied home appliance surface.

2 Clean the appliance surface with soap water to lay of dust layer deposited on the surface clean the appliance surface with low pressure clean water.

3 Let it allow to dry off in room temperature.

4 Select the paint color previously applied paint and those top coats that can be applied over them.

5 Don't select the lacquer paint over enamel paint. If you apply lacquer over enamel, incompatibility problems such as paint lifting can develop.

6 So that carefully select the paint for base coat.

7 Read the instructions printed on the label.

8 Prepare the paint to apply base coat.

9 A paint mixing stick can be used to add repair material ingredients in the correct amounts. Choose the correct stick for the paint material you are using. Only use perfectly clean containers with horizontal sides when mixing paint products. (Fig 1)

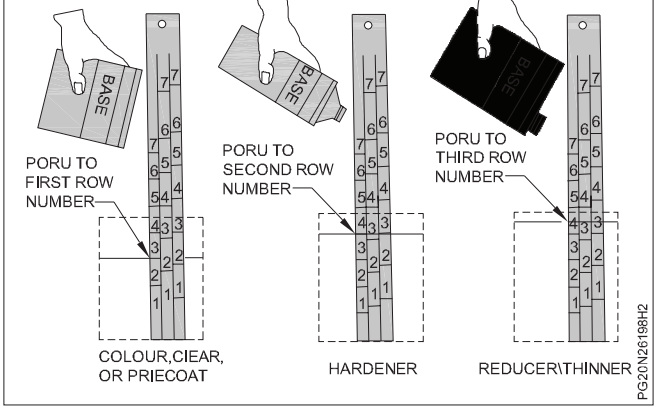
10 Study the basic steps for using a mixing stick. (A) Depending on information on the top of the mixing stick, you must usually pour in paint or primer first. Pour in the amount of material needed for your job. Stop when you reach any of the numbers on the mixing stick. (B) If used, pour hardener or catalyst in next. Pour material into the can until it is even with the same number on the mixing stick, but in the next column. If the paint was even with number 5, pour in hardener to number 5 on the next, or center, column on the stick. (C) Pour in solvent until the liquid is even with 5 on the right column. Pour all material slowly so you do not add too much. Stir material with a metal stick.

11 Cheek the paint viscosity and paint temperature before use to apply on the surface.

Fig 1

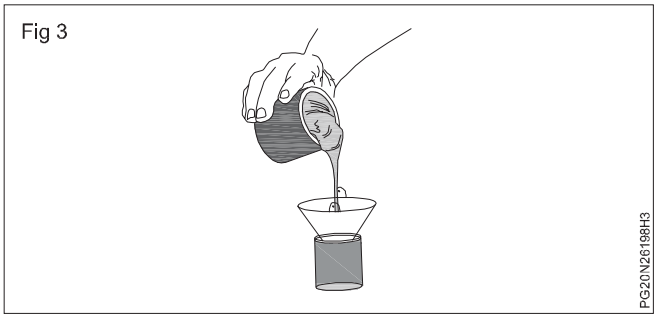
PG20N26198H1

Fig 2




12 Filter the prepared paint before drop in the paint spray gun container. (Fig 3)

Fig 3




13 Connect the air hose to paint spray gun and set the air pressure, spray pattern

14 Test the spray pattern on the test board.

15 Apply first base coat on the surface

16 Let it allow to dry for 4 to 6 hours and the sanding it

17 Clean the sanding area with soft cloth.

18 Clean the base coated area with cold water spray along rinse with soft sponge to remove the paint debris

19 Allow it to dry off time at room temperature.

20 Apply second coat paint to cover the minor scratches on the surface at even thickness of paint spray.

21 Let it allow to dry 4 to 6 hours at room temperature

22 Clean the surface by soft cloth

23 Prepare the sealer to apply on the base coat paint.

24 Apply sealer on the base coated surface.

28 Clean the sealer applied area with soft cloth

29 Apply topcoat on the surface of home appliance

30 Clean the top coat painted area if need apply rubbing wax and buffing the surface for more shining.

31 Ensure the base coat and top coat painting is properly finished.

**Note: Use the personal protective equipments, while surface preparation and paint spraying on the metal / plastics / wood surface)**

# Practice to prepare the surface of air compressor

**Objective:** At the end of this exercise you shall be able to
- **prepare the air compressor surface.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Scuffing pad | - 1No. |
| • Scraper | - 1No. |
| • Wire brush | - 1No. |
| • Bucket | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Power sander | - 1No. |
| • Water sprayer | - 1No. |

**Materials**

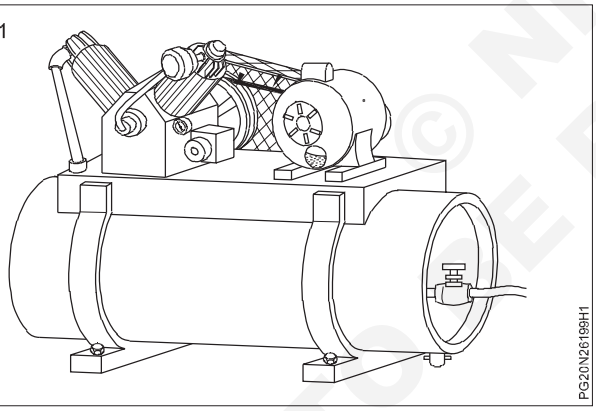
| | |
|---|---|
| • Cleaning solvent | - as reqd. |
| • Emery sheet | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Prepare the surface of air compressor for painting**

1 Place the air compressor on the paint shop floor. (Fig 1)

Fig 1




2 Remove the air compressor electrical connections and electrical parts like switch, wire, motor

3 Remove machine safety guard.

4 Disconnect the air hoses

5 Release the air pressure in the tank

6 Remove the compressor unit

7 Clean the all the part of air compressor, starter unit and electrical motor and reciprocating unit.

8 First prepare the reservoir unit and then reciprocating unit motor and other accessories.

9 Use the chemical solvent to remove the old paint applied on the compressor and accessories.

10 Select the suitable chemical solvent to remove deep paint and rust formed on the body surface.

11 Clean the cleaning solvent applied area with pressure water and rinse with wire brush to remove the rust formation on the surface, other wise use the sand blast, power sander hand sanding method to remove the old paint, sanding system required, depend upon the previous paint condition on the machine.

12 Do not use the chemical solvent and water spray, on the electrical parts only use the dry sanding system

13 After sanding clean the parts by apply compressed air flow on the surface to dust off the sanded dust layer deposited on the machine.

14 Clean the compressor parts by clean cloth and ensure compressor parts are very clean (reciprocator, reserviar, fan, safety guard, motor, starter switch cover, filter etc)

15 Ensure complete old paint and rust is cleaned well.

16 Prepare the metal conditioner and apply on the metal parts.

17 Clean the surface before apply putty and filler on it.

18 Write down the parts of air compressor in the table 1.

| Sl.No | Parts name | Paint color | Type of paint used |
|---|---|---|---|
| 1 | Electric | | |
| 2 | Reciprocator | | |
| 3 | Safety guard | | |
| 4 | Starter switch | | |
| 5 | Reservior | | |
| 6 | Air filter | | |
| 7 | FRL unit | | |

19 Write procedure of surface preparation of lath machine in your practical note book.

# Practice on priming and surfacing on the air compressor

**Objective:** At the end of this exercise you shall be able to
- **apply primer and surfacer on the air compressor surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Sanding tool - 1No.
- Scraper - 1No.
- Painting knife - 1No.
- Paint mixing stick - 1No.
- Bucket - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.
- Power sander - 1No.
- Buffer - 1No.

**Materials**

- Primer - as reqd.
- Primer surfacer - as reqd.
- Cleaning solvent - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.
- Emery sheet - as reqd.

## PROCEDURE

TASK 1: **Apply primer and primer surfacer on the air compressor**

1 Clean all the parts of air compressor

2 Clean the parts with degreasing solvent to remove the oil, grease dust layered on the surface (before primer apply)

3 Select the primer color and prepare primer

4 Read the instructions on the primer packing label.

5 Well shake the primer before opening a packing. It will help to mix the primer particles which is settled in bottom.

6 Open the packing with help of tin packing opener.

7 Use the paint mixing stick to mix the hardener, reducer or thinner to bring specified viscosity of the primer.

8 Select the primer color and mix the color with primer to match the base coat and top coat paint

9 After adding the correct amount of each material thoroughly mix the primer with help of paint mixing stick

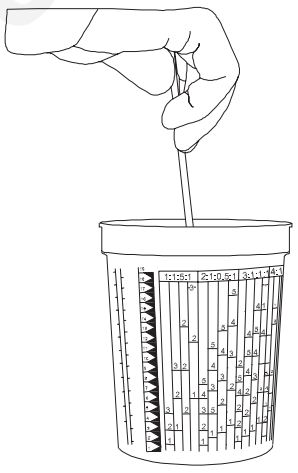
10 Strain the primer and fill it with your spray gun.

11 Use graduated mixing cups in the same way as mixing sticks they have graduated scales for adding ingredients as shown in figure - 01.

12 The method shown in the figure is provide constant mixing of all finishes and primers, primer surfacer, paints

13 They even keep metal flakes and metallic in total suspension and complete dispersion.

Fig 1




14 Adjust the main pressure regulator at the compressor to provide the manufacturers recommended line pressure (Fig 2)

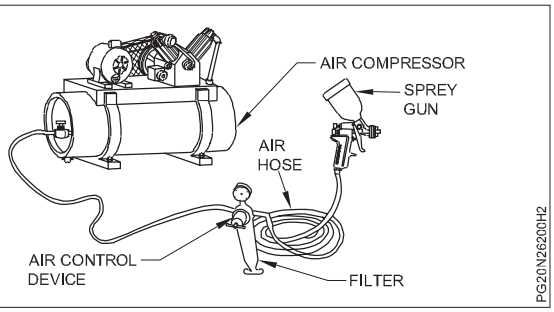
15 Make sure excess pressure is not fed to suction and pressure fed spray gun. Because they could be damaged

16 Adjust the spray gun mounted regulator to the air pressure recommended by the gun manufacturer. This well vary slightly with the nozzle size and viscosity of the material to be sprayed.

17 Wear the personal protective equipments for personal safety while apply primer.

18 Apply primer on the surface prepared for priming job one by one all parts of air compressor

Fig 2




19 Thickness of the primer film must use normal medium wet coats with proper flash times between coats. This will prevents problems.

**Note: The amount of material sprayed on the surface with one stroke of the gun will depend on the width of the fan distance from the gun air pressure at the gun, amount of reduction speed of the stroke and selection of a reducer.**

20 Maintain the spray gun distance from the spray gun nozzle to the surface being primer applied you keep spray gun about 6 to 10 inches (203 to 254 mm) from the surface being sprayed.

21 If you hold the spray gun too close to the surface primer will pile up unevenly on the surface and primer film can run or sag, if you hold spray gun too far away the material will partially dry before it hits the surface. The paint will look and will not flow down smoothly.

22 Difficult areas such as corners and edges should be sprayed first. Aim directly at the area so that half of the spray covers each side of the edge or corner hold the gun 1 to 2 inches closer than usual or screw the pattern control knob in a few turns.

23 After all of the edges and corners have been sprayed, the flat or nearly flat surface should then be sprayed.

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TASK 2 : **Apply surfacer on the primed air compressor parts**

1 Select the surfacer, hardener, reducer, thinner

2 Mix the hardener, thinner and solvent to bring the viscosity and color of the surfacer.

3 Clean the primed surface of the machine parts

4 Sanding the primed machine surface

5 Clean the sanded dust particals layered on the machine surface

6 Clean the surface with cleaning solvent under guidance of your instructor

7 Filter the surfacer before fill with paint spray gun

8 Top up the surfacer in a spray gun and set the correct adjustment to achieve good spray

9 Use the paint spray test board to check the surfacer spray pattern

10 Ensure surfacer spray pattern is as specified by manufacturer

11 Apply surfacer on the machine parts surface to cover the scratches on the parts. (Fig 1)

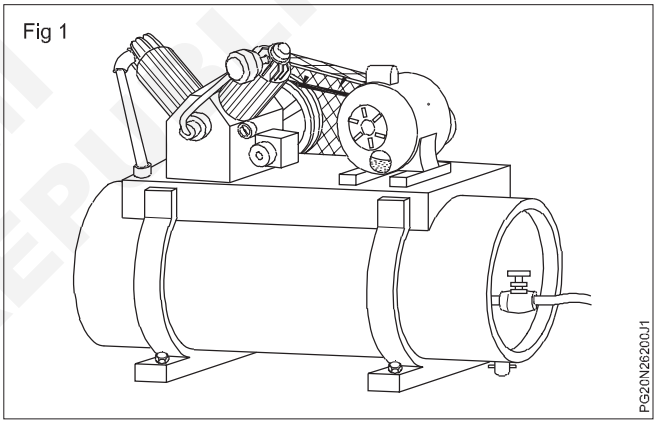
12 Spray gun speed is how fast you move the gun sideways over the surface film of surface on the machine parts surface.

13 Move the gun in a steady deliberate pass about 1 foot per second. Moving the gun too quickly will produce a thin film. Whereas moving it too slowly will result in the paint running. Never stop the gun in one place.

14 Ensure the each pass of the spray gun should surfacer over or cover about half of the previous surfacer stroke for proper spray overlap.

15 Always you should start at the top of the upright surface such as a compressor reservoir and other parts of compressor

Fig 1




16 The second pass is made in the opposite direction with the nozzle level at the lower edge of the previous pass.

17 Thus one half of the pattern overlaps the previous pass and the other half is sprayed on the unpainted area. Continue back and fourth passes, triggering the gun at the end of each pass and lowering each successive pass one half. The top to bottom width of the spray gun pattern.

18 The last pass should be made with the lower half of the spray pattern below the surface being surfacer applied.

19 Allow the first coat to set up or cured. Before applying additional coat.

20 After the surfacer sprayed on the machine parts, allow it for dry off time at least 4 to 6 hours in room temperature.

21 Ensure the surfacer thickness is evenly deposited on the machine parts

22 Clean the surfacer applied parts and sanding it before apply paint base coat.

# Practice to apply finish under coat and top coat on the machine

**Objectives:** At the end of this exercise you shall be able to
- **prepare the machine for under coat paint**
- **apply base coat and top coat paint on the machine.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Paint brush set | - 1No. |
| • Scrapper | - 1No. |
| • Painting knife | - 1No. |
| • Paint mixing stick | - 1No. |
| • Bucket | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |

**Materials**

| | |
|---|---|
| • Paint | - as reqd. |
| • Solvent | - as reqd. |
| • Thinner | - as reqd. |
| • Reducer | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |
| • Metal conditioner | - as reqd. |

## PROCEDURE

TASK 1: **Apply base coat paint on the machine parts**

1 Clean the machine parts before apply base coat paint.

2 Dust will quickly deposit on the surface while machine in the paint shop.

3 Throughly sanded or scuffed after washing to remove dead film and to smooth out imperfections sanding it to reducer the existing surfacer thickness too avoid too much reducer.

4 Sand the primer surface after it has curred properly.

5 Final sanding involves using fine and very fine grits of material to prepare machine surface for painting.

6 Find sanding is one of the most important steps in surface preparation.

7 The entire machine/machine parts surface to be refinished must be scuff sanded to improve adhesion of new paint.

8 A clean scuffed surface is very important for proper bonding of the new base coat.

9 Always use the correct grit sand paper for sanding the primer coats preparation for base coats of paint.

**Note: Initial prime coats ready the machine surface for the base coat/top coats of paint.**

10 Clean the sanded area with clean cloth after blow debris off machine surface wipe the machine body surface with a tack cloth. (A tack cloth is a disposable rag with sticky coating on it for removing dust and debris from the machine surface before painting).

11 As the tack cloth gets dirty, fold it over to expose a clean surface, methodically wipe every square inches of the machine surface to be painted if miss an area, dirt or pieces of lint could mar your fresh paint finish.

12 Further avoid dust and dirt problems in the paint wipe off your spray gun air hose with the used tack cloth.

13 After wiping with tack cloth be careful not to touch the surface being refinished.

14 Select the base coat paint and mixing with solvents.

15 Read the label instructions of paint manufactures.

16 Mix the base color and flex additive thoroughly before adding the type of solvent best suited for the shop temperature.

17 Mix only the amount needed for the job because the catalyzed material cannot be stored.

18 Use the paint mixing stick to mix the paint and check the paint viscosity after mixing paint.

19 Filter the paint before use to spray gun.

20 Use the recommended air pressure at the gun apply a sufficient number of coats, as directed by manufacturer.

21 Apply double coats to achieve complete hiding and the proper color match on flexible parts.

22 Spray first pass left to right.

23 Spray second pass right to left directly over the first pass.

24 Drop the nozzle so that 50 percent of pattern overlaps the bottom half of the initial double coat continue the pattern until complete.

25 Be sure to allow the recommended flash time between coats.

26 Allow the base coat adequate drying time before apply the clean coat.

27 Avoid sanding the base coat before applying the clear coat.

28 If base coat sanding is needed to remove paint film imperfections such as dirt or lint in the paint wet sand with very fine grit sandpaper (about 600 grit or finer grit).

29 Reclean the area. Apply one additional mist coat of color coat over the sanded area and let it flash.

30 During mist coat, the spray gun is moved more quickly from side to side. The mist coat cures or dries in a short period of time to bond and form a lightly textured paint film.

31 Ensure the base coat painting is properly sprayed as specified thickness on the machine parts.

Basecoat or colorcoat is sprayed on in light to medium coats. (Fig 1A)

The colorcoat can go on without a gloss. It will often look dull until the clearcoats are applied.

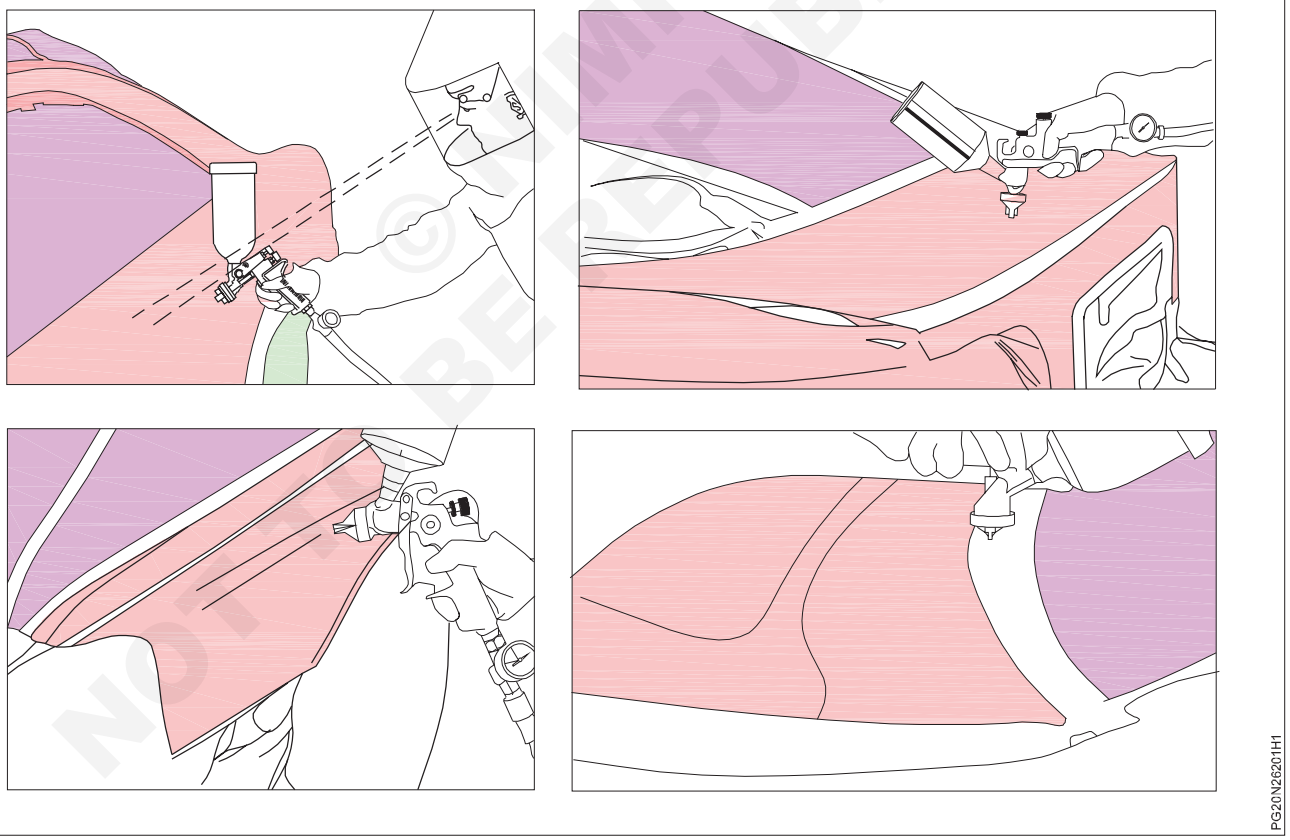
Colorcoats of basecoat/clearcoat finish or being sprayed by a professional painter. (Fig 1B)

Medium to full wet coats of clearcoat are normally used to a smooth, shiny finish. (Fig 1C)

Watch the clearcoat deposit on the body surface. It is easy apply too much transparent clearcoat, which prodces paint sags. Apply uniform medium wet to full wet coats, and not the body with too much clearcoat.

After the colorcoats have flashed enough apply the clearcoats to bring out the gloss or shine in the finish. (Fig 1D)

Fig 1



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TASK 2: **Apply top coat paint on the machine surface**

1 Clean the base coat painted surface before applying top coat paints.

2 Select top coat paint and paint color which is match with previous color applied on the machine surface.

3 Read the manufactures instructions given on the packing label.

4 Shack well before open the paint packing seal to mix the paint particles deposited bottom of the paint storage.

5 Open the paint tin seal with seal opening tool.

6 Follow the manufacturer's instructions to mix the paint.

7 Use the paint mixing stick to mixing the paint.

8 Ensure the paint viscosity as per specified limit.

9 Filter the mixed paint with paint strainer.

10 Fill the paint in paint spray gun container.

11 Set the spray gun pressure and spray pattern.

12 Keep proper distance from the surface to spray gun nozzle. (6 to 12 inches)

13 Apply top coat paint on the machine surface, left to right and right to left direction.

14 Cover the complete machine surface by top coat paint spray with even thickness of paint layer.

15 Do not load clear coats/top coat on heavily. Because these finishes are clear refinishers have a tendency to use too much in an attempt to increase the desired glamour effect.

16 Do not use cheap generic reducers when spraying top coats use a quality thinner/ reducer recommended for the shop temperature conditions.

17 Use the correct speed solvent for shop conditions. Let each coat flash thoroughly before applying the next one. Clean the top coat painted surface and ensure top coat paint is properly applied with shining effect.

— — — — — — — —

# Practice to prepare the two wheeler body and spare parts surface

**Objective:** At the end of this exercise you shall be able to
- **prepare the two wheeler body and spares parts surface.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Scraper | - 1No. |
| • Wire brush | - 1No. |
| • Scuffing pad | - 1No. |
| • Hand sander | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Power sander | - 1No. |
| • Car jet washer | - 1No. |

**Materials**

| | |
|---|---|
| • Cleaning solvent | - as reqd. |
| • Emery sheet | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |
| • Sponge | - as reqd. |
| • Metal conditioner | - as reqd. |

## PROCEDURE

**Method of two wheeler body and spare parts surface preparation**

1 Park the two wheeler on the paint shop floor.

2 Clean the two wheeler body surface with car jet washer water spray.

3 Apply pressure water spray on the body to remove the dust particles deposited on the two wheeler body.

4 Apply soap water solution on the body and rinse it with soft sponge to remove grease and oil deposited on the body.

5 Apply high pressure water spray on the two wheeler body to clean the soap water solution, grease, oil and deep dust particles deposited on the body.

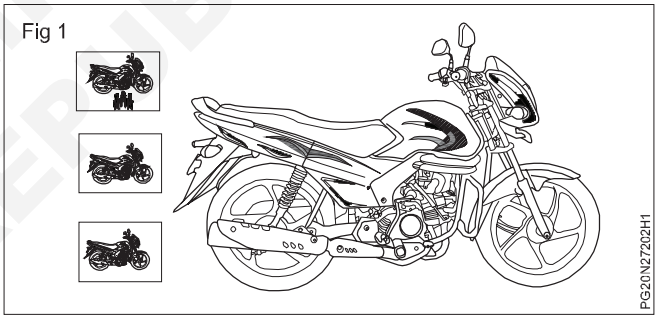
6 Dry off the vehicle body with clean cloth. (Fig 1)

7 Two wheeler body surface preparation is required for the application of a coating. Pretreatment can be accomplished in many different ways.

8 The sanding a part to remove dirt is simple mechanical method of surface preparation. Chemical pretreatment may be as simple as a solvent wipe or it may be a multistage spray washer that clean the two wheeler body parts and applies a conversion coating. (Two wheeler body, tank, frame, mud Gerard muffler, head light dome, number plate, panel board etc)

9 Select the sanding method depends on quality requirements of product.(chemical stripping, media blasting, manual sanding or grinding)

Fig 1




10 Surface preparation and pretreatment prevent the spread of corrosion and adding value to a two wheeler and extending its useful life.

11 Dismantle the two wheeler and place the dismantled parts on the work bench.

12 Select parts for different type of sanding method used for two wheeler body surface and accessory surface preparation. For example use the sand blast method for body surface paint removing inner side and exterior side of vehicle.

13 Use the chemical solvent to the deep deposited paints in large areas, it is an alternative to blasting in those areas that a power cannot reach

14 If you use the chemical to remove the paint, before applying paint remover, slightly scoring or scatching the surface of the paint to be stripped will help the paint remover to penetrate more quickly.

15 Paint remover should be applied following the manufacturer instructions and pay attention to warnings regarding ventilation smoking and the use of protective clothing such as PVC or rubber gloves, long sleeved shirts, safety glasses or goggles.

16 Chemical remover will cause irritation and burning of skin or eyes.

17 Use the brush a heavy coat of paint remover in one direction only onto the area being treated

18 Allow the paint remover to stand until the finish is softened.

19 Remove the dissolved paint with a squeeze or scraper

20 Be sure to rinse off any residue that remains on the body. Using cleaning solvent and steel wool follow by wiping with a clean rag.

21 After cleaning the paint and rust, First consider the type of rust

22 Select the metal conditioner depends on the type rust and type of substrate.

**Note: Rusting occurs very rapidly on metal that has been chemically stripped. So that fact any bare metal substrate should be treated immediately.**

23 Blasting off paint system is used to remove the paint on all type of body construction even aluminum, sheet, it leaves a clean, dry surface, an ideal condition for refinishing.

24 Blasting can be done quickly. So it saves time compared to sanding, grinding or chemical stripping because blaster concentrates the pressure and flow of air and sand. It focusing the pattern on a particular spot, rather than blasting in a wide pattern. (Fig 2)

Fig 2

PG20N27202H2

25 Clean the blasting area with soft cloth and apply high pressure water spray

26 Dry off the wet metal surface with compressed air pressure and wipe wet part with dry cotton cloth.

27 Ensure two wheeler body and other parts surface is well cleaned and ready for painting work.

28 After surface preparation immediately apply metal conditioner to prevent rust formation the metal parts. (Fig 3)

Fig 3

Fig A

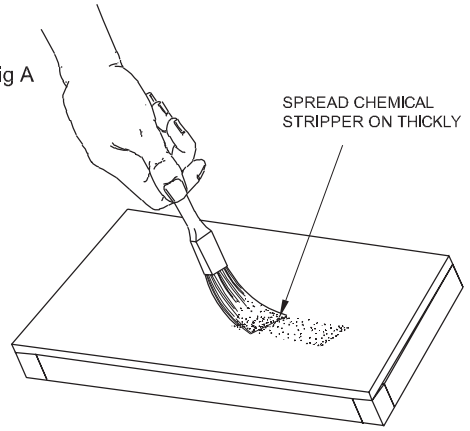



Fig B

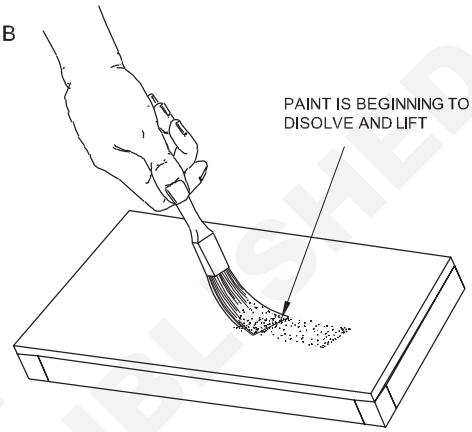
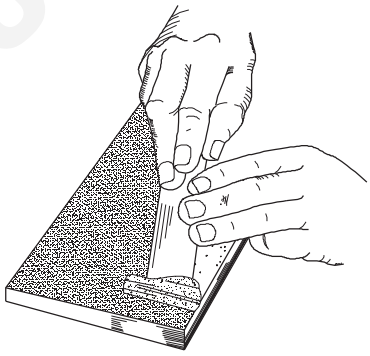



Fig C



PG20N27202H3

29 Hand sanding and grinding method also used for two wheeler body surface preparation follow the steps explained in Exercise. No 196 and 199.

30 Select the metal conditioner depend upon the metal used on the two wheeler body and accessories.

31 Mix the solvent with metal conditioner to bring the specified quality of viscosity

32 Check the viscosity of the metal conditioner and filter the metal conditioner before use.

33 Pour the metal conditioner on paint spray gun paint container.

34 Set the paint spray gun pressure and spray pattern

35 Apply metal conditioner on the two wheeler body and other parts surface wherever necessary.

36 Ensure the metal conditioner spray thickness is evenly sprayed.

# Practice to priming and surfacing the two wheeler body and spares surfaces

**Objective:** At the end of this exercise you shall be able to
- **priming and surfacing the two wheeler body and spare parts surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint mixing stick - 1No.
- Bucket - 1No.
- Paint strainer - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.
- Water sprayer - 1No.

**Materials**

- Primer - as reqd.
- Surfacer - as reqd.
- Reducer - as reqd.
- Thinner - as reqd.
- Cotton waste - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Priming and surfacing the two wheeler body and spare parts surface**

1 Clean the two wheeler body and parts surface with high pressure water spray. (Fig 1)

2 Dry off the water from the auto body and parts surface by apply compressed air.

3 Let it allow to dry in room temperature.

4 Select the primer for apply on auto body and parts surface.

5 Read the instruction given by manufacturers and follow it step by step process.

6 Well shake the primer container to mix well.

7 Open the primer packing and use the paint mixing stick to stirring to mix well.

8 Use the reducer/Thinner to increase or decrease the primer viscosity.

9 Ensure the primer viscosity is as specified by the manufacturers specification.

10 Select the paint spray gun and set the adjustment.

**Note: The amount of paint delving the gun is controlled by the pressure on the fluid container, the viscosity of the paint, the size of the fluid orifice, depend on paint spray gun adjustment**

11 While apply primer on the metal surface follow the methods for achieve effective air spray painting.

- Use lowest possible air and fluid pressure, when operating gun.
- Use the proper fan width for the job.
- Spray from the proper distance (6 to 10 inches).
- Hold the gun perpendicular to the work throughout the spray stroke.
- Move the spray gun parallel to the work surface throughout the spray stroke.
- Move the spray gun at a speed which assures that a full wet coat is applied to the surface.
- Overlap strokes at least 50% area should be covered.

12 Ensure all surfaces are primer sprayed in even thickness.

13 Let it allow to dry off time before apply surfacer.

14 Apply body filler on metal joints and welding spot to bring it for level the surface.

15 Sanding the body filler applied area with sanding tool.

16 Ensure the surface level is matched with metal joints.

17 Clean the surface with wet cleaning method.

18 Dry off it in room temperature.

19 Select the surfacer and read the instructions printed on the surfacer packing label.

20 Prepare the surfacer for spray application by using recommended pigments and solvents with proper mixing ratio.

21 Check the viscosity and temperature of the surfacer.

22 Filter the surface with help of paint strainer.

23 Fill the surface fluid in spray gun fluid container.

24 Set the spray gun air pressure and fluid spray pressure in air spray gun.

23 Test the spray pattern on test board.

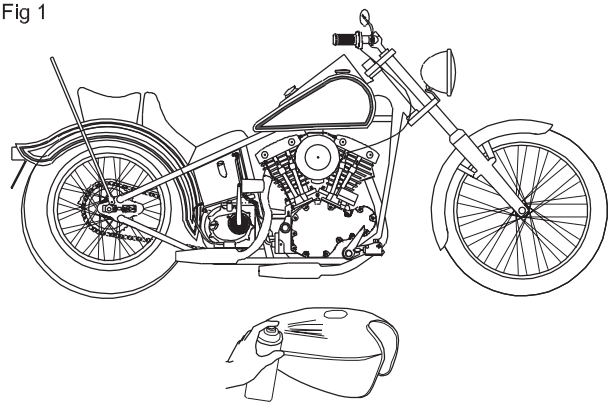
24 Apply surfacer spray as mentioned above primer spray method.

25 Ensure surfacer applied on the two wheeler body surface evenly

26 Remove the surfacer debris deposited on the metal surface.

27 Ensure the two wheeler body and parts surfacer are properly applied primer and surfacer.

Fig 1



PG20N27203H1

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# Practice to apply finish under coat & top coat on two wheeler body and spares surface

**Objectives:** At the end of this exercise you shall be able to
- **prepare two wheeler body and parts surface**
- **apply sealer on the metal surface**
- **apply base coat paint on the metal surface**
- **apply top coat paint on the metal surface.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Hand sander - 1No.
- Paint brush - 1No.
- Scraper - 1No.
- Painting knife - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.
- Water jet washer - 1No.
- Buffer machine - 1No.

**Materials**

- Paint - as reqd.
- Paint pigments - as reqd.
- Paint solvent - as reqd.
- Reducer/Thinner - as reqd.
- Emery sheet - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.



## PROCEDURE

TASK 1: **Prepare the two wheeler body and parts surface**

1 Clean the two wheeler body and parts surface with clean cloth.

2 Clean the surface with high pressure water and make it dry off.

3 Use the sand paper for sanding the surface to level the old painted surface (use the dry and wet sanding method).

4 Clean the sanded surface by wet cleaning method.

5 Allow dry off time before apply metal conditioner and primer on the surface.

6 Select, prepare and apply the metal conditioner on the metal surface.

7 Use the tack cloth to clean the surface. Ensure the metal primed surfaced area is properly cleaned and ready for further process.

8 Select, the primer, prepare it and apply on the surface by spray gun.

9 Select the sealler and prepare it for spray.

10 Sealers are spray over primers, spot putties and old finish to provide a barrier layer for the top coats.

11 Paint sealers prevents prime coat solvents from penetrating the primer and affecting the color.

12 Filter the sealer and fill it in spray gun fluid container.

13 Set the spray gun and test the spray pattern on the test board.

14 Apply sealer on the auto body and parts surface evenly.

15 Ensure the sealer sprayed thickness is evenly applied on the surface of auto body and parts.

**Note:**

- **Mix and apply metal conditioner sealer as per following putty packing label directions.**
- **Use the sealer is a clear or colored or tint to match the color of the two wheeler.**
- **Apply sealer in one or two full medium wet coats.**
- **Apply full coats of sealer to build the sealer over primer, spot putty and body fillers.**
- **Blend the sealer out by farming the spray gun side ways around the perimeter of repair areas.**

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TASK 2: **Apply finish under coat and top coat**

1 Clean the metal surface area.

2 Select the base coat paint, pigments, solvents, hardener, thinner etc.

3 Prepare the paint as per manufacturers instruction given on the paint packing label.

4 Ensure the paint viscosity and paint temperature.

5 Use the spray gun depend upon your need whether it is air spray gun HVLP, LVLP, airless spray gun, automated linear spray systems, automated flat line spray system or spray booth.

6 Fill the prepared paint in paint spray gun fluid container.

7 Adjust the spray gun air pressure, and spray pattern.

8 Apply paint spray on the primer surfaced area.

9 Base coat paint contain the visual properties of color and effects.

10 Base coat paint should be designed to enhance the visual appearance of the clear coat.

11 If need use the mid coat paint on the metal surface.

12 Prepare the top coating paint as per instructions given on the paint packing label.

13 Use the spray gun to apply paint on the body surface and parts.

14 Ensure the top coat paint color to be matched with previous paint applied on the surface.

15 Ensure the top coat paint will be protect from the weather and aid in other performance requirements.

16 Always prepare the base coat paint color for top coat to resist abrasion and chemically stable enough to with stand the combination of UV light as well as chemical aggression.

17 Use the respirator, goggles, hand gloves, overall cloth and check the manufacturers instruction on the base coat and clear coat paint for any other safety stipulations.

18 Work in a location temperature that is 70-80.F for best results.

19 Working in right temperature will be help the paint dry properly.

20 Wash the two wheeler surface and parts surface with dish soap water and dry it with a lint free towel inspect the painted surface for defects.

21 Base coat material needs to be completely free of wax, oil and dirt, clean everything without leaving soapy residue.

22 Sand out any paint defect spots or scratches with 180-320 grit sand paper.

23 Sand the corners and small crevices by hand to ensure they are fully prepping.

24 Wet sanding the entire body parts using 1000-1500 grit wet sand paper.

25 Rinse down the surface with soap water and dry it off again with lint free towel.

26 Tape off the lights and tires with masking material to keep the cover in place. Use the putty knife to press the tape down into cracks and crevices.

27 Spray first coat of the base coat and let it dry for 20 minutes.

28 Apply second coat of the base coat after the first coat has dried.

29 Let allow to base coat dry completely before moving on to the clear coat.

30 Apply the clear coat and finish the job.

31 Apply the first coat of the clear coat evenly over the base coat.

32 Apply the second clear coat to create a nice, glossy finish

33 Remove the masking tape and plastic before paint dries.

34 Fix any minor mistakes or uneven surface areas correct it by sanding and respraying the paint.

35 Buff your clear coat for a glossy finish.



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TASK 3: **Apply graphic sticker on paint surface properly**

1 Select the graphic sticker for two wheeler.

2 Select the surface to fix the sticker.

3 Clean the surface to be fixed the sticker with cleaning solvent.

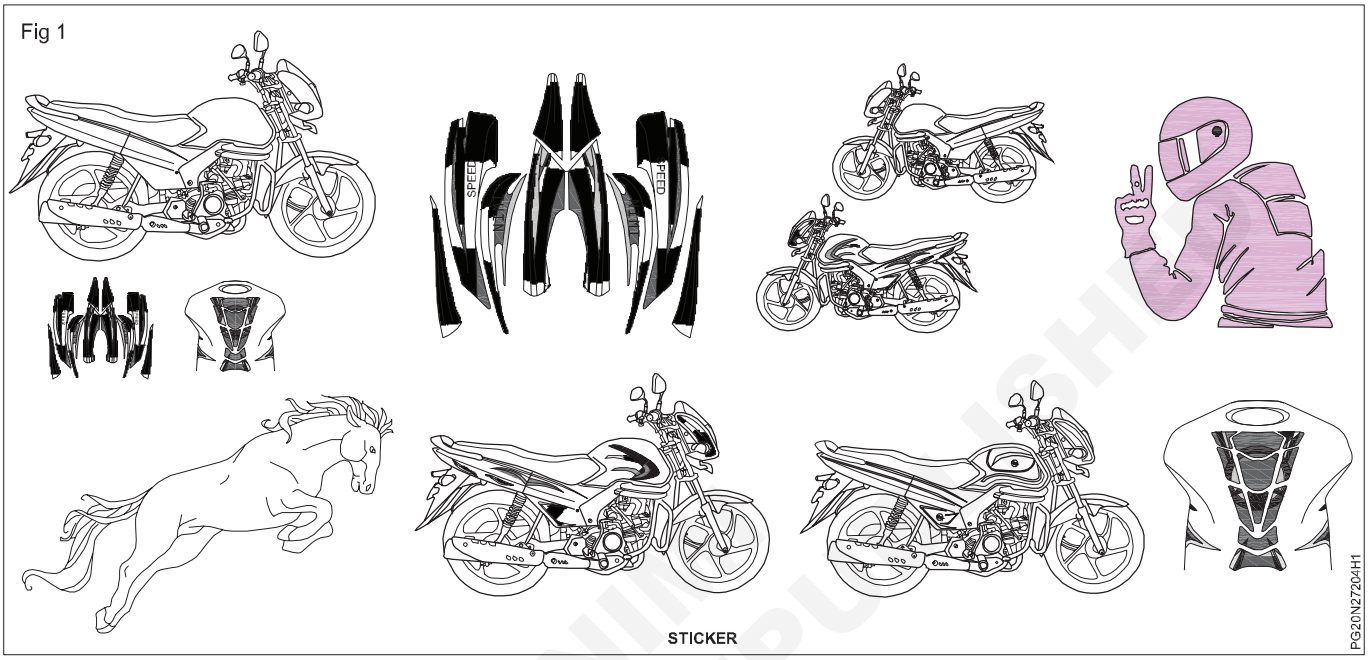
4 Remove the stickers glue safety paper.

5 Fix the graphic sticker on painted surface with proper aligning.

6 Fix the sticker and press it gently for pasting with two wheeler body surface.

7 Ensure the graphic sticker is fixed properly and look attractively. (Fig 1)

Fig 1



# Practice to identify the parts of electrostatic gun assembly and its function

**Objectives:** At the end of this exercise you shall be able to
- **identify the parts of electrostatic gun assembly**
- **operate the spray gun assembly and check the function of each part.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.

**Equipments**

- Air compressor - 1No.
- Buffer - 1No.

**Materials**

- Cotton waste - 1No.
- Soap oil - 1No.
- Paint - 1No.
- Reducer - 1No.

## PROCEDURE

TASK 1: **Parts identification of air assisted electrostatic paint spray gun**

1 Layout the air assisted electrostatic paint spray gun in your paint shop and clean it.

2 Identify the electrostatic hand held air spray system in your paint shop. (Fig 1)

3 Identify the spray gun.

4 Identify the high voltage cable.

5 Identify the power supply transformer.

6 Identify the fluid line.

7 Identify the air hose.

8 Identify the air pressure gauge.

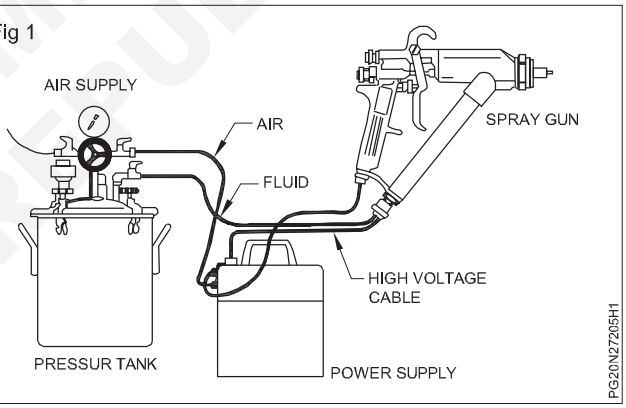
9 Identify the fluid pressure tank.

10 Identify the spray gun trigger.

11 Connect the spray gun electrical and air hose-connections.

12 Operate the spray gun and check the function of each parts of electrostatic paint spray gun.

Fig 1

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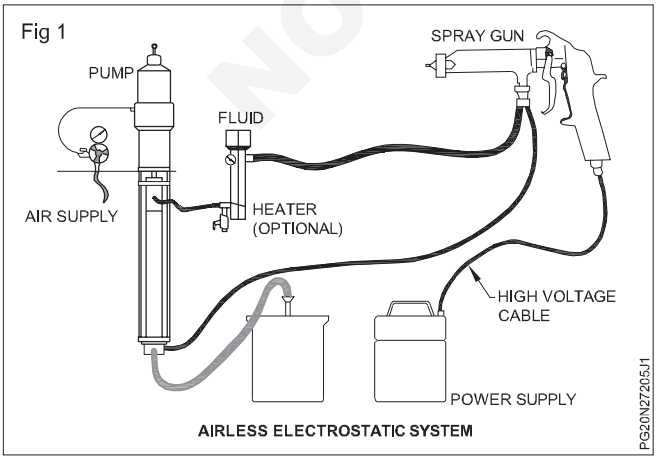
TASK 2: **Identify the parts of air less electrostatic paint gun spray system (Fig 1)**

Fig 1




1 Layout the airless electrostatic system and clean it.

2 Identify the paint spray gun.

3 Identify the spray gun trigger.

4 Identify the spray gun high voltage cable.

5 Identify the power supply unit.

6 Identify the fluid pressure tank.

7 Identify the pressure pump.

8 Identify the fluid control unit.

9 Identify the air pressure gauge.

10 Identify the fluid pressure gauge.

11 Identify the heater coil.

12 Connect all the connections of paint spray gun.

13 Operate the paint spray gun and check the function of each parts of spray gun.

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TASK 3: **Identify the parts of water borne electrostatic spray application**

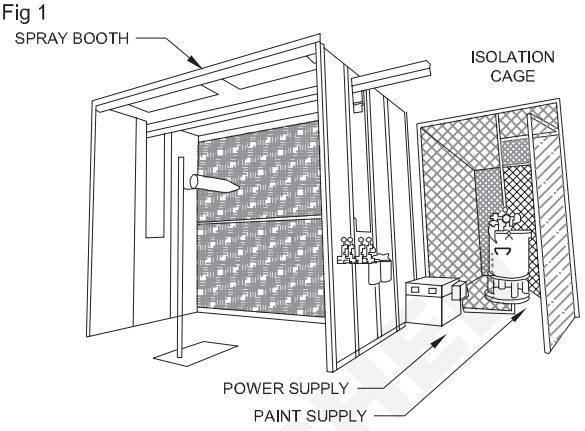
1 Locate the paint spray booth in your paint shop (Fig 1)

2 Identify the isolation cage.

3 Identify the power supply system in the water borne electrostatic paint spray system.

4 Operate the spray system and check the functions of each parts of water borne electrostatice spray system.

Fig 1




ISOLATION CAGE FOR WATERBORNE ELECTROSTATIC SPRAY APPLICATION

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TASK 4: **Identify the parts of air type electrostatic painting equipment (Fig 1)**

1 Identify the high voltage generator.

2 Identify the frame.

3 Identify the paint tank.

4 Identify the high voltage cable.

5 Identify the air hose.

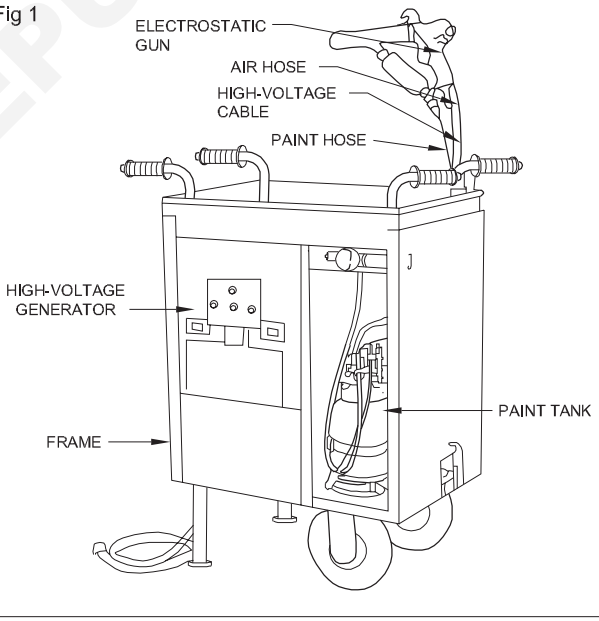
6 Identify the electrostatic gun.

7 Identify the paint hose.

8 Check all connections of paint spray gun.

9 Operate the paint spray gun and check the function of each parts

Fig 1

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TASK 5: **Identify the exploded view of HVLP paint spray gun as shown in the figure - 1**

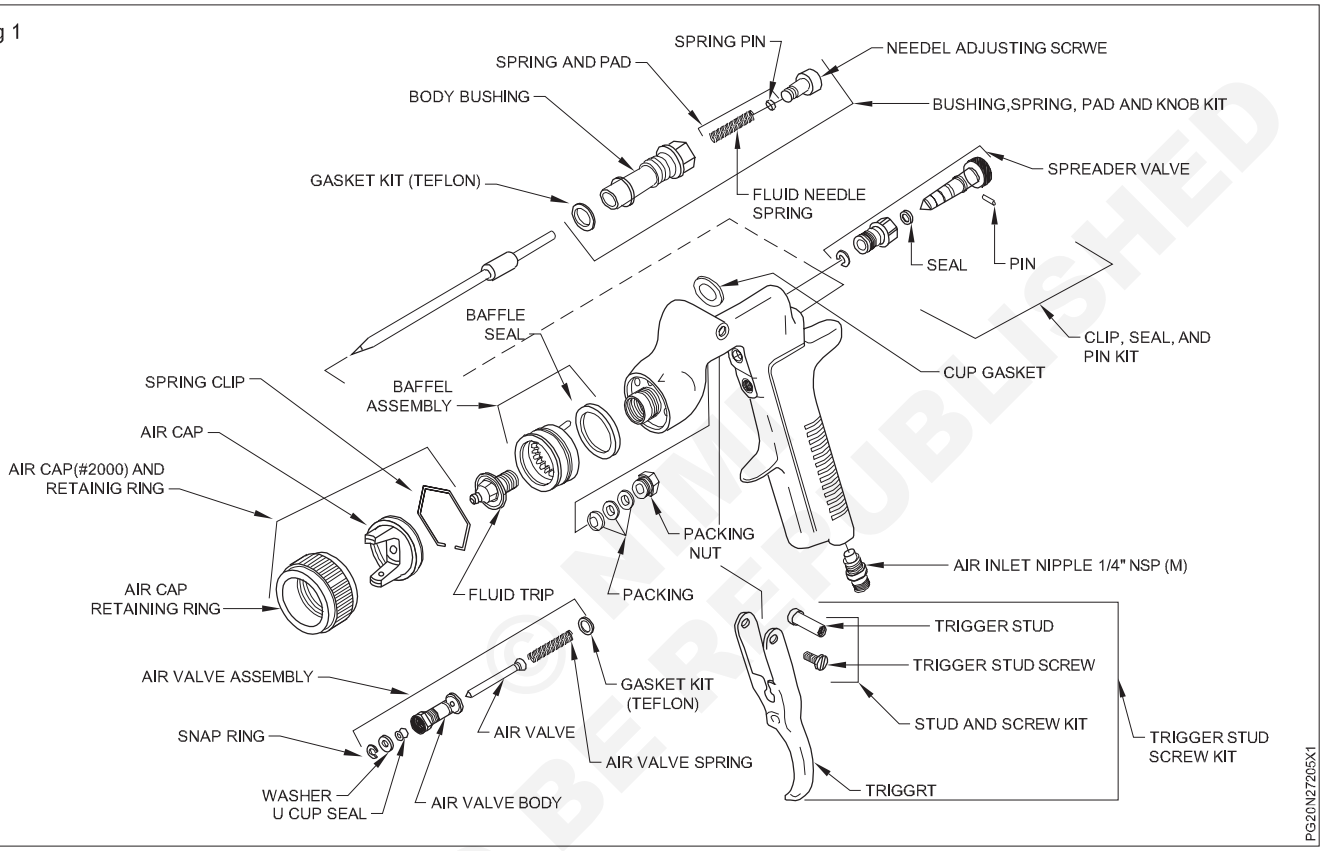
**Note: -**

**Dismantle the paint spray gun in your shop and identify the parts as shown in the figure - 1 under guideline of your instructor**

**Write the name and function of HVLP paint spray gun parts in table - 1**

| S.No | Parts name of spray gun | Function of the part | Remarks |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |

Fig 1




TASK 6: **Operating method and use an electrostatic system effectively and safely**

1 The parts being coated must be electrically conductive to ground.

2 Part carriers, racks, fixtures, carts, and so forth must be designed to provide a consistent ground path, and must be kept clean in order to maintain a good ground path.

3 All items in the vicinity of the spray booth must be grounded. They can develop a static charge and discharge it to ground. A spark may ignite volatile vapors.

4 The spray operator should never wear gloves that isolate them from the grounded gun handle. If gloves are worn, they should be designed with a conductive palm or a hole should be cut that allows skin to contact the gun handle. In addition, metallic objects, coins, watches, keys, and so forth that are normally kept in pockets should be removed as they, also, can build up a static charge. Rubber booth or insulated should not be worn; leather soles will dissipate any static charge.

5 Flooring in and near the spray booth should be conductive. In older buildings where wooden floors are still found, sheet metal should be used as a covering, making sure all pieces are mechanically connected to one another and the booth walls.

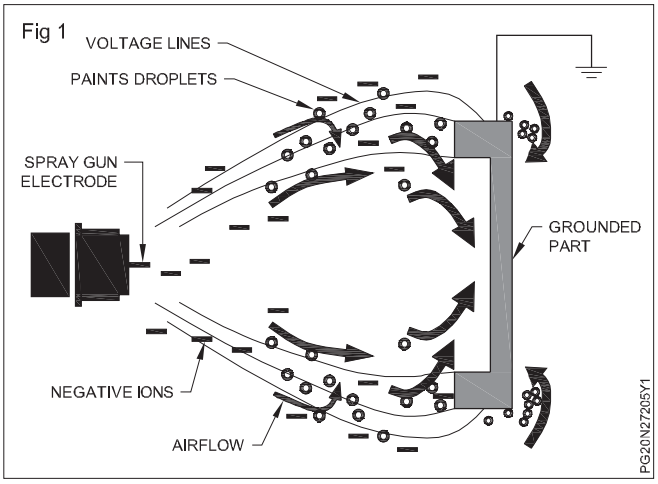
6 It is very important that that only items designed for electrostatic spray be used. Air hoses should contain a ground wire built into the jacket. Air or fluid moving through the hose can create a static charge. Be sure to use the proper high or low-voltage cable for your gun. Do not mix brand ‘’A’’ with brand “B’’.

7 The voltage should be turned off before servicing or cleaning the electrostatic device. If the gun has a built in cascade type generator or multiplier, the atomizing air must also be turned off. Be sure the gun is wiped clean and that no solvent remains in the fluid line before turning on the voltage.

8 Identify the spray gun electrode (Fig 1,2)

9 Identify the paint droplets (Fig 1)

Fig 1




10 Identify the voltage lines (Fig 1)

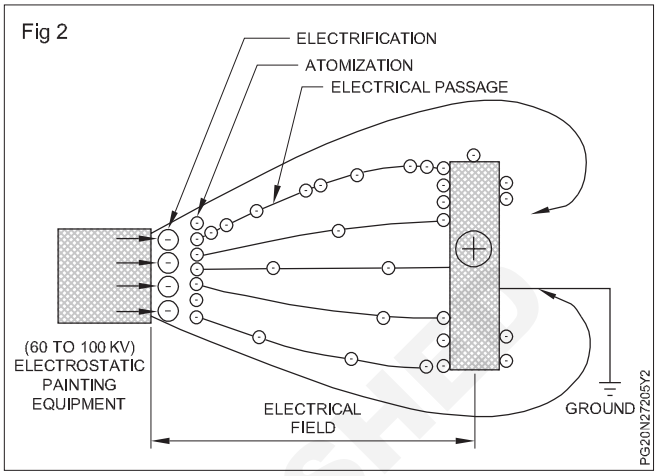
11 Identify the grounded part (Fig 1,2)

12 Identify the air flow (Fig 1)

13 Identify the negative line (Fig 1)

14 Operate the gun and check the function of the gun.

Fig 2



# Practice to identify the parts of airless gun assembly and operate the airless gun

**Objectives:** At the end of this exercise you shall be able to
- **identify the parts of airless paint spray gun**
- **operate the airless paint spray gun.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Spray gun cleaning tool - 1No.

**Equipments**

- Air compressor - 1No.
- Airless paint spray gun - 1No.

**Materials**

- Paint - as reqd.
- Cleaning solvent - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.
- Emery sheet - as reqd.

## PROCEDURE

TASK 1: **Identify the parts of airless paint spray gun assembly**

1 Identify the paint spray gun (Fig 1).

2 Identify the fluid filter.

3 Identify the pressure pump.

4 Identify the air pressure gauge.

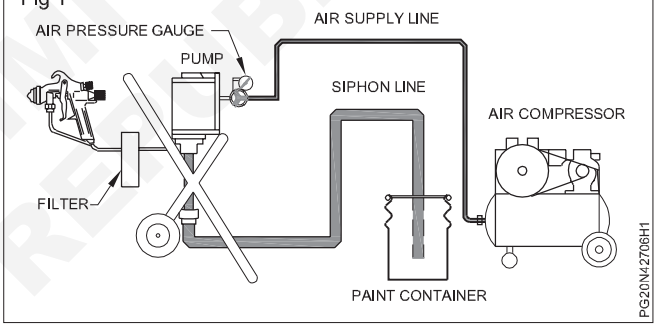
5 Identify the air supply line.

6 Identify the siphon line (Fluid line).

7 Identify paint container.

8 Identify the air compressor.

Fig 1




TASK 2: **Operation method of airless spray gun**

1 Prepare the airless spray gun for painting work.

2 Prime the pump to sprayer set up.

3 Fill the hose and gun.

4 Turn off the power switch.

5 Turn the spray/prime valve to prime the pump.

6 Aim the gun against the side of the waste pail and pull the trigger to release the pressure.

7 Engage the trigger lock.

8 Choose the best spray gun tip for the job.

9 Spray tips slide into a hole in the front of the airless paint sprayer gun they are labeled with a three digit number like 309 or 517 (these may be the last three digits of a longer model number).

10 Choose the smaller diameter hole for thin liquids like stain or varnish and larger hole (015 or 017) for thicker liquids like latex paint.

11 A 411 tip would work well for spraying varnish on wood work while a 517 is good size for spraying large surfaces with latex paint.

12 Adjust the fluid pressure to sprayer set up.

13 Turn on the pump and move the prime/spray lever to the spray position.

14 Spray a strip of paint across a piece of card board to check the spray pattern. If the spray pattern has tails, the pressure is set too low. Turn up the pressure.

**Note: Too little pressure will result in an uneven spray pattern and too much pressure causes excessive over spray and premature tip wear. If the spray pattern is round rattles than narrow the tip is worn and should be replaced.**

15 Plan your spraying sequence before you start.

16 Squeeze the trigger while the gun is off to side and then move it onto the work.

17 Move the gun parallel to the surface not in an arc.

18 Keep the gun perpendicular to the surface not tilted.

19 Move fast to prevent runs several thin coats are better than one thick one.

20 Overlap your stops about 30 to 50 percent

21 If paint stops flowing from the gun, the tip may be clogged.

22 Twist the tip to 180 degrees. Paint the gun at a scrap of paper and squeeze the trigger to clear the clog rotate the tip 180 degrees to point it. Forward again and spray a test strip onto the scrap

23 More spray problems are a result of clogged filters, clogged tip or pump that's either leaking at the packing or has stick ball. Check valves careful cleaning and proper maintenance will prevent most of troubles

**Caution: When you are spraying flammable oil-based product, follow all grounding precautions to prevent sparks read your manual or ask your instructor for instructions on grounding the gun and metal pail.**

24 Wear safety PPE while painting work

25 Work in a well ventilated area.

26 Keep the trigger locked and follow the pressure relief procedure when stop spraying.

27 Never put your hand in front of the sprayer tip unless the unit is off and depressurized.

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# Practice to different types of spray painting and industrial painting system

**Objective:** At the end of this exercise you shall be able to
- **achieve the knowledge of different type of spray painting system.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- paint manual - 1No.

**Equipments**

- Computer system - 1No.
- Smart class room - 1No.
- LCD projector - 1No.
- Video screen - 1No.
- Different type of paint spray equipment - 1No.

**Materials**

- Pendrive - as reqd
- Cotton cloth - as reqd
- White board - as reqd
- Marker pen - as reqd
- Soap oil - as reqd

## PROCEDURE

TASK 1: **Different types of spray painting system**

1 Select any one of the following painting system to practice air gun spraying electric fan, Electrostatic spray painting, airless spray guns, automated linear spray systems, automated flatline sprayer systems, spray booth painting system conventional air spray, HVLP, air assisted airless, electrostatic HVLP, Electrostatic air assisted airless, Electrostatic air spray, auto deposite power coating, rotary, lionizing, dip coating curtain coating, roll coating, electro coating.

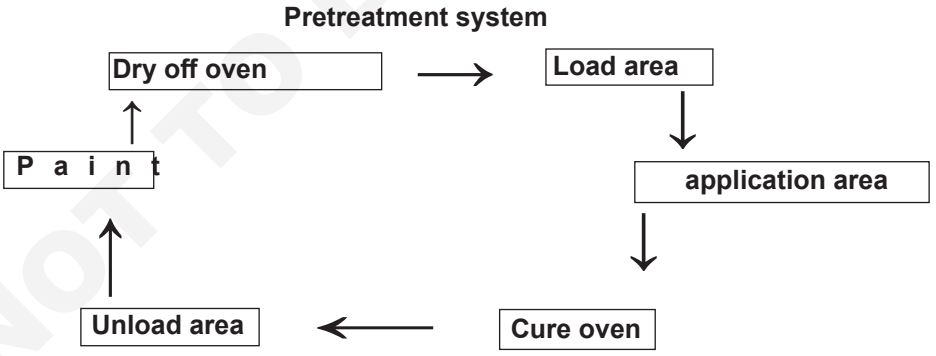
2 Paint curing stage is where the paint film is formed.

3 Paint can be cured by air drying or heating.

4 Ovens are used for heating are conventional gas fired high air velocity gas fired, electric, infra red, UV energy electron bean or induction, ovens can be either batch or continuous. Parts are moved from one stage to another stage by manual or automated conveyor system.

**Note: Instructor should be display the video in class room about the different type of paint spray system and industrial painting system**.

**Painting process**




5 Before painting grinding, filing, sanding to make them smoother surface.

6 Large pits holes, seams or scratches in the surface can be filled with a liquid or paste material and then sanded after they harden.

7 Use sand paper, grinding paper, aluminium oxide or silicone carbide abrasive.

8 Use the blasting abrasives may be sand, glass, metal grit walnut hulls. Abrasive musk be replaced or cleaned regularly so that they do not become oily and contaminate the surface.

9 Use the paint application of spray at any one of the above mentioned method as per need of the product and manufacture process.

10 Determine the correct paint spray application method as need of the product.

11 The industrial painting systems used to apply liquid coating with spray equipment.

12 The liquid coating is delivered from a container to a spray device that uses pressure to break the liquid streams into fine droplets.

13 Apply even distribution of the liquid paint into a finely divided mist of droplets.

14 Set the spray pattern control quality and efficiency.

15 Air spray device mixes a high velocity air stream with low velocity fluid stream and the resulting friction creates the paint droplets.

16 Hydraulic automization occurs when a high velocity fluid sheet that is formed by small orifice at spray gun tip exits into a stationary atmosphere.

17 In a centrifugal atomization fluid stream is introduced at the back of a disk that is rotating at high speed the centrifugal force of the rotating disk delivers the paint to the edge of the disk and breaks into a fine mist.

18 So that the different applicators and their strengths is useful in the selection of the correct device for a particular application.

**Note:**

**Fundamental of good spray techniques as follows.**

- **Proper overlap of the spray pattern.**
- **Proper gun speed.**
- **Proper distance of the gun from the object.**
- **Holding the gun perpendicular to the surface of the part.**
- **Triggering the gun at the beginning and end of each stroke.**

**Spray application of painting** (Fig 1 to 16)

- Paint can be applied to a substrate in many different ways as follows.
- Siphon feed system
- Air spray pressure feed system
- Paint circulation system
- Airless spray system
- Air assisted air less spray system
- Electrostatic handheld air spray system
- Air less electrostatic system
- Electrostatic attraction system
- Long stroke reciprocator with bells system
- Robotic arm movement painting system
- High volume low presseure spray system.
- Isolation cage for electrostatic spray application.
- Electrostatic bell system
- Flow coating system
- Inside rotary bell system
- Roll coating system.
- Electro deposition system
- Powder coating system
- Dip coating system
- Curtain coating system.

Fig 1

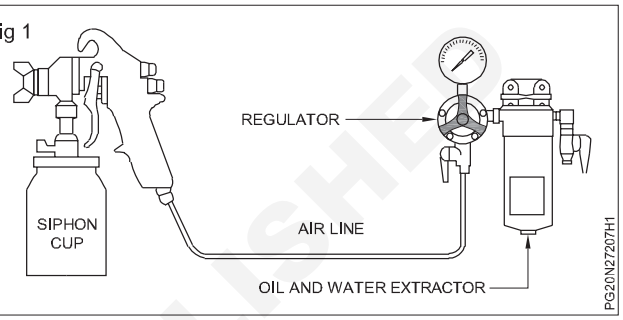



Fig 2

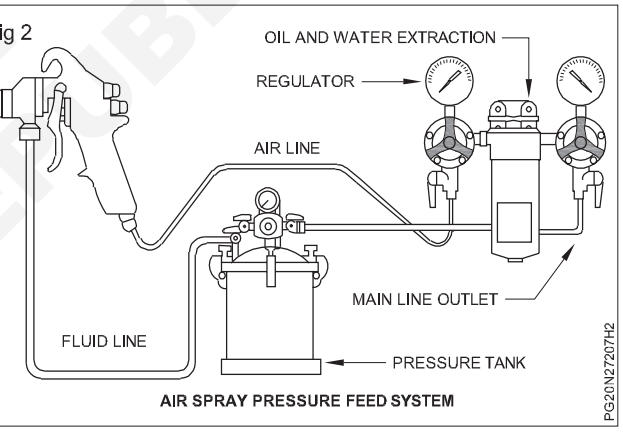



Fig 4

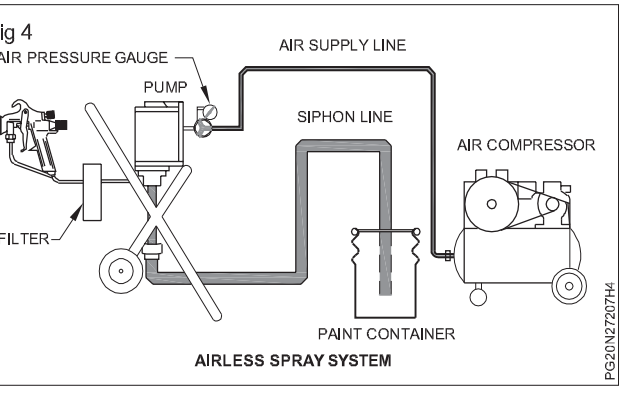
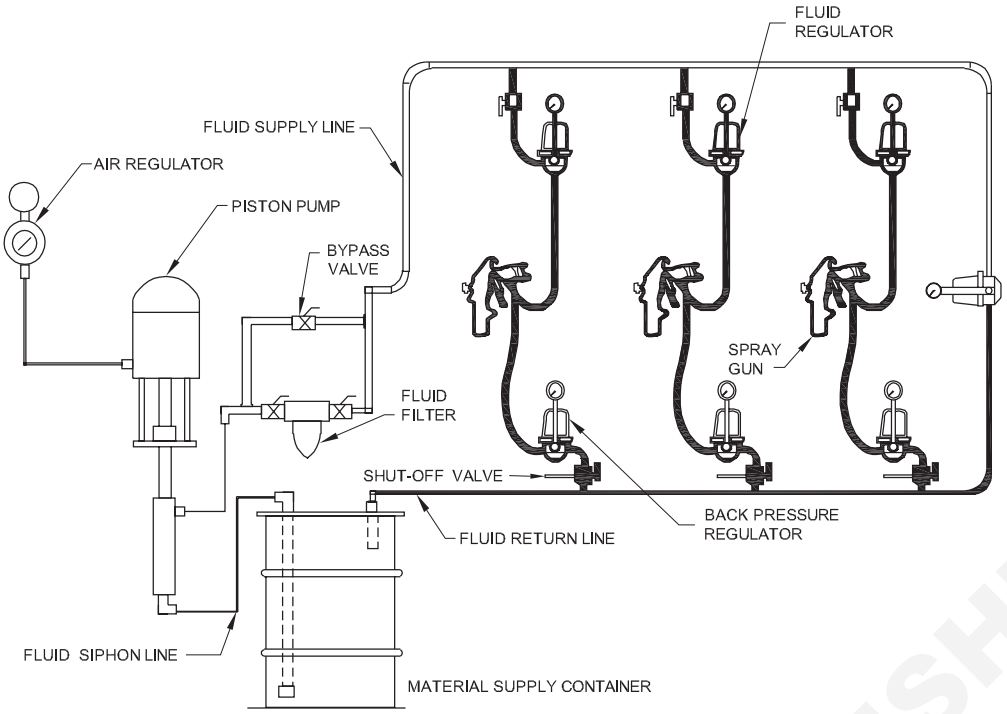


Fig 3




PAINT CIRCULATION SYSTEM

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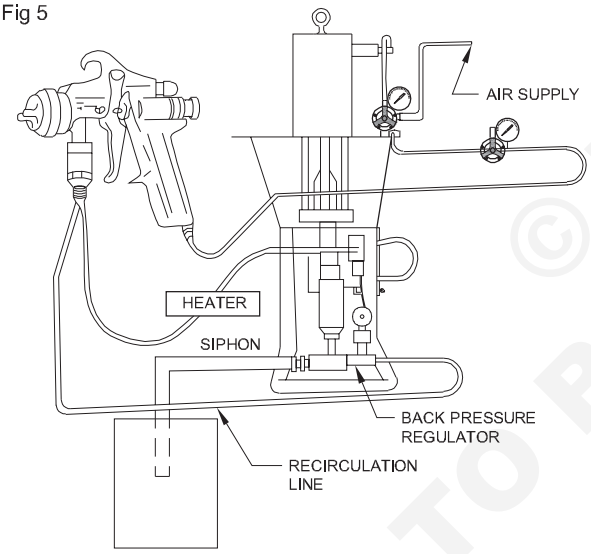
Fig 5




AIR-ASSISTED AIRLESS SYSTEM WITH HEATER

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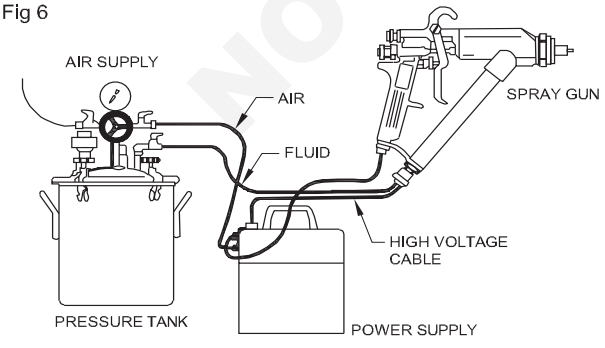
Fig 6




ELECTROSTSTIC HANDHELD AIR-SPRAY SYSTEM

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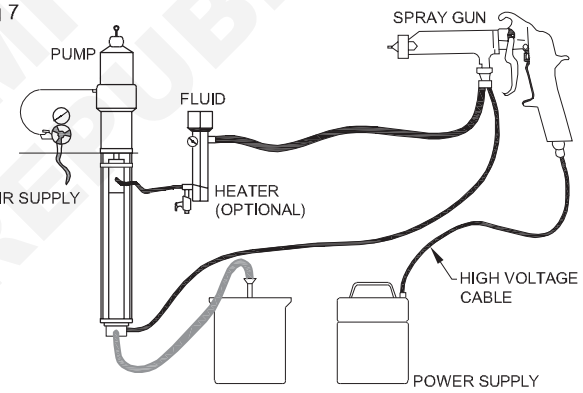
Fig 7




AIRLESS ELECTROSTATIC SYSTEM

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Fig 8

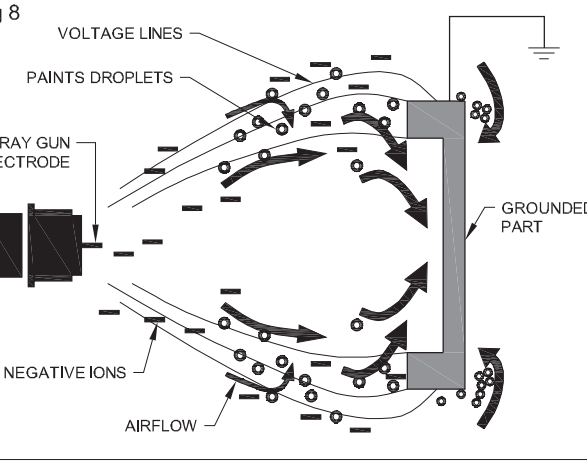


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Fig 9

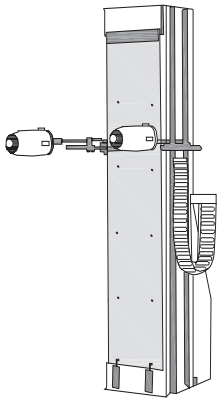

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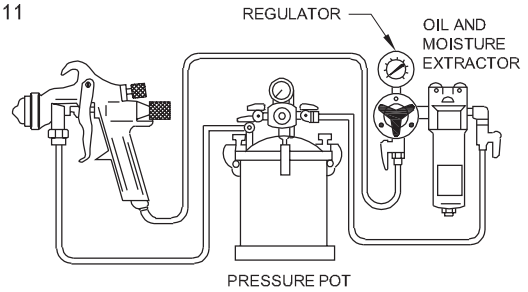
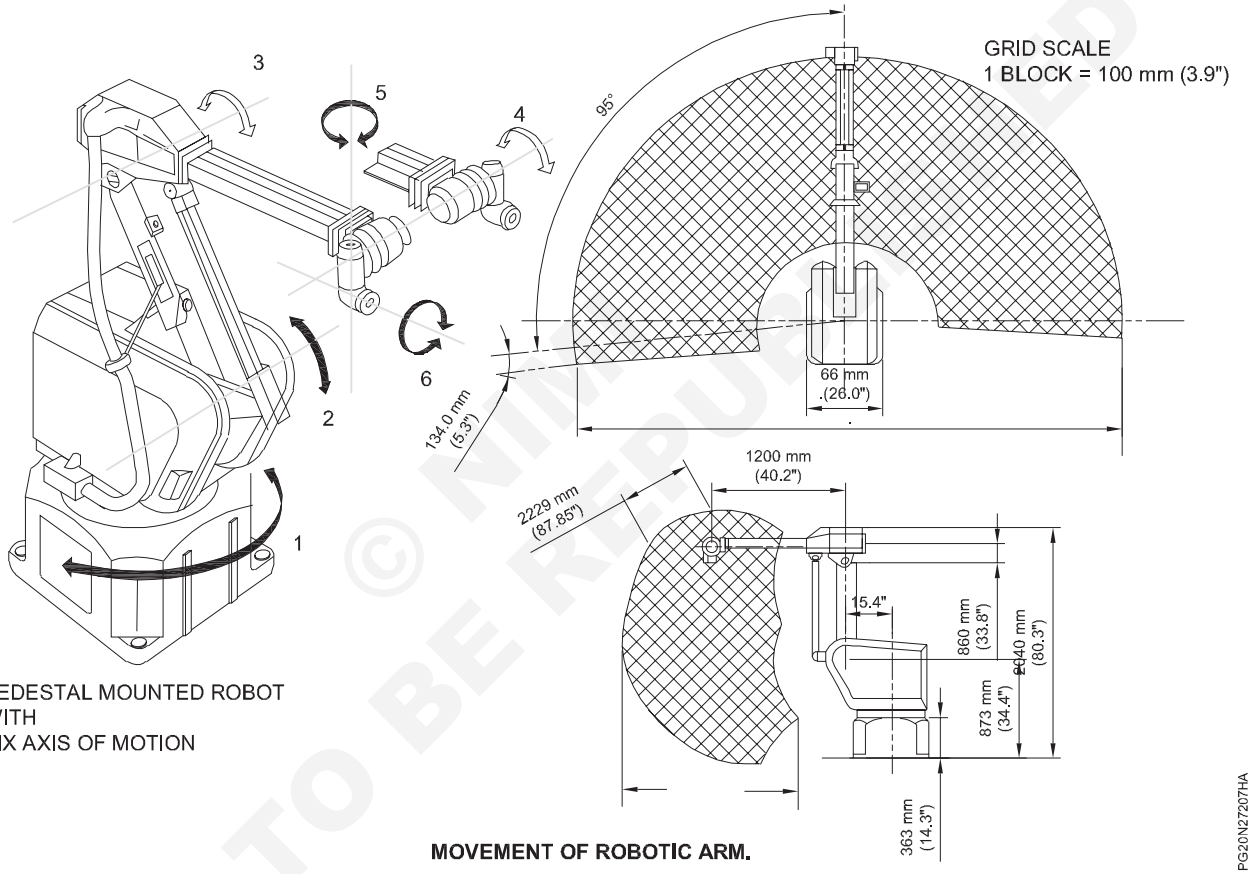
Fig 11




HIGH-VOLUME , LOW-PRESSURE SPRAY SYSTEM.

PG20N27207HB

Fig 10



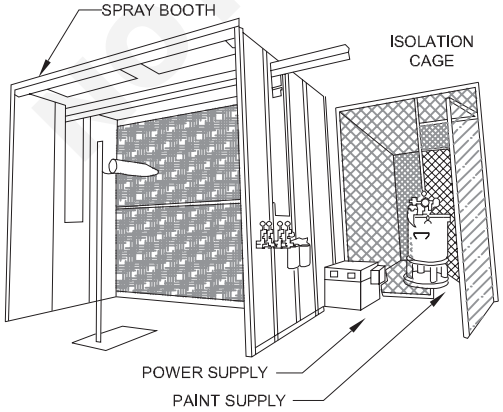

PEDESTAL MOUNTED ROBOT
WITH
SIX AXIS OF MOTION

MOVEMENT OF ROBOTIC ARM.

PG20N27207HA



Fig 12




ISOLATION CAGE FOR WATERBORNE
ELECTROSTATIC SPRAY APPLICATION

PG20N27207HC

Fig 13

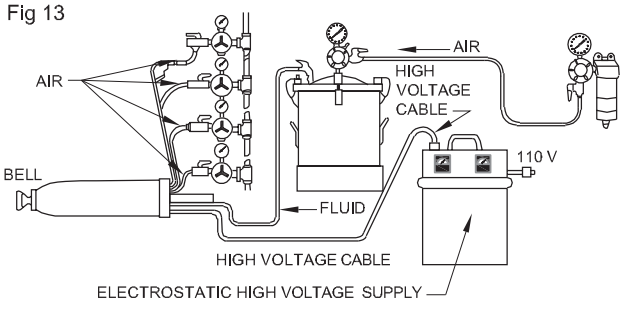



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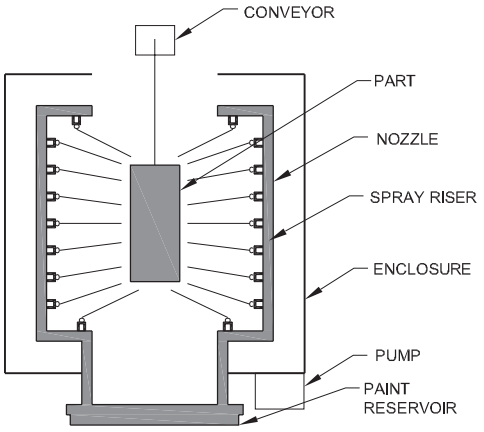
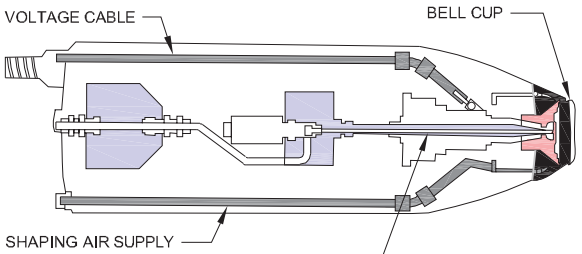
Fig 14




FLOW COATING

PG20N27207HE

Fig 15




INSIDE OF A ROTARY BELL

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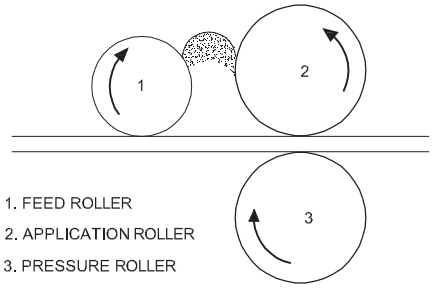
Fig 16




1. FEED ROLLER
2. APPLICATION ROLLER
3. PRESSURE ROLLER

ROLL COATING

PG20N27207HG

# Practice to inspect and marking the dented area of the parts

**Objectives:** At the end of this exercise you shall be able to
- **inspect the damaged parts**
- **marking the damaged area of parts**
- **dismantle the parts for repair work**
- **choose the denting tools.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Dent removing tool kit - 1No.
- Scrapper - 1No.
- Wooden mallet - 1No.

**Equipments**

- Damaged vehicle - 1No.
- Air compressor - 1No.
- Air hammer - 1No.
- Work bench - 1No.
- Anvil - 1No.

**Materials**

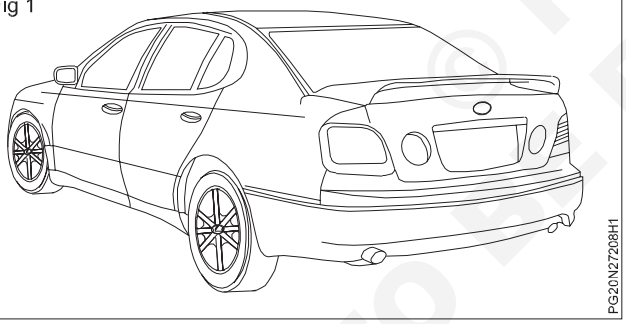
- Cotton rag - as reqd.
- Soap oil - as reqd.
- Sand paper - as reqd.
- Cleaning solvent - as reqd.

## PROCEDURE

**Dismantle the dented parts from the vehicle**

1 Park the vehicle on the paint shop floor. (Fig 1)

Fig 1




2 Clean the vehicle with cleaning solvent.

3 Inspect the vehicle for dent damage on the vehicle body.

4 Mark the dented area by marker.

5 Remove the damaged part from the vehicle.

6 Place the removed part on the work bench.

7 Remove the additional fittings fitted the on part (like vehicle door handle, inner pad, glass, door glass operating system, channels etc).

8 Inspect the type of dent damage on the part.

9 Clean the dented area with cleaning tools.

10 Select the suitable repair tool from tool grip store to remove the dent from the damaged area of the part. (Fig 2,3,4,5)

Fig 2

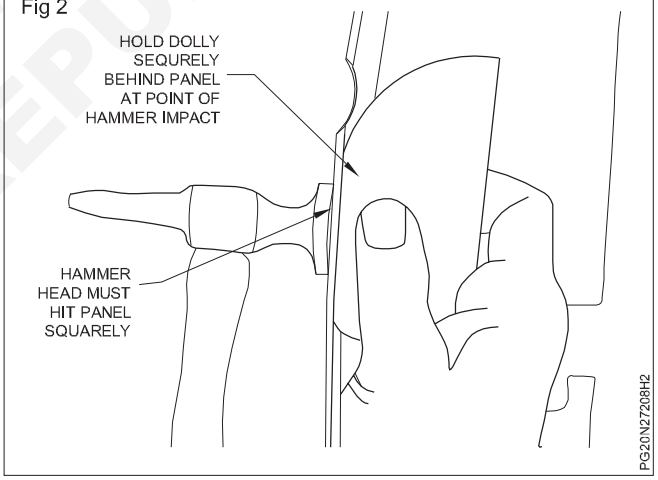



Fig 3

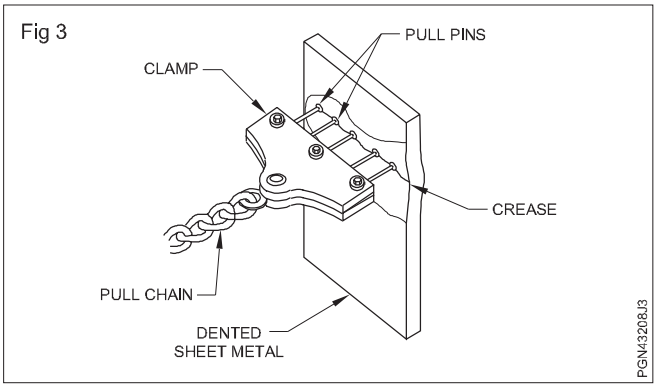


Fig 4

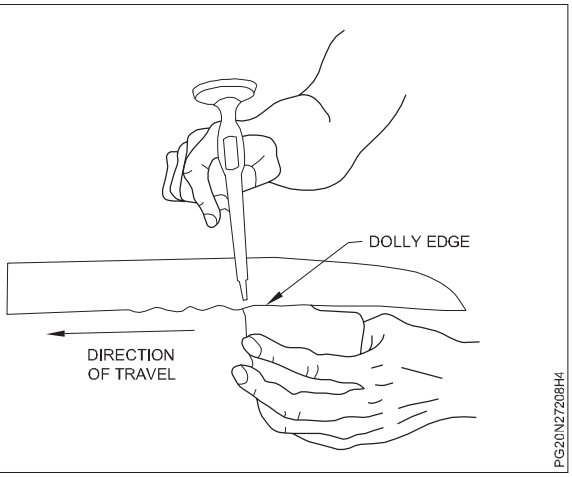
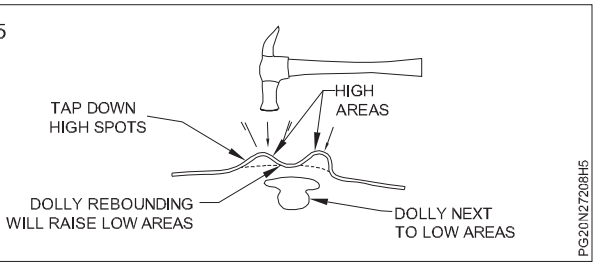



Fig 5



# Practice to remove dent on marked area of damaged part

**Objectives:** At the end of this exercise you shall be able to
- **remove the dent from a damaged part.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Dent removing tool kit - 1No.
- Dent puller - 1No.
- Wooden mallet - 1No.
- Scrapper - 1No.

**Equipments**

- Air compressor - 1No.
- Vacuum puller - 1No.
- Gas welding unit - 1No.
- Work bench - 1No.

**Materials**

- Cleaning solvent - as reqd.
- Cotton rag - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Dismantle the dented parts from the vehicle**

1 Park the vehicle on the paint shop floor.

2 Remove the dented part from the vehicle.

3 Select the dent removing tools (manual and power tools).

4 Remove the additional fitting part from the dent damaged part.

5 Clean the dented area on the damaged part.

6 Inspect the dented area marked spot.

7 Choose the method of dent removing system (by pulling, heating, Beating, welding, cutting and jointing or replacing the part).

8 Suppose dent is minor, use the vacuum puller to remove the dent from the thin sheet fabricated parts.

9 It the damage is very minor dents, use the mallet/ rubber hammer to beat on the dented area to level the surface.

10 If the damaged area is fabricated with thick sheet, heat the dented spot by gas blow or blow lamp flame and use the dent removing to tools before cool the damaged part by beating and tighten for level the dented surface.

11 If the dent damaged area is torn or cracked, heat the spot by hot flame and beating by dent removing tools for straighten and level the surface, and then use the welding process to repair the torn or crack on the sheet.

Fig 1

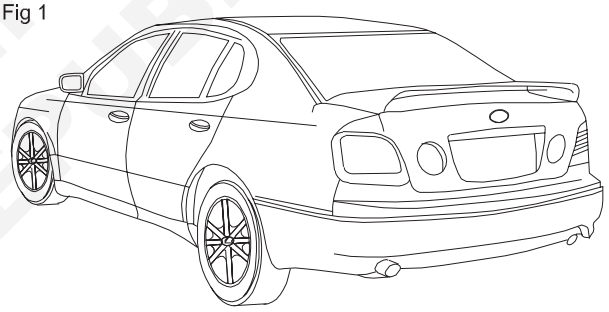


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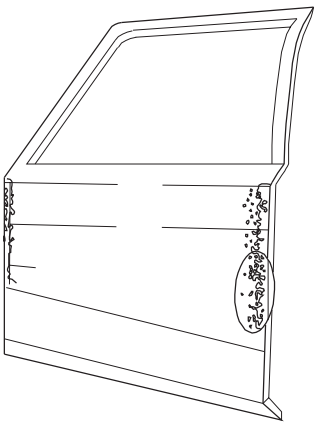
Fig 2



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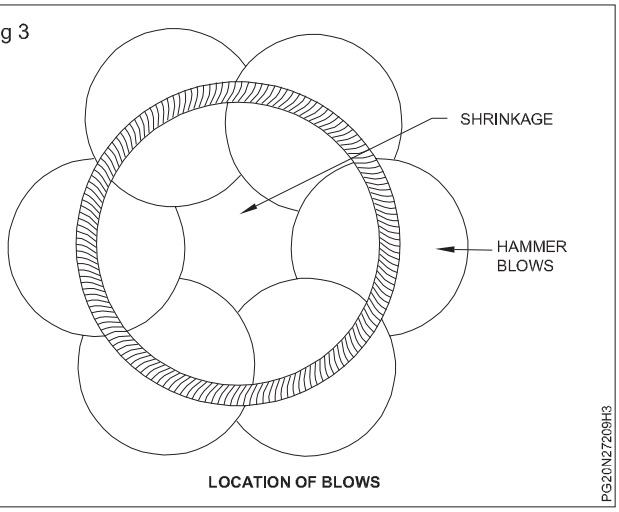
12 Ensure the damaged parts dent is removed and the parts surface level is matched with remain surface of the part. (Fig 1,10)

Fig 3




LOCATION OF BLOWS

Fig 4

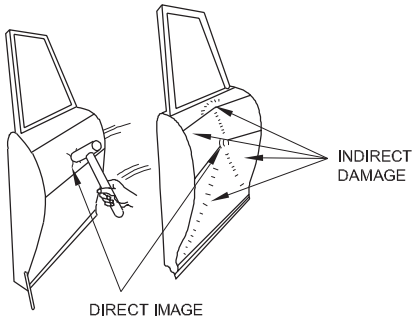



Fig 5

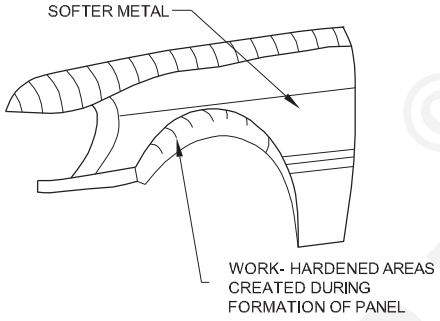



Fig 7

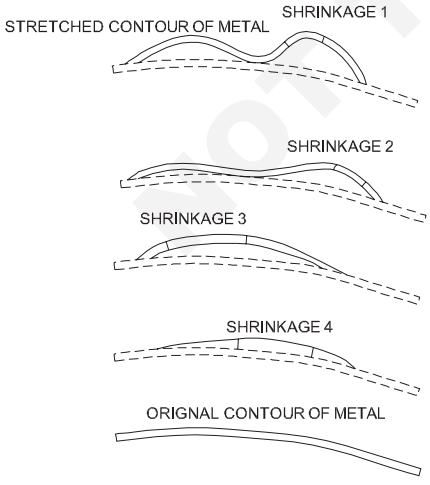



Fig 6

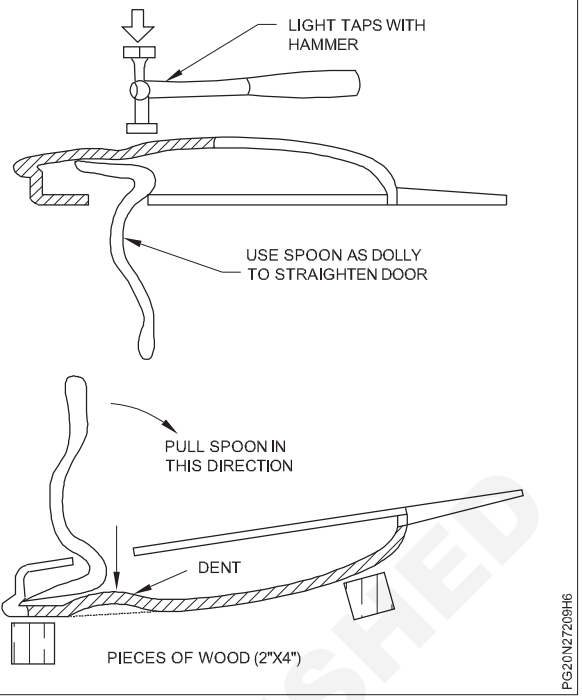



Fig 8

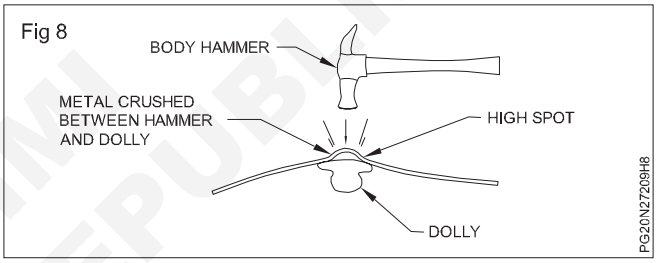



Fig 9

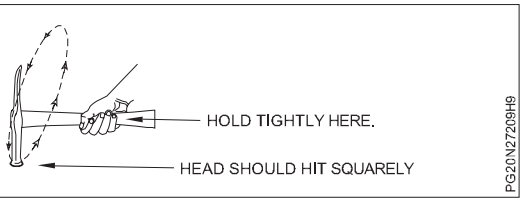
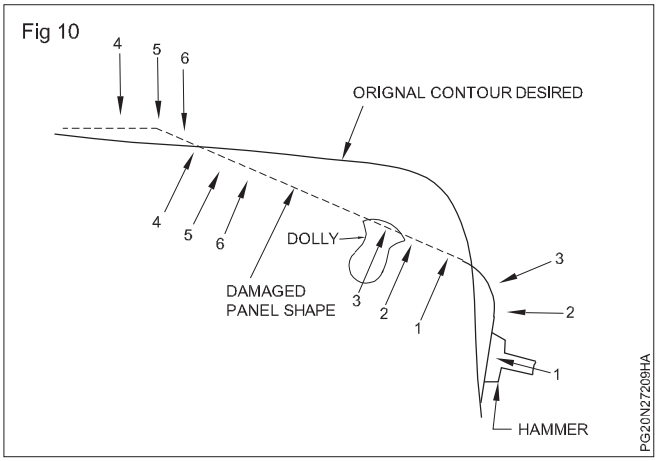



Fig 10



# Practice on sanding, primer, surfacer, putty apply on dent repair surface

**Objectives:** At the end of this exercise you shall be able to
- **sanding /burning the dent surface area of parts**
- **apply surfacer on the panel surface**
- **priming the damaged repair spot**
- **apply surfacer on the priming surface of the part**
- **apply putty on the priming surface.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Scraper | - 1No. |
| • Wire brush | - 1No. |
| • Paint mixing stick | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |
| • Power sander | - 1No. |

**Materials**

| | |
|---|---|
| • Primer | - as reqd. |
| • Reducer | - as reqd. |
| • Hardener | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

TASK 1: **Sanding / burning the old paint of the dents removed parts**

1 Clean the parts to be sanding/ burring.

2 Select the sanding tools.

3 Inspect the damaged parts previous paint thickness and condition of the paint layer.

4 Choose the abrasive method of paint removing by sanding or burning or chemical stripping or grinding system or sanding with speed fill.

5 Old paint should be chemically or abraded off with core sand paper.

6 Use the mil gauge to measure the thickness of paint applied on the surface of the part. (Fig1)

7 Use the chemical paint remover to remove the paint stripping in large area of part, if the environmental regulate allow.

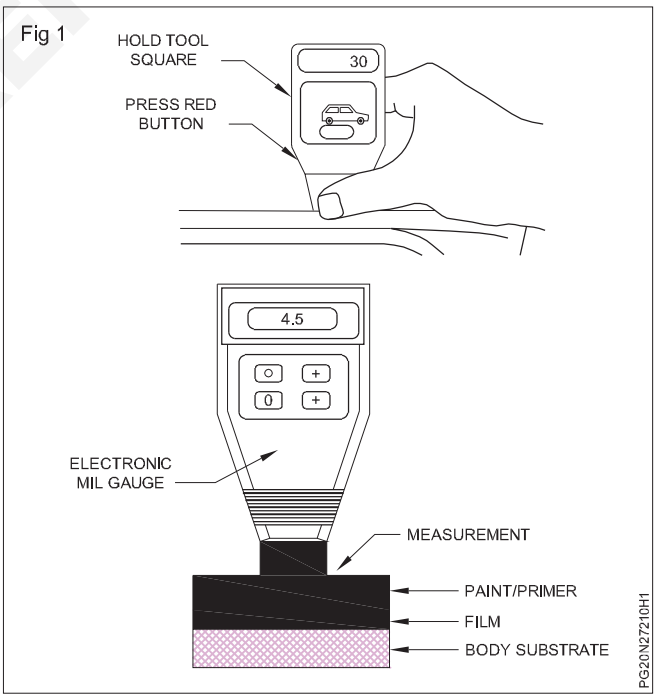
8 Chemical paint stripping method is alternate to blasting in those areas that a power sander enable to reach.

9 Before applying paint stripping method is alternative to blessing in those area that the remover does not gets on any area that is note to be stripped.

10 Paint remover should be applied following the manufacturer's instructions printed on the packing label.

11 Use the safety PPE while using chemical paint remover.

Fig 1




12 Use the brush to apply a heavy coat of paint remover in one direction only on to the area being treated.

13 Use the metal conditioner after remove the chemical paint striping to avoid rust formation on the metal.

14 If need use the air powered tools for forcing sand, plastic Beas onto surface for paint removal.

15 Preferred the blasting method to remove surface rust from repaired surface. Blasting will clean out rust pits without further thinning the panel. A blaster concentrates the pressure and flow of air and sand.

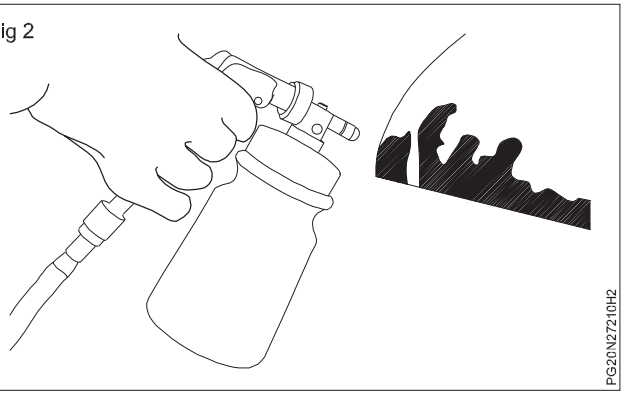
**Note:- basic procedure for operating a blaster is as follows**

16 Mask off the area that will not be affected by the spot repair.

17 Put on the necessary safety gear.

18 Before blasting check the manufacturers instruction for proper blasting pressure. (Fig 2)

Fig 2




19 Watch the surface carefully blasting May reveal a rust hole. (Fig 3)

20 After the paint has been removed, use an air blow gun to remove the some dust on area of repaired spot.

21 Prime the metal as soon as possible after sand blasting.

22 Never use the grinder to remove paint from a very large surface area on a panel heat from grinding will usually warp the panel and thin the metal too much.

Fig 3a

Fig 3b

— — — — — — — —

TASK 2: **Using metal conditioner on the metal surface**

1 Clean the metal surface to be painted with cleaning solvent.

2 Dry off the metal part before apply metal conditioner.

3 Select the metal conditioner and prepare it to apply.

4 To use metal conditioner mix the appropriate amount of conditioner with water in a plastic bucket.

5 Follow the instructions printed on the primer packing label.

6 Apply metal conditioner on the body surface with a cloth or sponge or spray bottle.

7 Before apply the conditioner wash the conditioner off the body with clean water.

8 If the metal conditioner with phosphoric acid reducer not only cleans, it also etches the metal and promotes the adhesion of the paint film it helps prevent the occurrence of rust and also eases sanding marks.

— — — — — — — —

TASK 3: **Preparing hard chrome surface (Fig 1,2)**

1 Clean the repaired metal surface with wax and grease remover.

2 Thoroughly sand the metal using 320grit well or dry sand paper.

3 Reclean the surface with wax and grease remover.

4 Apply any of metal treatments as discussed earlier exercise.

5 Spray two coats of primer and then two coats of primer surfacer.

6 Allow adequate drying time before dry sanding.

7 Blow out cracks then use a tack cloth on the entire surface.

8 If filling is required, apply an epoxy primer and allow it to cure a minimum of 1 hour and then apply a primer-surfacer.

9 Sand the primer surfacer after it has cured properly once the undercoat system is completed.

10 Apply use seam sealer to newly welded panels un an seam sealer where water leakage might be a problem between panel joints.

TASK 4: **Applying spot putty (Fig 1,2)**

1 Clean the primer surfacer applied area.

2 Inspect the metal surface for remaining small pinholes and scratches to be filled with spot putty or glazing putty.

3 Closely inspect the all panels to be painted for remaining surface problem (paint chips, pits, sanding marks or other imperfections.

4 Select the putty and hardener, prepare the putty.

5 Place a small amount of properly mixed putty onto a clean rubber squeeze or ting putty spreader.

6 Wipe a thin coat over the primer imperfection.

7 Use single strokes and fast scraping motion.

8 Putty dries very quickly use a minimum number of strokes when applying putty.

9 Repeated passes of the spreader might pull the putty away from the primer.

10 After curing block sand the putty flush with the surrounding surface with wet sanding works if needed dry sand the putty.

**Note: spot putty is normally applied over the primer or primer surfacer**

11 Ensure the metal surface is ready for base coat painting work.

Fig 1

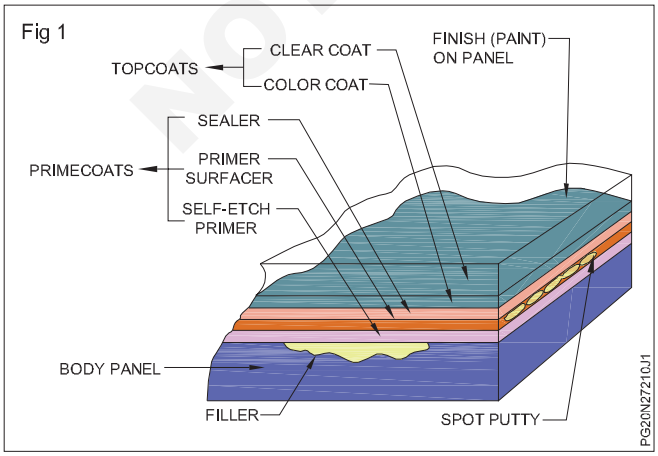



Fig 2

Fig A

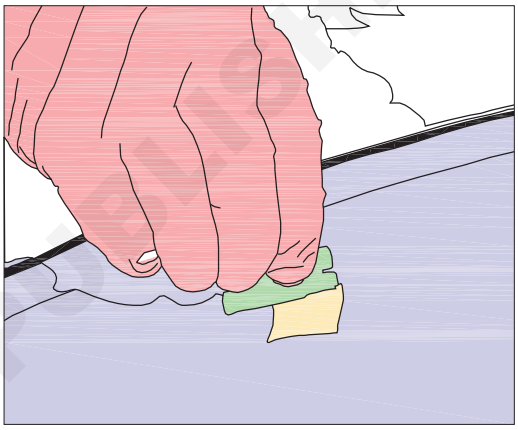


Fig B

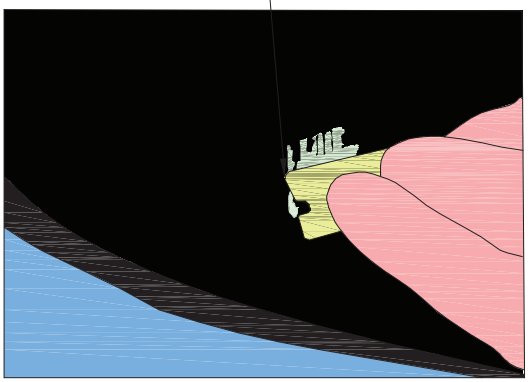
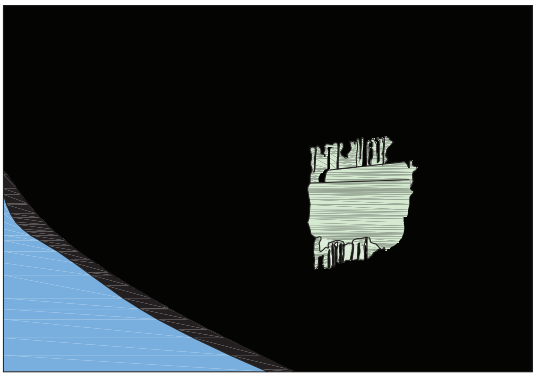



Fig C



# Practice on wet sanding and apply thin coat of surfacer

**Objectives:** At the end of this exercise you shall be able to
- **wet sanding the putty applied area**
- **apply thin coat of surfacer.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Hand sander - 1No.
- Bucket - 1No.

**Equipments**

- Air compressor - 1No.
- Air dryer - 1No.
- Paint spray gun - 1No.

**Materials**

- Sand paper - as reqd.
- Cleaning solvent - as reqd.
- Surfacer - as reqd.
- Reducer - as reqd.
- Soap oil - as reqd.
- Sponge - as reqd.
- Cotton cloth - as reqd.

## PROCEDURE

TASK 1: **Wet sanding on the metal surface** (Fig 1 to 5)

1 Clean the putty applied metal surface.

2 Ensure the putty is air dry until it is hard if it is sanded too soon, the putty will continue to shrink, leaving part of the scratch unfilled.

3 Once putty hardens, the putty should wet sanded, make sure to dry the surface thoroughly before applying sealer.

4 The wet sanding solves the problem of paper clogging when fine sanding it basically the same action as dry sanding except water.

5 Use the wet sanding paper, dip the paper in the water or wet the surface with the sponge.

6 Use plenty of water to flush away old paint and sanding grit.

7 Use long smooth strokes and light pressure when wet sanding large area.

8 Keep the sanding block to surface level and keep your finger tips from digging troughs in the surface.

9 If wet sanding a small area, use a circular motion only on the specific problem area.

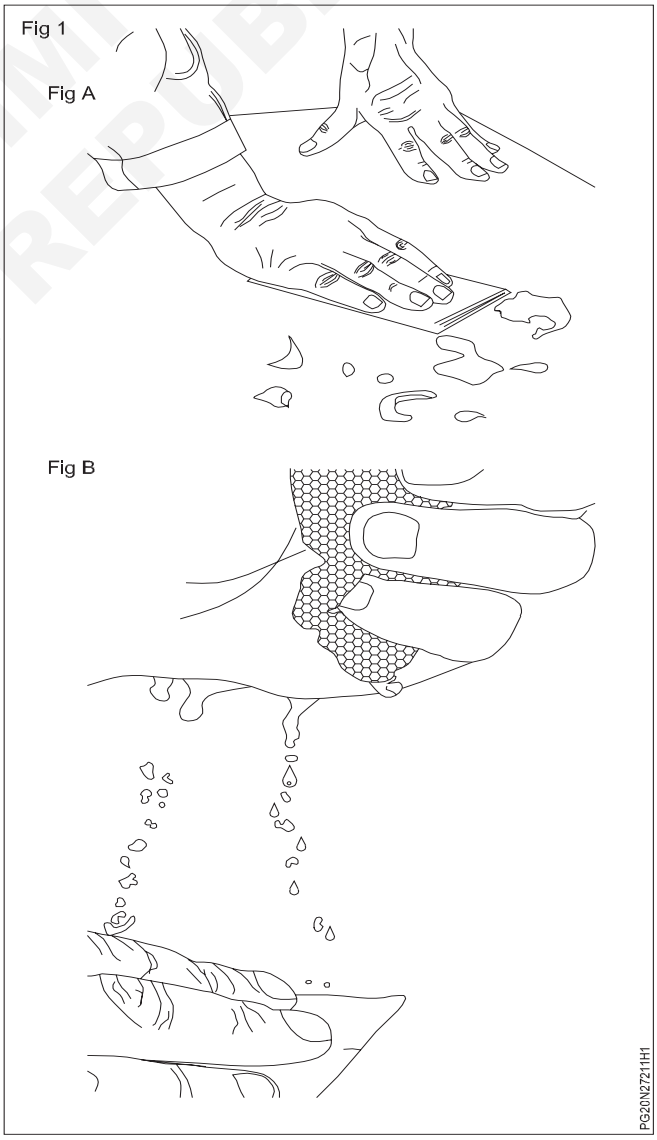
10 Small dirt nibs or pieces of dust in the primer came after be removed with wet sanding.

11 Never allow the surface to dry during the wet sanding operation.

12 Do not allow paint residue to build up on the abrasive paper.

13 When the sand paper begins to slide over the surface too quickly and easily, it is no longer cutting. The grit has become filled with paint particles or sludge.

Fig 1



14 Rinse the paper in water to remove the paint and sponge the surface to remove the remaining particles.

15 Check periodically by sponging the surface off and wiping it dry with a squeegee. This will remove all excise water so that it is easier to evaluate the surface condition.

16 Remove the sanding residues with a sponge and dry off with a squeegee before apply surface.

Fig 2

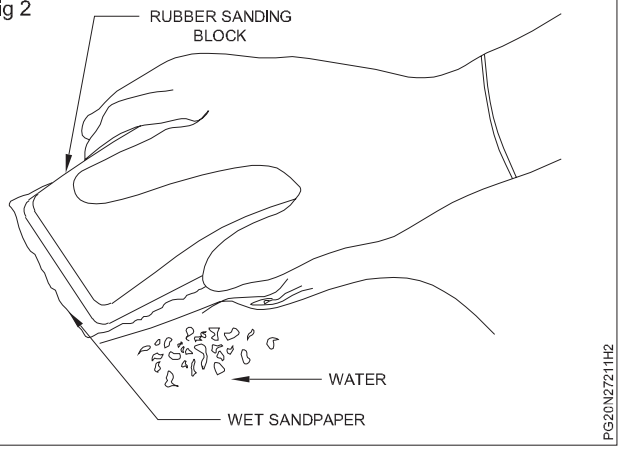



Fig 3

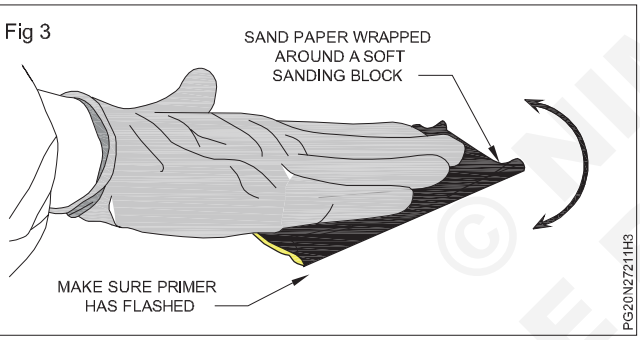



Fig 4

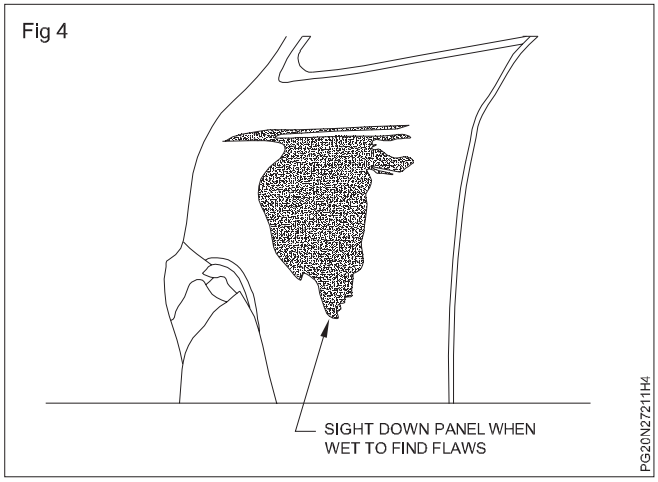
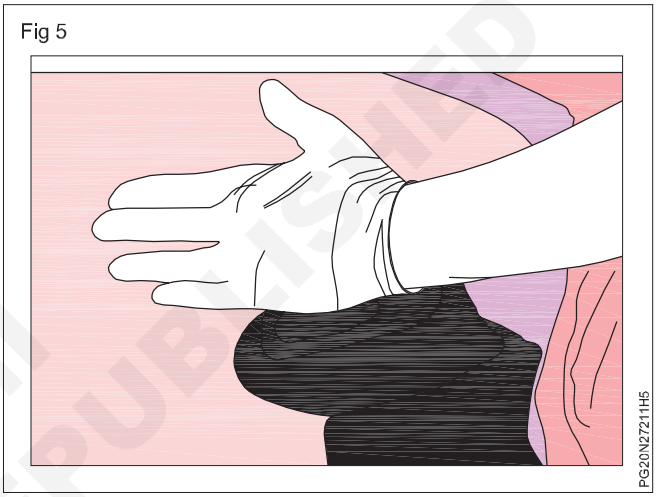



Fig 5




17 Once wet sanding operation is completed be sure that the surfaces are dry. Blow off the seams and molding with compressed air at a lower pressure and tack cloth the entire surface.

18 Don't touch the body surface with your bare hands.

— — — — — — — —

TASK 2: **Apply thin coat of surfacer**

1 Clean the wet sanded surface with tack cloth the entire surface to be apply surfacer on the metal surface

2 Select the primer surfacer and properly mix the surfacer as per the instruction given by the manufacturer

3 Check the viscosity of the surfacer and filter, the surfacer before fill in spray gun fluid condemner

4 Check the spray test and set the spray gun air pressure and spray pattern

5 Apply thin coating of surfacer left to right and right to left at even pressure and even thickness.

6 Let it allow to dry off time

7 Ensure the surfacer is evenly sprayed on the entire repaired surface and it is ready for base coat paint.

8 If need again apply one more surfacer coating on the metal surface.

9 Check the surfacer applied metal surface for smooth finish.

— — — — — — — —

# Practice to masking on unwanted painting area of the vehicle

**Objective:** At the end of this exercise you shall be able to
- **masking the unwanted painting area of the vehicle.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Painting knife - 1No.

**Equipments**

- Air compressor - 1No.

**Materials**

- Masking paper - as reqd.
- Masking tape - as reqd.
- Masking liquid - as reqd.
- Soap oil - as reqd.
- Cotton cloth - as reqd.

## PROCEDURE

**Masking on unwanted painting area of the vehicle**

1 Clean the vehicle (before painting) with cleaning solvent.

2 Identify the area of vehicle parts painting is not required.

3 Identify the types of masking material required to masking as masking paper and masking tape, plastic sheeting and specially shaped cloth or plastic cover wheels, antenia and rearview mirror, lights and liquid masking material.

**Note: Traditional masking products may not work with water based paints because of their high water content, if you using water based products, check with your supplier to determine which masking paper and tapes are made for use with these paints.**

4 Clean the vehicles before any type of masking material are applied.

5 If the masking surface is not cleaned, the masking material will not stick to surface.

6 When you are apply masking tape, pressed down firmly and adheres to the surface otherwise paint will creep under it.

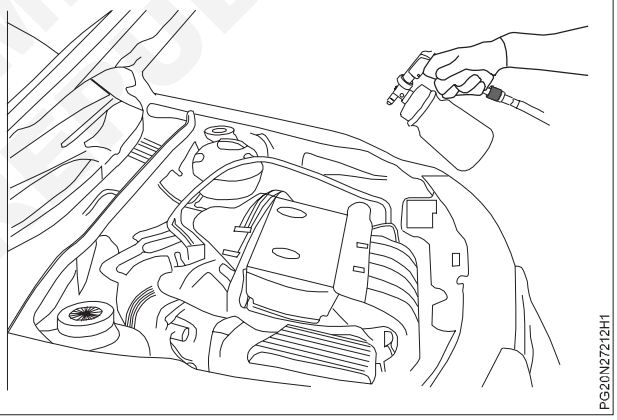
7 Completely clean and detail the vehicle before masking and again after the refinishing job is completed.

8 Use the liquid masking material to seals off large, complex surface of the vehicle to protect them from paint over spray. (Fig 1)

9 Liquid masking is used on areas where masking is necessary but difficult to apply, including wheels, head lights, the grille under body chassis and engine compartment.

10 Masking liquid coating washes off with soap and water. This masking coating is often removes right before the vehicle is ready to be returned to the customer.

Fig 1




Follow the steps: To mask a vehicle using the liquid masking system,

1 Partially mask the area to be painted by going around it with masking paper. Fold the paper over onto the area to be painted. Secure the paper with masking tape.

2 Apply the liquid masking material. Use a heavy, single, overlapping coat. Apply the material to all surfaces that are not meant to be painted. This would include bumpers, grilles, doors, windshields, body panels, wheels, wheel wells, door jambs, and even the engine compartment. An airless spray system is generally recommended for applying the masking material.

3 Fold the masking paper back over the liquid masking material. Wipe away any material from the area to be painted with a damp sponge. Allow the surfacer to dry.

4 Prepare the surface. Then apply primer and paint according to the manufacturer's instructions.

5 Allow the paint to dry, then unmask the vehicle. Liquid masking may be used in both air dry or bake conditions.

6 After that paint is cured wash off the dried liquid masking with a water pressure wash.

7 Use the plastic sheet masking to cover and protect large body surface.

8 Use the plastic sheet masking to cover the other end of the vehicle to protect it from over spray.

9 Lap the plastic sheeting under any masking paper. The masking paper should be applied over the masking plastic sheet.

10 Use the primer masking paper for masking off primer spray but not paint spray.

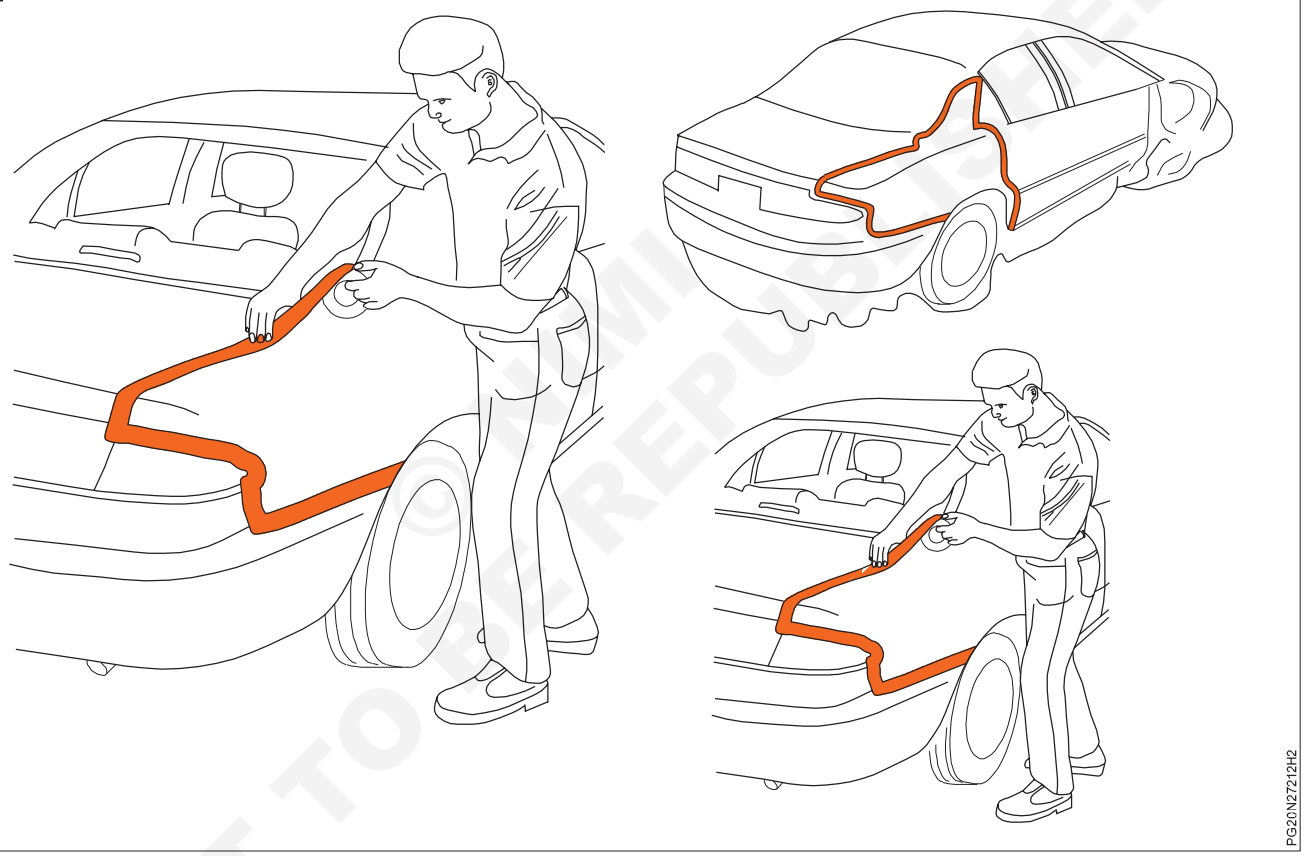
11 If you use it to mask off when painting, the paint solvent can soak through the paper and get onto the unpainted surface possibly damaging the finish.

12 Use the paint masking paper (often gold, yellow, blue or white) nonporous paper designed for masking off paint spray.

13 Never use news paper for masking a vehicle news paper has the added disadvantage of containing printing inks that are soluble in some paint solvents.

14 Use the masking tape to cover small parts and also hold masking paper in place. (Fig 2)

Fig 2




15 When applying masking tape hold and peel the tape with on hand and use your other hand to guide and secure the tape to provide tight edges of the vehicle.

16 Only stretch the masking tape around curved surfaces.

17 Cut the tape easily, quickly tear upward against your thumbnail. This permits a clean cut of the tape without stretching masked and then remove the fine line tape while the paint is still wet for a superior edge.

18 Tape down all loose paper and plastic to keep it from blowing around when spraying on the new finish.

19 Use the masking tape to hold down the large areas of masking paper.

20 Tape along the bottom of the vehicle to hold the paper on the bottom of the body.

21 Visually inspect all tape edges to make sure there are no gaps that could allow over spray leakage.

22 Use the double layer of masking paper or a layer tape over the paper to prevent bleed through or finish dulling from solvents. It is needed when spraying horizontal surfaces next to other masked horizontal surfaces.

23 Apply the masking tape along the back of the panel so that tape sticks out enough to cover the gap or

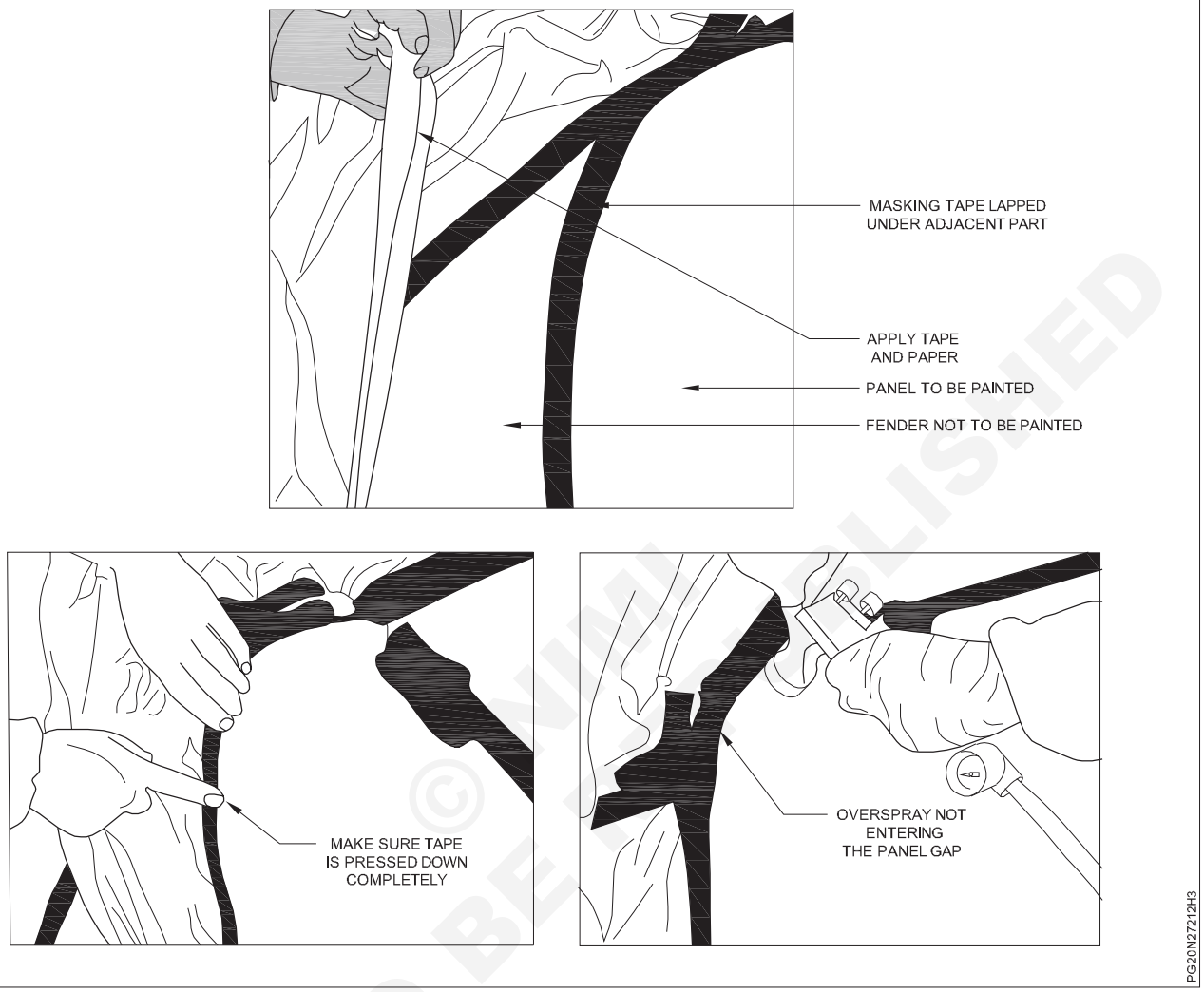
space between the adjacent panels (door, fender, hood, trunk, lid) it will be prevent the paint overspray enter the panel gaps.

24 Apply reverse masking tape to prevent a sharp paint edge. (Fig 3)

25 Use the masking rope behind gas cap door, soft paint edge around the perimeter or opening in the quarter panel.

26 Masking rope or aprature tape is handy for quickly back masking gaps between panels.

Fig 3



# Practice to match the paint colour shade overlay proper matching on unmask area

**Objective:** At the end of this exercise you shall be able to
- **match the paint colour shade by overlay equally on unmasked area.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint mixing stick - 1No.
- Paint bucket - 1No.
- Scraper - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.
- Power sander - 1No.

**Materials**

- Paint - as reqd.
- Reducer - as reqd.
- Thinner - as reqd.
- Abrasive material - as reqd.
- Tech cloth - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.

## PROCEDURE

**Match the overlay paint colour shade proper and equally on unmasked area**

1 Paint colour spraying variables a painting condition depend upon the temperature humidity and ventilation.

2 Paint colour variables a painting process of reduction evaporation speed of solvents, air pressure or type of equipment.

3 Painter can control paint colour through agitation of paint application technique amount of material applied, spray gun adjustment, atomizing and identification of correct paint code and mixing formula.

4 Use the proper spraying techniques to match the proper equality colour.

5 Always use the positive variables to achieve original finish as following method.

- Slowness of solvent evaporation which allows the refinisher to reproduce the factory finish
- Wetness of colour application
- Proper spraying techniques and the correct air pressure

6 Always properly prepared, reduced and the sprayed will provide a good colour match.

7 Metallic colour also appear to vary when viewed under different kinds of light such as day light, shade, sunlight or artificial light.

8 Use only medium to light spray coats to apply metallic colour to achieve the best colour match.

9 If your colour coat of metallic looks, to light, spray the next coat in a medium wet coat to darken the colour.

10 If use the paint booth follow the steps to darken a metallic colour.

- Use a larger spray gun fluid nozzle.
- Increase the fluid flow
- Decrease the fan width
- Decrease the air pressure
- Decrease the travel speed.
- Use a slower evaporating solvent
- Lower paint booth temperature

11 If you use the paint booth for painting follow the steps to lighten the metallic colour.

- Use a smaller fluid nozzle of spray gun
- Decrease spray gun flow
- Increase spray gun fan size
- Increase spray gun air pressure
- Use a faster evaporating solvent
- Increase paint booth temperature

12 The clear sprayed over the colour coat provides a brighter shine than single-stage paint.

13 When working with base coat/clear coat finishes remember the following.

- Clear coats are not all perfectly clear and they may change the appearance of a colour.

- Blend the base coat and clear coat the entire panel surface.
- Avoid blending the clear coat if needed blend the clear into the smallest area possible to hide the repair.

14 The colour of overlay should be the same as the rest of the area if not correct it by adding tinting. Clear all of the panels with one of the recommended clear coats.

15 If your paint colour does not match the original finish, check the following possible reasons for the mismatch before deciding to tint the paint.

16 The original finish may have faded. Check the paint on unexposed areas such as door jambs or under the trunk lid or hood to determine whether the finish has faded. If this is the case, restore the paints luster by compounding the old finish well beyond the repair area.

17 Has the clear coat oxidized and turned white? If using a clear coat, remember that compounding the clear coat will make the paint appear darker. Cleaning and compounding will remove any whitish, oxidized layer on the finish to deepen the colour.

18 Suppose the wrong colour is used, Check the auto manufacture's code and the paint company's stock number for the colour being used to make sure that it is the right one.

19 Suppose the paint is poorly mixed before spraying. The pigment or flakes may not have been mixed thoroughly. Leaving pigment, flake, or pearl in the bottom of the can cause a mismatch, so agitate thoroughly.

20 Has the amount of solvent or reducer been measured carefully? Over reducing will lighten or desaturate a colour. Remember that it is easy to add more solvent, but it cannot be taken out.

21 When spraying a colour on test panel, ensure the answer for the following questions

a) Did you do every-thing properly?

b) Did you mix the paint formula precisely?

c) Did you normal spray gun adjustments and spraying methods?

d) Did you allow proper flash times between coats?

22 If using a pearl paint, did you make an accurate letdown test panel and use it properly? Three-stage pearl paints are the most difficult to match. Did you use the correct number of pearl coats and clear coats? Each will slightly change the colour of three-stage pearl paint.

23 Apply clear coat on your test panel before comparing it to the vehicles' colour If testing for a basecoat / clear coat finish, colour matching cannot be judged until the clear is applied to the basecoat.

24 Use the different spraying technique to help for match the colour.

25 The colour of overlay should be the same as the rest of the area. If not correct , correct it by adding tinting clear all of the panels with one of the recommended clear coats.

— — — — — — — —

# Practice to unmasked the mask and touch up paint by necessary process

**Objectives:** At the end of this exercise you shall be able to
- **unmasked the mask & check out for paint touch up area**
- **paint touch up on paint damaged spot.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Painting knife - 1No.
- Hand sander - 1No.
- Scraper - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.

**Materials**

- Paint - as reqd.
- Reducer - as reqd.
- Thinner - as reqd.
- Abrasive material - as reqd.
- Tack cloth - as reqd.
- Cotton cloth - as reqd.
- Soap oil - as reqd.

## PROCEDURE

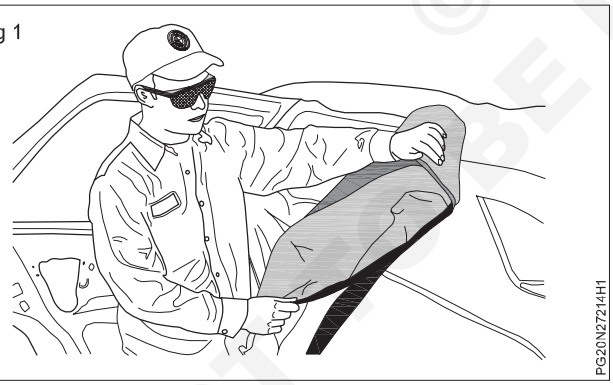
**Removal of masking materials and paint touch up**

1 De-masking can be a rewarding task

2 While removing masking material don't get careless and hit or bump the fresh paint.

3 Masking materials are removed after paint has fully flashed (Fig 1)

Fig 1




4 Never remove paint masking materials until the finish has had enough time to fully flash.

5 The waiting time before de-masking will vary with shop temperature, depend the type of paint producer and other factors.

6 Touch a piece of masking tape that has been covered with paint.

7 Lightly touch should not leave a fingerprint in the paint film.

8 Ensure the paint film is not marred when touched lightly you can carefully remove the remain masking materials.

9 Remove the masking tape while the finish is warm.

10 If the finish is allowed and it also leave adhesive behind or lift paint edges along fine line tape.

11 When removing fine line tape pull the tape back and straight out away from the body.

12 Pull the fine line tape off first. (Fig 2a)

13 Avoid pulling fine line tape sideways which could damage the new paint. (Fig 2b)

14 While removing masking materials, extreme care must be used so that the fresh, soft paint is not damaged.

15 Pull the tape slowly so that it comes of evenly.

16 If you used liquid masking material, wash it off with soap and water.

17 Do not wash freshly painted surface until they are fully cured.

18 Remove the making rope to reveal the blended paint edge formed in the gap between the edge of the rope and the edge of panel. (Fig 2c)

19 If masking tape adhesive dry out it can make it impossible to pull the tape back off in that case you have to gently scrape off the old masking tape.

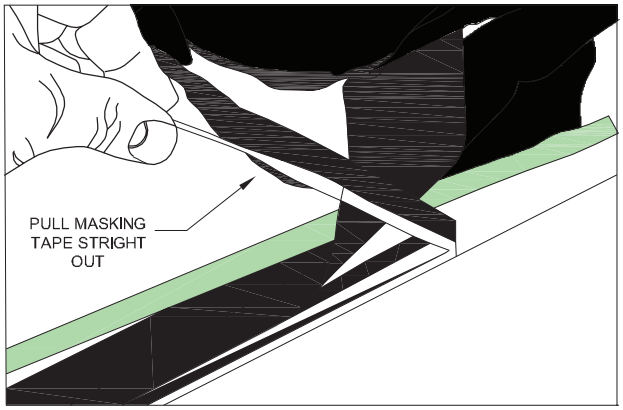
20 Then the old tape adhesive has to be cleaned off wash an adhesive solvent.

21 After removing masking material clean the surface with cleaning solvent and let it dry off.

22 Inspect the masking tape removed area for paint touch up.

Fig 2

Fig A




(a)

Fig B

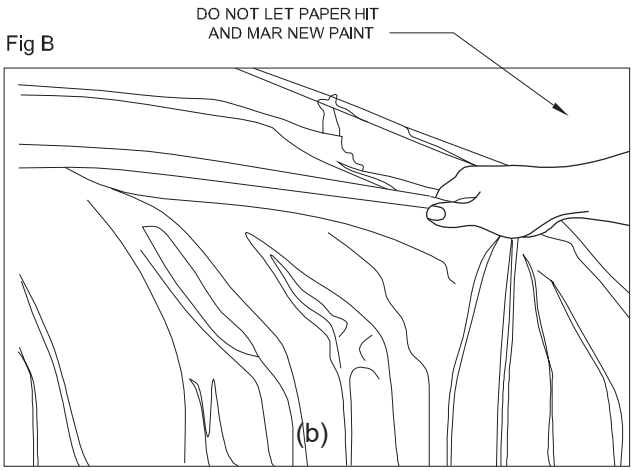
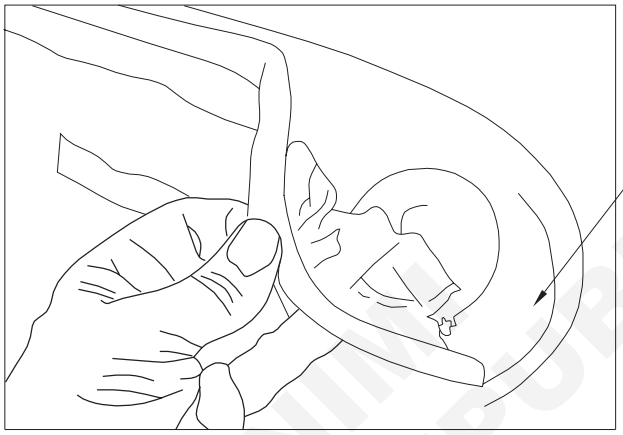



Fig C




(c)

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23 Prepare paint colour or use the already prepared and used paint to touch up by brush or brush gun gently and ensure the painting surface is matched with remain surface paint colour.

— — — — — — — —

# Practice to apply final coat rub and wax properly

**Objectives:** At the end of this exercise you shall be able to
- **apply rubbing compound on painted surface**
- **apply wax and buffing by hand and machine glazing and polishing.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Buffer pad set | - 1No. |
| • Swirl mark remover | - 1No. |
| • Dirt rub file | - 1No. |
| • Soft sanding block | - 1No. |
| • Hand glaze | - 1No. |

**Equipments**

| | |
|---|---|
| • Buffing machine | - 1No. |
| • Machine glaze | - 1No. |

**Materials**

| | |
|---|---|
| • Paint compound | - as reqd. |
| • Rubbing compound | - as reqd. |
| • Hand compound | - as reqd. |
| • Machine compound | - as reqd. |

## PROCEDURE

**Final coat rub and wax polishing the painting surface**

1 Wash the surface thoroughly with clean water and a sponge after panel detail sanding.

2 Use the rubbing compound to abrade and smooth a surface film by hand to level minor surface imperfections.

3 Apply rubbing compound on the painted surface and rubbing the surface with hand glazing compound to restore paint shine.

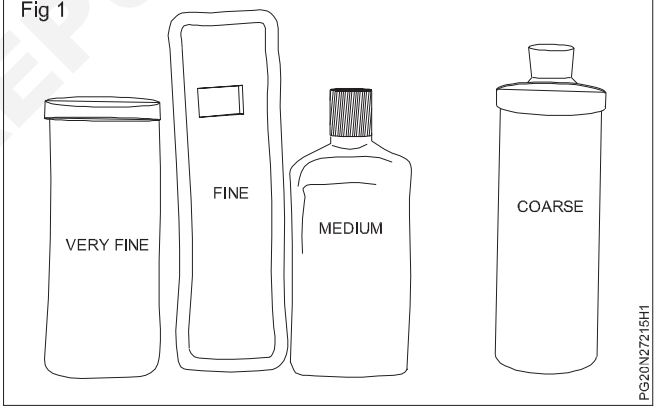
4 Use the rubbing compound on smaller parts or areas that cannot be compounded with a buffing machine.

5 Use the correct cutting strength rubbing compound as defect size.

6 Apply the glaze to the surface using a clean cloth and rub the glaze thoroughly into the surface and then wipe it dry

7 Refer the table for some application for different rubbing and polishing compounds. (Fig 1)

Fig 1




**POLISHING AND RUBBING COMPOUNDS (Fig 1)**

| Grade | Liquid | Paste | Use and application |
|---|---|---|---|
| Very fine | Machine or hand | – | Used to remove swirl marks on topcoat. Spread material evenly with buffing wheel pad before starting compounding. |
| Fine | Machine or hand | Hand (add water for machine use) | Used to level orange peel. Can, polish, and restore older finishes leaving no wheel marks or swirls. |
| Medium | Machine or hand | Paste (add water for machine use) defects. | Used for quick levelling orange peel. Can be used to repair other minor paint |
| Coarse | Machine | Machine top coating. | Used for compounding before final |

8 Use the wool pad first and then softer foam pad in second rubbing action

9 Use the polishing machine an orbital action to bring out the full paint gloss or shine

10 Instead of spinning the pad in circle, the pad is spun and moved sideways by the dual action of the machine (Fig 2A)

11 Machine orbital action will remove swirl marks and the finish will look like, mirror it has been hand-polished (Fig 2B)

Fig 2

Fig A

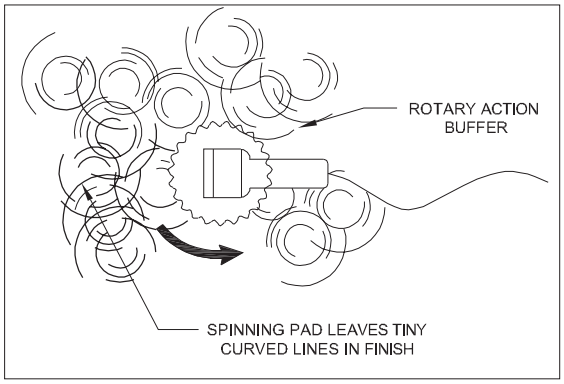
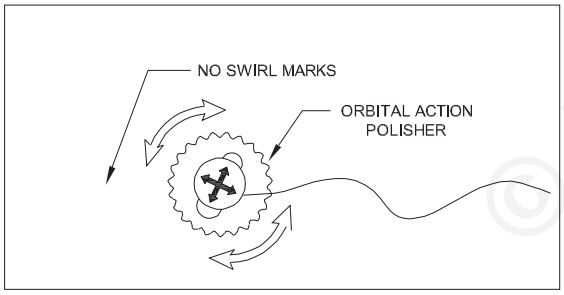



Fig B

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**Note: Use the rubbing compound for the purpose of the following**

- **Eliminate fine sand scratches around a repair area**
- **Correct a gritty surface**
- **Smooth and bring out some of the gloss of lacquer top coats**
- **Repair paint on area that cannot be buffed with a machine.**

**Note: Excessive buffing heat can cause swirl marks, warping discolouring, and hazing and make the material dry out too quickly if the area is hot to the touch, there is too much heat cool it with water.**

12 Follow the procedure for machine buffing

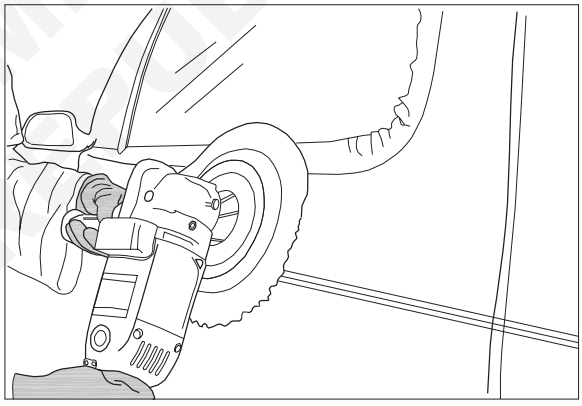
- Keep the pad flat or at about a 5-degree angle to the surface on flat body surface. Only tilt the pad to reach into or match a curved surface on the body. (Fig 3)

Fig 3

PG20N27215H3

- Let the weight of the machine do the work. If you press down on a buffing machine, it can quickly cut through the clear coat.
- Use care around panel edges and body lines to avoid burn-through. Do not let edge of the buffing pad get down into panel gaps, or you could even burn through your protective masking tape and the paint. (Fig 4)

Fig 4



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- Check the repair area often and apply more product as needed. Buff as little as possible to smooth and shine the paint surface.
- Compound until the product begins to dry. Do not keep buffing if the compound has dried, because you will burn through the paint surface.
- Never lay the face of a buffing pad on a workbench or any surface that could contaminate the pad with dirt and debris. One speck of sand in the pad can badly scratch the paint.
- Never use a power buffer with a hand-rubbing compound. This will cause deep scratches, swirl marks, and burn-through. Only use machine compounds when power buffing.
- Place masking tape over gaps in panels. This will keep compound out from behind panels so time is not wasted cleaning these area after buffing.

- Hand-rub small parts and internal pockets in panels that could be easily damaged by the spinning buffing pad. Hand-compound these areas to avoid burn-through.
- After initial compounding with a wool pad, buff again lightly with a foam pad and finer glazing compound. This will help remove swirl marks and bring out the paint gloss.
- After the machine compounding, remove the tape and hand-compound all edges and contours just enough to produce a smooth finish. Keep in mind that body lines usually retain less paint than flat surfaces and thus should get only minimal compounding.

**Hand and machine glazing and polishing**

- Glazing or polishing involves using very fine grit compound to bring the paint surface up to full gloss.
- Final polishing should always be done with an ultra fine polishing compound.
- When using rubbing compounds and machine glazes be sure to follow these procedures.

1 Use a single manufacturer's product line.

2 Follow the manufacturer's recommendations for use.

3 Use the materials sparingly.

4 Use the buffing wheel to evenly distribute the material over the area that is being repaired

5 Keep the pad flat and directly over the surface being repaired.

6 Use a slow, methodical motion so you can keep track of how much area has been buffed

7 Use the finest grit product possible last. Using a finer grit product may take a little longer initially but will generally require less time to complete the repair.

8 Reduce swirl marks by avoiding coarse products and worn buffing pads.

9 Instead of a circular action buffer, you should use an orbital action machine for final polishing. An orbital action polisher will move the polishing compound in a random manner to remove swirl marks from buffing.

10 Finally hand wash using only water and soft sponge dry with cotton towels only don't use a chamois.

11 Ensure the rubbed surface gloss is matched with remaining unpolished surface colour and shining.

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## Practice to identify the paint defects and its remedies

**Objectives:** At the end of this exercise you shall be able to
- **identify the paint defects**
- **rectify the paint defects.**

### Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint defects CD/DVD - 1No.
- Paint manual - 1No.
- Paint defects chart - 1No.

**Equipments**

- Audio video system - 1No.
- Video screen - 1No.

**Materials**

- Cotton cloth - as reqd.
- Soap oil - as reqd.

PROCEDURE

**Demonstrate knowledge of paint defects and its remedies**

1 Instructor should be use the paint defects figure chart

2 Explain about the paint defects and cause for the paint defects

3 Explain the type of paint defects and remedies for the defects in the paint shop

4 After briefing the defects and remedies, display the video in the class room and explain the causes for each type of paint defects and its remedies.

5 Trainees carefully watch the video and write the defects and remedies in the following table.

**Note: If paint defects DVD is not available with the paint shop use the you tube video.**

| Sl.no | Name of the paint defects | Cause for the defect | Remedies |
|---|---|---|---|
| 1 | Run down | Flow down the surface | Use proper spray gun motion<br>Use proper spray gun distance |
| 2 | Sagging | | |
| 3 | Pin hole | | |
| 4 | Orange peel | | |
| 5 | water spot | | |
| 6 | Un cover shade variation | | |
| 7 | Bleeding | | |

— — — — — — — —

# Practice to find out the different type ofpaint defects

**Objective:** At the end of this exercise you shall be able to
- **check and find the paint defects on painting surface.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Paint manual | - 1No. |
| • Paint defect chart | - 1No. |
| • Hand sander | - 1No. |
| • Swirl mark remover | - 1No. |

**Equipments**

| | |
|---|---|
| • Buffering machine | - 1No. |
| • Machine glaze | - 1No. |
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |

**Materials**

| | |
|---|---|
| • Paint | - as reqd. |
| • Reducer | - as reqd. |
| • Thinner | - as reqd. |
| • Wax | - as reqd. |
| • Polish | - as reqd. |
| • Soft sponge | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

**Procedure for find out the paint defects**

1 Clean the painted surface with clean water and dry it with clean tack cloth

2 After cleaning the surface don't put your hand on the surface and protect the painted surface from the dust particles.

3 Refer the paint manual for defect identification method

4 Achieve the paint defects knowledge through the video and paint manual.

5 Inspect the painted surface for the defects.

6 Find the cause for the following defects. Paint run down sagging, pin hols, orange peel, oil/water spot over/dry spray uncover shade variation.

7 **Paint run down:** A paint film that has droped under its own weight and displays a thick edge or wrinkle in the lower part caused by too heavy application of paint or the paint reduced too much. To repair wash off with solvent before the paint material dry off let allow to dry the painted surfrace, sand and refinish the surface in proper method.

8 **Paint sags:** A paint sag is a partial slipping down of the paint created by a film that is too heavy to support itself if a small area of wet paint, you can use solvent to wash off the sag before repainting if sag is on a larger area allow the paint to dry enough for wet sanding and avoid sand scratches. After fine sanding refinish the surface in proper learned method.

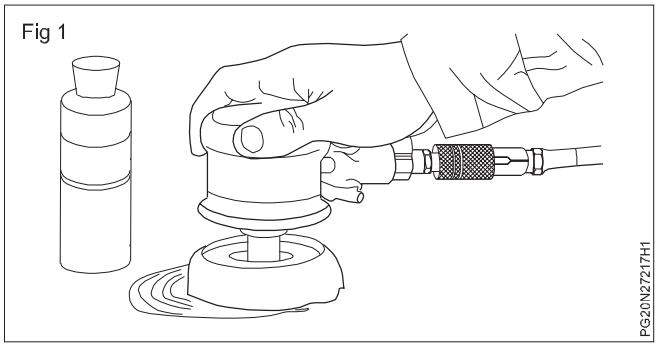
9 **Pinholing:** Paint pinholing is tiny holes in the finish. Which is the cause of trapped solvents air or mixture clean the surface throughly and sand the affected area as deep as needed and refinish the effected area.

10 **Orange peel:** Orange feel is an uneven surface formation like the skin of orange and paint surface look rough brumpy cause for orange peel paint droplets dry out before they can flow out and level smoothly together. Minor orange peel can be corrected by machine buffing or two full well coats of clear with the correct flash time between each coat.

11 **Water spot:** Water spotting is the general dulling of gloss in spots cause for water spot, water evaporating on the finish before it is thoroughly dry to correct it rubbing compound or wax polish the painted surface if need sand and refinish the effected surface (Fig 1)

12 **Chemical spot:** Such as acid alkali spotting causes an obvious discoloration of paint surface. Various paint pigments react differently. The cause of acid and alkali spotting is chemical change results from atmospheric contamination. Immediately following contamination. The body surface should be vaguely flushed with cool water and detergent and then sand & refinish it as per following the paint manufacturer's instructions.

Fig 1




13 **Dry spray:-** Dry spray is cause of more distance from painting surface to paint spray gun nozzle due to paint spray travelling distance is more then normal spray distance so that paint mixes are evaporate and dry spray deposited on the surface always maintain the proper gun distance, paint viscosity, temperature and gun air pressure, spray pattern carefully follow the paint manufacturer's instruction to avoid over spray and dry spray

14 **Paint colour mismatch:-** A paint uncover shade variation causes a repair area different colour from original colour on painting surface, the value, hue, or chrome may not be exactly the same in the two paints. The most common causes of a colour difference include improper paint mixing and not spraying the paint on properly. To prevent always use sprayed out test panel and let down test panels. Use a spray out panel with two stage base coat/clear coat.

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# Practice to identify and mark the defected area and rectify the defects

**Objectives:** At the end of this exercise you shall be able to
- **inspect the painted surface and identity the defects**
- **mark the defected area and rectify the defects.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Sanding tool - 1No.

**Equipments**

- Air compressor - 1No.
- Paint spray gun - 1No.

**Materials**

- Reducer - as reqd.
- Thinner - as reqd.
- Paint - as reqd.
- Putty - as reqd.
- Hardener - as reqd.
- Solvent - as reqd.
- Sanding paper - as reqd.

## PROCEDURE

**Inspect the painted surface for identify the defect cause and remedies.**

1 Clean the painted surface with recommended cleaning solvent.

2 Throughly read paint manual and compare the paint defects.

3 Inspect the paint surface for the defects and mark the paint damaged spots on the surface

4 Paint problems include a wide range of defects that can be found before or after painting

5 Paint problems are depend on surface preparation, painting procedure, environment paint quality paint ingredients and other sources.

6 Find the causes and remedies for the defects as following the table.

| Sl.No | Paint problem | Cause for problem | Remedies |
|---|---|---|---|
| 1 | Paint colour mismatch | - Improper paint mixing<br>- Improper paint spray on the surface | - Mix the paint properly<br>- Set the proper paint spray pattern and air pressure of spray gun<br>- Use the different spray technique |
| 2 | Orange peel | - Improper gun adjustment and spraying techniques.<br>- High booth temperature<br>- Improper recoat time<br>- Improper reducer used<br>- Improper paint mixing | - Adjust the paint spray gun before apply paint<br>- Use the suitable paint temperature, humility<br>- Use the proper and correct quantity of reducer with paint.<br>- Allow the sufficient flash and dry time<br>- Do not dry a painting area by fan<br>- Reduce the proper viscosity with proper thinner/reducer.<br>- Stir all pigmented under coats and top coats throughly. |
| 3 | Runs and sags | - Applying too much paint in one coat<br>- Triggering paint spray incorrectly when changing spray gun directions | - Use proper spray gun motion, distance, and speed of pass with equal over laps of coat<br>- Select the proper solvent<br>- Do not pile on paint coats too thickly.<br>- Allow sufficient flash or dry time in between coats |

| | | | |
|---|---|---|---|
| | | - Not allowing enough flash time between coats<br>- Wrong temperature rating of solvent | - Use proper gun adjustments techniques and air pressure<br>- Allow the paint surface to warm up to atleastroom temperature before attempting to refinish. Try to maintain an appropriate shop temperature for paint areas |
| 4 | Sand scratch swelling | - Improper surface cleaning<br>- Improper solvent especially a slow drying solvent when sealer<br>- Under reduced or too fast a solvent used in primer surfacer causes bridging of scratches | - Use appropriate grits of sand paper<br>- Apply a sealer over the primer to eliminate sand scratch swelling. Select thinner or reducer suitable for existing shop conditions<br>- Use proper thinner and reducer for primer surface |
| 5 | Bull's eye feather edge | - Not allowing the spot putty to cure enough before sanding.<br>- The use of older slow drying one part lacquer based spot putty is another cause<br>- Improper mixing of two part filler or putty. | - Allow spot putty to cure enough before block sanding<br>- Use fast drying one part lacquer-based spot putty<br>- Allow body filter to cure enough time<br>- Properly mix the two part body filler and putty. |
| 6 | Feather edge splitting | - Using too much primer.<br>- Using too much primer surfacer<br>- Solvent and ingredients has not uniformly mixed.<br>- Wrong solvent is used<br>- Improper surface cleaning or preparation<br>- Excessive putty use and film build up | - Use proper quality of primer and primer surfacer<br>- Using uniformly mixing the solvent and pigments<br>- Use proper solvent<br>- Properly clean the surface<br>- Remove the excessive putty film build up |
| 7 | Water spotting | - Water evaporating on the finish before it is thoroughly dry<br>- Washing the finish in the bright sunlight | - Compound or polish the surface with rubbing or polishing compound<br>- Sand the affected area and refinish. |
| 8 | Chemical spotting | - Acid and alkali spotting is a chemical change of pigments | - Wash with detergent and water and follow with a vinegar bath<br>- Sand down and refinish the surface.<br>- If the minor spotting you might try wet sanding with rubbing compound. |
| 9 | Paint curing or drying failure | - Improper stirring or mixing of products ingredients<br>- Sloppy surface cleaning and preparation.<br>- Allowing chemical contamination of refinish materials, splashing chemical paint remover<br>- Wet sanding with contaminated water<br>- Faulty refinish product ingredients were mixed incorrectly | - Wash or sand all affected areas thoroughly as needed and then refinish<br>- Properly dispose of aged refinish products.<br>- Thoroughly clean all areas to be repaired with a wax and grease remover to avoid chemical contamination<br>- Use clean fresh water to wet sanding<br>- Use proper recommended ingredients and refinishing products |

| | | | |
|---|---|---|---|
| 10 | Paint fish eyes | - Improper painting surface preparation/cleaning<br>- Previous repair can contain excessive amount of silicon from additives used during their application<br>- Contaminants in shop air lines and holes can blow out of air sander a spray gun on to the painting surface<br>- Using the wrong type of air tool lubricating oil | - Properly clean and prepare the surface<br>- Mix in a small amount of fish eye eliminator additive with paint.<br>- Spray another coat over the affected area as soon as possible to see whether the paint film will flow out smoothly over the eye dimples.<br>- Always keep the shop neat and clean<br>- Use proper lubricating oil for air tools. |
| 11 | Blushing | - In hot humid weather moisture droplets can become trapped in the wet<br>- Excess gun air pressure<br>- Using too fast evaporate thinner or reducer | - Use correct temperature<br>- Maintain the proper gun spray distance<br>- Recoat the surface<br>- Adjust the gun air pressure<br>- Use correct reducer |
| 12 | Bleeding | - Sealer not used before clear coat | - Use the sealer between base coat and clear coating. |
| 13 | Prime coat show through | - Insufficient colour coats used<br>- Sealer not used to match base coat | - Apply good coverage of colour<br>- Sand and refinish<br>- Tint the sealer to match the previous colour. |
| 14 | Blustering | - Improper surface cleaning<br>- Excess air pressure to paint spray gun<br>- Use of wrong reducer<br>- Excessive film thickness<br>- Contaminated compressed air | - Clean the surface thoroughly<br>- Maintain proper air pressure<br>- Use recommended reducer<br>- Apply recommended paint film thickness<br>- Use filtered air/drain and clean the air regulator on daily basics |
| 15 | Solvent popping | - Improper surface cleaning<br>- Use of fast drying solvent<br>- Excessive air pressure<br>- Excessive paint thickness<br>- Insufficient curing time between coats<br>- Improper paint spray pattern<br>- Surface is improperly prepared.<br>- Wrong solvent or reducer is used.<br>- Too heavy an application of undercoats can trap solvents, causing popping of the colour coast as they later escape. | - Properly clean the surface<br>- Use recommended solvent<br>- Set the correct air pressure<br>- Maintain proper paint layer thickness.<br>- Allow proper flash and dry off time.<br>- Use proper paints pray pattern.<br><br><br><br>- Use proper reducer<br>- Allow sufficient paint film thickness |
| 16 | Paint cracking | - Excessive paint thick coating<br>- Solvents improperly mixed<br>- Insufficient flash time<br>- Incorrect use of additive | - Apply paint film thickness as recommended<br>- Properly mix the solvent<br>- Allow sufficient flash time<br>- Use the recommended addictives only. |
| 17 | Crazing | - Paint shop temperature too cold<br>- Surface tension of original material is under stress<br>- Excessive paint shop temperature.<br>- Crazed paint finishing. | - Maintain paint shop temperature as recommended<br>- Surface tension of original<br>  - Bring the surface to room temperature before refinishing<br>  - Remove the crazed finish and repaint with appropriate materials for shop temperature |

| | | | |
|---|---|---|---|
| 18 | Paint lifting | - Use of incompatible materials<br>- Insufficient flash time<br>- Improper paint drying<br>- Effect of previous repair<br>- Improper reducer | - Use of recommended solvent and reducer<br>- Allow sufficient flash time<br>- Allow sufficient paint dry off time<br>- Sand and refinish<br>- Use of recommended reducer. |
| 19 | Paint wrinkling | - Improper drying<br>- Using too many heavy or wet coats<br>- Improper reducer usage<br>- Improper paint shop temperature | - Allow dry off time as recommended by paint manufacturer.<br>- Use only recommended paint coat<br>- Use proper reducer<br>- Maintain recommended room temperature |
| 20 | Mottling | - Wrong reducer used<br>- Solvents not uniformly mixed with paint<br>- Spraying too wet<br>- Hold the spray gun too close to work surface<br>- Uneven spray pattern<br>- Low paint shop temperature. | - Use proper reducer<br>- Mixing the solvent properly<br>- Allow dry off time<br>- Maintain proper gun distance from the surface<br>- Apply even thickness of paint film maintain proper temperature. |
| 21 | Pin holing | - Improper surface preparation<br>- moisture left on primer or sealer<br>- Improper paint spray gun adjustment<br>- Improper solvent used<br>- Solvent is dry too fast or to slow. | - Properly prepare the surface<br>- Ensure no moisture left on primer or sealer.<br>- Adjust the spray gun properly as recommended solvent only<br>- Maintain the paint surface and paint shop temperature evenly |
| 22 | Peeling | - Failure to remove sanding dust and other surface contaminants.<br>- Metal is not treated properly<br>- Materials is not mixed uniformly<br>- Proper sealer is not used<br>- Improper spray pattern used | - Properly clean the surface before painting<br>- Properly treat the metal as recommended<br>- Uniformly mix the paint materials<br>- Use proper sealer.<br>- Remove the finish from the area slightly larger than the affected and refinish it again. |
| 23 | Paint chalking | - Wrong reducer used<br>- Paint materials not properly mixed<br>- Excessive mist coat<br>- Paint surface exposed to bright sunlight | - Use proper reducer<br>- Properly mix the paint materials<br>- Use recommended mist coat only<br>- Protect paint surface from bright sunlight |
| 24 | Paint colour fade | - Finish is old and has been in bright sunlight<br>- Light colour faded by bright temperature. | - Keep paint protect from bright sunlight<br>- If paint is a solid colour machine buff the paint to remove the faded surface |
| 25 | Debris in the finish | - Improper surface cleaning blow off and tack rag wiping of the surface to be painted<br>- Dirty or failed air line filter<br>- Dirty paint spray shop defective air booth inlet filter<br>- Dirty spray gun<br>- Improper door closing while painting | - Properly clean the surface<br>- Clean or replace the air filter<br>- Maintain neat and clean in paint shop<br>- Clean or replace the filter<br>- Service the spray gun<br>- Properly close the paint shop door before or while painting. |
| 26 | Rust under the finish | - Poor corrosion protection<br>- Water in airline<br>- Road salt in cold climates | - Sanding and apply proper corrosion products materials.<br>- Sanding and apply seam sealer<br>- Cut off the salted surface and let new one. |

# Practice to painting effect on different surface of furniture

**Objectives:** At the end of this exercise you shall be able to
- **prepare the furniture surface**
- **apply paint colour gradations**
- **apply malty tones on furniture**
- **apply different textures on furniture surface.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Hand sander | - 1No. |
| • Scrapper | - 1No. |
| • Wire brush | - 1No. |
| • Wool Brush | - 1No. |
| • Paint brush set | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |
| • Power sander | - 1No. |

**Materials**

| | |
|---|---|
| • Paint | - as reqd. |
| • Reducer | - as reqd. |
| • Thinner | - as reqd. |
| • Varnish | - as reqd. |
| • Sand paper | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Soap oil | - as reqd. |
| • Wax | - as reqd. |
| • Polish | - as reqd. |
| • Steiner | - as reqd. |

## PROCEDURE

TASK 1: **Furniture surface preparation for painting (Fig 1)**

Fig 1


1 Select the furniture for painting work.

2 Clean the furniture surface with cleaning solvent.

3 Wipe out furniture dust deposited on the surface with clean dry cloth.

4 Inspect the furniture surface for paint colour designs textures and damages.

5 Test the paint thickness applied on the furniture.

6 Ensure the furniture is made of a wood or plastic or glass.

7 Select the sanding tools for surface preparation.

8 Suppose if you select the steel table with wooden top.

9 Use the sand paper for sanding the metal surface and wipe with mineral sprits to ensure good adhesion.

10 To remove persistent dirt wash surface with mild detergent solution or recommended commercial product for painted surface cleaning

11 Remove loose and peeling paint by hand wire brush or scraping or sanding by manual or power sanding. Which can help remove paint quickly and easily

12 Remove rust by brush to clean off loose rust sand the area and apply a high quality rust inhibitive primers

13 Use the metal conditioner to cover rusted spots turn them into non rusting paintable surface

14 Repair small holes and dents by inject an appropriate epoxy-based composite directly into the hole or dent for larger holes, apply epoxy filler to the edge of the hole. Cut a piece of fibreglass mesh approximately one inch larger has then hole and press it into the filler.

15 Select the right primer, the type of metal to be coated along with desired appearance, performance required

**Note: Water based primer should not be used on metal surface**

16 Priming immediately after cleaning the surface is imperative to prevent dust or dirt from accumulating and flash rust from forming.

17 Use a dust mask, Protective goggles and gloves and work in well ventilated area. Use earplug while grinding work.

TASK 2: **Painting the metal surface**

1 Clean the metal surface to be painted.

2 Select the paint and solvent and colour of paint

3 Shake the can several times to mix the paint

4 Hold the can 6 to 12 inches away from the metal. Which prevent the paint from pooling

5 Filter the paint before drop in spray gun container.

6 Spray the object using long sweeping motions. If you notice excessive dripping, wipe clean, back up and start the process again.

7 For best result apply up to three thin coats of spray paint and allow the paint to dry before applying an additional layer

8 If you want a longer lasting finish, brush on the paint using oil based paint by painting with brush, you can create thick surface that will be more durable

(Use a high quality natural bristle brush to paint on a thin layer)

9 Allow paint to cure 36 to 48 hours before moving it.

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TASK 3: **Preparing and painting the wooden surface of the table**

1 Clean the wooden table top grease or dirt by using sugar soap.

2 When it's dry check for any repairs, you may have to make and fill any holes or dents.

3 Sanding the table top by hand just a quick rub down or you can use hand sander by 120 grit paper.

4 Clean the dust before moving on to the next step.

5 Use the wooden primer for making sure that the overall finish is more durable and it should also ensure that no stains will come through finished paint.

6 Use the paint brush or roller to apply primer all over the piece of wooden top and let it dry completely.

7 Sand the wooden top with fine 240 grit sand paper remove any little bumps or air bubbles.

8 Ensure every things is completely smooth and wipe down with a soft cloth.

9 Select the paint, reducer, paint colour. Shake the paint tin well to mix.

10 Well mix the paint and filter the paint with strainer.

11 Use the paint brush to apply paint smooth finish.

12 Apply even coat of paint on the wooden top to get best possible finish.

13 Never try to cover your wooden top in just one coat of paint.

14 Sand the surface after first coat of paint has completely dried.

15 Do another sand by fine sand paper with 240 grit.

16 Remove any dirt and dust the sanding has created before 2nd coat painting.

17 Apply another coat paint on the wooden top for shine and smooth finish.

**Note: When painting. Always apply lots of thin coats instead of trying to cover it in even one it will give you a more even finish and avoid drips.**

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TASK 4: **Multi colour applying and different texture designs painting**

1 Use the multi colour layers on the table top and steel surface as per your choice design. Cover by making while applying multicolour to be unpainted surface.

2 Create texture through structure a form of textual contrast in monotone single coloured by varying with and thickness of threads used in the art would create a tone on tone variance in its texture without restoring to the use of colour.

3 Textural imagery intrigue and interest are created simply by using all the same colours with different weights and fibres

4 Use of colour is when initiating texture as an element is by using pattern to create texture with laminating film

5 Texture design is painted on the surface look projection on the painted surface. When you are painting multicolour and texture painting use making to be unpainted area.

6 Use stencil to paint a multicolour and texture design on the furniture surface.

7 Texture paint roller also used to designs on the furniture surfaces.

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# Practice to prepare the metallic article with chemical application

**Objectives:** At the end of this exercise you shall be able to
- **prepare the metallic article by using chemical**
- **apply metallic conditioner on the article surface**
- **apply phosphating, passivation and water washing.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Wire brush | - 1No. |
| • Scraper | - 1No. |
| • Hand sender | - 1No. |
| • Bucket | - 1No. |
| • Equipment | - 1No. |
| • Air compressor | - 1No. |
| • Paint spray gun | - 1No. |
| • Power sander | - 1No. |
| • Water sprayer | - 1No. |

**Materials**

| | |
|---|---|
| • Chemical cleaning solvent | - as reqd. |
| • Abrasive material | - as reqd. |
| • Soap oil | - as reqd. |
| • Sponge | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Tack cloth | - as reqd. |

## PROCEDURE

TASK 1**: Prepare the metallic article by chemical application**

1 Place the metallic article in the paint shop floor.

2 Apply cleaning solvent to degreasing and dust removing on the metallic surface (use the soap and water solution)

3 Apply low pressure water spray and rinse with soft sponge surface.

4 Apply compressed air on the metallic surface to clean the water layers on the surface.

5 Clean the surface with cotton cloth and let it allow to dry before apply chemical stripping.

6 Use two or three thickness of mashing tape to give adequate protection.

7 Apply mask on the electrical and parts which is effected by chemical

8 Select chemical and prepare the chemical for apply.

9 Apply chemical stripping on the metallic surface to remove the paint on large area of surface.

10 Cover any crevices to prevent the paint remover from seeping to the under surface of metallic article.

11 Slightly scoring or scratching the surface of the paint to be stripped will help the paint remove to penetrate more quickly.

12 Follow the chemical manufactures instruction to apply the chemical paint stripping.

Fig 1

Fig A

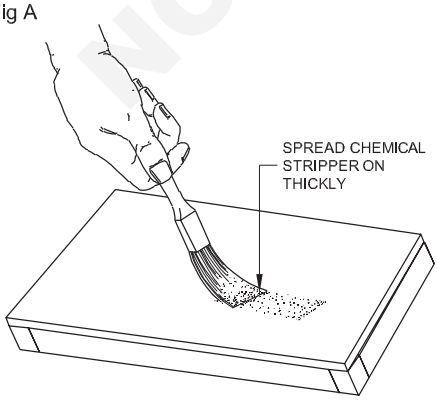



Fig B

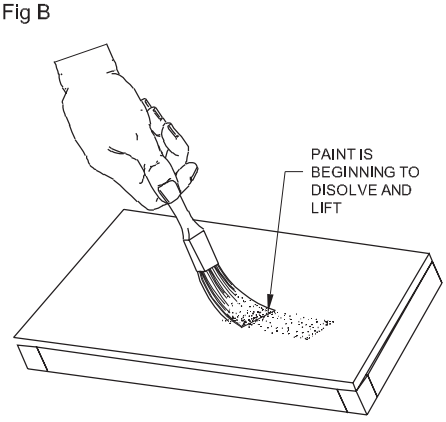
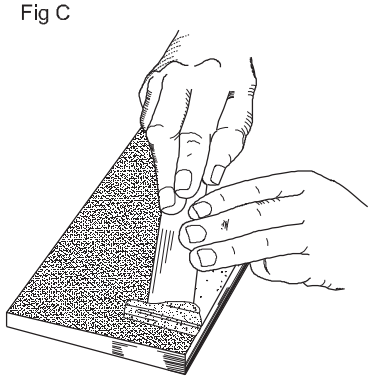



Fig C



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13 Pay attention to warning regarding safety precautions of self and Metallic Park.

14 Use brush to apply a heavy coat of paint remover in one direction only (Fig 1A).

15 Allow the paint remover to stand until the finish is softened.

16 Ensure the complete paint is removed by chemical if not removed completely apply second coat of chemical stripper. (paint stripper Fig 1B)

17 Causion should be taken with removing the loosened paint coatings.

18 Remove the dissolved paint with a squeegee or scraper (Fig 1C)

19 Rinse off any residue that remains on the metallic surface by using cleaning solvent and steel wool.

20 Clean the metallic surface with a clean cotton cloth.

**Note: Rusting occurs very rapidly on metal that has been chemically stripped.**

21 Apply sand blasting to remove deep rust and clean it after sanding.

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TASK 2**: Apply metal conditioner on metallic surface**

1 Clean the metallic surface with detergent water solution and dry off with room temperature.

2 Clean the surface with tack cloth.

3 Select the metallic conditioner and mix appropriate amount of conditioner with water in a plastic bucket according to the instruction label.

4 Apply metal conditioner with a cloth, sponge or spray gun.

5 Metal conditioner with phosphoric acid reducer not only clean it also etches the metal and promotes the adhesion of the paint film it helps prevent the occurrence of rust and also eases sanding marks.

6 Allow the proper amount of time to that the chemical reacts properly.

7 After drying wash the surface with water wipe water with soaked cloth and clean the surface with cotton cloth.

8 Dry off and wiped dry with clean cotton cloth

9 If you using the one part metal conditioner, it is reduced as required and then applied as directed wait for proper reaction time and then wash with clean water and wipe dry.

10 If the metallic surface designed to etch the metal and they also leave a phosphate coating to promote adhesion of ground coats.

11 When the metal has been phosphate coat conditioned, it should not be washed with cleaning solution.

**Note: When metal conditioner is used improperly, such as with no reduction or insufficient reduction with, water, it is just like applying a soap film of inactive acid. This causes the film to be hard to remove and clean off the surface.**

**If the trapped acid reacts it can affect the paint film as the acid reacts and dries it well form a power between the metal and primer which will cause a last of adhesion, blestering and generally a poor paint film.**

12 The conditioned metallic surface should be primed as soon as possible.

13 Balance reducing metal conditioner should be pour into appropriate container and marked as to its use, reduced metal conditioner can be kept for long periods, as it will not spoil.

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# Practice to powder coating on cleaned article and bake it in oven

**Objectives:** At the end of this exercise you shall be able to
- **prepare the metal surface**
- **priming the metal surface**
- **powder coating on the metal surface**
- **heat the metal parts in appropriate temperature and timing of oven.**

## Requirements

**Tool/Instruments**

| | |
|---|---|
| • Trainee's tool kit | - 1No. |
| • Scrapper | - 1No. |
| • Hand sender | - 1No. |
| • Furner exhauster | - 1No. |
| • Dust collector | - 1No. |

**Equipments**

| | |
|---|---|
| • Air compressor | - 1No. |
| • Paint both | - 1No. |
| • Industrial oven | - 1No. |

**Materials**

| | |
|---|---|
| • Paint powder | - as reqd. |
| • Cleaning solvent | - as reqd. |
| • Cotton cloth | - as reqd. |
| • Tack towel | - as reqd. |
| • Soap oil | - as reqd. |

## PROCEDURE

TASK 1: **Surface preparation of article to be painted**

1 Place the article in the paint shop floor.

2 Evaluate the surface condition of the article.

3 Identify the type of paint and overall condition of the existing paint.

4 Identify the developing surface rust can be detected by roughness, bubbling or pitting of a paint surface.

5 Check the powder coating thickness before sanding the surface.

6 Remove oil, grease and other contamination with a suitable detergent followed by high pressure water washing, you use aromatic solvents can also be used to remove the contaminants.

7 Ensure that all welds / Weld Seams are complete and continuous without any cracks and pinholes.

8 Remove all weld spatters and round off all the sharp edges prior to further surface preparation.

9 Remove the soap / alkali deposit on weld joint by using pressure water washing and scuffing with stiff nylon brushes.

10 Apply blast sanding for optimum results the profiles after blast cleaning shall be 50 – 75 microns.

11 Ensure the substrate temperature should be at least 30°C above dew point but not above 50 c.

12 Relative humidity should be above 50%.

13 Use steel grits, aluminium oxide grits or similar sharp edge abrasive, free of foreign matters and soluble salts, this will help to achieve the surface profile of 50 – 75 micron with 100 psi air pressure.

14 Clean the sand surface with cleaning material.

14 Ensure the article surface is properly sanded and cleaned and ready for apply metal conditioner.

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TASK 2: **Apply metal conditioner, and sealler**

1 Clean the surface with wax and grease remover and wipe dry.

2 Select the metal conditioner and prepare the conditioner as per instructions given on the metal conditioner packing label.

3 Read the instructions carefully and follow the steps during the process of metal conditioner preparation and application on the prepared article surface.

4 Well mix the conditioner with reducer to bring suitable viscosity.

5 Use the cloth or sponge or spray gun to apply the conditioner.

6 Apply metal conditioner even thickness on the metal surface.

7 If need spray on a full wet coat of self – etch primer to any exposed bare metal.

8 Allow it dry off time after apply the metal conditioner.

9 Inspect the surface, if need apply one more coating of metal conditioner.

— — — — — — — —

TASK 3: **Apply primer coats on the metal surface**

1 Once the undercoat refinish system is dry and sanded, wipe with a tack cloth. The surface is ready for the primer coating.

2 If filling is required apply an epoxy primer and allow it to (dry) cure a minimum of, one hour and then apply primer surfacer.

3 Sand the primer surfacer after it has properly cured.

4 Sanding and clean the primed surface now it is ready for top coat.

5 Prepare the seam sealer and apply sealer on the cleaned surface wherever it need.

6 Use the caulk gun with an intermix tip to mix and apply the seam sealer ingredients generally only one or two coats of primer or primer sealer are required.

7 Apply primer and primer surfacer one or two coats as on surface requirements.

8 Allow flash time between next coat applications.

9 Allow the primer coat to dry throughly.Do not apply extra heavy coats to speed up the operation.

10 After the material is fully dry block sanding the area until it smooth.

11 Clean the sanding surface for further process.

— — — — — — — —

TASK 4: **Applying spot putty on the primed surface**

1 Clean the surface and inspect the surface for cracks, pinhole, dent etc.

2 Select the putty and mixing with solvent.

3 Properly mix the putty and hardener.

4 Take part of putty and apply on the surface where ever need wipe putty in two directions only, use small plastic spreader to apply putty.

5 Let allow to dry time for enough.

6 Sanding the putty applied area with 220 grit sand paper and clean it after sanding.

7 Ensure the metal surface is even level.

**Note: spot putty should be applied to small surface imperfections only.**

8 When sanding the surface always use the correct size grit or sand paper coarseness.

9 Ensure the surface to be painted, must be dull and non-reflective double check the metal surface to make sure they are scuffed and ready for good paint adhesion.

10 Select the masking type and masking material to apply

11 Masking the unwanted painting surface.

12 After masking clean the surface to remove the contaninants from the surface.

13 Use wise and grease remover to remove any last trace of moisture and dirt from the surface.

14 Apply sealer spray over primers, spot putties and old finish to provide a layer for top coats.

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TASK 5: **Powder coating on the metal surface (Fig 1,2,3)**

1 Clean the metal surface with water pressure and dry it after drying clean the surface with tack cloth after cleaning with tack cloth don't touch the surface to be painted.

2 Select the colour paint powder to be spray on the metal part.

3 Ensure no solvent is mixed with paint powder to be sprayed.

4 Preheats the materials to be powder coating as per manufactures directions.

5 Select the powder coating equipment and fill the powder in the paint powder spray gun cup and connect power and air supply to the spray gun.

6 Make sure have good earthen ground ensure that the racks and hooks have good ground and metal to metal contact.

7 Fluidize the powder well, but not to the paint of geysers blowing stecily boiling soap is the consistency that you want with little bubbles of air disturbing the surface.

8 Check that your equipment is cleaned properly of all contaminants if you are spraying a black or pale metallic

9 Set the spray equipement between 60 KVs and 75 KVs to 40 micro amps now you have your electrostatic a good to go.

10 Check the gun pressure settings and adjust the gun distance between the gun and the substrate adjust the settings as you need to keep the gun steady and you will be fine.

11 Follow the guide lines on your supplier's products and be aware of spraying method. Like base and top coats are formulated same.

12 Pay close attention to the manufactures temperature and cure time directions the paint cure time is not include the preheating the oven larger parts.

13 Apply clear top coat evenly ensure the good earthen ground and this will help keep back ionization down. Be aware of your gun to part distance. Apply clear coat to thick and if can take on a milky or yellow image, Transfer the powder coated article to bake it in oven.

14 Set the oven temperature to cure the powder sprayed after set tome (20 minutes) remove the parts from the oven and allow all to cool down.

15 Clean up the air and spray gun parts to remove powder coat from all equipment clean the paint spray booth.

16 Polish the powder coated surface by using either physical rubbing or wax application, it helps to produce a metal surface that has an excellent specular reflection surface or use the machine buffing on the powder coated surface.

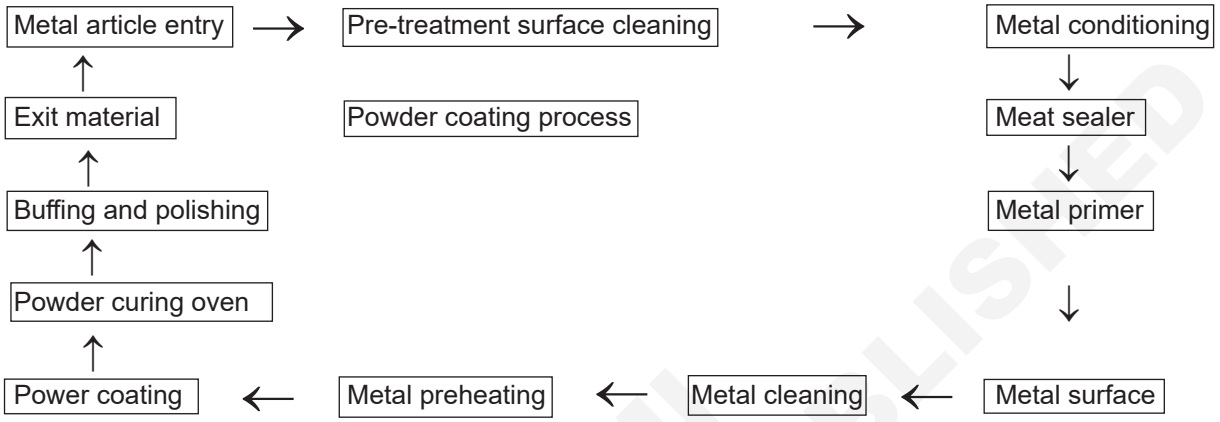
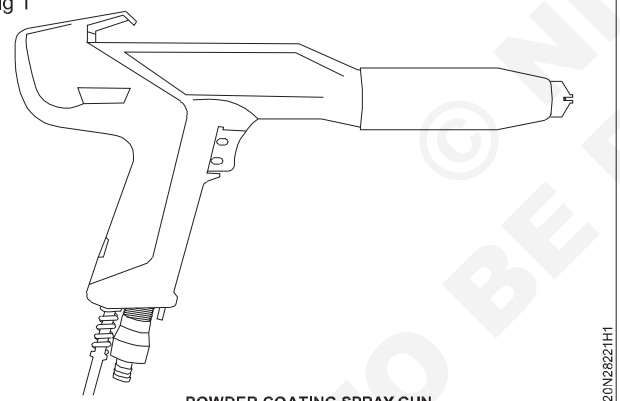



Fig 1



POWDER COATING SPRAY GUN

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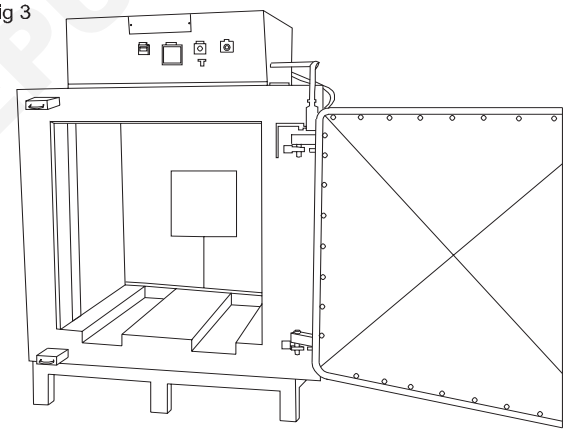
Fig 3



POWDER COATING OVEN

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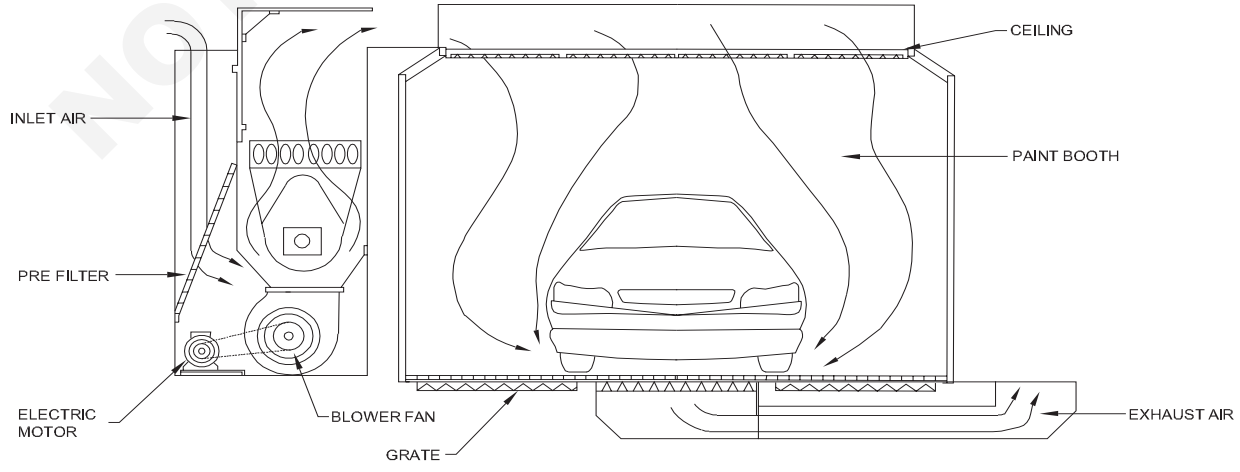
Fig 2

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## Practice to demonstrate knowledge of paint defects and its remedies

**Objective:** At the end of this exercise you shall be able to
- **achieve knowledge of paint defects through video watching.**

### Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint defects DVD - 1No.
- Paint manual - 1No.
- Paint defect chart - 1No.
- Paint defect models - 1No.

**Equipments**

- Computer system - 1No.
- Video projector - 1No.
- Video screen - 1No.

**Materials**

- Cotton cloth - as reqd.
- Soap oil - as reqd.

PROCEDURE

**Painting area wise defect ranking and tolerance**

Paint defects can have many causes, may be accident aggressive atmosphere condition, mistakes made during paint coating process, may be coat thickness was not right or paint drying time is too short, sometimes paint damage is due to body prepared substrates.

**Refinishing defects identification on the vehicle body**

1 Adhesion problems between base and clear coat.
2 Clouding.
3 Dirt and dust in base coat.
4 Dirt and dust in clear coat.
5 Edge mapping.
6 Lifting and wrinkling
7 Matting and gloss
8 Moisture blister
9 Orange peel
10 Pin holes in polyster
11 Polyster bleeding
12 Poor adhesion-polyster stopper
13 Poor adhesion on plastic parts
14 Poor opacity
15 Runs
16 Salt or pepper effect
17 Sanding scratches
18 Silver holo effect
19 Solvent popping
20 Water spotting
21 Crawling

**Environmental defects identification**

1 Acid rain
2 Bird droppings
3 Car wash abrasions
4 Colour fade/change
5 Industrial fall out/rail out
6 Insect scratches
7 Line or cement dust
8 Stone chip metallic
9 Stone chip solid
10 Tar sports
11 Tree resin/sap
12 Water spotting

**Panel surface defects identification**

1 Wrinkles, elevation and bulges, folds, depressions and dents.
2 Cracks, hole pattern, contraction, radius, spring back panel assembly-gap and flush.
3 Flush panel 1- panel 2-gap

**Paint defects (Fig 1)**

1 Brush marks
2 Peeling
3 Chalking
4 Flaking
5 Sagging
6 Low coverage
7 Dry not proper
8 Efflorescene
9 Pin holing breaks
10 Blustering
11 Wrinkling
12 Fish eye

**Note: Instructor should be displayed the video in class room about the title of paint defects and its remedies.**

Fig 1

# Practice to test the quality of paints and painted surface by using various method and instruments

**Objectives:** At the end of this exercise you shall be able to
- **check the quality of paint**
- **check the quality of painted surface with various method.**

## Requirements

**Tool/Instruments**

- Trainee's tool kit - 1No.
- Paint thickness gauge - 1No
- Bucket - 1No.
- Paint mixing stick - 1No.

**Equipments**

- Electronic paint tester - 1No.

**Materials**

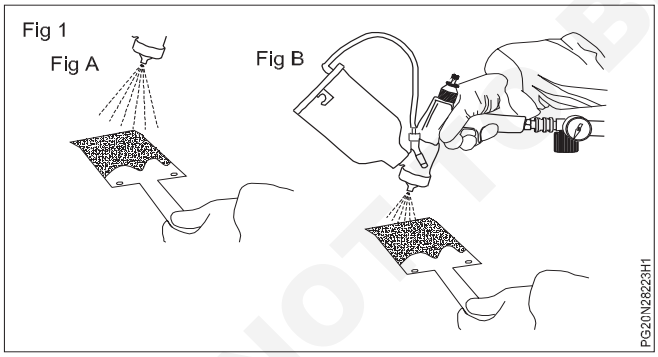
- Paint - as reqd.
- Cotton cloth - as reqd.
- Reducer - as reqd.
- Thinner - as reqd.
- Soap oil - as reqd.

## PROCEDURE

TASK 1: **Quality of paint testing methods**

1 Select the let-down test panel.

2 Prepare the let-down test panel with same sealer being used on the article. Many painters like to tint the sealer to match the colour of the basecoat to aid in matching these difficult colours. First the let-down test panel with a sealer tinted to match the base colour. Apply enough tinted sealer to completely cover the black and white halves of the panel. (Fig 1A)




3 After the sealer has flashed, apply the basecoat colour using the same air pressure and spray pattern that will be used on the article. Duplicating the actual spray techniques when preparing the let-down test panel is critical. Make sure you do not vary your procedures. After allowing the tinted sealer to flash properly, spray the whole test panel with the correct base colour for full hiding of the sealer. A let-down test panel is needed to properly match three-stage paints. (Fig 1B)

4 Evenly overlap four pieces of masking paper and tape to cover all but the top of the colour test panel. After the test panel has dried, mask it into four equal sections with small pieces of masking paper and tape. Leave the top fourth of the test panel exposed. (Fig 2A)

5 Spray the top exposed portion of the test panel with one normal coat of pearl. Apply one coat of semitransparent mid-coat colour (usually mica) over the top quarter of the card. (Fig 2B)

6 Remove the top masking paper and tape to expose another section of the test panel. After the mid-coat has flashed, remove the top layer of masking paper, exposing more of the test panel. (Fig 2C)

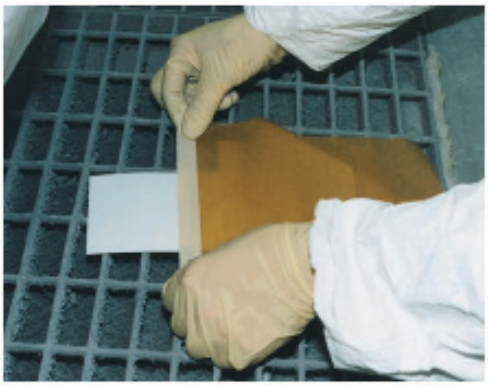
7 Spray the exposed area of the test panel with another coat of pearl. Apply another coat of mid-coat colour over the exposed top half of the test panel. (Fig 2D)

8 Repeat this on the rest of the test panel. After this second coat has flashed, remove the masking paper to expose three-quarters of the panel.

9 Mask vertically down the middle of the test panel. Then, apply full wet coats of clear to the exposed portion of the let-down panel. Apply another coat of mid-coat colour over the exposed three-quarters of the panel. (Fig 2E)

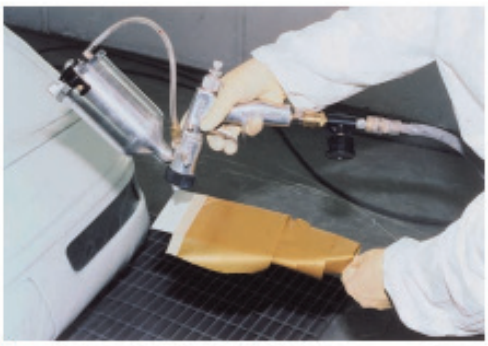
10 After the entire let-down test panel has dried, off half of the panel lengthwise. Apply the manufacturer's recommended number of clear coats to the exposed half. (Fig 2)

Fig 2



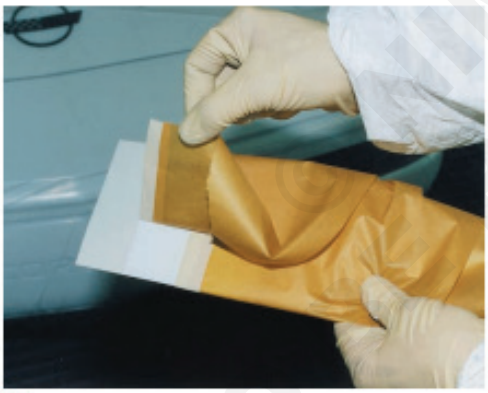
A

D



B

E



C

F

11 Compare the different shades on the let down test panel with paint on the metal surface.

12 Each layer of the intermediate or mid coat will darken the appearance of the finish.

13 Find which area on the let down test panel test matches the colour of the metal surface.

14 After flashing, remove the masking paper entirely.

15 Apply a fourth coat of mid-coat colour. As always spray the coating in the same way as you plan to an the article.

16 Use the same number of coats used on the matching section of the let down test panel. This will help you to achieve the correct paint match.

- You can hold your spray test panel next to this small area without clear coat on the metal surface when you are mixing colour match with test panel.
- Once the test panel can be kept and used on metal surface with same colour code on the back of the panel note the colour code and gun settings.

TASK 2: **Use the spectrometer to analyzing the colour of the paint**

1 Select the electronic paint colour analyzer

2 Place the spectrometer on the painted surface or test panel to be checked

3 Use the test panel to compare the paint colour

4 Ensure the multi angle spectrophotometers take readings at 25, 45, and 75 degrees

5 Ensure each angle is read for several variables.

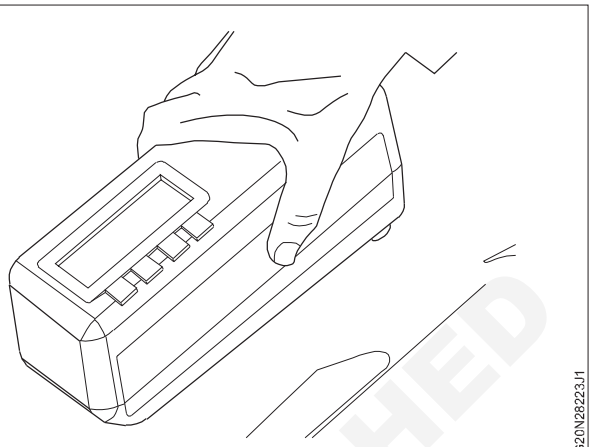
6 Get a reading on the relative lightness/darkness hue and chroma of the painted surface.

7 Decide how to move paint closer to the article paint already painted.

8 Take a decision on which tint and how much will be added must still be using human judgment.

A spectrophotometer, or electronic color analyzer, uses electronic technology to read the actural color of the vehicle. It can then communicate with the computer system and paint formula software to mix the correct paint color. (Fig 1)

Fig 1

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TASK 3: **Computerized paint matching**

1 Computer paint matching system use data the spectrophotometer to help match the paint colour

2 Compare the actual colour of the article to a computer stored set of colour formulations

3 Make a recommendation on which tint in the formula will move the simple panel closer to the article surface colour.

4 Automatically keep the record of the mixing or tinting procedure. This will let quickly match the paint if the article returns for another painting

5 Give a list of tints by numbers and name. Provide not strength or hiding characteristics

6 Summarize how each tint by number and name. provide notes on tint affects value, hue and chroma.

7 Give cautionary notes, if needed for using each tint.

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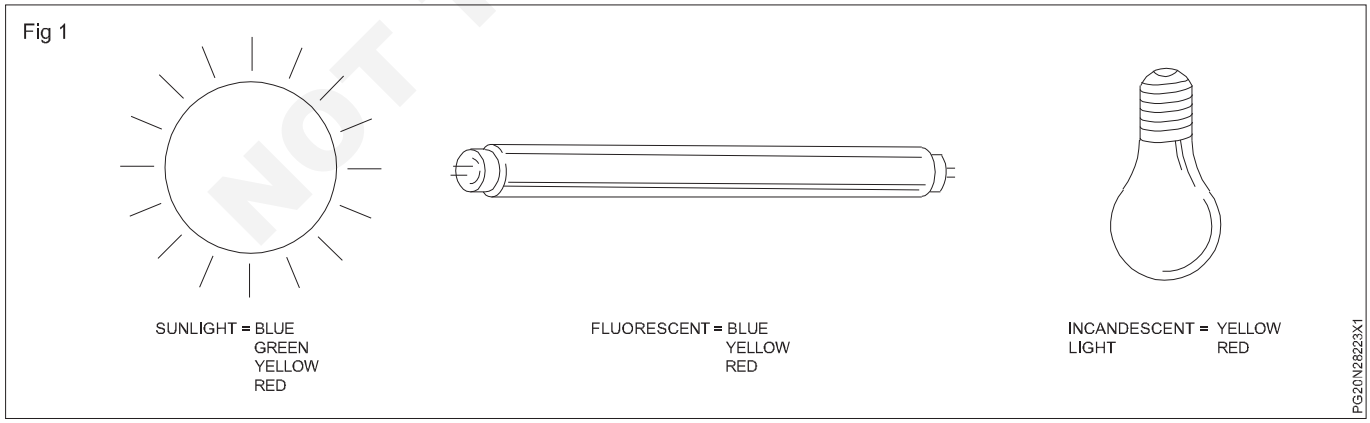
TASK 4: **Paint colour evaluate by light**

1 Always use the sun light or day light corrected indoor lighting when making colour evolutions

2 There are many kinds of light bulbs used in paint shop, each light effects has a different mixture of colour light as shown in Fig 1.

Fig 1




3 Compare to daylight incandescent light has more yellows oranges and reds. Fluarescent light has more violets and reds fluoresecent light has more violets and reds.

4 Don't use florescent light when analyzing a paint colour

5 If you use the florescent light, the same colour of paint will look very different, under different kinds of light.

6 So it is important to check the colour match in daylight or under a balanced or colour corrected artificial light.

7 Colour corrected light bulbs as same used by photographers most closely match the full spectrum of sunlight.

8 The eyes sees as colour is really light reflected from an object. The eye might see different shades of colour depending on the type of light source used.

9 Indoor lightning range of 85 to 100 is acceptable for spray booth lighting.

10 For painting a lamp rating of 6000 to 7000 Kelvin is recommended to able to see the colour of the painted surface colour.

11 Day light is 6200 Kelvin or use the lamps normally 1000 and 2000 lumens.

12 Always evaluate and match paint colours in daylight or day lighting corrected lighting.

13 The colour of the paint on the panel does not change what changes is the amount of coloured light from each light source reflected from the panel. (Fig 2)

14 Due to this reason choose lamps or bulbs that most closely simulate actual sunlight.

15 Always remember the blue, red, yellow, green (BRYG) while evaluate the colour.

16 Colour wheel values refer to the degrees of lightness or darkness of a colour. Values scale runs vertically through the colour space. White is the brightest value and black is the darkest value (Fig 3)

17 What we see hue, it moves around the outer edge of the colour wheel from blue to red to yellow to green

18 Chroma moves along the spokes that radiate outward from the control gray axis of the colour wheel/tree weak, washed out colours with the least chroma are closest to core of the colour wheel.

19 Highly chromatic colours that are rich, vibrant, and intense are at the outer edge. When using colour wheel chroma increases as it moves outward from the neutral grey center and decrease as it moves closer.

20 A paint matching chip is a colour printed on coated paper to closely match the colour of a paint all most every colours of paint from ever paint maker.

21 Use the paint colour chip with existing colour painted on the article surface. Make sure the colour on the sample chip matches the colour on the article metal surface.

Fig 2

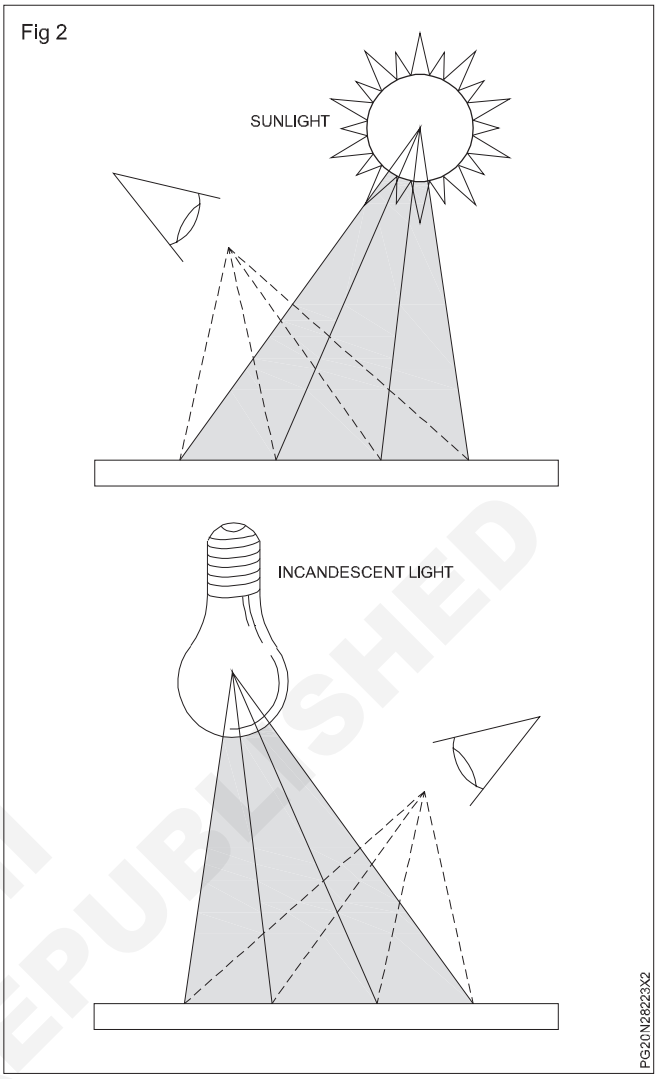
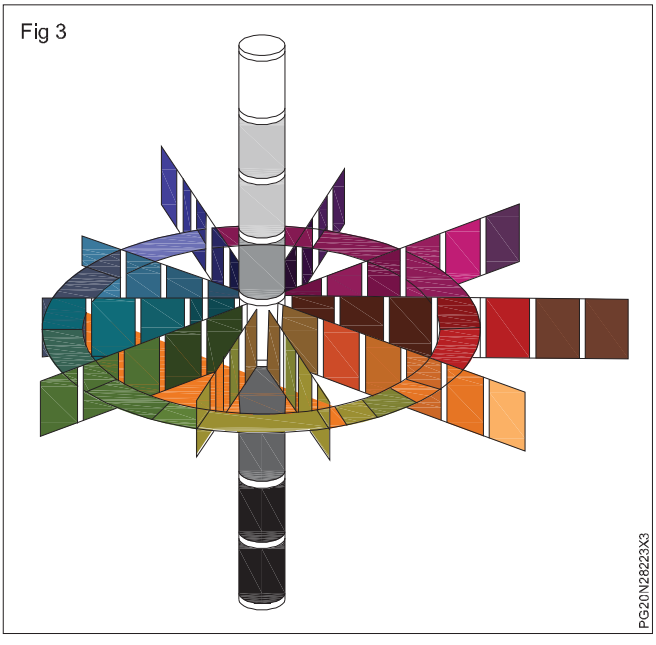



Fig 3



TASK 5: **Paint quality testing instruments and its usage**

1 Paint thickness (gauge) tester magnetic induction or eddy current to take non-destructive measurements of coating and dry film thickness on metal substrates such as steel and aluminium. This is used for painted and powder coated surface testing automotive paint inspection and coated material testing measuring range of 0-1350µm/6-53 miles.

2 Paint adhesion tester is used to determine the quality of the adhesion of coatings. It is suitable for thin, thick or tough coatings on all surfaces.

3 Paint gloss tester is used to measures the gloss units on materials surface.

4 Inspect the tester used to test coating, varnish and reflective sheeting's.

5 Skid resistance testing used to pendulum friction, sliders, and accessories for skid resistance.

6 Cupping tester and bend mandrels are used for flexibility test.

7 Test panels are used for paint colours.

8 Total quality control automatic wash ability test allows to perform an abrasion and wash ability scrub test on coated panels to define the resistance of paint.

9 Hardness and scratch testing equipment used for find a hardness or scratch resistance.

10 Grindometers, pyenometers, are used to test minimum film forming temperature, resistivity meter, used for drying time, prosily meter is used for flash point.

11 Film applicator used for test the manual and automatic applicator, spiral bars, baker, bird and queadruplex applicator.

12 Temperature and humidity tester. Used to measure temperature and humidity data records, thermometers, hygrometers, moisture in construction substrates, moisture analyzer, metas of environmental conditions.

13 Viscometer is used to check the paint viscosity.

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