इंटरनेट मानक

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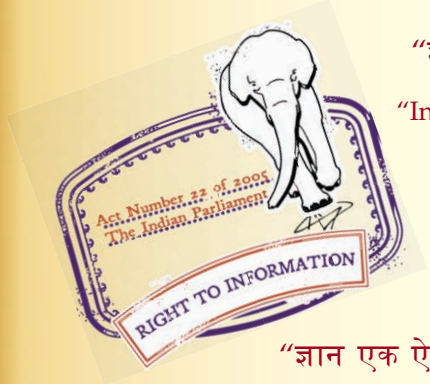
"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 10949 (1984): Code of practice for painting procedure for machine tools [PGD 3: Machine Tools]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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UDC 621·9 : 667·64 : 006·76

(Reaffirmed 2005)

Indian Standard

CODE OF PRACTICE FOR PAINTING PROCEDURE FOR MACHINE TOOLS

1. Scope — Describes the procedure to be followed for painting of machine tools.

Note — The purpose of painting is to give protection against corrosion and also to provide aesthetics looks.

2. Procedure — The procedure to be followed in the order of sequence is given in **2.1** to **2.3.**

2.1 *Cleaning and Priming*

2.1.1 One coat of 'etch primer' applied on castings after fettling by brushing and allowed to dry for two hours. This coat of 'primer' is provided to have a protective coating and to improve adhesion.

2.1.2 After drying for 2 hour one coat of 'white primer surfacers' is applied on the castings by brushing. After this process, the castings are dried for 30 min before being taken for marking and machining operations. The requirements of the 'white primer surfacer' have been given at Appendix A.

2.2 *Detailed Painting*

2.2.1 *Outside surfaces*

2.2.1.1 Outside surfaces of machine tool components shall be cleaned with suitable solvent free from lead, using cloth so as to remove oil, grease and dust from the surfaces.

2.2.1.2 Machined surfaces as well as components like mist lubricators, oil level indicators, bolts, nuts, switches, etc, which do not require painting shall be first coated with a layer of grease, then masked with bituminous hessian waterproof packing paper, preferably conforming to IS : 1398-1982 'Specification for packing paper, waterproof, bitumen-laminated (*second revision*)'. Electrical cables or conduits are also to be wrapped or covered with bituminous hessian waterproof packing paper. The essential requirements of the bitumen hessian waterproof packing paper have been given at Appendix B.

2.2.1.3 A coat of grey surfacer shall be applied on finished castings by brushing or spraying. The requirements of grey surfacer have been given at Appendix C.

2.2.1.4 Three or more coats of 'grey putty cellulose base' shall be applied on finished machine castings by steel putty knife within an interval of 30 min between the subsequent coats. This is then dried for four hours after final coat. This is done to even out the surface. The requirements of 'grey putty cellulose base' have been given at Appendix D.

2.2.1.5 The surface is first made uniform by rubbing with emery paper of IS grit No. 100 and then emery paper of IS grit No. 180. The emery paper shall conform to IS : 715 (Part 1)-1976 'Specification for coated abrasives : Part 1 General application (*third revision*)'. Wooden block is used for holding the emery paper. The surface is cleaned with cloth and by air-blast.

2.2.1.6 One coat of grey surfacer is applied by brushing or spraying. This is dried for four hours.

2.2.2 *Inside surfaces*

2.2.2.1 Inside surfaces are cleaned with suitable solvent free from lead, using cloth and air blast so as to remove oil, grease and dust from the surface.

2.2.2.2 Machined surfaces are masked with grease and then with bitumen hessian waterproof packing paper.

2.2.2.3 Inside surfaces which come in contact with oil are given a coat of oil-resistant synthetic enamel conforming to IS : 9034-1978 'Specification for enamel, synthetic, exterior, air drying, for use on primed surfaces of motor vehicles and other equipment' or any other suitable type of colour shade No. 537 of IS : 5 - 1978 'Colours for ready mixed paints and enamels (*third revision*)'.

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2.2.2.4 Inside surfaces which do not come in contact with oil are given a coat of white primer surfacer or grey surfacer by brushing or spraying. This is dried for four hours.

2.3 *Finished Painting* — Assembled machines shall be painted in the sequence given in **2.3.1** to **2.3.15**.

2.3.1 The surface is cleaned all over with suitable solvent free from lead, using cloth in order to remove oil, grease and dust.

2.3.2 Etch primer is applied wherever base metal is visible. This is dried and then masked with bitumen hessian waterproof packing paper.

2.3.3 The surfaces which are not painted are coated with a layer of grease and then masked with bitumen hessian waterproof packing paper.

2.3.4 One coat of grey surfacer is applied. This is dried for one hour.

2.3.5 Three coats of grey putty cellulose base are applied wherever required with steel putty knife, within an interval of 30 min between the subsequent coats. This is dried for four hours after final coat. This is done to even out the surface.

2.3.6 The surface is made uniform by wet rubbing first with emery paper of IS grit No. 100, then emery paper of IS grit No. 180 and finally with emery paper of IS grit No. 220. Wooden block is used for holding the emery paper. The surface is cleaned by cloth and air blast.

2.3.7 One coat of grey surfacer is applied on the surface by spraying wherever required. This is dried for two hours.

2.3.8 The surface is touched up with grey putty cellulose base wherever required. This is dried for 30 min.

2.3.9 The surface is made uniform by first rubbing with emery paper of IS grit No. 180 and then IS grit No. 220, using wooden block for holding emery paper. The surface is cleaned with cloth and by air blast.

2.3.10 One coat of nitrocellulose finishing paint conforming to IS : 6126-1971 ' Specification for nitrocellulose surface is applied on the surface by spraying. This is dried for one hour.

2.3.11 This surface is made even wherever necessary by grey putty cellulose base. This is dried for 30 min.

2.3.12 This surface is made uniform by wet rubbing with emery paper of IS grit No. 220, using wooden block for holding the emery paper.

2.3.13 The second and final coat of nitrocellulose finishing paint is applied on the surface by spraying. This is dried for one hour.

2.3.14 The mask is removed and the surface is cleaned. The surface is touched up with finishing paint by brushing wherever necessary. This is dried for four hours minimum before lifting the machine.

2.3.15 After shifting the machine on packing case, necessary touch-ups are applied by brushing wherever required, namely, motor directions, oil points, panel indications, etc.

APPENDIX A

(*Clause* 2.1.2)

WHITE PRIMER SURFACER

A-1. Description — White primer surfacer shall be of cellulose base with excellent hiding power and shall be able to withstand weather for about one year.

A-2. Colour — White or slightly off-white.

A-3. Viscosity — When mixed with thinner conforming to IS : 5667-1970 ' Specification for thinner for cullulose nitrate based paints and lacquers ' or any other suitable grade in proportion 1 : 1, it shall give 20 to 24 second when tested in Ford Cup Viscometer No. 4 in the manner as described under **7.4** of IS : 101-1964 ' Methods of test for ready mixed paints and enamels (*second revision*) '.

A-4. Brushing

A-4.1 Flat brush used in the preparation of test panels shall conform to IS : 384-1979 'Specification for brushes, paints and varnishes, flat (*fourth revision*)' and shall be clean, free from loose hair and shall be of suitable size.

A-4.2 The material applied by brushing without thinning shall obtain an even and uniform coat and shall not leave any bristle marks.

A-5. Drying — A layer of material of thickness 0·05 mm (approx) is applied to 150 × 150 × 1·25 mm mild steel plate prepared in the manner described in **5.2.1** of IS : 101-1964. This shall air dry for 45 minutes. It shall be able to wet flattened and coated over after six hours of air drying.

A-6. Flexibility — One coat of material is applied by brushing to a 150 × 50 × 0·315 mm tinned plate panel, prepared as described in **5.2.1.1** of IS : 101-1964, with or without etch primer to give a dry film. The panel is allowed to air dry in a horizontal position for 24 h. The paint film when bent gradually through an angle of 45° shall not show damage, detachment or cracking at the bend. The adhesion at bend shall be good.

A-7. Resistance to Corrosion — Two coats of material are applied on a sand blasted ferrous casting, dried for 24 h and then cured at a temperature of 60° to 65°C exposed to humid atmosphere near coolant tower or any other suitable method. After exposure under these conditions for 10 days, this is then examined for signs of deterioration on the painted surface. This shall not show sign of rust, blistering or softness.

A-8. Resistance to Lubricating Oil — One coat of material is applied by brushing on etch primer to a 150 × 50 × 0·315 mm tinned plate prepared as described under **5.2.1.1** of IS : 101-1964 to give a dry film. The panel is allowed to dry for 48 h. The panel is then immersed in a mineral lubricating oil having a viscosity 18·0 centistokes for 2 h at a room temperature and at 60°C for 2 h alternatively. This cycle is repeated 20 times. After these operations, the excess oil is wiped out from the panel with a pad or cotton wool. When examined after cooling for 30 min at room temperature, the paint film shall show no rusting, blistering, peeling off or any permanent injury.

A-9. Resistance to Cutting Oil — One coat of material is applied by brushing on etch primer, to a 150 × 50 × 0·315 mm tinned plate prepared as described under **5.2.1.1** of IS : 101-1964 to give dry film. The panel is allowed to dry for 48 h. The panel is then immersed in a mixture of suitable grade of cutting oil and 20 percent water for 72 h at a room temperature. The paint film shall show no blistering, softening or loss of adhesion.

A-10. Resistance to 10 Percent Caustic Soda Solution — A test panel prepared as described above (*see* **A-8**) and immersed in 10 percent caustic soda solution for 48 h. The paint film shall show no sign of blistering, softening or loss of adhesion.

A-11. Supply Condition — The material shall be supplied in 20 l of 285 mm dia steel drums or as agreed to between purchaser and manufacturer. The settling of pigment in 20 l drum shall be 75 mm maximum and shall be able to thoroughly mix on stirring easily.

APPENDIX B

(*Clause* 2.2.1.2)

BITUMINOUS HESSIAN WATERPROOF PACKING PAPER

B-1. Description — Two kraft papers cemented together with bituminous compound and reinforced with hessian cloth in between.

B-2. Construction

B-2.1 The material shall be made of two sheets of kraft paper of not less than 100 g/m^2 and hessian cloth not less than 30 g/m^2 mass.

B-2.2 The paper and cloth shall be cemented together with bitumen.

B-2.3 The finished substance shall not be less than 560 g/m^2.

B-3. Supply Condition — Shall be supplied in rolls of continuous length, the width shall be A0 size conforming to IS : 1064-1980 'Specification for paper size (*second revision*)', or as agreed to between the purchaser and the manufacturer.

APPENDIX C

(*Clause* 2.2.1.3)

GREY SURFACER

C-1. Colour — The colour of the material shall be light grey or of suitable shade of IS : 5-1978, different from ' grey putty ' so as to distinguish them.

C-2. Viscosity — When mixed with thinner conforming to IS : 5667-1970 in proportion 1 : 1, it shall give 20 to 24 s when tested in Ford Cup Viscometer No. 4 in the manner as described under **7.4** of IS : 101-1964.

C-3. Brushing

C-3.1 Flat brush used in preparation of test panels shall conform to IS : 384-1979, and shall be clean, free from loose hair, and of suitable size.

C-3.2 The material applied by brushing without thinning shall obtain an even and uniform coat and shall not leave any bristle marks.

C-4. Spraying

C-4.1 The spray gun shall be thoroughly cleaned before use. It shall be fitted with the correct size of nozzle and air cap and air pressure shall be adjusted in accordance with the viscosity of the material.

C-4.2 When the material of above viscosity (*see* **C-2**) is sprayed on glass panel or on castings after rubbing down of the putty, the spray shall be smooth, free from orange peel and pin holes. Flow level shall he uniform.

C-5. Drying — A layer of material of thickness 0·05 mm (approx) is applied to a 150 × 150 × 1·25 mm mild steel panel prepared in the manner described in **5.2.1** of IS : 101-1964. This shall air dry in 10 to 15 min when applied by brushing and in 7 to 8 min when applied by spraying. It shall be able to wet flattened and coated over after 4 h of air drying.

C-6. Rubbing Properties

C-6.1 Brush on no-absorbent surface a coat of filler prepared from the material as specified in **3.4** of IS : 110-1983 ' Specification for ready mixed paint, brushing, grey filler, for enamels, for use over primers (*second revision*) ' and allow it to air dry for 12 h under laboratory drying conditions. The film prepared as above shall be suitable for rubbing down with 100 to 200 g/m² waterproof paper without clogging on the paper.

C-6.2 Two coats of material is applied on a panel prepared as described above (*see* **C-6.1**) by spraying over etch primer and allowed to dry for 24 h and cured at 60°C for 2 h. When this is bent on 5 mm diameter rod through an angle of 45°C, the paint film shall not crack or peel off and there shall be good adhesion on the bend.

C-7. Over Sprayer — When the material is applied on nitrocellulose finishing paint by spraying, it shall not peel off or cause discoloration.

C-8. Compatibility — The material shall be compatible with NC thinner conforming to IS : 5667-1970 and shall produce smooth surface without pin holes.

C-9. Flexibility — Shall be as described in **A-6.**

C-10. Resistance to Corrosion — Shall be as described in **A-7.**

C-11. Resistance to Lubricating Oil — Shall be as described in **A-8.**

C-12. Resistance to Cutting Oil — Shall be as described in **A-9.**

C-13. Resistance to 10 Percent Caustic Soda Solution — Shall be as described in **A-10.**

C-14. Supply Condition — Shall be as described in **A-11.**

APPENDIX D

(*Clause* 2.2.1.4)

GREY PUTTY CELLULOSE BASE

D-1. Requirements

D-1.1 *Form and Condition* — The material shall be a homogeneous paste and shall be free from dust, grit or other visible impurities.

D-2. Pigment — The pigment used in the material shall be smooth, free from dirt and undissolved cellulose particle or any foreign matter which would produce scratches on application with a putty knife.

D-3. Application — Shall be easy to apply.

D-4. Consistency — Shall be thick so as to easily fill the deep dents and shall be compatible with grey surfacer for thinning down. The material after thorough working in hands, shall have good plastic quality without sliminess or stickiness which would render it difficult to handle or apply.

D-5. Drying Time

D-5.1 The material shall dry in 3 to 4 minutes. Shall take second coat after drying for 2 hours without rolling and pulling. Shall be hard dry after 24 hours drying.

D-5.2 The material when applied on a glass panel shall not peel off when dried.

D-6. Rubbing Properties — Shall be as described in **C-6.1.**

D-7. Flexibility and Adhesion — One coat or 0·03 to 0·05 mm thickness of material shall be applied both on etch primer or on combination of etch primer and grey surfacer by brushing or spraying on a 150 × 50 × 1 mm tinned plate panel prepared as described in **5.2.1.1** of IS : 101-1964. The panel is allowed to dry for 24 h and then cured for 2 h and then bend through an angle of 136°. There shall be no crack, detachment or damage when examined under ×10 magnification. Adhesion shall be good at the bend.

D-8. Sinking — The material shall not sink much when applied in various depths of 0·5, 0·7, 0·9 and 1·2 mm. It shall be dried through and shall not crack at the deeper bends.

D-9. Porosity — The material shall not contain powerful solvents which due to thick application may soften the under coat resulting in peeling off the system.

D-10. Supply Condition — The material shall be supplied. in steel drums conforming to IS : 2552-1979 ' Specification for steel drums (galvanized and ungalvanized)(*second revision*)' or 5 l containers with protective lining or as agreed to between purchaser and manufacturer.

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