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Indian Standard

CODE OF PRACTICE FOR FINISHING OF WOOD AND WOOD BASED PRODUCTS WITH NITROCELLULOSE AND COLD CATALYSED MATERIALS

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Indian Standard

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Indian Standard

CODE OF PRACTICE FOR FINISHING OF WOOD AND WOOD BASED PRODUCTS WITH NITROCELLULOSE AND COLD CATALYSED MATERIALS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 23 May 1968, after the draft finalized by the Painting, Varnishing and Allied Finishes Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 The term wood finishing covers all the operations involved in the application of transparent and semitransparent materials to wood surfaces to enhance the natural beauty of wood and to maintain the desired surface appearance. The natural colour of the wood may or may not be altered in the process.

0.3 The other equally important purpose of wood finishing is to protect the surface of wood from atmospheric conditions which would otherwise cause the wood to rot or change its dimensions. It also protects the wood from spotting and discolouration caused by dust, gases, grease or handling.

0.4 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2 - 1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard deals with the finishing of wood and wood based products using nitrocellulose based materials and cold catalysed materials.

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions of terms relating to finishing material shall be as given in IS:1303-1963* and those relating to wood and related material shall be as given in IS:707-1958†.

3. NECESSARY INFORMATION

3.1 The decorative and protective value of a finish may be influenced by the nature of the surface on which it is applied. There are several species of wood and an increasingly large number of wood-based panel products often differing from each other in surface characteristics. They may be hard, soft, resinous or porous in varying degrees.

3.1.1 Wood is a hygroscopic material and tries to reach a state of equilibrium with the atmosphere in so far as its moisture content is concerned. Changes in moisture content are accompanied by swelling and shrinkage, which is most pronounced across the grain of the wood. Due to moisture movement the summerwoods swell to a greater extent than springwoods and this sets up stress-concentration at the sharply defined junctions between one year's summer growth and the next year's spring and the failure commences about this region. The resulting stresses on the film of finishing material are such as to cause fissures to develop along the grain under adverse circumstances.

3.1.2 Before painting, wood shall be properly seasoned and the moisture content shall be brought as near as possible to the equilibrium moisture content as given in IS:287-1960‡ so as to prevent uneven shrinkage during drying which may result in distortion or even in cracks in the finish. It is also advisable not to finish excessively dry wood.

3.1.3 The cellular structure of wood has a strong influence on the absorption of liquid components of finishes. Non-uniform absorption of vehicle by the wood upsets pigment-binder ratio, impairing the appearance and life of the coating.

3.1.4 Plywood, blockboard, hardboard and particle board have greater dimensional stability than solid wood and provide more uniform surface for finishing.

3.2 For efficient application of wood finishes the following information is necessary and shall be taken into consideration:

a) The type of wood and nature of its pretreatment, namely, preservation and seasoning;

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*Glossary of terms relating to paints (*revised*).

†Glossary of terms applicable to timber, plywood and joinery.

‡Recommendations for maximum permissible moisture content of timber used for different purposes for different climatic zones (*revised*).

b) The location in which it is intended to be used;

c) The atmospheric conditions in the locality namely, temperature and humidity; and

d) The type of finish to be applied.

4. PREPARATION OF WOOD FOR FINISHING

4.1 Sanding — Adequate sanding of surfaces to be finished at all stages of finishing is a major factor in achieving a satisfactory result. Abrasions, dents, and deep sanding marks will show up in clear finishes. The surfaces shall be prepared by careful smoothing with fine abrasive paper used in the direction of the grain. Scratches across the grain, coarse sanding marks and bruises are likely to become stained darker than the rest of the surface thereby spoiling the finished appearance. If water stain is to be used, the surface shall be wetted with water to raise the grain and then allowed to dry before finally smoothing. Machine sanding or belt sanding is recommended.

4.2 The surfaces shall be carefully wiped free of wood flour and any minor repairs that may be necessary shall be made.

5. FILLING

5.1 The primary function of fillers is to fill the pores and opened cells of the wood in the surface layer. This is necessary to prevent the excessive penetration of the finish that is subsequently applied and to level off the surface of a porous wood to make a smooth top finish possible.

5.2 For special stain effects coloured fillers are used. However, the result lacks the grain and colour contrast characteristic of wood stains.

5.3 The filler is applied by a rag rolled to form a pad. The application is in a circular direction with sufficient pressure to force the filler into the pores. It may also be sprayed and then a specially designed mechanical mop may be used to force the filler into the pores and remove the excess. The number of coats applied by either method depends on the porosity of the wood.

5.4 The excess filler should be wiped off with a dry rag within 5 to 10 minutes of application.

5.5 The filler is air dried overnight and levelled off by dry sanding with '0' grade flint paper.

6. SEALING

6.1 The primary function of the sealer is to prevent the swelling and lifting of the grains, bleeding of woodfiller, etc, on application of the finish. However in most cases this is not essential in which case the sealer coat(s) may be replaced with finish coat(s).

6.2 The sealer is nitrocellulose based if the final finish is of the same material and is applied by spray. The number of coats required depends upon the nonvolatile content of the material used.

6.3 For wood finish with cold catalysed material the sealer used may be single pack like shellac sealer or two pack like cold catalysed sealer. In both cases the application is by spray.

6.4 The sealer is allowed to dry hard normally overnight, and sanded with '0' grade flint paper taking care not to cut through the edges and corners. The dust is blown off and the surface wiped with a rag.

7. LEVELLING WITH NITROCELLULOSE WOODFILLER

7.1 If the sealer shows uneven surface necessitating levelling off at this stage a transparent, nitrocellulose based woodfiller is used. It is applied with putty knife in straight strokes; air dried for one hour and dry sanded with '0' grade emery paper.

8. STAINING

8.1 Staining of wood may be resorted to for indoor fittings and even then only for subsequent clear finishes. The object of staining wood is to darken it as part of a decorating scheme. If skillfully carried out, staining may be used with good effect to enhance the natural grain or figuring of the wood. The stains may be applied over woodfiller or over the sealer.

8.2 The ability of stain to colour wood is affected by wood structure, the texture and grain of any given piece, the type of stain, its concentration, etc. Staining tends to accentuate the natural variations in grain. In hardwoods it results in increased emphasis on grain variations traceable to porous spring wood and dense summer wood. In soft woods on the contrary, the springwood generally absorbs more stain and hence the natural sequence of colour shades is reversed.

8.3 Depending on the requirements a water, spirit, naphtha or acid resistant stain may be used. It may be applied by brushing, sponging and wiping or spraying. The stain shall be so thinned that it can be applied fairly liberally without over-staining. Care shall be taken, especially on absorbent softwoods, to apply the stain evenly and without over-lapping. Spirit stains, in particular, require careful and quick application as they dry very quickly. In general flat surfaces shall be treated first and mouldings and edges last, the object being to avoid double staining along the edges.

8.3.1 *Water Stains*—Water stains are made with water soluble dyes or water miscible pigment paste. They emphasize the grain, especially that of softwoods, since they are readily absorbed by the porous portions but

less readily by the denser, more resinous portions. They will raise the grain of the wood, thus spoiling the smoothness of the finish if a highly polished effect is required; this difficulty can be overcome by first wetting the surface with water to raise the grain and then, after drying, smoothing it with abrasive paper before staining. Where it is necessary to provide a temporary staining treatment on wood, that is, unseasoned, water stain is preferable to other types of stain.

8.3.2 *Spirit Stains* — Spirit stains are solutions of spirit soluble dyes in industrial methylated spirit. Like water stains, spirit stains penetrate more into the softer portions of the wood and so accentuate the grain but they do not cause the fibres to swell nor raise the grain. They will dry very quickly and shall be applied quickly and skilfully to avoid patchy effects. If applied to damp wood, the dyes in the stains are liable to be thrown out of solution. The surface after staining with spirit stains may be finished in the same way as after treating with water stains.

9. FINISHING

9.1 The function of the finish is to decorate and protect the wood. It is nitrocellulose based or a two-pack material (a lacquer and an activator) which has limited pot life after mixing and, therefore, only the amount required for use shall be mixed and used up within the recommended time.

9.2 It may be applied over the sealer or, in many cases, directly over the filler. The application is by spray and the number of coats depends upon the nonvolatile content of the material used.

9.2.1 In the case of nitrocellulose type of finish, it is recommended that at a time two coats are sprayed wet on wet, with 15 to 30 min air drying between coats; air dried overnight and wet flatted with '400' grade abrasive paper and soap water before spraying the next two coats. In place of sealer the finish coats may be applied after checking that it has no effect like grain raising or bleeding of woodfiller. In addition to the sealer coats two or three coats of finish are considered adequate for furniture whereas four to six coats are required for radio cabinets.

9.2.2 In the case of cold catalysed type of finish, in place of the sealer, a coat of finish may be applied after checking that it has no effect like grain raising or bleeding of woodfiller. Each coat of finish is air dried for at least 4 h so as to be dry enough for subsequent operations. Before recoating it shall be ensured that the surface is clean and dry. In addition to the sealer coat, one coat of finish is considered adequate for furniture whereas two or three coats of finish are required for radio cabinets.

9.3 After the application of the final coat the film is allowed to age for at least 24 h.

10. PULLING OVER

10.1 Pull over solution may be used to level off only the nitrocellulose finish. However, if burnishing and polishing is going to be done this operation may be eliminated.

10.2 The application is by pad. The pad should be moderately damp when the operation is started. The initial application is along the grain and then, as the pad dries, the pressure is increased and a circular motion is used. This works out all the marks in the film and the final straightening-up motion leaves a bright and full finish.

10.3 The pullover solution leaves some solvent in the finish and hence at least 12 h air drying is required before handling and packing. However, the fittings may be fixed during this period.

10.4 For best results pulling over is followed up with a polish.

11. BURNISHING

11.0 The best appearance may be obtained from nitrocellulose and cold catalysed type of finishes by means of burnishing.

11.1 Levelling before burnishing is advisable. The film is wet sanded with a fine abrasive paper (400 grade) and soap water. The sanding is done along the grain taking care not to cut through the edges and corners.

11.2 A suitable burnishing compound is used for further levelling. The application is by pad.

11.3 A suitable polishing compound is used to clean the surface after burnishing and to bring up the gloss. The application is done along the grain with a pad.

11.4 A final light rub with a flexible shaft polishing machine using a soft lamb's wool mop gives the best results. Small items which can be easily manipulated may be mopped on a stationary polishing machine. Care shall be taken to avoid burning the finish by local overheating.

11.5 In case of semiglossy or matt finishes with nitrocellulose based materials burnishing is not required. However, wet sanding with 400 grade paper and soap water or burnishing may be done to obtain a smooth even surface.

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