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## A Sprayable Heat, Water and Liquor Proof Shellac Varnish for Wooden Furniture

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The development of a sprayable shellac varnish for use on wooden furniture is reported. The varnish is prepared by dissolving dewaxed decolorized lac in toluene-alcohol-isopropanol-butanol (11 : 22 : 6 : 1) mixture and adding 40% butylated melamine formaldehyde resin. The varnish when sprayed on well prepared wooden surface produces a hard, smooth, highly glossy and attractive finish. The surface polished with the varnish does not get spotted when kept in continuous contact with water for up to 30 days. It also does not show any sign of sticking or marking when a boiling water bucket is kept over it for 2 min. Spillage of alcoholic beverages does not leave any marks or spoil the gloss. The varnish is ideally suited for application on dining and club table tops.

SHELLAC is among the earliest materials to be used in wood finishing. It produces from its alcoholic solution, a hard, smooth and highly lustrous finish, unmatched by that produced by any of its synthetic rivals. Its poor resistance to heat, water and liquors, however, stood

in the way of its large scale use and several synthetic products came into use for this purpose.

A semi-synthetic shellac varnish free from the above mentioned drawbacks of shellac was reported from this Institute in earlier

communications<sup>1,2</sup>. The varnish is prepared by modifying lac with melamine resin in the cold. It is a chemically drying type of varnish, which when applied, forms film by polycondensation type of reaction between the functional groups of lac and butylated melamine resin. Infrared study of the products at different stages of air drying of the film has also confirmed this view.

The varnish when applied on a wooden surface produces a hard, smooth and highly glossy finish, which shows excellent resistance to the action of water, heat and spirituous liquors. In addition, the polished surface can be cleaned with dilute soap solution. The varnish has been found to be highly satisfactory by a number of consumers and manufacturers of varnishes and paints. In performance, this varnish compares favourably with the synthetic lacquers, except that its sprayability is not good. Studies were, therefore, undertaken to develop a satisfactory sprayable composition, which could produce a highly lustrous finish on wooden furniture. To achieve this object, various solvents and solvent mixtures were tried. The results obtained are presented in this communication.

#### Experimental procedure

Dewaxed decolorized shellac varnishes were prepared in various solvent mixtures, viz. (1) alcohol-toluene (2:1), (2) alcohol-toluene-butanol (22:11:2), (3) alcohol-butanol-isopropanol (10:2:4), (4) alcohol-diacetone alcohol (5:1), (5) alcohol-ethyl acetate (5:1), and (6) alcohol-toluene-isopropanol (22:11:6). Clear varnishes were obtained in all cases. To these varnishes, 40% butylated melamine resin (on the weight of solids) in butanol-toluene mixture was added. In the case of alcohol-ethyl acetate (5:1) solvent mixture, slight turbidity appeared, while in all other cases, clear solutions were obtained. These varnishes were filtered over No. 1 filter paper to remove any suspended impurities.

#### Spraying characteristics

Wood panels (6×8 in) were properly prepared for this purpose. The grains of

the wood were filled thoroughly with talc and the varnish and the panels were finally cleaned with No. 00 sand paper.

The varnish compositions were then sprayed on these panels. All the coated panels were tested for drying characteristics of the compositions. The panels prepared from varnishes No. 2, 3 and 4 took comparatively longer time for drying. On the other hand, the panel prepared from varnish No. 6 became tack-free within 5 min.

As regards smoothness, levelling and gloss of the various panels, varnishes No. 2 and 6 gave satisfactory performance. Composition No. 6 was chosen for further study, because it produced a tack-free film within 5 min.

#### Sprayable varnish

The composition of the sprayable varnish is as follows: Dewaxed decolorized shellac, 100; butylated melamine resin syrup (60% solids), 66; methylated spirit, 220; toluene, 110; isopropanol, 60; and *n*-butanol, 10 g.

#### Film performance

Films of the varnish were obtained on tin, glass and wood panels by spraying. Hard,

**Table 1—Film properties of the sprayable varnish**

(Film thickness, 10  $\mu$ )

|   |   |
|---|---|
| Nature of the film  | Transparent, smooth and glossy                    |
| Gloss   | 96% of standard black glass                       |
| Flexibility (tested on conical mandrel)                               | No cracking beyond 0.25 in                        |
| Scratch hardness (load on 1 mm steel ball)                            | 700 g   |
| Water resistance (continuous immersion in water)                      | No blushing up to 30 days                         |
| Heat resistance (boiling water beaker kept over the film for 2 min)   | No sticking or marking                            |
| Alcohol resistance (50 % alcohol splashed over the surface)           | No loss of gloss or marking after complete drying |
| Resistance to dilute acids (1% soln of HCl splashed over the surface) | No marking  |

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durable and glossy films were obtained on each surface. These films were tested for mechanical, water and heat resistant properties after 7 days' of air drying. The sprayed panels showed excellent resistance to water and heat and also to spirituous liquors and compared favourably with the French polished panels (Table 1).

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### References

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