

CHAPTER NO. 16.

PAINTING AND VARNISHING

SPECIFICATION NO. 16.1—Painting—General

1. Painting shall not be started until the Sub-Divisional Officer has inspected the work to be painted and given his approval in writing to commence the paint work.

Commencing
work.

No internal or external painting shall be put in hand until all other work is finished excepting in case of joinery work where priming coat may be given earlier at the time of fixing the joinery. Before starting interior paint work, the rooms shall be swept out and closed for at least a day. The work to be painted shall be thoroughly cleaned and dusted with dusting brushes before painting is started. Where necessary, to keep down dust, floor and pavings shall be sprinkled with water for either internal or external work before painting is taken in hand.

2. Paints shall be of the quality and type specified and shall comply with specification no. 3.37 in all respects. Paints shall generally be arranged and supplied to the contractor departmentally. Under special circumstances, when contractor is specially permitted to obtain paints by direct purchase, he shall use only ready mixed paint of an approved make and brand. For good results, it is desirable that both the undercoating and finishing paint are obtained from the same manufacturer. The primer paint should also be compatible with undercoat paint and should be as far as possible be the one recommended by the manufacturer of undercoating paint.

Supply of Paint.

3. Brushes used for painting shall comply with the Indian Standard Specifications as given in specification no. 3.37.

The brushes used shall be of the approved type and of a size suitable for the work in hand. For general wood work, including doors, sashes etc., a 2 to 4 inches (7.5 to 10 cm.) brush for the larger areas and a 2 inch (5 cm.) for the rails would be considered suitable. Alternatively, ground brush and No. 1 sash tool respectively are sometimes preferred. For flat wall paint, flat brushes from 4 to 6 inches (10 to 15 cm.) width are also used.

Brushes.

4. Brushes shall be rubbed out at the close of the work and kept immersed in a mixture of linseed oil and white spirit, when not in use. Before being used again, the oil and spirit must be rubbed out. If not required, for sometime or when required to be used with another colour, the brushes shall be cleaned out with turpentine and then washed with

Care of
brushes.

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soapy water. A brush in which paint has dried is ruined and shall on no account be used. New brushes may contain addressing of extraneous matter and shall be well-washed with soapy water before use.

Climatic conditions.

5. No painting work shall be done during damp weather. Extremes of weather shall also be avoided for Securing good results. Painting (especially out-door) shall not be carried out when weather conditions are very windy, otherwise dust is likely to damage the work.

Workmen.

6. Only skilled painters shall be employed for paint work, and the percentage of labourers required to help shall not exceed 25 per cent of the skilled workmen.

Protection from poisonous effect.

7. Since some of the paints are poisonous, painters should never fail to wash their hands after painting. Precautions may also be taken that workmen do not smear themselves with paints unavoidably. Where it is necessary to rub down with sand paper, only water-proof paper shall be used and the work kept wet. Too much pressure must not be used in rubbing. Slush formed in rubbing must be frequently washed off with plenty of water.

Preparation of surface.

8. It is of the utmost importance any surface to be painted, whether it has been painted previously or not, shall be suitably prepared to receive the paint. To be properly prepared for painting, the surface should be clean, dry and sound, not friable or unduly absorbent, and it should, as far as possible, have reached a stable condition. The surface should also be smooth enough to make it possible to produce the particular quality of paint finish required. The following procedure shall be adopted for preparing old painted surfaces:—

(a) Old paint work that is in a sufficiently sound condition not to require removal, shall be thoroughly cleaned and washed with warm water and soap powder or soap of good quality, substantially free from alkalis. After the dirt and grease have been removed, the work shall be thoroughly rinsed off with plenty of clean water.

(b) After cleaning, the surface shall be rubbed down to remove any loosened material so that it would be in a fit condition to receive the new paint. It is particularly important not to omit this rubbing down process, even when the surface appears quite sound. For rubbing, pumice stone blocks or soap stone or water proof abrasive per stretched over

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wooden block shall be used. All paint work must be rubbed down wet. There is however, no harm in rubbing down the paint work dry provided the paint does not contain lead. After rubbing down, the surface shall again be rinsed-off to remove grit and loosened material.

9. The first aim of applying paint should be even distribution and hence considerable pressure should be exerted in the early stage of application. The work should then be crossed once or twice, i.e., brushing alternatively in opposite directions, gradually reducing the pressure of the brush, until it just touches the work on the final strokes. Provided the paint has not been applied too heavy, the final brush marks should scarcely show. Special care shall be taken, so that every part of the surface (especially joints) is adequately covered. Fat edges shall be avoided by brushing towards the edges rather than away from them. Laying off (i.e. final light brushing) shall be thorough and complete otherwise "ladders" will show (i.e. small patches showing brush marks in the wrong direction). Generally, laying off shall be in the direction of the grain of wood on wood work and towards the light on large areas such as ceilings and walls. Certain quick drying synthetic finishes and flat paints have to be applied quickly and evenly and do not lend themselves to the brush manipulations described above. The direction of laying off, however, is the same.

Method of applying.

Paints shall be applied neither too quickly nor too thinly. Full time shall be allowed to elapse between the application of successive coat of paint. Each coat of paint shall be rubbed down with fine abrasive paper before applying the next: a fit condition has been reached when the paint can be rubbed down without clogging the abrasive paper.

10. Each coat of paint shall differ slightly in tint from the preceding one, so as to make each coat readily distinguishable, the last coat being of the tint required for the finished work. Every coat shall be perfectly dried and shall be got approved from the subordinate-in-charge before applying the next coat.

Separate Tint for separate coats.

11. Paint shall be constantly stirred while being applied. Such stirring being done with a smooth stick, and under no circumstances with the brush.

Stirring.

12. The main requirement of priming coat is that it should adhere firmly to the unpainted surface and also provide a suitable ground to receive and hold the next coat. It is most important that the priming

Priming coat.

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paint should be of the correct type for the surface to be painted and that it should be supplied in a proper manner. Special care shall be paid to places where decay or corrosion is likely to occur, such as joints in wood or metal and end grain in wood. Hurried priming should be voided particularly on absorbent surfaces. Any primed work that has been allowed to deteriorate through exposure for a long pumice stone or other suitable abrasive.

Stopping and Filling.

13. Stopping and filling shall be done after priming. The material required for this purpose shall conform to Indian Standards specified in specification no. 3.36. Stopping is used to fill holes and cracks while the function of the filler is to level up slight irregularities of surfaces. Filler shall be applied with a bread knife and shall be subsequently rubbed down to a level surface with abrasive paper, pumice stone or other suitable abrasive.

Undercoats.

14. The functions of the paint used for undercoating are to obscure the primed surface, to provide a fresh surface of uniform texture and of a colour approaching that of a finishing coat, and to build up a layer paint sufficient in type and thickness to protect the material painted according to the conditions of exposure.

The number of undercoats required in each case will depend upon the type of finish desired and on the conditions of exposure. For most works, a minimum of one undercoat is needed while for works requiring a high class gloss finish or required to undergo a severe exposure, a large number of undercoats may be needed.

Finishing coat.

15. The finishing coat in a paint system is intended to provide the particular colour and degree of gloss or texture required. In external work, the finishing coat also serves to protect the main body of the paint beneath and it should, therefore, be renewed when necessary before undercoat becomes seriously damaged by the weather.

Cleanliness.

16. Care shall be taken while painting to avoid damage to furniture, floors etc., and to maintain general tidiness. The contractor shall remove with turpentine or any other approved method all stains, smears, splashings and droppings of every kind from floors, glazing, furniture and from similar situations.

Measurement.

17. The work shall be measured by multiplying the length or width by the height. It shall be measured flat over including frames

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and the area thus obtained, multiplied by the following factors which include the frames, edges, cleats, chocks, etc. and apply to both sides :—,

1. Panelled, or battened doors and windows	..	2½
2. Fully glazed or gauzed doors and windows	..	1
3. Part panelled and part glazed or gauzed doors and windows	..	2
4. Fully venetianed or louverd doors and windows	..	3
5. Flush doors	..	2
6. Grated doors and windows and gratings	..	1
7. Trellis work (no deduction to be made for open spaces and supporting members not to be measured separately).	..	2

Corrugated steel or asbestos cement sheets surfaces shall be measured flat and the following extras shall be added to the areas to cover extra girth etc.—

1. Corrugated asbestos cement sheets (such as "Big-Six", "Crownit" and the like)	..	20 per cent
2. Semi corrugated asbestos cement sheets (such as "Trafford", "Superthirteen" and the like)	..	10 per cent
3. Corrugated steel sheets	..	14 per cent
4. All other works shall be measured net on all visible painted surface.		

18. The through rates for painting in general include the cost of all materials, such as paints, brushes, abrasive paper etc., and the cost of preparation of surface, ladders, scaffolding and removal of all splash, droppings etc. The through rates for painting priming coat include the cost of stopping, filling and knotting as well. Rate.

The through rates for painting undercoats and finishing coat on old work in addition, include the cost of cleaning, washing with water and soap, rubbing down the old surface and rinsing, as detailed in para 6 and moving of movable furniture and cup-boards and replacing them in position.

The labour rates include the labour charges for the above operations including removal of all splashes, droppings, etc., moving of movable furniture etc., wherever required, scaffolding charges, and cost of brushes, sand paper and soap.

SPECIFICATION NO. 16.2—Painting Woodwork:

Materials.

1. The priming paint shall be either an aluminium primer or a pink primer, the former being preferred on account of its better sealing properties.

The paints for undercoat work shall be either ready-mixed or synthetic enamel paints. These shall have matt or semi-gloss finish as specified.

The paints for finishing coat shall be either ready-mixed with oil-gloss finish or synthetic enamel with full gloss finish.

The paints and other materials shall conform to specification no. 3.37 in all respects.

Dryness.

2. New woodwork shall only be painted when the surface is thoroughly dry.

Preparation of surface.

3. Unless otherwise specified, new woodwork to be painted shall be finished smooth with the plane, but free from plane marks of every kind. The woodwork shall then be rubbed smooth with sand paper first with grade 2½ paper and then with 1½ grade paper. The sand papering must be finished with the grain, the cost of sand papering being included in the rate of priming coat.

Knotting.

4. Before applying paint, all knots must be covered with two coats of knotting or shellac varnish, conforming to specification no. 3.36. The knotting shall be applied thinly and extended about an inch (2.5 cm) from the actual area requiring treatment.

Knots in deodar or other resinous woods must be painted over with slaked lime, this being scraped off after 24 hours, the knot rubbed smooth with pumice stone and one coat of knotting or shellac varnish applied. All large knots in joinery shall be cut away and the space plugged with sound wood before the priming coat is applied.

Application.

5. The application of priming and subsequent coats along with stopping and filling shall be done in the manner prescribed in general specification no. 16.1 which will apply in all other respects to painting of woodwork.

SPECIFICATION NO 16.3—Painting Iron and Steel Work

1. The surface of iron or steel work to be painted shall be absolutely free from dirt, grease, rust and scale. For normal works, cleaning shall be done by hammers, chisels, wire-brushes and scrapers. For large works, grinding machines, light shot sand or grit blasting, flame cleaning may be employed as directed by the Executive Engineer.

Cleaning Surface.

2. If cleaning has been completed the day before or earlier, the surface must be brushed out with a wire brush just prior to painting.

Recleaning if necessary.

3. For priming, either red lead ready-mixed primer or zinc chromate ready-mixed primer conforming to specification no. 3.37 shall be used. For iron and steel work, red lead primer has given good results in the past and shall normally be used.

Materials.

For undercoats and finishing coats, either oil paints or bitumastic or aluminium paints may be used. Bitumastic paints shall be used where appearance is of a secondary consideration. The oil paints may be either synthetic enamels or ready-mixed oil paints. Where a red colour is acceptable, red oxide of iron paints shall generally be used.

4. If the work has received a priming coat before delivery and erection, the whole of it shall be carefully examined to discover any places where the coating of primer has become damaged or is missing. Such places shall be thoroughly cleaned and freed from all grease, dirt, rust and scale, in the usual manner. After cleaning, the areas treated shall be touched up with a primer of a similar kind to that already applied. Special attention shall be paid to rivets, bolt heads and welds. If the existing primer appears to be of a poor quality or of an inadequate thickness, or if there are signs of rusting beneath the paint at numerous places the whole surface shall be cleaned and reprimed.

Application.

If the surface is without a priming coat, it shall be primed as per directions given in the general specification no. 16.1. Priming shall be given also in case of bitumen or tar paints.

The subsequent coats shall be applied in the usual manner as given in general specification no. 16.1, special care being taken about the sharp edges and prominences during application. In case of corrugated sheets, paints shall be applied first to the crown of the corrugations and only then when dry, a general coat may be applied over the whole surface. For repainting an old painted surface, the surface shall be cleaned, washed, rubbed and prepared as per instructions in para 6 of general specification no. 16.1.

SPECIFICATION NO. 16.3—Painting Iron and Steel Work

Painting galvanised
proofing sheets.

5. Galvanised iron shall not be painted until it has been exposed to the weather for a year. If absolutely necessary to paint sooner, a coat composed of 8 ounces (1/4 kg.) of copper acetate added to a gallon of water or a coat of a 4 ounces (1/8 kg.) of washing soda to a bucket of water shall be given and the surface scrubbed with a bursh. The surface shall then be rinsed with clean water and allowed to dry before applying the paint. This treatment is not included in the rate and shall be paid for separately.

General.

6. In other respects, specification no. 16.1 for "Painting General" shall be followed.

**SPECIFICATION NO. 16.4—Painting Plastered and
Concrete Surfaces**

1. Except under special circumstances and then only under the written orders of the Executive Engineer, plastered or concrete surfaces shall be painted only 12 months after plastering or concreting has been completed. Cement and lime are strongly alkaline and, for this reason, oil paints are very likely to be damaged by alkalis. Another danger is the moisture, which ruins the paint. It is desirable, therefore, to delay painting as long as possible so as to enable the surface to be completely free from adverse chemical reaction. During the interim period, the surface may be finished with white wash, colour wash, dry distemper or cement paint (e.g. Snowcem, Robbinacem etc.).

Time for painting.

2. The paints and other materials shall conform to specification no. 3.37. For flooring, ready-mixed floor paints shall be used.

Materials.

3. After waiting for a period of 12 months, the surface shall be thoroughly brushed to remove accumulated dust and all loose or powdered material. If, on the exterior surface, there is an extensive growth of vegetable matter, and this cannot be removed by brushing, the growth shall be killed by applying a wash of ammoniacal copper solution consisting of—

Application on unpainted surface.

Copper carbonate	one ounce (60 gms)
Solution of Ammonia (Specific gravity—0.880)	10 ounces (0. 28 kgs.)
Water	10 gallons (45 litres)

Alternatively, a 2½ per cent solution of magnesium silica fluoride may be used.

When dead and dry, the remains of the growth shall be brushed off, before painting is commenced. Any loose or hollow areas and any major cracks shall be cut out and made good, and the repairs allowed to dry thoroughly before painting. Minor repairs can be made with mastic cement (made from boiled oil, sand and litharge), to avoid the delay caused by the use of cement. A coat of ready-mixed alkali-resistant primer shall then be applied over the prepared surface. The next day, a second but a slightly heavier coat of primer shall be applied. Thereafter the usual undercoat and finishing coats with ready-mixed paint or synthetic enamels can be given. Alternatively, if so desired, ready-mixed alkali-resistant paint may be applied without using primer.

4. On old surface previously painted, the vegetable matter shall be removed as specified above. If the existing paint has completely perished or shown extensive flaking, bleaching or saponification, it shall

Application on painted old surface.

**SPECIFICATION NO. 16.4—Painting Plastered
and Concrete Surface**

be removed and repainting done as specified for new surfaces,— *vide* paragraph no. 4.

If only a few patches are defective, these shall be treated individually by removing all loose or soft paint and bringing forward the treated patches with ready-mixed alkali-resistant primer and the under coating before applying a fresh finishing coat over the whole area.

If the existing paint work is in a reasonably sound condition, it shall be given a finishing coat with the ready-mixed or synthetic enamel paint in the usual manner.

General.

5. In other respects, specification no. 16.1 for "Painting General" shall be followed.

SPECIFICATION NO. 16 5—Varnishing

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| <p>1. Size used shall be gold size as per specification no. 3.36. Varnishing used for undercoating shall be flattening copal varnish. Varnish used for finishing coat shall be finishing copal varnish meeting the requirements of specification no. 3.37.</p> | <p>Materials.</p> |
| <p>2. Woodwork shall be prepared as per general specification no. 16.1 and specification no. 16.2 for "Painting on Woodwork."</p> | <p>Preparation of surface.</p> |
| <p>3. After the surface has been prepared, stopping and filling shall be carried out in accordance with instructions contained in para 9 of General Specification no. 16.1.</p> | <p>Stopping and filling.</p> |
| <p>4. After the new woodwork has been properly prepared, it shall be sized with a coat of thin clear glue which must be applied hot. When dry, the sized surface shall be rubbed down with sand paper till smooth and clear. A second coat of the same glue but nearly cold shall be applied, if so ordered by the engineer-in-charge, for a smoother finish.</p> | <p>Sizing.</p> |
| <p>5. If the woodwork is to be stained, the staining colour shall be mixed with the coat of size. When two coats of size have been applied, the colour shall be mixed only with the second coat. The coat of size containing the staining colour shall be applied evenly and quickly keeping the colour on the flow.</p> | <p>Staining.</p> |
| <p>6. If the woodwork is of an oily nature, a little "multani mitti" and ochre shall be added to the first coat of size (otherwise varnish will not dry readily).</p> | <p>Treating Oily-wood.</p> |
| <p>7. After the sized surface has perfectly dried, all dust must be removed not only from the surface but also from edges and joints. The surface shall then be rubbed down with fine sand paper, leaving colour even. One coat of undercoating flattening varnish shall then be applied. Varnish shall be applied freely being worked well in using strong firm strokes with brushes (not rags) and spread as evenly and as smooth as possible. If the work is vertical, varnish shall be applied diagonally, then left and right, then down and finished the up-stroke, so that the varnish as it sets, flows down and eliminates brush-marks. If the surface is horizontal, varnish shall be worked in every direction, decreasing the weight behind the brush and finished in one definite direction so that it will set without showing brush marks. The brush used shall be well-worn and perfectly clean. New brushes leave specks, ends of bristles and loose hair. After applying the varnish, it shall be allowed to harden and then rubbed lightly with fine sand paper. A second coat of undercoating shall be applied, if so ordered by the engineer-in-charge and then flattened down.</p> | <p>Under coating.</p> |

SPECIFICATION NO. 16.5—Varnishing

Finishing.

8. Finishing varnish shall be applied as described for undercoating work. The finished varnish shall present a uniform appearance and glossy texture, free from streaks, blisters, etc.

**Varnishing
old varnished
work.**

9. Old varnished surface shall be cleaned and prepared as prescribed in para 6 of General Specification No. 16.1 Particular case shall be taken to remove all grease, wax, gloss etc., from old surface so that the new varnish sticks properly. The finishing varnish shall then be applied as specified above.

Measurement.

10. The provisions of para 13 of general specification no. 16.1 shall apply.

Rate.

11. The through rate for varnishing new woodwork includes the cost of all materials and the labour charges for preparing the stopping and filling, one coat of sizing, staining if required, treatment of oily wood, rubbing down of sizing, one coat of undercoating varnish followed by the finishing coat of varnish. The through rate of varnishing old varnished woodwork covers the cost of materials and labour for preparation of surface and application of the finishing coat of varnish.

The labour rates include the labour charges for the above operation and cost of brushes and sand paper.

The second coat of sizing or that of undercoating, if ordered to be done, shall be paid for over and above the rates.

SPECIFICATION NO. 16.6—Oiling Woodwork

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| <p>1. Woodwork not exposed to the weather shall be oiled where so specified. The oiling shall be done with raw linseed oil.</p> | Where used. |
| <p>2. Raw linseed oil shall comply with the requirements of Specification no. 3.37.</p> | Materials. |
| <p>3. When woodwork to be treated is new, it shall be finished smooth with plane but free from plane marks. It shall be stopped and rubbed down smooth with sand paper—first with grade 2½ and then with 1½ and finally wiped clean. The surface shall be perfectly dried, and cleaned. When the woodwork is old, it shall be cleaned of all smoke and grease by sand paper or by washing with lime and water. The surface shall then be washed with soap and water and completely dried.</p> | Preparation of surface. |
| <p>4. The oil shall be applied freely with brushes (not rags) and spread as evenly and as smooth as possible. The surface shall be given one or more coats, taking care that it is completely and fully treated and finally presents a uniform appearance.</p> | Application. |
| <p>5. Where oiling is to be done with raw linseed oil and water, about 4 ounces (0.12 kg) of linseed oil shall be mixed with two gallons (10 litres) of water and the same applied to the work as specified above.</p> | Mixing. |
| <p>6. The work shall be measured according to instructions laid down in para 13 of specification no. 16.1 for 'Painting'.</p> | Measurement. |
| <p>7. The through rates for oiling wood work include the cost of raw linseed oil and other materials and labour charges for preparation of surface and application of material. The labour rates cover the labour charges for the above operations and also the cost of brushes, soap and sand paper.</p> | Rate. |

SPECIFICATION NO. 16.7--Bees-Waxing

Where used.

1. Where a dull polish, which will not destroy the original colour and grain of the teak or shisham, is required, bees-waxing shall be done.

Materials.

2. Bees wax and turpentine oil shall comply with specification no. 3.37.

Preparation of surface.

3. New woodwork to be treated shall be finished smooth with plane. It shall be then stopped, rubbed down perfectly smooth first with medium-grained sand paper and then with fine sand paper. The surface shall be smoothened very carefully at the final stage and wiped out clean.

Old polished woodwork shall be cleaned of all smoke and grease by sand papering or by washing with lime and water. The surface shall then be washed with soap and water and completely dried.

Preparation of mixture.

4. The mixture for application shall consist of two parts of bees-wax and one part of turpentine oil by weight. The wax shall be heated over slow fire and when completely melted, it shall be added to the turpentine oil. It shall be mixed well and allowed to cool.

Application on new surface.

5. The mixture shall be applied by a soft mat made of clean cotton cloth. Spreading shall be as even and smooth as possible. Care shall be taken to ensure that the surface is completely and fully covered. The surface shall be briskly rubbed normally for half an hour or so until dry. More mixture shall then be applied and rubbed continuously for an hour or more, if necessary, till the surface is dry. Finally more wax-mixture shall be applied for the third time and the surface rubbed for two hours (more if necessary) with a soft flannel until the surface has assumed a uniform gloss and is quite dry, showing no signs of stickiness when touched.

The final polish depends largely on the amount of rubbing. The rubbing must be continuous and with uniform pressure and with frequent changes in direction. Four men shall set to rubbing the work with each painter.

Application on old polished surface.

6. After the old polished surface has been prepared, wax mixture shall be applied thereon and the surface rubbed for two hours (more if necessary), with a soft flannel until the surface has assumed a uniform gloss and is dry.

SPECIFICATION NO. 16.7—Bees Waxing

7. The work shall be measured in accordance with the instructions laid down in para 13 of General Specification No. 16.1.

Measurement.

8. The through rates for bees-waxing including the cost of all materials and labour charge for preparation of surface, preparation of bees-wax mixture, its application and rubbing to uniform gloss. The labour rates include the labour charges for the above operations and cost of sand paper, cotton cloth, flannel and fuel for preparing the mixture.

Rate.

SPECIFICATION NO. 16.8—Spirit Polishing

- Polish.** 1. The polish shall be either French polish or shall be made by dissolving $1\frac{1}{2}$ lbs. of shellac in 1 gallon ($1\frac{1}{2}$ kgs. per 10 litres) of denatured spirit without heat. To obtain the required shade, pigment may be added and mixed.
- Materials.** 2. The French polish, denatured spirit and shellac shall comply with specification no. 3.37.
- Preparation of surface.** 3. The surface shall be cleaned. All unevennesses shall be rubbed down perfectly smooth first with medium-grained sand paper and then with fine sand paper and well-dusted. Knots shall be treated as specified in para 4 specification no. 16.2. Holes and indentations on the surface shall be filled in as laid down in para 9 of specification, no. 16.1. The surface shall be given a coat of filler made of 5 lbs. whiting in $\frac{1}{2}$ gallon of denatured spirit (15 kgs. per 10 litres). When it dries, the surface shall again be rubbed down perfectly smooth with glass paper and wiped clean.
- Old polished woodwork shall be cleaned of all smoke and grease by sand papering or by washing with lime and water. The surface shall then be washed with soap and water and completely dried.
- Application on new wood work.** 4. A piece of clean cotton fine cloth and cotton wool shall be made into the shape of a pad which shall be moistened with the polish and rubbed hard on the wood, applying the polish sparingly but uniformly and completely over the entire surface. It shall be allowed to dry and another coat applied in the same way. To finish off, the pad shall be covered with a fresh piece of clean cotton fine cloth, slightly dampened with denatured spirit and rubbed lightly and quickly with circular motion. The finished surface shall have a uniform texture and high gloss.
- Application on old polished woodwork.** 5. After the old polished woodwork, has been prepared, only one coat of polish shall be applied on the surface with the pad. The surface shall be rubbed and finished to a high gloss in the same manner as for new work.
- Measurement.** 6. The work shall be measured in accordance with the instructions laid down in para 13 of General Specification no. 16.1.
- Rate.** 7. The through rates for spirit polishing include the cost of all materials and labour charges for preparation of surface and polishing. The labour rates include the labour charges for above operations and cost of sand paper, cotton wool and fine cotton cloth.

SPECIFICATION NO. 16.9—Painting with Creosote

1. The creosote oil (such as solignum) shall comply with specification no. 3.37 and shall be of approved manufacture.

Materials

2. The wood to be painted must be clean and absolutely dry.

Wood to be dry.

3. Before applying, the creosote must be heated to just short of boiling. It shall then be supplied with a stiff flat brush, the creosote being occasionally stirred whilst being applied. All ends of timbers must be liberally coated and where possible, dipped in the hot creosote.

Heating and applying.

4. Where more than one coat is to be applied, each coat must be thoroughly dry before the next is applied.

Second coat.

5. The work shall be measured by superficial area. In case of doors, windows and trellis work, the method given in para 13 of specification no. 16.1 shall be followed.

Measurement.

6. The through rates for painting with creosote include the cost of creosote, and all other materials like brushes, fuel etc., and the labour charges for heating and applying the material. The labour rates cover the labour charges for above operations and cost of fuel and brushes.]

Rate.

SPECIFICATION NO. 16.10—Coal Tarring

Preparing of surface.

1. The surface to be coal-tarred shall be dry and well-cleaned. Iron-work must have all rust and scale removed, as specified in specification no. 16.3 and where possible heated to nearly red hot before tarring.

Materials.

2. Coal tar shall comply with specification no 3.37. Lime shall comply with specification no. 3.8.

Heating and preparing the tar.

3. The tar, to every gallon ($4\frac{1}{2}$ litres) of which 2 lbs. (1 kg.) un-slaked fat lime has been added, shall be heated till it begins to boil. It must then be taken off the fire and kerosene oil added slowly in the proportions of one part of kerosene to six of tar.

Application.

4. The tar shall be applied as hot as possible, with a brush. Rags shall on no account be used to apply the tar. Where possible, the article to be tarred must be dipped in the hot tar.

Quantity.

5. Not less than 10 lbs. (5 kgs.) of tar shall be used for every 100 sq. ft. (10 sq. metres) of surface tarred. Iron articles to be buried or embedded shall be sanded to absorb any excess of tar.

Khanki mixture.

6. For painting iron work which remains under water like sluice gates, the standard Khanki mixture composed of the materials given below shall be used :—

	Non-metric units	Metric units
Coal tar	.. 84 lbs.	38 kgs.
Mineral pitch	.. 10 lbs.	4. $\frac{1}{2}$ kgs.
Slaked white lime	.. 9 lbs.	4 kgs.
Kerosene oil	.. 9 lbs.	4 kgs.
	112	50. $\frac{1}{2}$

The mixture shall be prepared by heating the pitch and coal tar separately and then mixing them together over a fire, stirring well and adding the slaked lime gradually while stirring. The mixture shall be then withdrawn from the fire and kerosene oil added and well stirred into the mixture. Care shall be taken to see that the mixture is not over heated, the temperature being kept below the 360-F to 450-F

SPECIFICATION NO. 16.10—Coal Tarring

(110 to 140C) range. on the average, the covering capacity of the mixture is about 2,500 square feet per cwt. (460 square metres per quintal).

7. The work shall be measured by superficial area.

Measurement.

8. The through rates include the cost of all materials and labour charges for preparation of surface, heating and preparing the tar mixture and its application. The labour rates cover the labour charges for the above operations and cost of brushes and sand paper.

Rate.

SPECIFICATION NO. 16.11—Lettering

- Materials.** 1. The material used for lettering shall be synthetic enamel paint, conforming to specification no. 3.37.
- Method.** 2. Painting of letters and figures shall be done to the required size and width. The letters, etc., shall be stencilled or drawn in pencil and got approved before painting. They shall be of uniform size and finished neatly drawn. The edges shall be straight or in pleasant smooth curves. For new work, two or more coats of paints and for old work one or more coats of paint shall be applied till a uniform colour and gloss finish is obtained.
- Measurement.** 3. The letters and figures shall be measured by numbers, giving their height in inches (cms.) Letters under one inch (25 mm.) high shall be paid for as one inch (cm.). Stops, commas, hyphens and the like shall be deemed to be included in the item.
- Rate.** 4. The through rates include the cost of all materials and labour charges while the labour rates cover the labour charges and cost of brushes, sand paper, etc.

**SPECIFICATION NO. 16.12—Painting Mile Stones, Furlong
Stones, Other Road Side Structures And Distance Marks**

1. New structures shall be painted according to the type of surface (namely concrete, steel, etc.) and the procedure followed shall be as laid down in the respective detailed specifications. The surface shall be prepared and primed as specified. On old structures, if the previous coat is in good condition, there shall be no necessity of a priming coat, but the surface shall be suitably prepared to receive the fresh coat. Unless otherwise specified, the back-ground of the structures shall be painted white and the lettering and other legend in black paint.

General.

2. For priming coat, material specified in respective specifications shall be used. For under-coats and finishing coats and lettering, synthetic enamel paint conforming to specification no. 3.37 shall be used.

Materials.

3. The through rates for respective items include the application of paint on old work after preparing the surface and also lettering. The labour rates include the cost of labour charges for painting, and lettering only. The rates do not include the cost of priming coat which if got done in new work shall be paid for separately.

Rate.

SPECIFICATION NO. 16.13—Removal of Paint

General.

1. When specially ordered in writing by the engineer-in-charge, old paint shall be removed either by blow-lamps or by paint-removing chemicals (either caustic type or solvent type) as ordered.

Materials.

2. The solvent type chemicals shall be non-inflammable, and shall conform to specification no. 3.37. Caustic soda shall also conform to specification no. 3.37.

Burning off.

3. Burning off is the quickest, cleanest and most convenient method, specially on wood. The flame shall be allowed to play upon the paint just long enough to soften it without appreciably charring either paint or the background. The softened paint shall then be removed with stripping knife, following frame as it is moved up the surface. Burning off shall begin on the bottom of the vertical surface and proceed upwards. Mouldings shall be burnt up first, and flat areas, last. The contractor shall be liable for all fire risk consequent in use of blow-lamps.

Use of caustic soda solution.

4. While using caustic soda solution, special care shall be taken to protect the skin and clothing and also any neighbouring paint work, polished woodwork etc., after the softened paint has been removed, the surface shall be very thoroughly rinsed, with several changes of clean water to remove all traces of alkalis. A little acetic or vinegar added to the final change of rinsing water will help to neutralise any remaining alkali. Caustic soda solution should not be used on non-ferrous metals, as they are susceptible to alkalis.

Use of solvent type Chemicals.

5. The solvent type chemicals are usually volatile organic liquids, thickened with wax or other ingredients. They soften the oil in the paint, the time required for this varying somewhat according to the type, age and thickness of the paint coating. Solvent-type chemicals are less damaging to the skin and clothing than alkaline removers. After removing the paint, the surface shall be washed down with whitespirit to remove any remaining wax or other thickening agents, before repainting.

Measurement.

6. The work shall be measured by superficial area. In case of doors, windows, and trellis work, the method given in para 13 of specification no. 16.1 shall be followed.

Rate.

7. The through rates include the cost of all materials and hire charges of blow lamp if it is used and the labour charges. The labour rates include the labour charges for the above operations.