

CHAPTER No. 17

WOODWORK

SPECIFICATION NO. 17.1—Woodwork 'General

1. The timber used shall comply with specification no. 3.15 for timber in every respect. The timber shall be either air-seasoned or kiln-seasoned. If kiln-seasoned, the instructions given as per note no. 7 should be followed.

Materials.

The timber shall be free from all dead knots and other defects mentioned in specification no. 3.15 on "Timber." The maximum diameter of individual live knots shall not exceed the figures given below for various width of faces of timber with a further proviso that only one live knot per $3\frac{1}{2}$ feet (metre) length of the face shall be allowed.

NON-METRIC UNITS		METRIC UNITS	
Width of face	Maximum diameter of live knots	Width of face	Maximum diameter of live knots
1. Less than 3 inches	.. 1/2 inch	1. Less than 75 mm.	.. 12.5mm
2. 3 inches and more up to 6 inches	.. 1 inch	2. 75 mm and more upto 150 mm.	.. 25 mm.
3. More than 6 inches but up to 10 inches	1 1/2 inches	3. More than 150 mm but up to 250 mm.	.. 38 mm.
4. More than 10 inches	.. 2 inches	4. More than 250 mm.	.. 50 mm.

Further in the case of structural members, live knots occurring in such position and numbers so as to weaken a member thereby shall not be permissible. The decision of the Executive Engineer shall be final in this respect. The slope of cross-grain in timber shall not be steeper than 1 in 15, and the maximum depth of checks shall not exceed 108 inch (3 mm).

White lead shall comply with Indian Standard: 34. Red lead shall comply with Indian Standard : 57.

The nails and screws shall comply with specification no. 3.42 : "Door and Window fittings."

Creosote oil shall comply with Indian Standard : 280.

SPECIFICATION NO. 17.1—Woodwork General

Definitions of defects.

2. **Knots:**—A knot is a branch or limb embedded in the tree which has been cut through in the process of lumber manufacture.

Heart rot and sap rot:—Heart rot and sap rot are kinds of decay or disintegration of the wood substance due to action of wood destroying fungi.

Checks:—A check is a lengthwise separation of the wood, which occurs usually across the rings of annual growth.

Pitch pockets:—A pitch pocket is a well-defined opening between rings of annual growth usually containing resin or pitch.

Pitch streaks:—A pitch streak is a well-defined accumulation of pitch or resin in a more or less regular streak.

Splits:—A split is a length wise separation of the wood, due to the tearing apart of the wood cells.

Warp:—Warp is any variation from a true or plane surface.

Cross-grain:—A cross-grain is the departure of wood cells or fibres from a direction parallel to the axis of the timber piece. Slope of cross-grain is expressed as a ratio between a one inch deviation of the grain from the side of the piece and the distance within which this deviation occurs.

Worm holes:—Worm holes are holes in wood bored by termites, wood borers and other insects, and may extend partially or entirely through the timber piece.

Working.

3. All woodworks shall be neatly and truly finished to the exact dimensions required, woodwork which will be exposed to view when the work is complete, shall be accurately planed to the required dimensions. A tolerance of $\pm 1/16$ th inch (1.6 mm) shall be allowed for nominal dimensions of structural timber. Where dimensions are specifically mentioned as net dimensions, no such tolerance shall be permissible.

Joints.

4. Unless otherwise specified, all joints shall be simple tenon and mortise joints with the end of the tenon exposed to view. All mortise and tenon joints or scarfs shall fit truly and fully, without filling. Where specified in the case of special high class joinery, the end of tenon shall not show. The contractor shall observe the following principles in forming joints:—

- (i) to cut the joints and arrange the fastenings, so as to weaken the pieces of timber they connect, as little as possible,

SPECIFICATION NO. 17.1--Woodwork General

- (ii) to place each abutting surface in a joint as nearly as possible perpendicular to the pressure, which it has to transmit; and
- (iii) to form and fit accurately every pair of surfaces that come in contact.

The joints shall be painted with white or red lead before the frames are put together.

5. Holes of correct sizes shall be drilled before inserting screws; driving in or starting in screws with a hammer is prohibited. All screws shall be dipped in oil before being inserted in the wood. When owing to the nailing arrangement or to the timber used, splitting may occur, the nails shall be driven into pre-bored holes with diameter not greater than $\frac{4}{5}$ of the diameter of the nail. The heads of nails or screws shall be sunk and puttied or dealt with as the Sub-divisional Officer may direct.

Screws and nails.

The gauge and length of nails and screws used shall be subject to the approval of the Sub-divisional Officer.

6. All woodwork shall be passed and initialled by the Sub-divisional Officer before being treated or finally fixed in position. Rejected timber shall at once be removed from the site of the work by the contractor.

Inspection before fixing.

7. All woodwork shall be fixed in accordance with the drawings or the instructions of the Executive Engineer.

Fixing.

8. All portions of timber, built into or against or close to masonry or concrete, and all junctions of rafters, purlins, beams and wall plates shall be given two coats of hot creosote or other wood preservative approved by the Executive Engineer.

Preservatives.

9. All beams and girders shall be bedded on wall plates with not less than 9 inches (25 cm.) bearing. All joints shall bear not less than $4\frac{1}{2}$ inches (12 cm.) on wall plates, and every purlin or batten supported on a wall, will have a bearing in the direction of its length equal to its own depth, subject to a minimum of 4 inches (10 cms.).

Bearing Air Space.

10. As a precaution against fire, no wood work shall be fixed within 12 inches (30 cms.) of the interior face of a chimney flue.

Chimney Flues.

11. Wood posts, in exposed position, must rest on a raised stone or cement concrete base, and be fixed by a holding down bolt. Tenons projecting into the stone or concrete base are prohibited. The holding

Posts fixing in exposed position.

SPECIFICATION NO. 17.1—Woodwork General

down bolt shall be at least $\frac{3}{8}$ inch (16 mm.) in diameter and fixed to a washer embedded in the plinth at least $10\frac{1}{2}$ inches (27 cms.) below the stone base. The bolt must pass through the base and project 9 inches (22 cms.) through the bottom of the post, being secured to it by a nut let in through a side cavity, which must be subsequently plugged.

Trusses.

12. In construction of roof trusses, a full-size truss shall first be lined on a level platform. From this full size diagram, templates of tenons, mortise and scarfs etc., shall be made for use in the manufacture of trusses, Camber shall be provided, where required, in accordance with the specified details.

Planking.

13. Woodwork over 3 inches (75 mm.) in width and 2 inches (50 mm.) or less in thickness will be paid for as planking. The plank shall be dressed and planed square and true with sides and ends parallel. They shall be fixed with iron screws. The edges of planks shall be butt or tongue and groove jointed as specified. The timber for planking shall be planed on both sides, and rebated, if required.

Scaffolding.

14. The contractor shall provide all labour, scaffolding, ladders and tackle necessary for hoisting and fixing woodwork in position, and for its inspection during construction. He is also responsible that the tackle and staging are of the requisite strength and that the work is secured in a proper manner during construction.

Measurement.

15. Woodwork "wrought and planed" shall be measured for finished sections in cubic feet (cubic metres). No allowance shall be made for wastage, and for dimensions supplied beyond those specified. The length of each piece shall be measured overall so as to include projections for tenons, scarfs or mitres. In case of mouldings, rebates, circular and varying sections, the sectional area of the piece shall be taken as the area of the least square or rectangle from which such section can be cut and nothing extra shall be paid for such moulding and rebates. Planking for ceilings floors, shelves etc. shall be measured by superficial area.

Rate.

16. The through rates for woodwork "wrought, planed and fixed in position" include carriage to and delivery at the site of works, the fair rendering of all surfaces, sawing, planing, moulding, framing and chamfering of angles in exact accordance with the drawings or other directions given by the Executive Engineer, supply and fixing of all nails, screws etc. glue, coating joints with red lead, painting the surface in contact with masonry with two coats of creosote, (or solignum) and putting the work together and fixing the same in position. Extra rate as provided in the Common Schedule of Rates,

SPECIFICATION NO. 17.1—Woodwork General

is payable in case of roof trusses, composite beams and built-in fixtures, etc. where jointing is involved. The rates do not include the cost of bolts, iron straps, and other special iron or steel fittings required for wooden trusses, composite beams etc. which shall be paid for separately. The labour rates provide for the labour charges for the above operations sawing carriage to and from saw mill and hoisting.

The through rates for planking include the cost of planing of both sides and of shooting or rebating edges and fixing in positions with nails and screws. The labour rates include the cost of labour charges for the above operations, sawing carriage to and from saw mill, and hoisting. The rates for planking are intended for plain woodwork fixed in shelves and the like. These rates do not apply to planking in case of floorings and ceilings, for which items separate rates exist.

SPECIFICATION NO. 17.2—Doors and Windows—General

Materials.

1. Timber shall comply with specification no. 3.15. Adhesive shall be either animal glue conforming to I.S. 852 or synthetic resin conforming to I.S. 851 or cold setting glue conforming to I.S. 849. For exterior work synthetic resin adhesive shall be preferred on account of its better water-resistant properties.

Corner straps shall be of galvanised iron sheets conforming to specification no. 3.27. They shall be $2\frac{1}{2}$ inches (60 mm.) wide and $\frac{1}{16}$ inch (1.60 m.m.) thick. The length of the legs of the straps shall be equal to the depth of the chowkats.

Hold-fasts shall be made from $1\frac{1}{2}$ inch x $\frac{1}{2}$ inch (38 mm. x 3 mm.) mild steel flats 15 inches (380 mm.) long. Three inch (75 mm.) length at one end of the flat shall be bent at right angles for fixing it to the frame, three inch (75 mm.) length on the other end shall be forked into two and bent at right angles in opposite directions.

Fittings shall conform to specification no. 3.42 for "Door and Window fittings". They shall be of the size and type specified or as directed by the Engineer-in-charge.

Sections and fittings to be as per table.

2. All chowkats, doors and windows together with their fittings; and furniture shall be as specified, in the drawings or by the written orders of the Executive Engineer. If not thus specified, the particulars and dimensions given in the table attached on page 460 and 461 and further amplified in the detailed drawings and specifications shall be strictly complied with, both as regards the joinery and the furniture. A tolerance of $\pm 1/16$ inch (1.6 mm.) for sections more than $\frac{3}{8}$ inch (20 mm.) thick and $\pm 1/16$ inch (1.6 mm.) for sections more than $\frac{3}{8}$ inch (20 mm.) or less than $\frac{3}{8}$ inch (20 mm.) thick shall be allowed. No tolerance on minus side is permissible whatsoever for sections $\frac{3}{8}$ in. (20 mm.) thick or less. All assembling of shutters of doors, windows, etc. and chowkats shall be exactly at right angles.

All members of the door, window and ventilator shutters and frames shall be straight without any warp or bow and shall have smooth, well-planed faces at right angles to each other. The chowkat members shall be planed on the three sides exposed at right angles for each other.

Sills.

3. No sills shall be provided unless otherwise specifically ordered. If so ordered, wooden sills may be provided in case of external doors so as to project $\frac{3}{8}$ inches (20 mm.) above floor level. Nothing extra

SPECIFICATION NO. 17.2—Doors and Windows—General

shall be payable for wooden sills. Where specifically ordered in case of internal or external doors, concrete floors in the door opening shall be so laid as to provide a concrete sill $\frac{3}{4}$ inch (20 mm.) above the floor and sloping down to the floor on either side. Concrete sills shall be paid for separately.

4. Where no sill has been provided, the feet of the chowkat shall rest on the damp proof course or floor as the case may be. Where a sill has been provided, the number of hold fasts in the chowkat shall be reduced by two.

Fixing Chowkats.

5. Before fixing, chowkats shall have the side in contact with the brickwork or masonry painted with two coats of hot creosote, coal tar or other wood preservative approved by the Executive Engineer. Wood preservative shall be applied carefully so as not to soil the visible faces of the chowkat. If doors and windows are to be subsequently painted, the chowkats must have the priming coat painted on before fixing.

Painting with a Preservative.

6. Chowkat shall be properly framed and mortised together. Door and window chowkats shall have $4\frac{1}{2}$ inches (11.5 cms.) wide horns left on the heads (also on sills where these are provided) : or the corners of the chowkats bound with corner straps fixed with four 2 inch (5 cms.) screws. The cost of horns or straps is included in the rate. In the absence of any directions to the contrary, the latter method shall be adopted.

Chowkat framing and corners.

7. Chowkats shall have a rebate cut to receive the leaves, the rebate to be $\frac{1}{2}$ inch (13 mm.) deep and of width equal to the thickness of the leaf. The other side shall be rounded off if wire gauze is to be fitted. Where the plaster butts against the chowkat, a $\frac{1}{2}$ inch (13 mm.) deep rebate with a slight-cut back shall be given to serve as a key to the plaster.

Rebates.

8. No chowkat shall be painted or fixed before the Sub-Divisional Officer has inspected and initialled it in token of his acceptance. All chowkats shall be ready before the work reaches sill level, so that they can be built in as the brick work or masonry proceeds. Where specially ordered, chowkat may be fixed later after the completion of brick work and roofing but before plastering. In that eventuality the brick work of portions where holdfasts have to be embedded shall be done in mud or laid dry. No extra payment is due when chowkats are fixed in this manner.

To be ready before starting superstructure.

TABLE SHOWING SIZES OF CHOWKATS, FRAMES AND OTHER PARTS OF JOINERY FOR AIR SEASONED TIMBER

Serial No.	Particulars of type of Doors and Windows (a)	Deodar Wood		Teak Wood		Width of Thickness Styles and ledges or Braces (e)	Remarks
		Size of Chowkat		Thickness of leaves			
		mm	mm	mm	mm		
1	2	3	4	5	6	7	8
(A) Glazed or partly glazed panelled Doors							
1	Double upto 120 x 235 cm.	60 x 80	30	50 x 80	25	90	(a) Dimensions given are out to one of chowkat containing the leaves except where marked (x) where the dimension of each leave is given
2	Double exceeding 120 x 235 cm. upto 150 x 235 cm.	60 x 80	35	50 x 80	30	100	
3	Double exceeding 150 x 235 cm.	60 x 80	40	50 x 80	35	110	
4	Single upto 190 x 205 cm.	60 x 80	30	50 x 70	25	100	
5	Single exceeding 90 x 205 cm.	60 x 80	35	50 x 80	30	110	
(B) Battened Brace or framed Doors							
6	Double upto 120 x 205 cm.	60 x 80	50 (d)	..	..	100	(b) Dimension given is for a chowkat carrying two sets of leaves
7	Double upto 120 x 205 cm.	60 x 80	50 (d)	..	..	110	
8	Single upto 90 x 205 cm.	60 x 80	50 (d)	..	..	100	
9	Single exceeding 90 x 205 cm.	60 x 80	50 (d)	..	..	100	
(C) Wire Gauzed Doors							
10	Double upto 120 x 205 cm.	60 x 100 (b)	30	50 x 100 (b)	25	100	(c) Chowkat to be the same as for Doors or Window
11	Double exceeding 120 x 205 cm.	60 x 100 (b)	35	50 x 100 (b)	30	110	
12	Single upto 90 x 205 cm.	60 x 100 (b)	30	50 x 100 (b)	25	100	
13	Single exceeding 90 x 205 cm.	60 x 100 (b)	35	50 x 100 (b)	30	110	(d) 25 mm. ledges braces and 25 mm. Battens
(D) Windows							
14	Glazed double upto 90 x 130 cm.	60 x 80	30	50 x 70	25	70	

15	Glazed Double exceeding 50×120 cm up to 120×130 cm. .. 60×80	30	50×70	25	70	(f) Moulding styles may be three quarter of the dimension given (g) For doors upto 205 cm. 208, cm. and above 135 cm. in height the lock rails 150 mm, 175 and 200 mm. wide. Respectively and the bottom rails 200 mm; 225 mm. and 250 mm. wide respectively.
16	Glazed double exceeding 120×120 cm.	35	50×70	30	80	
17	Glazed Single upto 60×130 cm.	30	50×70	25	80	
18	Glazed single exceeding 60×130 cm.	30	50×70	25	80	
19	Facillights .. (c)	30	..	..	60×80	
20	Orerostory Windows .. 50×70	30	..	..	80	
21	Battened double all sizes .. 60×70	50 (d)	..	..	80	
22	Battened single all sizes .. 60×70	50 (d)	..	..	80	
23	Wire Gauzed upto 60×130 cm (x) .. 60×80 (b)	25	50×80 (b)	25	80	
24	Wire Gauzed exceeding 60×130 cm (x) .. 60×80 (b)	25	50×80 (b)	25	80	
25	Wire Gauzed Slutter O.S. Windows .. 50×70	30	50×70	25	60	

SPECIFICATION NO. 17-2—Doors and Windows—General

Chowkats
erection.

9. When sill level is reached and damp proof course laid, chowkats shall be erected, being placed truly level and plumb. They shall be securely strutted or lashed in position till built in.

Hold Fast.

10. Chowkats shall be secured to the brick work or masonry by holdfasts which shall be built into the wall with 1 : 4 cement sand mortar. Each hold fast shall be fixed to the chowkats with three 2 inch (5 cms.) iron screws. Where the chowkat is fixed at the extreme edges of the jambs, the holdfasts shall be forked or bent as directed by the Sub-Divisional Officer. The number of holdfasts to each chowkat shall be as indicated in the table on pages 458-459 with the exception that, where sill has been provided, the number of holdfasts per chowkat shall be reduced by two.

Position of
chowkats in jambs.

11. Unless otherwise specified, doors and windows opening to another room, or to a corridor, or verandah, shall have the chowkats so fixed that they project $\frac{3}{8}$ inch (10 mm.) from the plastered face of the wall. They shall not be kept flush with the wall.

The plaster will stop against the chowkat which will have the rebate mentioned in paragraph 8 as a key for the plaster.

Other doors and windows will be set-back from the face of the wall to the extent specified in the drawings. If this set-back is not specified, it shall be $2\frac{1}{2}$ inches (6 cms.)

In the case of doors and windows in dhajji walls, the depth of the chowkat shall be equal to the thickness of the wall and the faces kept flush with the plaster.

Where architraves have been provided, chowkats shall be fixed as shown in the drawings giving the detail of the architrave.

Protection.

12. To protect against water and mortar splashings, wood strips shall be lightly nailed on the arrises of the chowkat temporarily till painting.

Seasoning.

13. All door and window leaves shall be cut out and framed together, as soon as possible after the commencement of the work, and stacked closely. They shall be glued just prior to being hung. Before final glueing up all portions in which defects appear shall be replaced.

Leaves method
of framing.

14. All styles and rails shall be properly and accurately through mortised and tenoned, no filling or wedging being permitted.

SPECIFICATION NO.17-2—Doors and Windows—General

intermediate rails, muntins and glazing bars shall be subtenoned to the maximum depth permitted by the size of the members morticed or to a depth of 1 inch (25 mm.) whichever is less. No tenon shall be within $1\frac{1}{2}$ inch (38 mm.) of the top or bottom of the door. The thickness of tenon shall be approximately one-third of the finished thickness of the member and the width shall not exceed 5 times its own thickness. All rails over 7 inches (18 cms.) in depth shall have a pair of single tenons. All tenons shall be secured by $\frac{3}{8}$ inch (10 mm.) hard wood or bamboo pins. All rails are to be haunched to depth of groove for panels.

15. All tenons at the final assembly of the door shall be glued and immediately after glueing, the frames shall be tightly clamped and so left till the glue has set. Glueing.

16. Leaves are to be hung on hinges of the size and the number specified in the table. All hinges shall be countersunk into the chowkat as well as in the leaf, the recesses being cut to the exact size and depth of the hinge, no subsequent packing being tolerated. Two inch (5 cms.) screws shall be used with 5 inch (12.5 cms.) and 6 inch (15 cms.) hinges and $1\frac{1}{2}$ inch (3.75 cms.) for smaller sizes. Hinges.

17. All fittings are subject to the approval of the Executive Engineer and, where so directed by him, the contractor must deposit in his office one sample of each fitting to be used in the work. Unless otherwise specified, fittings shall be of the number, size and type specified in detail in the table on pages 458-459. Brass and other special fittings shall ordinarily be arranged departmentally and issued to the contractor for fixing. Fittings.

18. Screws shall be used of such diameter as to fill completely the holes and cups in the fittings which they secure, and are to be oiled before being inserted. Unless the head can be counter-sunk flush with the fitting, round-headed screws shall be used. Brass fitting shall be secured with brass screws. Screws.

19. Hinged chocks shall invariably be fitted to all doors and windows to keep them open. Chocks shall be of hardwood and swung on 2 inch (5 cms.) butt hinges. Chocks.

20. Wooden stops of a size suitable for the leaf concerned shall be fixed to the door or window chowkats to prevent the leaf from damaging the plaster of the jamb when fully opened. Stops.

SCHEDULE OF DOOR

Serial No.	Items	Hold-Fasts	Hinges (c)	Handles (d)	Hinged Checks	Door Stops	
1	2	3	4	5	6	7	
1	Single leaf Panelled or glazed door	..	8 .125 mm	2.150mm	1.100 mm	1.50 mm	
2	Single leaf Flush Door	..	8 3.125 mm	..	1.100 mm	1.500 mm	
3	Double leaf Panelled or Glazed Door	..	8 6.100 mm	3.150 mm	2.100 mm	2.150 mm	
4	Double leaf Flush Door	..	8 6.100 mm	..	2.100 mm	2.150 mm	
5	Single leaf Battened Door	..	8 3.300 mm	2.150 mm	1.100 mm	1.150 mm	
6	Double Leaf Battened Door	..	8 6.330 mm	3.150 mm	2.100 mm	2.150 mm	
7	Single Leaf Wire Gauge Door	..	..	3.125 mm	1.150 mm	1.100 mm	..
8	Double Leaf Wire Gauge Door	..	..	6.100 mm	2.150 mm	2.100 mm	..
9	Single Leaf Panelled or Glazed or Wire Gauge Window	..	6 2.75 mm	1.50 mm	1.100 mm	1.125 mm	(h)
10	Double Leaf Panelled or Glazed or Wire Gauge Window	..	6 4.75 mm	2.150 mm	2.100 mm	2.125 mm	(h)
11	Single Leaf Battened Window	..	6 2.250 mm	1.150 mm	1.100 mm	1.125 mm	
12	Double Leaf Battened Window	..	6 4.250 mm	2.150 mm	2.100 mm	2.125 mm	
13	Fan Light	..	2 2.75 mm	..	..	..
14	Clerestory Window Centre Hung	..	2	Sets of Brass Fan Light	..	..	..
15	Clerestory Window Bottom Hung	..	2 2.75 mm	..	..	..
16	Cup Board Shutters	..	6 6.100 mm	2.150 mm	..	..

AND WINDOW FITTINGS

Tower Bolts (e)				Special Fittings if any	REMARKS
Top of Master style	Bottom of Master style or bottom rail	Top of Under style	Sliding Bolts (j)		
8	9	10	11	12	13
1.150 mm	1.150 mm	..	1.300 mm	..	(a) The first digit indicates the number of fittings and the second digits gives its size.
1.150 mm	..	..	..	One brass mortice lock 14 cm. size with handles and one 14 cm. Brass floor stopper (i)	(b) The designated sizes shall be measured as provided for in the respective Indian Standard
1.150 mm	1.150 mm	1.150 mm	1.300 mm	..	..
1.150 mm	1.150 mm	1.150 mm	..	One brass mortice lock 14 cm. size with handles and two 14 cm. brass floor stopper	(c) Hinges for panelled or Glazed jointly shall be mild steel pressed butt hinges ordinary variety finished bright
1.150 mm	1.150 mm	..	1.300 mm	..	..
1.150 mm	1.150 mm	1.150 mm	1.300 mm	..	..
1.150 mm	1.150 mm	..	..	1.225 mm	Hinges for flush doors shall be Brass butt hinges ordinary variety hinges for Battened joinery shall be mild steel tee hinges.
1.150 mm	1.150 mm	1.150 mm	..	2.325 mm	..
1.100 mm	1.75 mm	..	..	..	(d) Handles shall be of Aluminium.
1.100 mm	1.75 mm	1.100 mm	..	..	..
1.100 mm	1.75 mm	..	..	..	..
1.100 mm	1.75 mm	1.100 mm	..	..	..
..	..	..	..	One set of cast brass fan light catch and one set of chain with hook	(e) Tower bolts for panelled or glazed or battened joinery shall be Aluminium barrel type with Aluminium barrel and aluminium bolts tower bolts for flush doors shall be brass barrel type with cast brass barrel and rolled or drawn brass bolt.
..	..	..	..	One set of cast brass fan light catch	(f) Hasp and staple shall be of Aluminium safety type.
..	..	..	..	One set of cast brass fan light catch and one set of chain and Hook	(g) Door spring shall be helical type of Aluminium
..	..	1.100 mm	..	One hasp and staple 150 mm size (f)	(h) The size of hinges shall be increased to 100 mm (if height of window exceeds 90 cm). (i) for lavatory flush doors brass mortice latch 14 cm size shall replace the mortice lock.
..	..	..	..	..	(j) Sliding bolts shall be of Aluminium.

SPECIFICATION NO. 17.2—Doors and Windows—General

Measurements.

21. Doors and windows shall be paid for by measuring the clear opening in the brick work or masonry. Circular or other similar joinery will be paid for on the net area. In the absence of such special rate, ordinary rates shall be paid and measurements taken as the least square or rectangular to contain the opening in question.

General.

22. In all other respects, specification No. 17.1 for "Wood work General" shall be followed.

Rate.

23. The through rates for doors and windows include the cost of chowkat as well as joinery and allow for the cost of preservative treatment, holdfasts, corner straps, hinges, screws, checks, cleats, stops and cords, etc., complete fixed in position. The labour rates cover the cost of labour charges for the above operations, sawing charges and carriage to and from the saw mill.

The through rates exclude the cost of sliding bolts, tower bolts and handles but include the cost of labour for fixing them. These fittings can be either of aluminium or brass. While brass fittings should be arranged departmentally, aluminium fittings of approved quality may be arranged by the contractor as per table on pages 458—459 in which case the through rate shall be increased suitably as mentioned in the common schedule. The cost of labour for fixing mortise or rim locks and latches is not included in the rates of doors and windows and is to be paid for separately.

The through rates are for the sections and sizes of chowkats and joinery as shown in the table and drawings. The rate shall be modified suitably if these sections and sizes are varied from the standard ones.

**SPECIFICATION NO. 17.3—Panelled and Glazed
Doors and Windows**

1. The provisions of this specification shall apply to all framed doors and windows, either all panelled or all glazed or partly panelled and glazed. The provisions of general specifications for doors and windows,—vide specification no. 17.2 shall apply in addition to these specifications.

Scope.

2. Timber shall be of the kind specified and shall conform to specification no. 17.1 for 'Wood work General' Glass panes shall conform to specification no. 3.43 'Glass panes' and shall be of type and thickness specified.

Materials.

3. Panels shall be in one piece up to 12 inches (30 cms.) clear in the case of deodar and other soft woods, and 18 inches (45 cms.) clear in the case of teak. In larger sizes they may be jointed, with a continuous tongued and grooved joint, and glued together. The grains of the solid panel shall run along the longer dimension of the panel. Panels shall be framed into grooves to the full depth of the groove leaving an air space of 1/16 inch (1.6 mm.) and the faces shall be closely fitted to the sides of the groove. Mouldings to the edges of panel shall be scribed at the joints.

Panels shall not be less than 12 mm. thick. If the thickness of the stiles and the rails exceeds 38 mm the thickness of panel shall be $\frac{1}{2}$ rd of the thickness of the stiles and rails.

Panels shall be planed absolutely smooth so that no marks are visible. Unless otherwise specified, panels shall be plain (and not splayed) and the arises of the frame receiving the panels shall be rounded off.

4. Sash bars shall be the full thickness of the leaf and $1\frac{1}{2}$ inch (38 mm.) in width and shall be moulded and mitred on the outside and rebated from inside. The width of the rebate shall be $\frac{1}{2}$ inch (13 mm.) and the depth shall be half the thickness of the stiles and rails. A rebate of similar dimension shall also be cut in the stiles and rail receiving the glazing.

Sash Bars.

5. All glazing shall be carried out in accordance with the specification no. 17.9 for glazing. Doors and windows of bed rooms and bath rooms shall be glazed with frosted glass, where ordered, up to full eye level without extra payment.

Glazing.

**SPECIFICATION NO. 17.4—Battened and Braced
Doors and Windows**

- Scope.** 1. This type of door will be formed with battens secured to three ledges, with two braces between the ledges. Windows will have only two ledges and one brace. The provisions of general specifications for "doors and windows",—vide specification no. 17.2 shall apply in addition in these specifications.
- Construction.** 2. The top edges and ends of ledges and braces shall be chamfered. The battens (planks) shall have tongued and grooved joints, finished with a V on one side, and shall be of uniform width, not more than 5 inches (12.5 cms.). The battens shall be screwed with two screws at each end and one over each brace and the middle ledge. The ledges, braces and battens shall be of the size specified in the table on pages 454-455. The portion of the middle ledge shall be such as to the braces to have the same inclination otherwise the appearance will not be satisfactory. The braces shall be housed and not tenoned into the ledges.
- Double Leaves.** 3. In the case of double doors, a 3 inches \times 1 inch (75 mm \times 25 mm.) cover bar shall be screwed on to the edge of one leaf so as to make it a master leaf.
- Hanging.** 4. The chowkat shall be rebated to a depth equal to the full thickness of the door, i.e., the battens plus ledges. The doors shall be hung with the battens inside and the ledges outside. Hinges shall be fixed to the ledges. The braces shall incline upwards from the hanging edge.

**SPECIFICATION NO. 17.5—Battened and Framed
Doors and Windows**

1. Battened and framed doors will consist of two styles, three rails forming the frame of each leaf to which the battens (planks) will be fixed. Windows will be as above, but will have two rails. The provisions of general specifications for "doors and windows" —, vide specification no. 17.2 shall apply in addition to these specifications.

Scope.

2. The framing shall be made with mortise and tenon joints as per specification no. 17.2. As the middle and bottom rails are comparatively thin, the tenons in these rails shall be made flush with one face of the rail. The top rail and stiles shall equal the thickness of the door. The middle and bottom rails shall be of less thickness, so that the battens may run continuously in one length from the underside of the top rails to the bottom of the door. The exposed edges of stiles and rails shall be chamfered or stop-chamfered. The framing and rails shall be of the size specified in table on page 454-455.

Framing.

3. The battens will not be more than 5 inches (12 cms.) wide and shall also be parallel and uniform in width. The joints shall be tongued and grooved and either V-jointed or beaded on the outside. Battens shall be secured with two screws at the bottom end and with one screw over the lock rail. The heads of the battens shall be tongued into the top rail, where side battens shall be tongued into the stiles.

Battens.

SPECIFICATION NO. 17.6—Wire Gauze Shutters

- Scope.** 1. Wire gauze shutters shall conform to general specification no. 17.2 for "Doors and Windows", except as provided in the following paragraphs. The work shall be carried out in accordance with the drawings or in their absence directions given by the Engineer-in-charge.
- Materials.** 2. The wire gauze shall be of 12×12 meshes to the square inch (140 G nominal size) made from 22 S.W.G. (0.71 mm.) galvanised iron wire. Wire gauze shall conform to specification no. 3.25 for "Wire gauze" in all respects. All wire gauze panels shall be in one piece, no joints being allowed in the gauze.
- Chowkat.** 3. Wire gauze shutters shall normally be hung on the same chowkat as other doors and windows, the thickness of the chowkat being increased suitably to take the rebate of the wire gauze shutter. On existing chowkats, wire gauze shutters may be fixed with additional moulding having thickness equal to that of shutter and width equal to that of chowkat.
- Shutters.** 4. The thickness of the shutter shall be as specified. Stiles and rails shall conform to specification no. 17.2 for "Doors and Windows General"; except that these shall be rebated to a depth equal to half the thickness of stiles and rails to receive the wire gauze, which shall form the panels.
- Fixing.** 5. Wire gauze shall be fixed to the frame of the leaf after being stretched from out to out of rebate and nailed down taut and then fixed by a $\frac{1}{2}$ inch (13 mm) thick fillet screwed into the rebate. The depth of the fillet shall be such that it projects by $\frac{1}{8}$ inch (3 mm) from the face of the stile or rail when fixed. Screws shall not be less than $1\frac{1}{2}$ inch (45 mm.) to the length nor spaced further than 9 inches (25 cms.). All exposed arises of the fillet shall be finished with a small neat mould.
- Rate.** 6. The through rates include the provision of extra depth in the chowkat to take the rebate of the wire gauze shutter. Where wire gauze shutter is fixed with additional moulding on the existing chowkat, payment will be made on the overall measurement of masonry opening, otherwise on the area of clear shutter opening when the shutter is housed in chowkat. The labour rates provide for labour charges for above operations, sawing charges and also carriage to and from the saw mill.

SPECIFICATION NO. 17.7—Cup-Board Shutters

1. Unless otherwise specified, cup-board shutters shall consist of a chowkat of size 45 mm. x 60 mm. and double shutters. The shutter shall consist of a skeleton frame with stiles and rails of 2 inch (50 mm.) width (or as shown in the drawings). The skeleton frame shall be en faced on one side with plywood panel or alternatively plywood panel shall be framed into grooves of stiles and rails as shown in the drawing or as directed by the Executive Engineer

General.

2. Timber shall be of the wood of the kind specified and shall conform to the specification no 17.1 for "Wood work General" Plywood shall be 3 ply 4 mm thick and shall conform to specification no 3.16.

Materials.

3. The skeleton frame shall be built in accordance with General Specifications for 'Doors and Windows', vide specification no 17.2. When the skeleton frame has to be en faced, plywood panels shall be struck thereon with a cold setting synthetic resin adhesive and secured in addition with thin panel pins. The pins shall be counter-sunk and shall be later filled in with plastic wood filler. If plywood panels are framed into grooves of stiles and rails, care shall be taken that panels penetrate to the full depth of the groove leaving an air space of 1/16 inch (1.6 mm).

Construction.

4. The through rate for cup-board shutters covers the cost of materials and labour for making chowkats and shutters, but excludes the cost of handles, bolts and hasp with staple. The through rates, however, include the cost of hinges, screws, corner straps, four hold-fasts and the labour for fixing all the fittings. The labour rate includes the labour charges for the above operations including fixing of chowkat in position, sawing charges and carriage to and from the saw mill

Rate.

**SPECIFICATION NO. 17.8—Wire Gauze or
Expanded Metal**

General.

1 The work shall be carried out in accordance with the drawings or in their absence directions given by the Sub-Divisional Officer.

Materials.

2 The wire gauze shall be 12×12 meshes to the square inch (140 G. nominal size) made from 22 S.W.G. galvanised iron wire. Wiregauze shall conform to specification no. 3.25 for 'Wire Gauze' in all respects. All wire gauze panels shall be in one piece, no joints being allowed in the gauze.

Expanded metal shall be of $\frac{3}{8}$ inch to 1 inch (19 to 25 mm.) short way mesh and $\frac{3}{32}$ inch to $\frac{1}{2}$ inch (2.4 to 3.2 mm.) thick, as specified or as directed by the Executive Engineer. Expanded metal shall conform to specification no. 3.27 for 'Expanded Metal' in all respects.

Fixing.

3 Wire gauze shall be fixed to the outside of the chowkat. This shall be drawn taut to the full width of the chowkat and nailed down and a cover strip 1 inch (2.5 cms.) in thickness and of the same width as the chowkat, so as to seem part of the chowkat, fixed all round with $1\frac{1}{2}$ (30 mm.) screws at intervals not more than 9 inches (25 cms.) apart.

Expanded metal shall be cut in pieces to the exact size, joining being not permitted. Expanded metal shall be stretched taut and fixed with galvanised iron staples to wooden members. A cover strip 1 inch (2 cms.) in thickness and of the same width of the chowkat shall then be fixed all round with $1\frac{1}{2}$ inch (30 cms.) screws at intervals not more than 9 inches (25 cms.) apart. Diagonal grooves shall be cut in the cover strip to receive the expanded metal so that when screwed there is no clearance between the chowkat and the cover strip.

SPECIFICATION NO. 17-9—Glazing

1. Glass panes shall conform to specification no. 3-43. They shall be plain, forsted, plate glass or any other type as specified.

Materials.

Putty used on wooden doors and windows shall consist of whiting (conforming to Indian Standard: 63) and ground fine to pass a sieve of 45×45 meshes to the square inch (18 meshes to the sq. cm.) and raw linseed oil (conforming to Indian Standard: 75) mixed and kneaded in such proportions as to form a stiff paste. For putty used on steel doors and windows, varnish gold size (conforming to Indian Standard: 198) shall be added at the rate of 1½ pints per 100 lbs. (1.7 litres per 100 kgs.) of above mentioned linseed oil putty.

The material shall be a homogeneous paste and shall be free from dust, grit and other visible impurities. Putty shall conform to the requirements and test laid down in Indian Standard: 419 'Specifications for putty for use on wooden frames,' and Indian Standard: 120 'Specifications for putty for use on metal frames.' Timber for fillets shall conform to specification no. 3-15 for 'timber.'

All dirt and surface moisture shall be removed from the rebates before starting glazing.

Preparation of Surface.

3. Sufficient putty shall be applied to the rebate, so that when the glass has been pressed into the rebate, a bed of putty not less than 1/16th inch (1.6 mm.) thick shall remain between the glass and rebate. The surplus putty shall be squeezed out and stripped at an angle as shown in fig 17-9 (a) to prevent water accumulating. Wooden beading shall be equal to the size of the rebate and shall project outside the sash bars by a thickness equal to that of the glass. The beading shall be screwed to sash bars in such a manner that there is a thin layer of putty between the glass panes and the beading and also between the rebate and the beading. Care shall be taken to ensure that no voids are left between the glass and the beading.

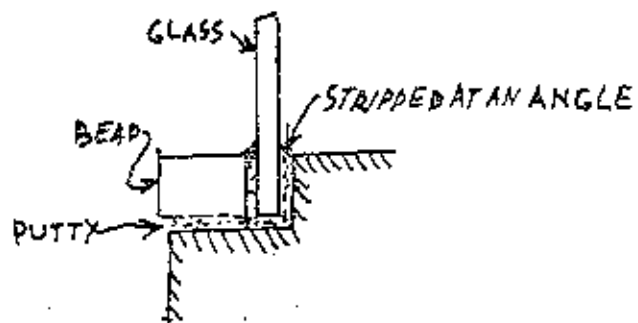
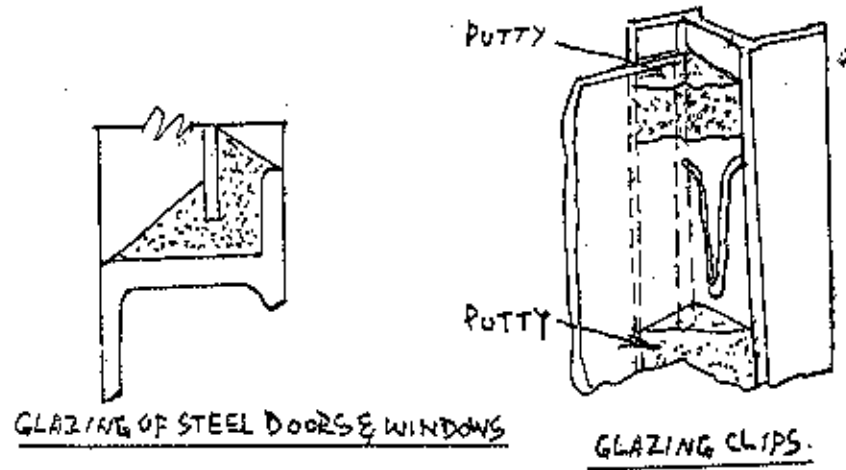
Glazing in Wooden doors and windows.

4. Special putty for metallic doors and windows shall be applied to the rebate in the same manner as given above for wooden doors and windows. No beading is to be employed in case of steel doors and windows but the glass panes secured by the putty in the form of a triangular fillet. Large glass panes shall, however, be secured by glazing clips spaced not more than 12 inches (30 cms.) apart, measured round the perimeter of the pane and afterwards fronted with putty to form a triangular fillet. Glazing clips are not usually necessary for normal size panes. Fig. 17-9 (a)

Fixing Glazing of steel doors and windows.

SPECIFICATION NO. 17-9—Glazing

illustrates the method of fixing the glass panes in steel doors and windows.



GLAZING OF WOODEN DOORS & WINDOWS

FIG: 17-9 (2)

SPECIFICATION NO. 17.10—Flush Doors

1. Flush doors shall consist of factory-manufactured solid flush shutters of specified thickness fixed in teak or deodar wood chowkats as specified or shown in the drawings. Commercial type flush doors shall have veneers of either elm (kanju) or gurjan, while decorative flush doors shall have veneers of teak.

General.

2. Timber shall conform to specification no. 17.1 for "wood work General".

Materials.

Glue used in the manufacture of flush doors shall conform to B.W.R. type of synthetic resin specified in Indian Standard: 847.

3. The core shall be wood laminae prepared from battens of well-seasoned and treated good quality wood, having straight grains. The battens shall be of uniform size of about 1 inch (2.5 cm.) width. These shall be properly glued and machine pressed together with grains of each piece reversed from that of the adjoining ones. The longitudinal joints of the battens shall be staggered and no piece shall be less than 1 ft. and 6 inches (0.45 meter) in length.

Core.

4. All decorative flush doors, with teak facing shall be lipped with teak wood battens of 1 inch (2.5 cm.) minimum depth, glued and machine pressed along with the core. Elm or gurjan faced type flush doors shall be lipped with elm or gurjan wood battens. If so specified, core shall be un-lipped.

Lipping.

5. The core surface shall have two or more veneers firmly glued on each face. The first veneer (called cross band) shall be laid with its grains at right angles to those of the core and the second and third veneers with their grains parallel to them. The under-veneers shall be of good quality, durable and well-seasoned wood. The facing veneers shall be of minimum 1 mm. thickness and shall be of well-matched and seasoned teak or elm or gurjan as specified. They shall be laid along the grain of the core battens. The combined thickness of all the veneers on each face shall not be less than 4 mm. The direction of grain of face veneers shall be vertical.

Veneers.

6. Where specified, openings for glazing shall be provided with glazing beads, ready-mitred, loosely pinned within the thickness of the door.

Glazing Beads.

7. Flush shutters shall be flat, square and sanded to a smooth finish.

Finish.

8. Specification No. 17.2 for "Doors and Windows—General" shall apply regarding other details of the door regarding chowkat, fixing, cleats, stops etc.

Details.

SPECIFICATION NO. 17-10--Flush Doors**Measurements.**

9. Flush doors shall be measured in the same manner as per general provision given in para 22 of specification no. 17-2.

Rate.

10. The through rates include the cost of factory-manufactured solid flush doors, chowkats with wood preservative, iron hold fasts, corner straps, brass hinges, cleats and stops and the labour for fixing the doors and all fittings in position. The labour rates includes the labour charges for the above operations. The rates exclude the cost of fittings like tower bolts, handles etc. (other than those specified above) but include the labour charges for fixing them. The cost or labour for fixing mortise or rim locks and latches is not included in the rates of doors and windows and is to paid for separately.