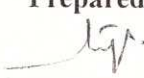
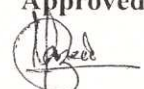


TECHNICAL SPECIFICATION FOR
THE MANUFACTURE OF PATTERN EQUIPMENT

- 1.0 SCOPE:**
This specification covers all the details of manufacture of the pattern equipment for use in Foundry, BHEL, Hyderabad.
- 2.0 CATEGORIES OF PATTERNS:**
Based on the size, pattern equipment is divided into three categories viz.
(a) Small patterns (b) Medium patterns (c) Large patterns.
- 3.0 QUALITY OF WOOD:**
Good quality teakwood or softwood (Deodar) only shall be used for pattern manufacture as Specified. The wood shall be fully seasoned. The material shall be free from defects like insect damages, knots and cracks etc., which cause harm to the quality and durability of pattern equipment.
- 4.0 CONSTRUCTIONAL FEATURES:**
- 4.1 The patterns shall be manufactured as per the procedure given. The patterns shall be strong and rigid to withstand all forces during mould / core making, using resin sand / Co₂ sand or similar rigid sand systems. The pattern / core equipment shall come out easily from sand and should not break during pattern withdrawal from mould.
- 4.2 The pattern / core box equipment shall be true to the process drawing / component drawing supplied and as per the contraction scale given in the drawings. They shall have pattern draft allowance and generous fillets.
- 4.3 The pattern surface shall be smooth, without any undercuts, surface depressions etc.
- 4.4 The equipment should not warp during usage.
- 5.0 PROCEDURE FOR CONSTRUCTION:**
- 5.1.0 **SMALL PATTERNS:** Size up to 500 X 500 X 500 mm
- 5.1.1 **PATTERN:** Complete pattern equipment shall be made in teakwood. Pattern frame thickness shall be minimum 50mm and width 75mm. Segments construction shall be as follows:
Thickness: 25-30mm Width: 80mm min. Length: 150mm.
- 5.1.2 **CORE BOX:** Side and bottom board thickness shall be min. 40mm with suitable supporting battens in teakwood.

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5.2 **MEDIUM PATTERNS:** Size from 500 X 500 X 500 mm to 1500 X 1500 X 1500 mm.

5.2.1 **PATTERN:** The pattern base at parting line and core print shall be made out of teakwood. Loose pieces, projections and flanges shall also be in teakwood. Construction of the body and Core boxes etc, shall be in teak wood / softwood. Pattern frame at parting line shall be made with min. thickness of 80mm and width 120mm. The segments for the construction of pattern equipment Shall be as follows:

Thickness: 40-50mm width: 150 mm min. Length: 300mm.

5.2.2 **CORE BOX:** Side boards and bottom board thickness shall be min. 60mm with supporting battens in teak wood of size 80 X 50 mm at an interval of 500mm. All loose pieces, projections and flanges etc. shall be in teakwood.

5.3 **LARGE PATTERNS:** Size above 1500 X 1500 X 1500 mm

5.3.1 **PATTERN:** The pattern base at parting line and core print shall be made out of teakwood. Loose pieces, projections and flanges shall also be in teakwood. Construction of the body and core boxes etc. shall be in teakwood / softwood. Pattern frame at parting line shall be made with minimum thickness of 100mm and width of 200mm. The segments for the construction of pattern equipment shall be as follows:

Thickness: 40-50mm Length: 300 mm width: 150 mm. for more than 1500mm dia. & 120mm width for less than 1500mm dia.


5.3.2 **CORE BOX:** Side boards and bottom board thickness shall be min. 75mm with supporting battens in teakwood of size 100 X 80 mm at an interval of 500mm.

5.4 **CLEARANCES:** Clearances between core and core seat on cope is provided to avoid damage of Core during core setting and closing. This varies from 1 to 3mm for small / medium / large Patterns. For drag side also to ensure easy and snug fit a small clearance is provided but only on sides (not exceeding 1 mm) and not at bottom.

5.4.1 **MOULD TAPER / DRAFT:** The pattern shall be provided with tapers / drafts as specified in the process drawing. Wherever not specified suitable draft may be given for removal of the Pattern from mould or removal of core from core box.

5.4.2 **ALLOWANCES ON MACHINED SURFACES:** Machining allowances shall be as per process drawing.

5.4.3 **ALLOWANCES ON NON – MACHINED SURFACES:** Sometimes process drawing specify allowances on non machined faces like wall thickness, flange, etc., to take care of dimensional variations in process and shall be provided.

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- 5.5 **LAYOUTS, TEMPLATES:** Necessary layouts shall be made for the purpose of pattern manufacture and inspection also. All necessary templates shall be made for shaping the profiles and also for inspecting the pattern equipment after completion.
- 5.6 **PARTING LINES:** Parting lines and openings of the core box shall be as per the process drawing.
- 5.7 **JOINING OF SEGMENTS:** Segments shall be joined together with synthetic glue and screws.
- 5.8. **LOOSE PIECES:** All loose pieces shall be in Teakwood / Al. Metal and shall be firmly located without any movement.
- 5.9 **FILLETS AND RADII:** All fillets and radii shall be made in teakwood.
- 5.10 **CLAMPING OF CORE BOXES:** All core boxes shall be provided with clamping devices with bolts and nuts. Large core boxes shall be provided with tie rods also.
- 5.11 **TURNING ARRANGEMENTS:** Core boxes, which are to be turned, shall be provided with MS angle plates at sling locations.
- 5.12 **LIFTING ARRANGEMENTS:** Suitable lifting and rapping tackles / plates made of MS shall be provided on pattern and core boxes.
- 6.0 **FINISH AND PAINT:**
- 6.1. Pattern and core boxes shall be finished smooth and then only primary coating shall be applied.
- 6.2 The Pattern equipment shall be offered for inspection with primary coat, and only after final approval, painting shall be done with NITRO CELLULOSE PAINT. The final painting shall be done as per the color code mentioned in the process drawing.
- 7.0 **MARKING ON PATTERNS:**
- 7.1. All central lines / ref lines shall be marked deeply for further use.
- 7.2 Pattern No. shall be fixed with nails on pattern with raised letters, of appropriate size with sufficient taper.
- 7.3 Pattern No. shall be marked with black paint on pattern and all core boxes including gating and loose pieces.
- 7.4 All technological markings as per process drg. shall be marked with black paint on pattern and Core boxes.



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8.0 INSPECTION AT SUPPLIERS WORKS:

Pattern equipment shall be inspected at supplier's works. Pattern manufacturer shall provide all necessary inspections facilities like surface plate, scales, height gauges etc.

9.0 REJECTION AND REPLACEMENT:

In case the pattern / core box equipment proving defective in the course of mould / core making, attributable to pattern manufacturing or materials, the equipment shall be rectified / replaced at the supplier's cost, not withstanding any previous satisfactory inspection.
