



RESEARCH DESIGNS AND STANDARDS ORGANISATION
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Track Machine and Monitoring Directorate

SPECIFICATION NO. TM/HM/6/108 REV- 3

SPECIFICATION OF STEEL BUSH FOR TAMPING ARM
(CENTRE PIN) PART NO. 2E31.02A)

(Date effective: --/--/2025)

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1.0 Scope

This specification covers dimensional, functional and material requirements with testing criteria of steel bush for tamping arm (Centre pin) of continuous action tamping machines of model (CSM 09-32). This specification may be treated as provisional subject to modifications based on service performance.

2.0 Reference Documents

Following documents have been referred to in this specification. Full sets of relevant specification and drawings, duly incorporating the up-dated corrections/ amendments shall be available for reference at the manufacturer's works.

- i) IS:1608 – 1992 - Mechanical testing of metals - tensile testing.
- ii) BS:970(Pt.II)-1970 - Specification of direct hardening alloy Steel.
- iii) RDSO Drg. No. : TM/0129 REV-3

3.0 Functional Requirement

The bush shall be capable to withstand vibrations as well as squeezing pressure exerted on the tamping arm and to act as spacer sleeve between the Centre pin and the tamping arm hole. The surfaces of the bush shall be machine finished as mentioned in the drawing.

4.0 Terminology

For the purpose of the specification following definitions shall apply:

- 4.1 **Carburizing:** A process of introducing carbon into the surface of a solid piece of steel by heating and holding above the transformation temperature in contact with a suitable source of carbon which may be a solid, liquid or gas.

5.0 Dimension & Tolerance

Dimensions and tolerances of the bush shall be as mentioned in RDSO drawing no. TM/0129 REV-3.

6.0 Material

The material of the bush shall be made from Steel of grade 709M40(EN-19).

7.0 Heat Treatment

Necessary heat treatment shall be done by case hardening process to achieve case hardness $55 \pm 2 \text{HRc}$.

8.0 Marking: Month & year of manufacture and manufacturer's code/ identification shall be engraved / embossed on the outer surface of the bush.

9.0 Tests

9.1 Type Test: The manufacturer shall make available three samples of the bush for conducting test of chemical analysis and visual & dimensional checks. For conducting the tests for mechanical properties, two nos. test bars shall be made with the same material and heat treatment as that of the bush samples.

- i) **Visual and dimensional check:** All the three sample of the bush shall be visually checked for surface defects like, roughness, cracks, improper edges etc. Dimensions of the bush shall be as mentioned in the drawing no. TM/0129-Rev-3.
- ii) **Non-destructive test:** For checking surface cracks, which cannot be detected by naked eyes, all the three samples of the bush shall be subjected to non-destructive tests like liquid penetrant test. For detection of internal flaws ultrasonic tests shall be carried out.
- iii) **Chemical composition test:** One out of three samples shall be subjected to chemical composition test. The manufacturer shall arrange for this test at his laboratory if in-house facility for this test is available with the firm. Otherwise the sample shall be sent to a Govt./Govt. registered test house for conducting chemical composition test. The inspecting officials, may witness the test of chemical composition at firm's premises / out side test agency, if desired by them. Before sending the samples to the test house, the same shall be duly sealed by the inspecting officials and the manufacturer shall arrange for sending the samples to the test house. Cost of such testing shall be borne by the manufacturer. The chemical composition shall conform to the grade as mentioned in the clause no. 6.0.
- iv) **Hardness test:** Hardness test of the test bars shall be carried out at the manufacture's premises. Hardness shall be measured at three different locations on the samples. Hardness shall be in the range of $55 \pm 2 \text{HRc}$. The hardness test shall be witnessed by the inspecting officials and no test certificate for hardness from outside agency shall be acceptable.

9.2 Acceptance Test: The acceptance test shall be conducted by the manufacturer before dispatch of material, as per following details:

- i) Visual & Dimensional Check as per para 9.1 (i): for every bush.
- ii) Non-destructive test as per para 9.1 (ii): for every bush.

- iii) Chemical composition test as per para 9.1 (iii): One for every melt/batch of heat treatment,
- iv) Test of hardness: one for every melt / batch of heat treatment.

The manufacturer shall conduct the above acceptance tests before offering the materials for inspection and shall show the result of the acceptance tests to the inspecting officials before commencement of inspection. The manufacture shall issue certificate in respect of each bush that the same conforms to the stipulated dimensions and physical properties. Any deviation in the test results from the requirements of the specification shall be the cause of rejection of the component. The supplier shall also furnish certificate that the material used for manufacturing of the bush conforms to the requirements mentioned in the specification.

10.0 Inspection

The inspection of the bush shall be carried out as per following Para.

- 10.1 Every bush shall be subjected to dimensional & visual check as per para 9.1 (i) and non-destructive test as per para 9.1 (ii).
- 10.2 Whenever the consignee considers it necessary, hardness test shall also be carried out under the witnessing of inspecting officials on minimum 5% of the consignment size or one whichever is more. The manufacturer shall also produce all relevant documents as proof for conformity to the quality of the raw material used in manufacturing of the bush.
- 10.3 In case more than 10% of the samples of the consignment fail during inspection in respect of para 10.1 & 10.2, fresh samples (the numbers of which is equal to those of failed samples) shall be inspected as per para 10.1 & 10.2. and the failed samples shall be rejected. If the samples, taken afresh again fail, the total consignment shall be rejected.

11.0 Protection

The bush shall be protected with one coat of boiled linseed oil conforming to IS:77-1976 (Linseed oil for paints) or with other rust preventive compound.
