

3693776/2026/O/o SR DEPT/SC/REB/MUM/CR

SPECIFICATIONS OF BATTERY-OPERATED TAMPING MACHINE

This specification covers technical and material requirements with testing details of Battery-Operated Tamping Machine.

One set shall consist of

- 02 Nos. hand held tampers
- 08 Nos. Li-Ion battery
- 04 Nos. tamping tool/blade
- 04 Nos. fast charger
- 02 Nos. transportation trolley

A. The tamping tool of the tamping equipment shall be made of alloy steel / High Carbon steel or equivalent to attain following minimum parameters:

- | | |
|------------------------------|----------------------------------|
| 1. Density | : Approx. 7.85 g/cm ³ |
| 2. Ultimate Tensile Strength | : 1000 to 1500 MPa |
| 3. Yield Strength | : 1000 to 1200 MPa |
| 4. Elongation at Break | : 10 to 25% |
| 5. Modulus of Elasticity | : Approx. 200 GPa |
| 6. Brinell Hardness | : 300 to 400 HIB |
| 7. Shear Strength | : 600 to 900 MPa |
| 8. Fatigue Strength | : 500 to 700 MPa |

Test for chemical composition and mechanical properties of tamping tool/blade: Certificate from Government laboratory/ NABL accredited laboratory shall be produced for chemical composition and mechanical properties of tamping tool. Vendor shall upload the test report/certificate at the time of bidding of tender. Failure to submit the same shall result in summary rejection of the offer.

B. The tamper shall be light in weight, portable and shall be made of 6000 series aluminum alloy or equivalent to attain following minimum parameters:

- | | |
|------------------------------|----------------------------------|
| 1. Density | : Approx. 2.70 g/cm ³ |
| 2. Ultimate Tensile Strength | : 90 to 130 MPa |
| 3. Yield Strength | : 35 to 70 MPa |
| 4. Elongation at Break | : 12 to 20% |
| 5. Modulus of Elasticity | : 50 to 70 GPa |
| 6. Brinell Hardness | : 30 to 40 HB |

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MANOJ KUMAR
TARINI GOUDA
Date: 2026.01.05
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Reason: IREPS-CRIS
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Office by MANOJ KUMAR GOUDA, SSE(PWAY)11/ENG/MUM/CR, MUMBAI DIVISION on 05/01/26 02:11 PM

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Digitally signed by
MANOJ KUMAR
TARINI GOUDA
Date: 2026.01.14
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Reason: IREPS-CRIS
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7. Shear Strength : 60 to 80 MPa
8. Fatigue Strength : 40 to 60 MPa
9. Ingress Protection (IP) : IP 62 and above

Test for chemical composition and mechanical properties of tamper: Certificate from Government laboratory/ NABL accredited laboratory shall be produced for chemical composition and mechanical properties of tamper. Vendor shall upload the test report/certificate at the time of bidding of tender. Failure to submit the same shall result in summary rejection of the offer.

C. The tamper shall be fitted with suitable vibration dampening system and shall be made of natural rubber/EPDM/Neoprene/NBR/PU to attain following minimum parameters:

1. Density : 1.1 – 1.2 g/cm³ (varies by rubber type)
2. Hardness (Shore A) : 40 – 80 Shore A (softer for better damping)
3. Elongation at Break : 300% – 600% (high elasticity)
4. Tensile Strength : 5 – 25 MPa
5. Modulus of Elasticity : 0.01 – 0.1 GPa (very flexible)
6. Compression Set : < 25% (low values preferred for shock absorption)
7. Resilience : Medium to high (important for energy return)
8. Damping Capacity : High (absorbs vibrations and shocks effectively)
9. Fatigue Resistance : Good (especially in dynamic applications)
10. Temperature Range : -40°C to +120°C (depends on rubber type)

Test for chemical composition and mechanical properties of vibration dampers: Certificate from Government laboratory/ NABL accredited laboratory shall be produced for chemical composition and mechanical properties of vibration damper. Vendor shall upload the test report/certificate at the time of bidding of tender. Failure to submit the same shall result in summary rejection of the offer.

D. The tamper shall be supplied with suitable BIS certified Li Ion battery system and shall be made of LCO/LFP/NMC/NCA to attain following minimum parameters:

1. Nominal Voltage : 36V to 42V
2. Capacity : 15Ah to 18 Ah
3. Max Charge Voltage : 36V to 42V
4. Discharge Cut-off Voltage : 25V to 30V to prevent deep discharge
5. Cycle Life : 1200 to 2000 cycles
6. Maximum Charge Current : 15A to 18A
7. Maximum Discharge Current : Can be 1C to 3C
8. Operating Temperature : Typically -20°C to + 60°C
9. Form Factor : Cylindrical (e.g., 18650), prismatic,
10. Protection Circuit : BMS (battery management system) to prevent overcharge- discharge, Limit charge/discharge current, monitor temperature.
11. Smart BMS : Mobile app for online monitoring of battery parameters.
12. Ingress Protection (IP) : IP 62 and above

Test for Li Ion battery specifications: Certificate from Government laboratory/ NABL accredited laboratory shall be produced for Li Ion battery system. Vendor shall upload the test report/certificate at the time of bidding of tender. Failure to submit the same shall result in summary rejection of the offer.

Battery Operated Tamping Machine		
Technical Specifications & Operational Parameters		
No	Technical Specifications	Requirement

1	Warranty	01 Year
2	Training & Installation	Free of cost
3	Supplied In	Plastic carry case
4	Weight of machine with battery	20Kg to 25Kg
5	Machine Features	Light weight, Battery operated, Low vibration level, High blow frequency, Fast In fast out, No Emission, option to use two batteries.
6	Power source	Double Lithium-Ion Battery
7	Blows per minute (BPM)	12000 to 13000
8	Rotation per minute (RPM)	17000 to 18000
9	Battery Capacity (Ah)	15Ah to 18Ah
10	Rated Voltage (DC V)	36V to 40V
11	Acceleration to handle (M/S ²)	< 10
12	Non-loaded Amplitude (mm)	> 1.35
13	Vibration frequency (Hz)	> 300
14	OTR (°C)	- 40 to 50
15	Continuous running time	45 min to 55 min
16	Joules per blow (KN)	> 4.2 KN
17	Ingress Protection (IP) Rating	IP 62 and above
18	Tamping machine trolley with storage locations for 01No. tamping tools & 02 Nos battery.	With large rubber wheels for easy transport across uneven terrain with retention strap and full-metal fastening and loading capacity of 30 Kg.
19	Battery certification & test reports required along with an authorization letter from the approved battery Supplier.	<p>The Vendor shall upload the BIS (Bureau of Indian Standards) certified valid licence of the OEM for the offered battery at the time of bidding of the tender.</p> <p>The supplied battery must bear the same 'R' (Registration) number as mentioned on the BIS license. The battery shall be tested as per IS No. IS 16046 (Part 2):2018/IEC 62133-2:2017 with latest amendments. The same will be verified during inspection by the inspecting agency, and at the consignee end at the time of delivery.</p> <p>The failure to submit the required BIS license at the time of bidding of the tender shall result in summary rejection of the offer.</p>
20	Tamping machine operational parameters as per technical specifications.	The vendor shall provide a test report/certificate issued by a Government laboratory/ NABL accredited laboratory at the time of bidding of tender for verifying compliance with operational parameters. Failure to submit the same shall result in summary rejection of the offer.
21	Tamping machine materials chemical composition and mechanical properties.	The vendor shall provide a test report/certificate issued by a Government laboratory/ NABL accredited laboratory at the time of bidding of tender for tamping tool, Aluminum Parts & vibration dampers. Failure to submit the same shall result in summary rejection of the offer.