

**TECHNICAL SPECIFICATION DOCUMENT (COPPER BUSBAR - BARE / UNPLATED)****PRODUCT OVERVIEW & APPLICATION**

Product	Copper Busbar - Bare / Unplated	Supplier	HEX Worldwide (India)
Material Grade	Cu-ETP / UNS C11000	Equivalent Ref.	CW004A / JIS C1100 (where applicable)
Nominal Size	32 mm x 6 mm x 3657.6 mm	Cross-Section	192 mm ²
Primary Standard	ASTM B187/B187M	Other References	JIS H 3140 / EN 13601
Intended Use	Electrical distribution, switchgear, panel boards	Certification	Batch MTC / CoC required

High-conductivity Electrolytic Tough Pitch (ETP) copper busbar intended for fabrication of low-voltage electrical distribution systems. The supplied product shall be bare/unplated copper, suitable for cutting, punching, drilling, bending, bolted jointing and general switchboard fabrication.

- Typical applications: main and distribution busbars, switchgear, panel boards, transformer connections, power distribution assemblies, neutral/earth bars and grounding systems.
- Supply condition: straight rectangular bar, clean and dry, without tin, silver or nickel plating unless separately specified by purchase order.
- Traceability: each bundle/lot to be identifiable to the supplier batch/heat and corresponding Material Test Certificate (MTC).

CHEMICAL COMPOSITION

Parameter	Requirement / Typical Value
Copper (Cu), including Ag	≥ 99.90 %
Lead (Pb)	≤ 0.05 % where specified
Iron (Fe)	≤ 0.03 % where specified
Other individual impurities	≤ 0.02 % where specified
Oxygen / trace elements	ETP process dependent

PHYSICAL & ELECTRICAL PROPERTIES

Parameter	Requirement / Typical Value
Density at 20 °C	≈ 8.91 g/cm ³ (8,910 kg/m ³)
Electrical conductivity at 20 °C	≥ 98 % IACS (procurement minimum)
Volume resistivity at 20 °C	≤ 0.0176 Ω·mm ² /m
Electrical conductivity	≥ 56.8 MS/m
Temperature coefficient of resistance	≈ 0.00393 /°C
Thermal conductivity at 20 °C	≈ 391 W/m·K

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Document No:	QMS/L	Date Issued:	2026/01/26
Revision No./Date:	00 / 0000 – 00 – 00	Page No:	Page 1 of 4

**TECHNICAL SPECIFICATION DOCUMENT (COPPER BUSBAR - BARE / UNPLATED)**

Coefficient of thermal expansion	$\approx 16.9 \times 10^{-6} /K$
Specific heat capacity	$\approx 385 \text{ J/kg}\cdot\text{K}$
Melting range	Approx. 1065-1083 °C
Elastic modulus	$\approx 117 \text{ GPa}$

MECHANICAL PROPERTIES

Parameter	Requirement / Typical Value
Temper / condition	Hard or half-hard as required to meet properties
Tensile strength (Rm)	300-370 N/mm ² (MPa)
0.2 % proof / yield strength	250-330 N/mm ² (MPa)
Vickers hardness	80-115 HV
Elongation	As per selected temper / governing standard
Cold forming capability	Suitable / high
Minimum inside bend radius	General guide: $\geq 1 \times t$ for $t \leq 10 \text{ mm}$

DIMENSIONAL & SURFACE REQUIREMENTS

Parameter	Requirement / Typical Value
Nominal thickness	6 mm
Nominal width	32 mm
Nominal length	3657.6 mm
Cross-sectional area	192 mm ²
Approx. mass per m	1.71 kg/m
Approx. mass per 6 m bar	6.241 kg/bar
Edge condition	Straight, deburred; sharp / radiused edge as PO
Surface finish	Bare / unplated copper
Straightness / flatness	Per ASTM B187/B187M / applicable PO

ELECTRICAL & THERMAL DESIGN GUIDELINES

Parameter	Requirement / Typical Value
Preliminary current density - enclosed LV panels	1.8-2.2 A/mm ² (design starting point only)
Indicative current for 10 × 140 mm single bar	$\approx 345 - 422.4 \text{ A}$
Nominal DC resistance at 20 °C	$\leq 12.6 \mu\Omega/\text{m}$
Temperature-rise verification	Required for final assembly
IEC 61439 copper-busbar upper rise ceiling	105 K maximum only when all other criteria are satisfied
Short-circuit withstand	Must be verified separately
AC skin / proximity effects	Consider for high current and multiple bars

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Revision No./Date:	00 / 0000 – 00 – 00	Page No:	Page 2 of 4

**TECHNICAL SPECIFICATION DOCUMENT (COPPER BUSBAR - BARE / UNPLATED)****FABRICATION & JOINTING GUIDANCE**

Parameter	Requirement / Typical Value
Cutting / shearing	Permitted
Punching / drilling	Permitted
Bending	Permitted
Bolted joints	Recommended
Brazing / soldering	Possible with suitable procedure
Surface plating	Not included in this TDS

QUALITY, INSPECTION & CERTIFICATION REQUIREMENTS

- Supplier shall provide a batch/lot Material Test Certificate (MTC) or Mill Test Report with material designation, heat/lot number, chemical composition and test results.
- Conductivity or resistivity result at 20 °C shall be stated. If conductivity is measured by eddy-current method, test equipment shall be calibrated and the method identified.
- Mechanical results shall identify tensile strength and, where tested/specifically required, yield/proof strength, elongation and hardness.
- Dimensions shall be verified for thickness, width and length against the purchase order / applicable standard.
- Incoming visual inspection: rejecting material with cracks, laminations, severe edge damage, deep scoring, heavy corrosion, contamination, distortion or unacceptable straightness.
- Supplier CoC, RoHS/REACH declarations or ISO certification shall be provided only where contractually required; this TDS itself does not certify those statuses.

PACKAGING, HANDLING & STORAGE

Parameter	Requirement / Typical Value
Packaging	Bundled and protected for export / road shipment
Identification	Each bundle to be labelled
Handling	Use slings/forklift with edge protection
Storage	Indoor, clean and dry
Surface preservation	No oil/grease on electrical jointing areas

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Revision No./Date:	00 / 0000 – 00 – 00	Page No:	Page 3 of 4

**TECHNICAL SPECIFICATION DOCUMENT (COPPER BUSBAR - BARE / UNPLATED)****ACCEPTANCE, REVISION & LIMITATIONS**

This TDS defines the requested material and procurement / engineering reference values for Meklet Metal Technology. It does not replace the supplier's certified MTC, project drawings, customer specification or the final electrical design verification of the completed switchboard.

- Where the purchase order, approved drawing or customer specification is more stringent, the more stringent requirement shall apply.
- Any deviation in grade, conductivity, mechanical condition, dimensions or surface condition requires written approval before dispatch.
- Supplier-certified values shall be reviewed against this TDS during incoming inspection and product approval.

DISCLAIMER

The information provided in this Technical Data Sheet is intended as a general guide to product performance under standard test conditions. Actual performance may vary depending on substrate condition, surface preparation, environmental conditions, application method, and site practice. Users should verify suitability for the intended application before use.

MANUFACTURER / REFERENCE PRODUCT INFORMATION**HEX Worldwide (India)**

Brass Copper & Alloy (I) Ltd.
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Maharashtra, India

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Revision No./Date:	00 / 0000 – 00 – 00	Page No:	Page 4 of 4