



instrumentation cable series

WDT / WQT Cryogenic Twisted Pair

32–36 AWG Phosphor-Bronze & Manganin cryogenic twisted pair (WDT) & quad (WQT) wire



10 mK to 400 K Cryostat

Phosphor-Bronze & Manganin

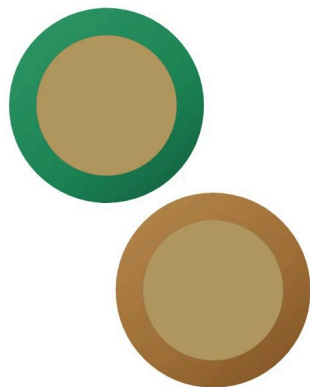
WDT Pair & WQT 4-Wire Quad

Application

WDT (Duo-Twist Pair) and WQT (Quad-Twist 4-Wire) Cryogenic Sensor Lead Wire engineered with low-thermal-conductivity Phosphor-Bronze (CuSn5) or Manganin (Cu86Mn12Ni2) 32–36 AWG solid conductors, heavy polyimide (ML) or Formvar enamel.

Typical uses: Dilution Refrigerators & Quantum Computing (10 mK–4 K), 4-Wire Cernox, RuO₂ & Ge Cryogenic Thermometry, High-Field (15–25 T) Superconducting Magnet Dewars, Space Infrared Bolometer & Cryocooler Flight Harnesses, UHV Scanning Tunneling & ARPES Cryostats

Construction



Cross-section, not to scale

- 1 Solid 32 AWG or 36 AWG Phosphor-Bronze / Manganin wire
- 2 Heavy Polyimide (NEMA MW 16-C) or Formvar enamel
- 3 Precision-twist duo (WDT) or quad (WQT) lay + bondcoat

Technical data

Typical values

DC resistance @ 295 K (PhBr)	19.0 Ω/m (32 AWG) · 48.0 Ω/m (36 AWG) per single conductor	DC resistance @ 4.2 K (PhBr)	16.5 Ω/m (32 AWG) · 41.8 Ω/m (36 AWG) — RRR ≈ 1.15
DC resistance @ 295 K (Mang.)	13.7 Ω/m (32 AWG) · 34.7 Ω/m (36 AWG) — ΔR < 10 % to 4 K	Dielectric breakdown	≥ 600 V rms (twist test per NEMA MW 1000)
Operating temperature	10 mK (-273.14 °C) to 400 K (+127 °C) · Polyimide to +220 °C	Thermal cond. (PhBr)	≈ 48 W/(m·K) @ 300 K · ≈ 12 W/(m·K) @ 77 K · ≈ 2.2 W/(m·K) @ 4.2 K
Thermal cond. (Manganin)	≈ 22 W/(m·K) @ 300 K · ≈ 6.5 W/(m·K) @ 77 K · ≈ 0.5 W/(m·K) @ 4.2 K	Bare / insulated wire Ø	32 AWG: 0.202 / 0.236 mm · 36 AWG: 0.127 / 0.155 mm
Finished bundle OD	0.31–0.47 mm (WDT Pair) · 0.62–0.94 mm (WQT Quad)	Twist pitch	3.9 to 5.5 twists/cm (10 to 14 twists/inch)
Magnetic susceptibility	Phosphor-Bronze: strictly non-ferromagnetic (zero Ni / Fe)	UHV outgassing	Polyimide ML passes NASA SP-R-0022A (TML < 1.0 %, CVCM < 0.1 %)
Cryo varnish compatibility	Resistant to GE 7031 varnish, Stycast 2850FT & Apiezon N	Standards	NEMA MW 1000 (MW 16-C Polyimide / MW 28-C Polyurethane-Nylon)

Sizes

4 standard constructions

Tick the sizes you need and send this page to info@tebaoflex.com or WhatsApp +86 185 9591 3361.

Order designation	Configuration & alloy	Bundle Ø mm	R @ 295K Ω/m	R @ 4.2K Ω/m	k @ 4.2K W/m·K
Cryogenic Twisted Pair (WDT) & 4-Wire Quad (WQT) Sensor Leads 4 sizes					
☐ WDT-32 (Phos-Bronze Pair)	2-Wire Pair × 32 AWG Phosphor-Bronze	0.47	19.0	16.5	2.2
☐ WDT-36 (Phos-Bronze Pair)	2-Wire Pair × 36 AWG Phosphor-Bronze	0.31	48.0	41.8	2.2
☐ WQT-32 (Phos-Bronze Quad)	4-Wire Quad (2P) × 32 AWG Phosphor-Bronze	0.94	19.0	16.5	2.2
☐ WQT-36 (Phos-Bronze Quad)	4-Wire Quad (2P) × 36 AWG Phosphor-Bronze	0.62	48.0	41.8	2.2

– Resistance values are per single conductor. Manganin versions (WDT-MN-36 / WQT-MN-36) are also stocked.

Standards and approvals

- ✓ NEMA MW 1000 Compliant
- ✓ ASTM B103 C51000 Alloy
- ✓ NASA SP-R-0022A Low Outgas

Certifications



Management systems: ISO 9001, ISO 14001, ISO 45001

Request a quotation

Send the size, length and destination. An application engineer replies within 2 business hours.

WhatsApp / phone

+86 185 9591 3361

Email

info@tebaoflex.com

Web

tebaoflex.com/cables/wdt-wqt-phosphor-bronze-and-manganin-loom-woven-cryogenic-twisted-pair-wire



Typical values for this cable type, based on NEMA MW 1000 (MW 16-C / MW 28-C) / ASTM B103. Values for your order are confirmed in the quotation. Subject to change without notice. Jiangsu Tebaoflex Special Cable Co., Ltd., Taicang, Jiangsu, China.