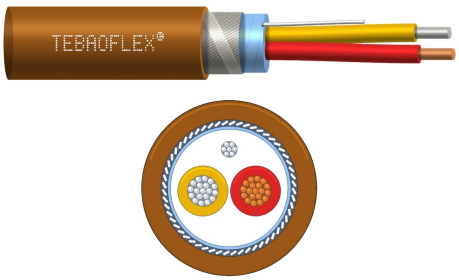
Duplex FEP, PFA & Sintered PTFE Thermocouple Sensor Wire



TEBAOFLEX® manufactures true thermocouple-grade duplex sensor wires (40 AWG ultrafine solid up to 20 AWG solid and 7-strand flexible) calibrated in accordance with ASTM E230 (ANSI MC96.1) Special Limits of Error (SLE) and IEC 60584-1 Class 1 across calibrations K, J, T, E, and N. Available with melt-extruded PFA (-200°C to +260°C), extruded FEP (-90°C to +200°C), fused sintered PTFE tape (-200°C to +260°C), and twisted-shielded foil/braid (TWSH) constructions.

1. Key Electrical, Thermal & Mechanical Ratings

Calibration Types	True Sensor Grade: Type K, J, T, E & N (Class 1 / SLE)	**Thermal Envelope**	-200 °C to +260 °C (PFA & PTFE) | -90 °C to +200 °C (FEP)
Gauge Span	40, 36, 30, 24 & 20 AWG Solid | 24S, 22S, 20S (7-Strand)	**EMF Tolerance**	IEC 60584-1 Class 1 | ASTM E230 Special Limits (SLE)
Dielectric Formats	Melt-Extruded PFA, Extruded FEP & Fused Sintered PTFE	**Profile Geometry**	Parallel Oval Rip-Duplex | Twisted Round | TWSH Screened
EMI Shielding	Unshielded, Foil + Drain (TWSH) or >=85% Tinned Cu Braid	**Color Standards**	ANSI MC96.1 (Brown/Color) or IEC 60584-3 (Green/Black/etc.)

2. Layer-by-Layer Cable Construction

Matched single-melt thermocouple alloy pairs insulated in pinhole-free fluoropolymers for zero cold-work drift, vacuum sealability, and chemical immunity.

Calibrated Alloy Conductors	Matched sensor-grade positive/negative thermoelements (Type K, J, T, E, N) in solid (40, 36, 30, 24, 20 AWG) or flexible 7-strand (24S = 7/32, 22S = 7/30, 20S = 7/28, 0.22 mm² = 7×0.20 mm)
Primary Core Dielectric	Color-coded virgin melt-extruded PFA (+260 °C), melt-extruded FEP (+200 °C), or wrapped & thermally fused sintered PTFE tape (+260 °C)
Parallel vs Twisted Layup	Flat oval rip-cord duplex (easy-strip parallel cores) for miniature bead welding, or precision short-lay twisted pair for magnetic hum cancellation
EMI / RFI Screening (TWSH / C)	Optional 100% aluminum-polyimide/PET foil tape + stranded tinned copper drain wire (TWSH), or ≥85% tinned/silver-plated copper wire braid (FEP/C/FEP)
Outer Fluoropolymer Jacket	Continuous extruded PFA, FEP, or fused sintered PTFE outer sheath coded to ANSI MC96.1 (Brown overall for SLE/Thermocouple Grade) or IEC 60584-3 (Green K, Black J, Brown T, Violet E, Pink N)

3. Applicable Engineering & Testing Standards

• ASTM E230 / ANSI MC96.1: Temperature-Electromotive Force (EMF) Tables & Special/Standard Limits of Error for Thermocouples

• IEC 60584-1 & IEC 60584-3: International Thermocouple EMF Tolerances (Class 1 / Class 2) & Insulation Color Coding

• SAE AMS 2750 (Pyrometry): Aerospace Heat-Treating & Autoclave Load-Thermocouple Accuracy Support (SLE / Class 1)

• UL 1581 VW-1 & IEC 60332-1-2: Inherent Fluoropolymer Non-Flammability (LOI > 95% for PTFE/PFA/FEP)

4.1 Duplex FEP, PFA & Sintered PTFE Thermocouple Sensor Wire Dimensional Schedule

Series Code	AWG / Metric Gauge	Stranding (mm)	Core / Jacket Wall (mm)	Nominal OD (mm)	Approx. Weight (kg/km)
Tier 1 — Melt-Extruded PFA Duplex Sensor Wire (-200 °C to +260 °C, Parallel Oval Profile)					
TBX-TC-PFA-20	20 AWG (0.52 mm²)	Solid (1 × 0.81)	0.25 / 0.25 PFA	1.7 × 3.0	16.7
TBX-TC-PFA-20S	20S AWG (0.56 mm²)	7 × 0.32 (7/28)	0.25 / 0.25 PFA	1.9 × 3.2	16.7
TBX-TC-PFA-22S	22S AWG (0.35 mm²)	7 × 0.254 (7/30)	0.25 / 0.25 PFA	1.7 × 3.4	13.3
TBX-TC-PFA-24	24 AWG (0.205 mm²)	Solid (1 × 0.51)	0.20 / 0.20 PFA	1.4 × 2.4	10.0
TBX-TC-PFA-24S	24S AWG (0.22 mm²)	7 × 0.20 (7/32)	0.20 / 0.20 PFA	1.6 × 2.6	10.0
TBX-TC-PFA-30	30 AWG (0.051 mm²)	Solid (1 × 0.254)	0.10 / 0.13 PFA	0.6 × 1.0	3.3
TBX-TC-PFA-36	36 AWG (0.013 mm²)	Solid (1 × 0.127)	0.09 / 0.10 PFA	0.5 × 0.8	1.8
TBX-TC-PFA-40	40 AWG (0.005 mm²)	Solid (1 × 0.079)	0.08 / 0.09 PFA	0.4 × 0.7	1.2
Tier 2 — Melt-Extruded FEP Duplex Sensor Wire (-90 °C to +200 °C, Oval & Round Profiles)					
TBX-TC-FEP-20	20 AWG (0.52 mm²)	Solid (1 × 0.81)	0.25 / 0.25 FEP	1.7 × 3.0	16.5
TBX-TC-FEP-20S	20S AWG (0.56 mm²)	7 × 0.32 (7/28)	0.25 / 0.25 FEP	1.9 × 3.2	16.5
TBX-TC-FEP-24	24 AWG (0.205 mm²)	Solid (1 × 0.51)	0.20 / 0.20 FEP	1.4 × 2.3	9.8
TBX-TC-FEP-022-OV	2 × 0.22 mm² (~24S)	7 × 0.20 Stranded	0.20 / 0.25 FEP	1.5 × 2.5	10.5
TBX-TC-FEP-022-RD	2 × 0.22 mm² (~24S)	7 × 0.20 Twisted	0.20 / 0.25 FEP	2.0 (Round)	11.2
Tier 3 — Fused Sintered PTFE Tape Duplex Sensor Wire (-200 °C to +260 °C, Slim Oval Profile)					
TBX-TC-PTFE-20	20 AWG (0.52 mm²)	Solid (1 × 0.81)	0.18 / 0.18 PTFE	1.5 × 2.5	13.8
TBX-TC-PTFE-20S	20S AWG (0.56 mm²)	7 × 0.32 (7/28)	0.18 / 0.18 PTFE	1.5 × 2.7	14.2
TBX-TC-PTFE-24	24 AWG (0.205 mm²)	Solid (1 × 0.51)	0.15 / 0.15 PTFE	1.3 × 1.9	8.4
TBX-TC-PTFE-24S	24S AWG (0.22 mm²)	7 × 0.20 (7/32)	0.15 / 0.15 PTFE	1.3 × 2.2	8.9
Tier 4 — Twisted-Shielded (TWSH Foil+Drain & Copper-Braided) Fluoropolymer Sensor Cables					
TBX-TWSH-PFA-20	20 AWG Twisted Pair	Solid (1 × 0.81)	PFA + Foil/Drain + PFA	3.7 (Round)	24.5
TBX-TWSH-PFA-20S	20S AWG Twisted Pair	7 × 0.32 (7/28)	PFA + Foil/Drain + PFA	3.8 (Round)	25.2
TBX-TWSH-PFA-24	24 AWG Twisted Pair	Solid (1 × 0.51)	PFA + Foil/Drain + PFA	2.7 (Round)	14.8
TBX-TWSH-PFA-24S	24S AWG Twisted Pair	7 × 0.20 (7/32)	PFA + Foil/Drain + PFA	2.9 (Round)	15.6
TBX-TWSH-FEP-24S	24S AWG Twisted Pair	7 × 0.20 (7/32)	FEP + Foil/Drain + FEP	2.9 (Round)	15.2
TBX-TC-FEPC-022	2 × 0.22 mm² (~24S)	7 × 0.20 Twisted	FEP + TC Braid + FEP	2.6 (Round)	18.5

Selection Note: Choose extruded PFA (-200/+260°C) for pressurized autoclaves, vacuum bagging, and semiconductor cleanrooms; extruded FEP (-90/+200°C) for lyophilizers and steam retorts; sintered PTFE for high clamp loads; and TWSH or braided builds near VFDs and SCR furnaces.

5. Quotation & Custom Manufacturing Checklist

Specify calibration type (K, J, T, E, or N), tolerance class (IEC Class 1 / ASTM SLE or Standard), color code (IEC 60584-3 or ANSI MC96.1), AWG/stranding (40 AWG to 20 AWG), fluoropolymer (PFA, FEP, PTFE, or TWSH), and total length (MOQ 50 m; 7–45 working days).