

**Medical Micro-Coaxial & Ultra-High-Vacuum Cables**

301-KAP50 / 301-KAP50-S

Polyimide UHV 50 Ohm Coaxial Cable

UHV $\leq 10^{-10}$ mbar · $50 \Omega \pm 2.5 \Omega$ · $\varnothing 1.95 / 2.25$ mm · -269 °C (4 K) to +250 °C ·



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-269 to +250 °C (4 K)

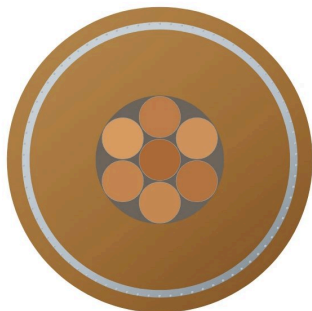
10 MGy Radiation-Hard

Application

301-KAP50 and 301-KAP50-S are 50Ω ultra-high-vacuum (UHV $\leq 10^{-10}$ mbar), cryogenic (-269 °C / 4 K liquid helium to +250 °C bakeout), and radiation-hard (10^7 Gy / 10^9 rad) miniature coaxial cables insulated with fused aromatic polyimide film—available

Typical uses: Synchrotron & Particle Accelerators, UHV Surface Science (XPS, ARPES, STM), Cryogenic 4 K Quantum & Detector Dewars, Semiconductor EUV Lithography Vacuum, Spacecraft & Satellite Payload Harnesses

Construction



Cross-section, not to scale

- 1 Stranded Ag-OFC center conductor (24)
- 2 Multi-layer fused polyimide dielectric
- 3 Silver-plated copper RF shield braid
- 4 Fused amber polyimide UHV jacket
- 5 AISI 316L stainless-steel overbraid

Technical data

Typical values

Characteristic impedance Z_0	50 $\Omega \pm 2.5 \Omega$	Nominal capacitance	105.0 pF/m (32.0 pF/ft)
Velocity of propagation (VoP)	65.0 % (5.13 ns/m delay)	Center / shield DC resistance	$\leq 86 \Omega/\text{km} / \leq 26 \Omega/\text{km}$ at 20 °C
Max. operating voltage	1,200 V DC / 850 V rms AC (in air/UHV)	Dielectric withstand test	2.0 kV rms at 50/60 Hz
Operating temperature range	-269 °C (4 K) to +250 °C continuous	Short-term bakeout peak	+300 °C in vacuum
Cryogenic thermal shock	Direct immersion in LN ₂ (77 K) & LHe (4 K)	Outgassing (ASTM E595 / ECSS)	TML < 0.30 % · CVCM < 0.01 % (post-bake)
UHV pressure compatibility	$\leq 1 \times 10^{-10}$ mbar (10^{-8} Pa)	Flammability in air	Self-extinguishing UL 94 V-0
Center conductor stranding	19 $\times$ 0.12 mm Ag-OFC ($\varnothing$ 0.60 mm, 24 AWG)	Dielectric diameter	1.48 mm $\pm$ 0.05 mm
Outer diameter (KAP50 / KAP50-S)	1.95 mm $\pm$ 0.08 mm / 2.25 mm $\pm$ 0.10 mm	Min. bend radius (fixed / dynamic)	10 mm (5 $\times$ D) / 20 mm (10 $\times$ D)
Nominal weight (KAP50 / KAP50-S)	10.5 kg/km / 16.8 kg/km	Connector compatibility	UHV peek/ceramic SMA, SMB, Microdot, BNC
Ionizing radiation resistance	Up to 10^7 Gy (10 MGy / 10^9 rad) gamma/e ⁻	Halogen & fluorine free	Zero F ⁻ outgassing under beam bombardment
Magnetic permeability	Non-magnetic Ag-Cu & annealed 316L SS	Solvent & ultrasonic cleaning	Compatible with acetone, IPA & UHV clean
Abrasion protection (-S version)	316L stainless braid resists sharp ports	RoHS / REACH status	RoHS 3 compliant
Standards	ASTM E595 / NASA SP-R-0022A / ECSS-Q-ST-70-02		

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	Construction / Variant	Conductor	Outer $\varnothing \approx$ mm	Metal kg/km	Weight $\approx$ kg/km	Min. bend R fixed mm
Standard 301-KAP50 / 301-KAP50-S variants 4 sizes						
☐ 301-KAP50 Smooth Polyimide Outer ($\varnothing$ 1.95 mm)	50 Ω Ag-Cu Braid + Polyimide Jacket	24 AWG (19 $\times$ 0.12 Ag-Cu)	1.95	6.2	10.5	10
☐ 301-KAP50-S With 316L SS Outer Braid ($\varnothing$ 2.25 mm)	50 Ω Ag-Cu Braid + Polyimide + 316L SS	24 AWG (19 $\times$ 0.12 Ag-Cu)	2.25	6.2	16.8	11
☐ 310-PEEK50-TRIAK PEEK UHV Triaxial Sister	50 Ω Dual Guard Braids (PEEK UHV)	26 AWG ($\varnothing$ 0.48 Ag-Cu)	2.95	11.5	19.5	15
☐ RG-196A/U Non-Radiation PTFE Coax ($\varnothing$ 2.03 mm)	50 Ω Single SPC Braid (PTFE)	30 AWG (7 $\times$ 0.10 SCCS)	2.03	4.2	8.9	10

– Dimensions and weights are nominal production values subject to manufacturing tolerances per UHV Coaxial Spec ($\leq 10^{-10}$ mbar) / MIL-DTL-17 Ref..

Attenuation & RF power handling

6 sizes

Frequency	Nominal attenuation dB / 100 m	Nominal attenuation dB / 100 ft	Max. CW RF power W (@ 40 °C)	Impedance Z_0 Ω	Velocity VoP %
10 MHz	6.5	1.98	180	50	65.0
100 MHz	21.0	6.40	60	50	65.0
500 MHz	49.0	14.94	26	50	65.0
1000 MHz (1 GHz)	72.0	21.95	18	50	65.0
3000 MHz (3 GHz)	135.0	41.15	10	50	65.0
5000 MHz (5 GHz)	185.0	56.39	7	50	65.0

– Attenuation values apply at +20 °C ambient into a matched 50 Ω load; CW power ratings assume VSWR 1.0:1 at +40 °C ambient.

Standards and approvals

- ✓ UHV $\leq 10^{-10}$ mbar Certified
- ✓ ASTM E595 / ECSS-Q-ST-70-02
- ✓ 10 MGy Radiation-Hard

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/301-kap50-301-kap50-s-polyimide-uhv-50-ohm-coaxial-cable



Typical values for this cable type, based on UHV Coaxial Spec ($\leq 10^{-10}$ mbar) / MIL-DTL-17 Ref.. Values for your order are confirmed in the quotation. Subject to change without notice. Jiangsu Tebaoflex Special Cable Co., Ltd., Taicang, Jiangsu, China.