Kapton insulated wires for UHV use

Type	Construction	AWG	Conductor diameter mm	Max. voltage in vacuum [1] V DC	Max. current [2] A	Conductor area mm^2
311-KAP-010	Plain copper wire, dipped	38	0.1	2.000	0.1	0.01
311-KAP-012	Plain copper wire, dipped	36	0.12	2.000	0.15	0.01
311-KAP-014	Plain copper wire, dipped	35	0.14	2.000	0.2	0.02
311-KAP-025	Plain copper wire, dipped	30	0.25	2.000	1	0.05
311-KAP-040	Plain copper wire, dipped	26	0.4	2.000	2	0.13
311-KAP-060	Plain copper wire, dipped	22	0.64	2.000	5	0.31
311-KAP-100	Plain copper wire, dipped	18	1	10.000	10	0.79
311-KAP-102	Plain copper wire, dipped	18	1.02	2.000	10	0.79
311-KAP-130	Plain copper wire, dipped	16	1.3	5.000	13	1.33
311-KAP-170	Plain copper wire, dipped	14	1.7	12.000	17	2.2
311-KAP1	Silver plated copper wire, wrapped quality	30	0.25	4.000	1	0.05
311-KAP2	Silver plated copper wire, wrapped quality	22	0.6	4.000	4.5	0.28
311-KAPM-025	Multi-strand silver plated wire, 7 x 0.08mm	31	0.23	1000	0.5	0.04
311-KAPM-035	Multi-strand silver plated wire, 7 x 0.12mm	27	0.35	1.000	1	0.08
311-KAPM-060	Multi-strand silver plated wire, 19 x 0.1mm	23	0.6	1.000	2.5	0.15
311-KAPM-075	Multi-strand silver plated wire, 19 x 0.15mm	21	0.75	1.000	5	0.33
311-KAPM-100	Multi-strand silver plated wire, 19 x 0.2mm	18	1	1.000	9	0.6
311-KAPM-200	Ultra flexible thick multi-strand wire,	12	2	1.000	20	2.0

	400 x 0.8mm, silver plated					
311-KAPM-035-RAD	Multi-strand silver plated wire, 7 x 0.12mm, Radiation Resistant, 300°C	27	0.35	4.000	1	0.08
311-KAPM-060-RAD	Multi-strand silver plated wire, 19 x 0.1mm, Radiation Resistant, 300°C	23	0.6	4.000	2.5	0.15
311-KAPM-100-RAD	Multi-strand silver plated wire, 19 x 0.2mm, Radiation Resistant, 300°C	18	1	4.000	9	0.6
311-KAP50-RAD	50 Ohm coaxial wire, multi-strand silver plated conductor, 7 x 0.15mm, silver plated screen, Radiation Resistant, 300°C	26	0.45	10.000	1	0.12
311-KAP-TCK-RAD	Thermocouple wire, double insulation, Radiation Resistant, 300°C	32	2 X 0.2	-	-	0.03
311-KAP50	50 Ohm coaxial wire, multi-strand silver plated conductor, 7 x 0.15mm, silver plated screen	26	0.45	5.000	1	0.12
311-KAP50S	Miniature 50 Ohm coaxial wire, multi-strand silver plated conductor, 7 x 0.08mm, silver plated screen	32	0.23	1.000	0.5	0.12
311-KAPM-025-SHIELD	Multi-strand coaxial wire, 7 x 0.08mm, outer not insulated	32	0.23	1.000	0.5	0.04
311-KAPM-060-COAX	Multi-strand coaxial wire, 19 x 0.01mm, outer insulated	23	0.6	1000	2.5	0.15
311-KAPM-060-PAIR1	Shielded Twisted Pair cable, 1 Pair	23	2 x 0.6	1.000	2	0.15
311-KAPM-060-PAIR2	Shielded Twisted Pair cable, 2 Pairs (4 conductors)	23	4 x 0.6	1.000	2	0.15
311-KAP-RIB4	Ribbon cable	27	4 x 0.35	1.000	1	0.08
311-KAP-RIB10	Ribbon cable	27	10 x 0.35	1.000	1	0.08
311-KAP-RIB15	Ribbon cable	27	15 x 0.35	1.000	1	0.08

311-KAP-TCK	Thermocouple wire, double insulation	32	2 x 0.2	-	-	0.03
312-KAP-TCK	Thermocouple wire, one wire blank, with outer insulation	32	2 x 0.2	-	-	0.03
312-KAP-TCN	Thermocouple wire, one wire blank, with outer insulation	32	2 x 0.2	-	-	0.03

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1 *Max. voltage in air is significantly lower. Allectra does not recommend these wires for air use.*
2 *Max. current depends on application. If you are planning to use high currents, please discuss your requirements with a sales engineer.*

	Dipped wire	**Wrapped and Multi-strand wire**	**Radiation Resistant wire**
Temperature range (vacuum)	4K to 260°C, up to 300°C for short periods	4K to 260°C	4K to 300°C
Dielectric constant (1 KHz)	~3.5	~3.1	~3.4
Dielectric strength (dry) kV mm	>135	>135	>200
Dissipation factor Vacuum range	0.0015 UHV, $<10^{-11}$ mbar	0.0015 UHV, $<10^{-11}$ mbar	0.0018 UHV, $<10^{-11}$ mbar
Radiation Resistance	10^9 Rad = 10^7 Gy	10^7 Rad = 10^5 Gy (non-flexing applications)	10^9 Rad = 10^7 Gy

Additional values for 50 Ω cables:

	311-KAP50	**311-KAP50S**
Impedance	50Ω +/-10%	50Ω +/-10%
Nom. capacitance	115pF/m	120pF/m
Attenuation	0.1db/m at 100MHz 1.1db/m at 500MHz 1.9db/m at 1Ghz	~3db/m at 1GHz
Dimension similar to conductor	RG174 0.45mm	RG178 0.23mm
Dielectric	1.55mm	0.9mm
Shield	2.0mm	1.35mm
Max. frequency	~17 GHz	

(measured with UHV-SMA connectors mounted)

Choosing the right wire:

Dipped wires are a good choice, if the parts need little or no movement. These are the cheapest types, but stripping is difficult.
For a radiation environment, and temperatures above 260°C, Allectra offer Radiation Resistant (-RAD) wires or dipped wires.
The best choice for higher voltage applications are the Caburn UHV® qualities or the RAD qualities.
If flexibility is required, use Multi-Strand types – these are the typical wires for connecting sensors and motors etc and stripping is easy.

Kapton wire in vacuum will outgas water on first use. A bake to 120°C for 4 to 5 hours will remove excess gas.
50 Ohm wire can be supplied ready fitted with 50Ω SMA/SMB/BNC/MHV/SMA/ SMB/BNC/MHV/SHV/N/Microdot vacuum connectors.

NOTE: All values are given to the best of Allectra's knowledge, but values might change without notice. Allectra does not guarantee the given figures.