

- Resistant to electrical arc tracking in wet or dry conditions
- Single or dual wall constructions
- Small size, ultra light weight
- Exceptional chemical resistance

Spec 55
Wire and cable

Spec 55 wire is insulated with modified radiation cross-linked ETFE polymer. It has a temperature rating of -65°C to 200°C continuous, and combines the easy handling of a flexible wire with excellent scrape abrasion and cut-through characteristics.

The dual wall airframe construction of Spec 55 wire is currently used on

numerous aircraft programmes. It has a choice of two total wall thickness, 0.25 mm and 0.2mm, both have a contrasting core colour to act as a damage indicator. Chosen for its balance of properties, Spec 55 wire has outstanding resistance to chemicals and solvents, excellent electrical arc track resistance, and is not susceptible to UV and moisture degradation. Single wall

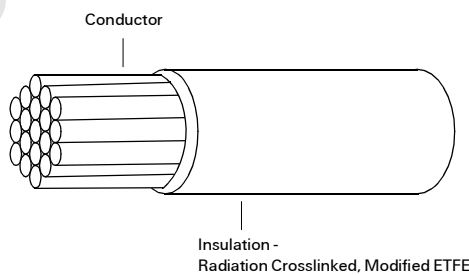
equipment wire constructions are available in 0.10 mm and 0.15 mm wall thicknesses for use inside black boxes where flexibility and solder-iron resistance make it a wire which is very easy to reliably install.

Both single and dual wall insulated wires are available in twisted pairs, triples, etc., and as screened and jacketed cables.

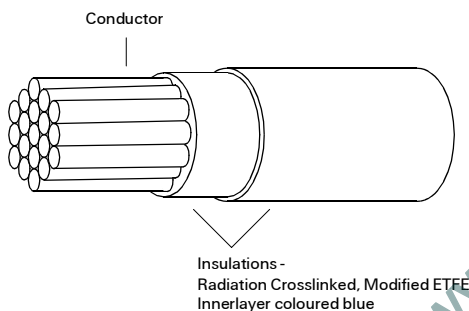
Specifications

MIL-W-22759/32-35 and /41 to /46 and MIL-DTL-C-27500 (Cables)
Defence Standard 61-12 Part 33
VG952 18 Part 20, Type D; Part 21, Type A; Part 22, Type A; Part 23, Type A, Part 1001 and Part 1002
VDE 9426, 9427, 9428
British Standard 3G233
Civil Aviation Authority Accessory Approval E1 1749
Boeing BMS 13-48
Airbus ABS 0820 to 0826
Underwriters Laboratory Style 3467
NASA preferred product list
European Space Agency 3901/012, 3901/020 and 3901/022
Raychem Specification 55

Spec 55 Insulation system - Single wall



Spec 55 Insulation system - Dual wall



Spec 55

Physical characteristics

Size and weight

Spec 55 wire provides one of the most comprehensive wiring product ranges for aerospace users, with a wide choice of conductor sizes and insulation wall thickness. The dual wall airframe wire has an insulation wall thickness of either 0.2mm or 0.25 mm for robustness in unprotected harnesses and has excellent wire to wire abrasion properties. The single wall equipment wire has a 0.15 mm wall thickness for use inside equipment and

protected harnesses. For high density interconnect wiring, the 450 volt 55M04 1X series of equipment wire has a nominal 0.1 mm wall and provides considerable weight and size savings over other comparable wires.

Handling

The excellent flexibility and low resilience makes Spec 55 the ideal wire to install, both in new aircraft and equipment and for maintenance purposes. The wire is easily stripped with conventional tooling. The insulation is readily marked by hot stamp, ink jet or laser, and can be potted without pre-etching.

For full descriptions of the appropriate tools see separate wire handling guide.

Typical properties

Temperature rating (Tin plated conductor)	-65°C to +150°C
(Silver or nickel plated conductor)	-65°C to +200°C
Thermal endurance	200°C, 10000 h
Scrape abrasion (BS 3G233)	>100 cycles at 150°C
Flexing endurance (Boeing BSS 7324)	>1000 cycles
Voltage rating	600 V, 450V
Tensile strength + core elongation	(Airframe wire only) 35 N/mm ² , 125%
Tensile strength + total elongation	(All primary wire) 35 N/mm ² , 75%
Notch propagation BS 3G230 0.05 mm notch	Pass
Solder iron resistance (370°C, 1 minute)	Pass
Solderability - Tin plated copper conductor BS 3G233 conditions	<0.8 secs to wet
Shrinkage	<1%
Long term water resistance	Will not hydrolyse
Permittivity 1 KHz (ASTM D150)	2.7
Dissipation factor (ASTM D150)	0.001

Environmental performance

Temperature rating

Spec 55 wire and cable is rated for continuous operation from -65°C to +200°C and for short periods at temperatures as high as 400°C.

Mechanical performance

Radiation crosslinking of the Spec 55 insulation significantly improves the following mechanical characteristics; scrape (sharp edges), cross wire abrasion, cut-through resistance and creep resistance.

Solder iron/Overload resistance

Radiation crosslinking ensures that the insulation does not melt at high temperature. As a result Spec 55 wire is resistant to hot

solder irons and current overloads which would melt most thermoplastic insulations.

Chemical resistance

Spec 55 is unaffected by all commonly used chemicals, eg. fuels, hydraulic fluids, defluxing agents, cleaners, coolants and de-icers. It also shows excellent resistance to weathering (UV, ozone, pollutants, water).

Space wire

Spec 55 is available in special versions suitable for use in outer space meeting both ESA and NASA requirements for outgassing.

Flammability

Special additives increase the flame retardance





of Spec 55 compared to unirradiated ETFE so that it meets the latest high performance tests, eg. BS 3G230 vertical test FAR 25.

Electrical arc tracking resistance

Spec 55 insulation demonstrates resistance to arc tracking under both wet and dry conditions at aircraft system voltages.

Spec 55

Spec 55 wire & cable: Standard constructions, nominal sizes, strandings, diameters and weights

Conductor	Primary wire	Twisted pair	Single	Screened & jacketed Pair
				

55A - AWG conductor: Equipment/Interconnect wires & cables

Size	Stranding (mm)	55A011X		55A012X		55A111X		55A112X	
		OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)
30	7/0.102	0.61	0.98	1.27	1.94	1.51	5.1	2.12	7.74
28	7/127	0.68	1.35	1.42	2.68	1.59	5.8	2.27	8.9
26	19/102	0.81	2.1	1.67	4.2	1.71	6.85	2.53	11.32
24	19/127	0.94	2.98	1.93	5.96	1.84	8.2	2.8	13.86
22	19/0.16	1.09	4.2	2.23	8.6	1.99	10.3	3.07	17.9
20	19/0.203	1.27	6.4	2.66	13.26	2.2	13.4	3.5	23.8
18	19/0.25	1.52	9.7	3.2	19.57	2.45	17.88	4.1	32.6
16	19/287	1.73	12.4	3.58	25.8	2.67	21.75	4.43	39.7
14	19/0.36	2.2	19.4	4.47	39.6	3.1	30.4	5.3	57.0
12	37/0.32	2.62	29.35	5.38	60/0	3.55	42.46	6.3	81.2
10	37/0.403	3.25	47.4	6.65	96.7	4.2	62.7	-	-
8	133/0.287	4.77	87.6	9.8	178.8	5.8	110.5	-	-

55A - AWG conductor: Airframe wires & cables

Size	Stranding (mm)	55A081X		55A082X		55A111X		55A112X	
		OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)
26	19/102	1.01	2.5	2.1	5.1	1.71	6.85	2.63	11.32
24	19/127	1.14	3.4	2.33	6.84	1.84	8.2	2.8	13.86
22	19/0.16	1.27	4.8	2.64	9.98	1.99	10.3	3.07	17.9
20	19/0.203	1.47	7.0	3.07	14.75	2.2	13.4	3.5	23.8
18	19/0.25	1.78	10.7	3.63	21.9	2.45	17.88	4.1	32.6
16	19/287	1.95	13.4	4.06	27.5	2.67	21.75	4.43	39.7
14	37/0.36	2.4	20.5	4.9	42.3	3.1	30.4	6.3	57.0
12	37/0.32	2.82	30.5	5.8	63.0	3.55	42.46	6.3	81.2
10	37/0.403	3.4	48.3	7.1	99.1	4.2	62.7	-	-

55PC - AWG conductor: Statistical Process Controlled Airframe wires & cables

Size	Stranding (mm)	55PC021X		55PC042X		55PC141X		55PC142X	
		OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)	OD (mm)	Weight (g/m)
26	19/102	0.087	1.8	-	-	1.52	6.32	2.33	10.75
24	19/127	1.00	3.2	2.0	6.3	1.65	7.63	2.89	13.27
22	19/0.16	1.15	4.56	2.31	9.12	1.80	9.55	2.89	17.28
20	19/0.203	1.37	6.8	2.74	13.66	2.00	12.47	3.30	23.00
18	19/0.25	1.61	10.3	3.22	20.6	2.23	16.72	3.78	31.33
16	19/287	1.8	12.96	3.6	26.0	2.44	20.05	4.16	38.05
14	19/0.36	2.18	19.86	4.36	39.9	2.79	28.08	4.92	54.25
12	37/0.32	2.66	30.2	5.3	60.8	3.30	40.45	5.92	78.80
10	37/0.403	3.27	47.9	-	-	3.98	61.16	7.39	128.06

X = 1 - Tin plated copper conductor.
 4 - Silver plated high strength copper alloy conductor.
 (Recommended for size 24 & 26in airframe applications).

55PC - extra light weight constructions

For applications where weight is critical, light weight tight tolerance conductors and insulations are available. These are

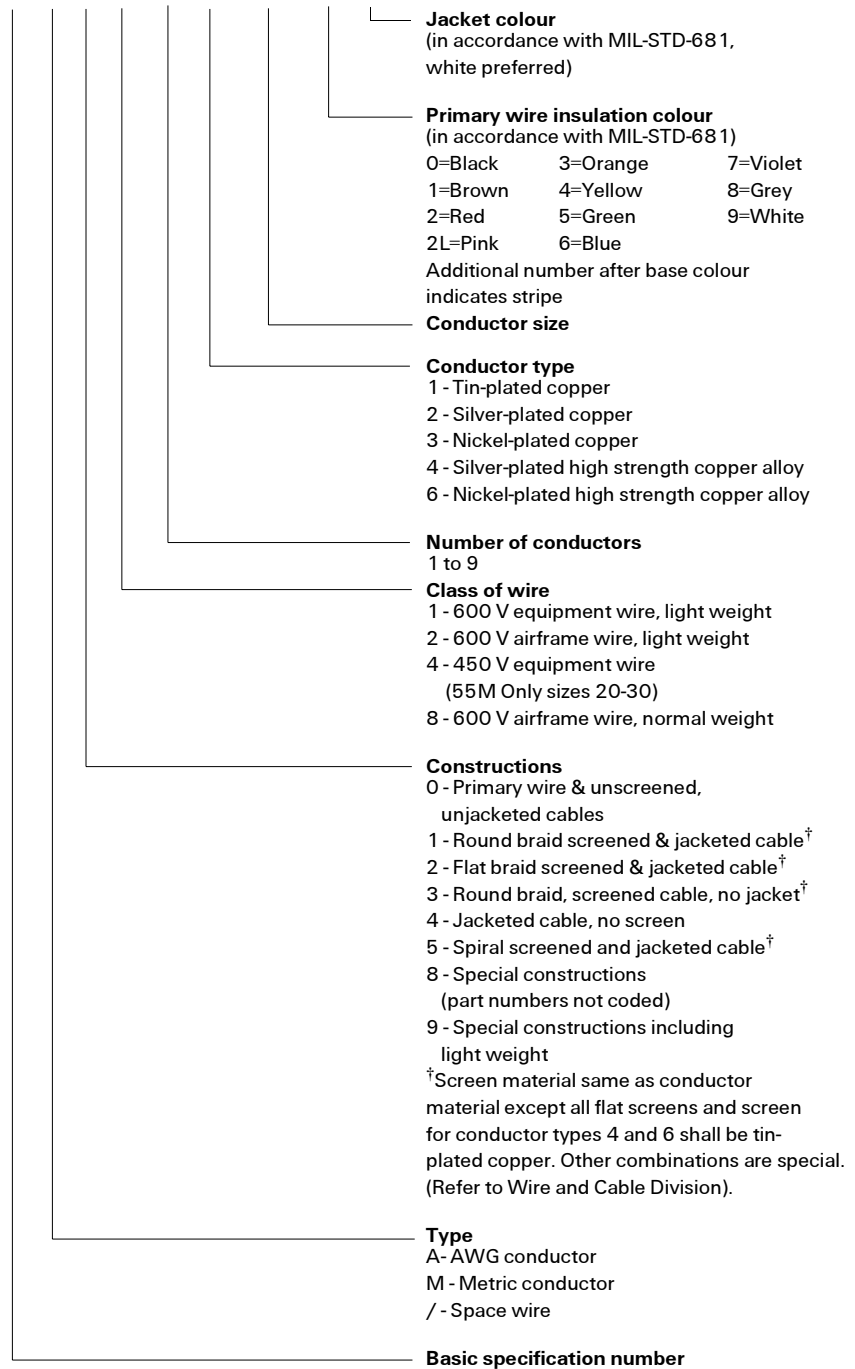
manufactured using statistical process control methods and achieve weights that are equal or lighter than the equivalent polyimide/

PTFE constructions. Contact Wire & Cable Division for further details.

Spec 55

Part numbering system

55 X X X X X- Size- X/X- X



Typical ordering example

3 conductors, red, yellow, blue, 600 volt equipment wire with overall round braid, 20 AWG tinned conductor and white jacket: total part number is 55A1131-20-2/4/6-9.

Ordering information

A list of stock policy items can be identified by contacting the relevant Product Specialist or Sales Order Office. Stock policy items are recognized by the use of a suffix, such as (300) defining the pack size, typically 55A0111-22-9(300).

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