

1. CONDUCTOR

Material: Bare Copper
ISO Conductor Sizes 2 mm² to 120 mm²
Configuration: See Table 1
Cross Sectional Area: See Table 2
Diameter: See Table 2

2. CABLE (INSULATED CONDUCTOR)

Material: **FlexradXF®**
Thickness: See Table 2
Diameter: See Table 2
Base Color: Per Agreement
Stripe Color: Per Agreement
Color Standard: SAE or JUDD
Marking: None

3. PHYSICAL CHARACTERISTICS

Temperature Rating: -40 °C to 150 °C
Voltage Rating: 1 kV
Unit Weight: See Table 4

**4. PERFORMANCE PROPERTIES
CABLE (ISO 19642-5)**

Electrical Tests

Conductor Resistance See Table 3
Withstand Voltage 1 kV, 60 Hz, 30 min
500 V/s Increase to 10 kV, Hold for 5 min
Withstand Voltage after Environmental Testing 3 kV, 1 min
Insulation Faults 8 kV
Insulation Volume Resistivity 10¹² Ω-mm, min.
Theoretical Ampacity (Industry Standard Calculation) See Table 3

Mechanical Tests

Bend Radius (Industry Standard Calculation) See Table 4
Strip Force (50 mm @ 50 mm/min) Per Agreement
Sandpaper Abrasion Test See Table 4
Cyclic Bending (ISO Conductor Sizes ≤ 25.0mm²)
Record number of cycles
Flexibility Test Record average value in N

Environmental Tests

Long-term heat ageing (3000 hr @ 150 °C)
No visible conductor
Pass Withstand Voltage after Environmental Testing
Short-term heat ageing (240 hr @ 175 °C)
No visible conductor
Pass Withstand Voltage after Environmental Testing
Thermal Overload (6 hr @ 200 °C) No visible conductor
Pass Withstand Voltage after Environmental Testing

PERFORMANCE PROPERTIES

CABLE (Continued)

Environmental Tests (Cont'd)

Pressure Test at High Temperature (4 hr @ 150 °C)
Pass Withstand Voltage after Environmental Testing
Shrinkage by Heat (15 min @ 150 °C) 2 mm, max.
Low Temperature Winding (4 hr @ -40 °C)
No visible conductor
Pass Withstand Voltage after Environmental Testing
Cold Impact (4 hr @ -15 °C) No visible conductor
Pass Withstand Voltage after Environmental Testing
Temperature and Humidity Cycling (-40 °C to 150 °C)
No visible conductor
Pass Withstand Voltage after Environmental Testing
Resistance to Hot Water (85 °C) No cracks
Insulation Volume Resistivity @ 85 °C: 10¹² Ω·mm, min.
Pass Withstand Voltage after Environmental Testing
Resistance to Liquid Chemicals
Media Group 1 (1000 hr @ 150 °C)
Engine Coolant (50% ethylene glycol/50% distilled water)
Engine Oil (ISO 1817, Oil No. 2)
Salt Water (5% NaCl, 95% Water, mass %)
Windscreen Fluid (50% Iso-propanol, 50% water)
No visible conductor
Pass Withstand Voltage after Environmental Testing
Resistance to Liquid Chemicals
Media Group 2 (240 hr @ 150 °C)
Gasoline (ISO 1817, Liquid C)
Diesel (90% ISO 1817, Oil No. 3 + 10% p-xylene)
Ethanol (85% Ethanol + 15% ISO 1817 Liquid C)
Power Steering Fluid (ISO 1817, Oil No. 3)
Automatic Transmission Fluid (Dexron VI)
Brake Fluid (SAE RM-66-06 or ISO 4926)
Battery Acid (25% H₂SO₄ and 75% H₂O s.g.1.26)
No visible conductor
Pass Withstand Voltage after Environmental Testing
Resistance to Ozone (192 hr @ 65 °C) No Cracks
Resistance to Flame Propagation (GMW15626)
ISO Conductor Sizes ≤ 6 mm²: 30 s Burn, max.
ISO Conductor Sizes ≥ 8 mm²: 10 s Burn, max.
Thermal Stability in a Wound State (GMW15626)
(ISO Conductor Sizes ≤ 6 mm²)
(1 hr @ 200°C) No visible conductor
Pass 1 kV Withstand Voltage for 1 min

5. REFERENCE PROCEDURAL SPECIFICATIONS

ISO 19642-2
GMW15626

6. REFERENCE PRODUCT SPECIFICATIONS

ISO 19642-5
GMW15626


 <p>JUDD WIRE INC. 124 Turnpike Road Turners Falls, MA 01376 (413) 863-4357</p>	Date	Rev	By	Ap'd	ECN	Description: BC, THINWALL, FlexradXF®, ISO 150 °C, 1 kV, HEV, BATTERY CABLE
	06/19/14	--	CHU	RTB	--	
	03/01/19	C	RTB	RMB	19-1956	Specification Number: JW1544-14
	05/02/19	D	RTB	MJM	19-1976	
Customer Approval:						

Table 1 Conductor Configurations

Conductor			
ISO Conductor Size	Number of Strands ^b	Maximum Strand Diameter	ISO 19642-5 Structure ^b
mm ²		mm	
2	19	0.38	Standard
2.5	50	0.26	None
3	44	0.31	Standard
4	56	0.31	Standard
5 ^a	105	0.25	None
6	84	0.31	None
8	98	0.33	None
10	80	0.41	None
12	154	0.33	None
16	133	0.41	None
16	513	0.21	Flexible
20	154	0.41	None
20	247	0.33	None
25	196	0.41	None
25 ^a	494	0.27	None
30	361	0.33	None
35	665	0.27	None
40 ^a	741	0.26	None
50	399	0.41	None
50	798	0.30	None
60	1841	0.21	Flexible
70	2147	0.21	Flexible
85	2664	0.21	Flexible
95	2926	0.21	Flexible
120	3724	0.21	Flexible

Note ^a Does not meet ISO 19642-5 requirements for Conductor Cross Sectional Area (CSA)

Note ^b Slight deviations are allowed from the ISO 19642-5 configurations: ± 5 % for ≥ 50 strands, as long as the conductor meets the conductor resistance and the maximum strand diameter.



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Table 2: Dimensional Data

Conductor				Cable (Insulated Conductor)		
ISO Conductor Size	Maximum Diameter	Cross Sectional Area (CSA)		Wall Thickness		Diameter
		mm ²		mm		
mm ²	mm	Min.	Max.	Min.	Nom.	mm
2	2.00	1.83	1.98	0.28	0.35	2.65 ± 0.15
2.5	2.20	2.27	2.45	0.28	0.35	2.85 ± 0.15
3	2.40	2.80	3.03	0.32	0.40	3.25 ± 0.15
4	2.80	3.66	3.95	0.32	0.40	3.55 ± 0.15
5 ^a	3.10	4.73	5.30	0.32	0.40	4.05 ± 0.15
6	3.40	5.49	5.93	0.32	0.40	4.15 ± 0.15
8	4.30	7.24	7.82	0.32	0.40	4.80 ± 0.20
10	4.50	9.47	10.2	0.48	0.60	5.65 ± 0.35
12	5.40	11.3	12.3	0.48	0.60	6.15 ± 0.35
16	6.30	14.9	16.1	0.52	0.65	6.80 ± 0.40
20	6.90	18.1	19.5	0.52	0.65	7.40 ± 0.40
25 (196)	7.80	23.2	25.1	0.52	0.65	8.30 ± 0.40
25 (494) ^a	7.80	24.2	26.0	0.52	0.65	8.30 ± 0.40
30	8.30	26.6	28.8	0.64	0.80	9.15 ± 0.45
35	9.00	32.7	35.3	0.64	0.80	9.90 ± 0.50
40 ^a	9.60	37.3	39.6	0.71	0.90	10.55 ± 0.55
50	10.50	46.9	50.6	0.71	0.90	11.60 ± 0.60
60	11.60	54.7	59.1	0.80	1.00	12.65 ± 0.65
70	12.50	66.6	71.9	0.80	1.00	13.70 ± 0.70
85	13.60	78.7	85.0	0.90	1.10	15.10 ± 0.70
95	14.80	88.0	95.0	0.90	1.10	16.00 ± 0.70
120	16.50	113	122	1.28	1.60	18.70 ± 1.00

Note ^a Does not meet ISO/FDIS 19642-5 requirements for Conductor Cross Sectional Area (CSA)



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Table 3: Electrical Properties

ISO Conductor Size	Maximum DCR @ 20 °C	(Single Cable Routing in a Non-Enclosed Space)							
		Ambient Temperature							
		22 °C	50 °C	75 °C	100 °C	125 °C	135 °C	140 °C	
mm ²	mΩ/m	Theoretical Ampacity (Maximum Current, Amps)	37	33	28	23	16	13	10
2	9.42		43	38	33	27	19	15	12
2.5	7.60		50	45	39	31	22	17	14
3	6.15		60	53	46	38	27	21	17
4	4.71		70	62	53	43	31	24	19
5	3.94		79	70	61	50	35	27	22
6	3.14		98	87	75	61	43	34	27
8	2.38		119	105	91	74	53	41	33
10	1.82		136	120	104	85	60	47	38
12	1.52		164	145	126	103	73	56	46
16	1.16		188	166	144	117	83	64	52
20	0.955		224	198	171	140	99	77	63
25	0.743		248	219	190	155	110	85	69
30	0.647		284	251	217	177	125	97	79
35	0.527		307	272	235	192	136	105	86
40	0.473		362	320	277	226	160	124	101
50	0.368		400	353	306	250	177	137	112
60	0.315		460	407	352	288	203	157	129
70	0.259		517	457	396	323	228	177	145
85	0.219		562	497	430	351	248	192	157
95	0.196	663	586	508	414	293	227	185	
120	0.153								



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Table 4 Performance Properties

Size (mm ²)	Sandpaper Abrasion		Bend Radius		Nominal Unit Weight
	Applied Mass (kg)	Minimum Tape Length (mm)	Static Mount (mm)	Dynamic Mount (mm)	(kg/km)
2	0.2	500	8.0	10.6	21.4
2.5	0.5	250	8.6	11.4	26.0
3	0.5	300	9.8	13.0	33.0
4	0.5	350	10.7	14.2	41.3
5	0.5	430	12.2	16.2	57.3
6	0.5	500	12.5	126.6	60.0
8	Not Required		14.4	19.2	78.5
10	Not Required		17.0	22.6	105
12	Not Required		18.5	24.6	128
16	Not Required		20.4	27.2	153
20	Not Required		22.2	29.6	193
25	Not Required		24.9	33.2	253
30	Not Required		27.5	36.6	290
35	Not Required		29.7	39.6	343
40	Not Required		31.7	42.2	387
50	Not Required		34.8	46.4	496
60	Not Required		38.0	50.6	577
70	Not Required		41.1	54.8	702
85	Not Required		45.3	60.4	815
95	Not Required		48.0	64.0	976
120	Not Required		56.1	74.8	1180



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