1. CONDUCTOR
Material: Bare Copper
ISO Conductor Sizes 2 mm^2 to 120 mm^2
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. SCREEN (SHIELD)
Material: Tin Plated Copper
Single End Size: See Table 2
Coverage: See Table 2
Diameter: See Table 2

4. SHEATH (JACKET)
Material: **FlexradXF®**
Wall Thickness: See Table 2
Diameter: See Table 2
Base Color: Per Agreement
Stripe Color: Per Agreement
Color Standard: SAE or JUDD
Marking: None

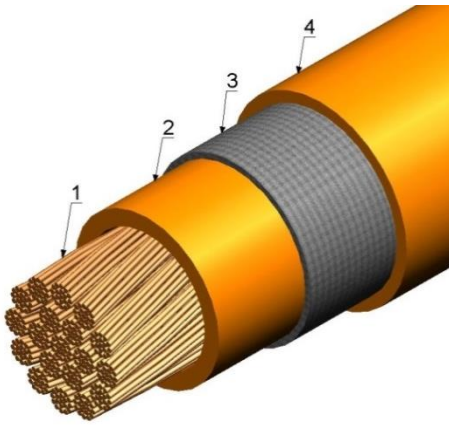
5. PHYSICAL CHARACTERISTICS
Temperature Rating: -40 °C to 150 °C
Voltage Rating: 1 kV
Unit Weight: See Table 4

6. 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	10^{12} Ω-mm, min.
Theoretical Ampacity (Industry Standard Calculation)	See Table 3

Mechanical Tests

Strip Force (50 mm @ 50 mm/min)	Per Agreement
Sandpaper Abrasion Test	See Table 4



PERFORMANCE PROPERTIES (Cont'd)
CABLE
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

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: 10^{12} 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

JUDD WIRE INC.
Turners Falls, MA 01376
124 Turnpike Road
(413) 863-4357

Date	Rev	By	Ap'd	ECN
06/19/14	--	CHU	RTB	--
03/01/19	C	RTB	RMB	19-1957
05/02/19	D	RTB	MJM	19-1976

Customer Approval:

Description:
1C BC, THINWALL, FlexradXF®, SCREENED, FlexradXF®, ISO 150 °C, 1 kV, HEV

Specification Number:
JW1545-14

PERFORMANCE PROPERTIES (Cont'd)
CABLE (ISO 19642-5)
Environmental Tests (Cont'd)

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)
Auto. Transmission Fluid (Dexron VI)
Brake Fluid (SAE RM-66-06 or ISO 4926)
Battery Acid (25% H_2SO_4 and 75% H_2O 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 mm^2 : 30 s Burn, max.
ISO Conductor Sizes ≥ 8 mm^2 : 10 s Burn, max.

Thermal Stability in a Wound State (GMW15626)
(ISO Conductor Sizes ≤ 6 mm^2)
(1 hr @ 200°C) No visible conductor
Pass 1 kV Withstand Voltage for 1 min

SHEATHED SCREENED CABLE (ISO 19642-9)
Electrical Tests

Electrical Continuity (Cable) No discontinuity

Withstand Voltage (Sheath) 2 kV, 3 s

Direct Current Resistance of the Screen See Table 3

Sheath Faults on Screened Cables 3 kV

Mechanical Tests

Strip Force of Sheath (50 mm @ 50 mm/min)
Per Agreement

Bend Radius (Industry Standard Calculation) See Table 4

Cyclic Bending (ISO Conductor Sizes ≤ 25 mm^2)
Record number of cycles

Flexibility Test Record average value in N

Environmental Tests

Long-term Heat Ageing (3000 hr @ 150 °C) No Cracks
Pass Withstand Voltage (Sheath)

Short-term Heat Ageing (240 hr @ 175 °C) No Cracks
Pass Withstand Voltage (Sheath)

PERFORMANCE PROPERTIES (Cont'd)
SHEATHED SCREENED CABLE (ISO/FDIS 19642-9)
Environmental Tests (Cont'd)

Thermal Overload (6 hr @ 200 °C) No Cracks
Pass Withstand Voltage (Sheath)

Pressure Test at High Temperature (4 hr @ 150 °C)
> 40% remaining Wall Thickness

Shrinkage by Heat of Sheath (15 min @ 150 °C)
Record shrinkage of the sheath, mm

Low Temperature Winding (4 hr @ -40 °C) No Cracks
Pass Withstand Voltage (Sheath)

Cold Impact (4 hr @ -15 °C) No Cracks
Pass Withstand Voltage (Sheath)

Temperature and Humidity Cycling (-40 °C to 150 °C)
No Cracks

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 Cracks

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)
Auto. Transmission Fluid (Dexron VI)
Brake Fluid (SAE RM-66-06 or ISO 4926)
Battery Acid (25% H_2SO_4 and 75% H_2O s.g.1.26)
No Cracks

Resistance to Ozone (192 hr @ 65 °C) No Cracks

Resistance to Flame Propagation 70 s Burn, max.

7. REFERENCE PROCEDURAL SPECIFICATIONS
ISO 19642-2
GMW15626

8. REFERENCE PRODUCT SPECIFICATIONS
ISO 19642-5
ISO 19642-9
GMW15626

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.			

Table 2: Dimensional Data

Conductor				Cable (Insulated Conductor)			Screen			Sheathed, Screened Cable		
ISO Conductor Size	Max. Dia.	Cross Sectional Area (CSA)		Wall Thickness		Diameter	Single End	Minimum Coverage	Max. Dia.	Wall Thickness		Diameter
		mm²		mm						mm		
mm^2	mm	Min.	Max.	Min.	Nom.	mm	AWG	%	mm	Min.	Nom.	mm
2	2.00	1.83	1.98	0.28	0.35	2.65 ± 0.15	36	90	3.3	0.32	0.40	3.90 ± 0.20
2.5	2.20	2.27	2.45	0.28	0.35	2.85 ± 0.15	36	90	3.5	0.32	0.40	4.10 ± 0.20
3	2.40	2.80	3.03	0.32	0.40	3.25 ± 0.15	36	90	4.0	0.32	0.40	4.50 ± 0.30
4	2.80	3.66	3.95	0.32	0.40	3.55 ± 0.15	36	90	4.3	0.32	0.40	4.80 ± 0.30
5[a]	3.10	4.73	5.30	0.32	0.40	4.05 ± 0.15	36	90	4.8	0.48	0.60	5.70 ± 0.30
6	3.40	5.49	5.93	0.32	0.40	4.15 ± 0.15	36	90	4.9	0.48	0.60	5.80 ± 0.30
8	4.30	7.24	7.82	0.32	0.40	4.80 ± 0.20	36	90	5.8	0.52	0.65	6.80 ± 0.30
10	4.50	9.47	10.2	0.48	0.60	5.65 ± 0.35	36	90	6.8	0.52	0.65	7.80 ± 0.30
12	5.40	11.3	12.3	0.48	0.60	6.15 ± 0.35	36	90	7.3	0.52	0.65	8.30 ± 0.30
16	6.30	14.9	16.1	0.52	0.65	6.80 ± 0.40	36	90	8	0.64	0.80	9.30 ± 0.30
20	6.90	18.1	19.5	0.52	0.65	7.40 ± 0.40	36	90	8.6	0.64	0.80	9.90 ± 0.30
25 (196)	7.80	23.2	25.1	0.52	0.65	8.30 ± 0.40	36	90	9.5	0.72	0.90	11.00 ± 0.30
25 (494)[a]	7.80	24.2	26.0	0.52	0.65	8.30 ± 0.40	36	90	9.5	0.72	0.90	11.00 ± 0.30
30	8.30	26.6	28.8	0.64	0.80	9.15 ± 0.45	34	90	10.4	0.72	0.90	11.90 ± 0.30
35	9.00	32.7	35.3	0.64	0.80	9.90 ± 0.50	34	90	11.2	0.80	1.00	12.90 ± 0.30
40[a]	9.60	36.5	39.4	0.71	0.90	10.55 ± 0.55	34	90	11.9	0.80	1.00	13.60 ± 0.30
50	10.5	46.9	50.6	0.71	0.90	11.60 ± 0.60	34	90	13	0.88	1.10	14.90 ± 0.30
60	11.6	54.7	59.1	0.80	1.00	12.65 ± 0.65	34	90	14.1	0.88	1.10	15.90 ± 0.40
70	12.5	66.6	71.9	0.80	1.00	13.70 ± 0.70	34	90	15.2	0.88	1.10	17.00 ± 0.40
85	13.6	78.7	85	0.90	1.10	15.10 ± 0.70	32	90	16.8	0.88	1.10	18.60 ± 0.40
95	14.8	88	95	0.90	1.10	16.00 ± 0.70	32	90	17.7	0.88	1.10	19.50 ± 0.40
120	16.5	113	122	1.28	1.60	18.70 ± 1.00	32	90	20.7	1.36	1.70	23.70 ± 0.40

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

Table 3: Electrical Properties

ISO Conductor Size	Maximum DCR @ 20 °C	Nominal Screen Resistance @ 20 °C	(Single Cable Routing in a Non-Enclosed Space)						
			Ambient Temperature						
mm^2	mΩ/m	mΩ/m	22 °C	50 °C	75 °C	100 °C	125 °C	135 °C	140 °C
2	9.42	17.5	37	33	28	23	16	13	10
2.5	7.60	17.2	43	38	33	27	19	15	12
3	6.15	14.5	50	45	39	31	22	17	14
4	4.71	13.7	60	53	46	38	27	21	17
5	3.94	12.6	70	62	53	43	31	24	19
6	3.14	11.1	79	70	61	50	35	27	22
8	2.38	9.88	98	87	75	61	43	34	27
10	1.82	8.05	119	105	91	74	53	41	33
12	1.52	8.74	136	120	104	85	60	47	38
16	1.16	7.78	164	145	126	103	73	56	46
20	0.955	6.99	188	166	144	117	83	64	52
25	0.743	6.58	224	198	171	140	99	77	63
30	0.647	4.3	248	219	190	155	110	85	69
35	0.527	3.89	284	251	217	177	125	97	79
40	0.473	4.11	307	272	235	192	136	105	86
50	0.368	3.89	362	320	277	226	160	124	101
60	0.315	4.02	400	353	306	250	177	137	112
70	0.259	3.85	460	407	352	288	203	157	129
85	0.219	4.31	517	457	396	323	228	177	145
95	0.196	4.39	562	497	430	351	248	192	157
120	0.153	2.67	663	586	508	414	293	227	185

Theoretical Ampacity (Maximum Current, Amps)

Table 4: Performance Properties

ISO Conductor Size	Cable		Sheathed, Screened Cable		
	Sandpaper Abrasion		Bend Radius		Nominal Unit Weight
	Applied Mass	Minimum Tape Length	Static Mount (mm)	Dynamic Mount (mm)	
mm^2	kg	mm	mm	mm	kg/km
2	0.2	500	11.7	15.6	39.3
2.5	0.5	250	12.3	16.4	44.2
3	0.5	300	13.5	18.0	55.7
4	0.5	350	14.4	19.2	65.2
5	0.5	430	17.1	22.8	84.5
6	0.5	500	17.4	23.2	90.5
8	Not Required		20.4	27.2	123
10	Not Required		23.4	31.2	156
12	Not Required		24.9	33.2	180
16	Not Required		27.9	37.2	219
20	Not Required		29.7	39.6	263
25	Not Required		33.0	44.0	336
30	Not Required		35.7	47.6	381
35	Not Required		38.7	51.6	455
40	Not Required		40.8	54.4	509
50	Not Required		44.7	59.6	636
60	Not Required		47.7	63.6	723
70	Not Required		51	68.0	860
85	Not Required		55.8	74.4	994
95	Not Required		58.5	78.0	1173
120	Not Required		71.1	94.8	1483