



## *Fire Resistant Cable for the Petrochemical Industry*



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# Why VITALink® Wire & Cable?

Since 1918, RSCC Wire & Cable continues to be recognized for providing dependable, high quality, unmatched performance in the harshest of environments. RSCC cables are specified and installed predominantly on Oil & Gas Land and Offshore Drilling Equipment, Transit and Transit Infrastructure systems, Nuclear Power Plants, and other industrial applications.

For Fire Safety Applications in the Petrochemical industry, RSCC VITALink® cables are the product of choice for critical circuits such as motor operated valves, fire pumps, emergency notification systems, emergency lighting, flame and gas detectors, deluge systems, and any other applications where circuit integrity is paramount during a fire event.



# Petrochemical Fire Resistant Products

RSCC Wire & Cable fire resistant products for the petrochemical industry include our flagship VITALink® 2000 series of the highest performing fire safety cables as well as a wide range of cables that meet and exceed customer specifications across the industry. VITALink® petrochemical products are offered in power, control, or instrumentation configurations.

The VITALink® family of products for the petrochemical industry are designed and tested to meet the requirements of the following standards\*:

- API 2218 Flame Test per UL 1709 Oven Test at 2000°F.
- Modified IEC 60331-11 with Side Bricks and 15A Load Rapid Rise 2000°F for 30 min.
- IEC 60331-11 Flame Test Modified to 3 hrs. at 2000°F
- MIL-W-25038
- UL 44/CSA 22.2 No. 38
- IEEE 1580 and UL 1309/CSA C22.2 No. 245
- UL 1569
- UL 1277
- Type ACIC IAW CSA 22.2 No. 239
- CSA Listed R90
- ABS Recognized for Marine Shipboard

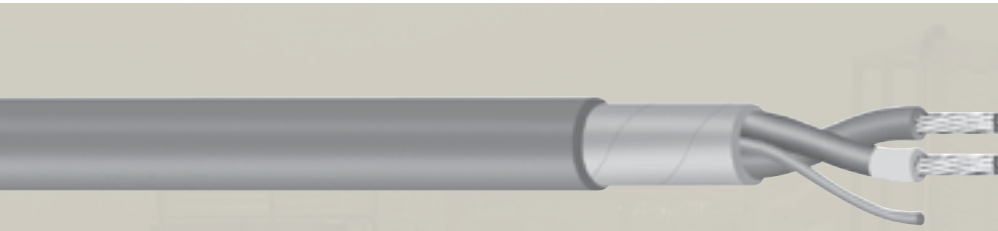
VITALink® Petrochemical Products include VITALink 2000®, VITALink TC/NCC, and VITALink® MC/NCC.

Products are designed to meet the needs of our customers and ensure both life and plant safety during a potential catastrophic fire event.

Our product portfolio features world class cables, designed with patented, high grade low smoke Zero Halogen compounds, providing safe, dependable performance.



# VITALink® 2000 Instrumentation



## Features

- Fire Rated Circuit Integrity Cable
- Installed on steel tray with steel fittings
- Moisture Resistant Suitable for wet locations
- Low Smoke, Halogen free design
- Flexible for ease of installation
- Easy stripability
- Available in long lengths
- No special tools, connectors, or installation procedures
- Easily pulled (low friction jacket)

## Performance Standards

- Passes API 2218 flame test per UL 1709 oven test at 2000°F for 20 minutes with heat flux of 65,000 ± 5000 BTU/h – ft<sup>2</sup> (204 ± 16 kw/m<sup>2</sup>)
- UL Listed, NEC Type TC in accordance with UL Standard No. 1277
- Approved and marked with the “Sunlight Resistant” designation
- Singles UL Type RFFH-3
- Singles wet rated per UL44/CSA 22.2 No. 38 Section 5.4 Long Term Insulation Resistance in Water Test
- Approved and marked with “FT-4” flame test designation
- CUL Listed as CEC Type CIC in accordance with CSA Standard C22.2 No. 239
- CUL Listed as CEC Type TC in accordance with CSA Standard C22.2 No. 230
- ABS Recognized for marine shipboard
- -ER meets the crush and impact requirement of Type MC cable and can be used per NEC 336.10 (7) for extended runs
- -HL for Class 1 Division 1 locations for constructions one inch and less in diameter

## Scope

VITALink® 2000 is a unique cable which offers superior fire endurance capabilities along with the well-established benefits and features associated with NEC Type TC cable designs. This cable is suitable for use in circuits where the maintenance of circuit integrity is an absolute necessity to allow the operation of systems or equipment vital to life or safety under emergency conditions. It has applications in the petroleum industry for MOV instrumentation, communication systems and other critical functions where fire survivability is essential.

## Construction

**Conductor:** Stranded, nickel coated copper

**Thermal Barrier:** Inorganic layer

**Insulation System:** Proprietary Low Smoke Zero Halogen thermoset Fire-Roc layer and thermoset low smoke zero halogen covering

**Circuit Identification:** ICEA Method 3: Black insulation with printed numbers and color names — black and white for pairs — black, white and red for triads. In addition, legs other than black have colored stripe in the named color.

**Shield and Binder Tape:** As required, shields are copper polyester laminated tape with flexibly stranded copper drain wire. Individual pairs or triads may be shielded or unshielded. Cables may have overall shields if required.

**Jacket:** Black Low-Smoke Zero Halogen Polyolefin (colors available on request)

# Fire Resistive Instrumentation Cable

## 600 Volt – Pairs

**Size: 16 AWG** – 19/29 nickel-coated copper, thermal barrier layer, .045" low-smoke zero-halogen thermoset ceramifiable insulation and .015" black low-smoke zero-halogen thermoset conductor jacket (nominal diameter 0.235", 5.97 mm)

Product Code	Number of Pairs	Shields	Jacket Thickness (inch)	Jacket Thickness (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (Amps)
VP02016-003	1	NS	.060	1.52	0.61	15.5	185	0.275	4.88	12.4	8
VP02016-005	1	SP	.060	1.52	0.62	15.7	193	0.287	4.96	12.6	8
VP04016-009	2	SP/OS	.080	2.03	1.07	27.2	465	0.692	8.56	21.7	6.4
VP08016-005	4	SP/OS	.080	2.03	1.24	31.5	585	0.870	9.92	25.2	5.6
VP16016-005	8	SP/OS	.080	2.03	1.65	41.9	1000	1.488	13.2	33.5	4
VP24016-007	12	SP/OS	.110	2.79	2.08	52.8	1625	2.418	16.64	42.3	3.6

## 600 Volt – Triads

**Size: 16 AWG** – 19/29 nickel-coated copper, thermal barrier layer, .045" low-smoke zero-halogen thermoset ceramifiable insulation and .015" black low-smoke zero-halogen thermoset conductor jacket (nominal diameter 0.235", 5.97 mm)

Product Code	Number of Triads	Shields	Jacket Thickness (inch)	Jacket Thickness (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (Amps)
VP03016-008	1	NS	.060	1.52	0.63	16.0	210	0.312	5.04	12.8	8
VP03016-007	1	ST	.060	1.52	0.65	16.5	226	0.336	5.2	13.2	8

Shields: NS = not shielded. SP = shielded pair. ST = shielded triad. OS = overall shield.

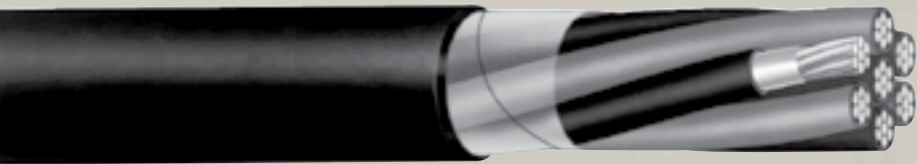
Drain wires are 16 AWG 26/0.010" bare copper.

Maximum direct current resistance of each leg of one pair or triad cable is 6.3896 Ohms/1000 feet at 20°C.

<sup>1</sup> Minimum Bending Radii are instructive for permanent training.

<sup>2</sup> Ampacity based on API 14FZ for nickel-coated copper conductor (27% nickel), 75°C, 600V adjustment factors from NEC 2011 Table 310.15(b)(2)(a) for more than three current carrying conductors.

# VITALink® 2000 Power & Control



## Features

- Fire Rated Circuit Integrity Cable
- Installed on steel tray with steel fittings
- Moisture Resistant Suitable for wet locations
- Low Smoke, Halogen free design
- Flexible for ease of installation
- Easy stripability
- Available in long lengths
- No special tools, connectors, or installation procedures
- Easily pulled (low friction jacket)

## Performance Standards

- Passes API 2218 flame test per UL 1709 oven test at 2000°F for 60 minutes with heat flux of 65,000 ± 5000 BTU/h – ft² (204 ± 16 kw/m²)
- UL Listed, NEC Type TC in accordance with UL Standard No. 1277
- Approved and marked with the “Sunlight Resistant” designation
- Singles UL Type RHW-2 suitable for wet locations
- Approved and marked with “FT-4” flame test designation
- CSA Listed R90 in accordance with CSA C22.2 No. 38/UL44
- CUL Listed as CEC Type CIC in accordance with CSA Standard C22.2 No. 239
- CUL Listed as CEC Type TC in accordance with CSA Standard C22.2 No. 230
- CUL Listed RW90 in accordance with CSA C22.2 No. 38/UL44
- ABS Recognized for marine shipboard
- -ER meets the crush and impact requirement of Type MC cable and can be used per NEC 336.10 (7) for extended runs
- -HL for Class 1 Division 1 locations for constructions one inch and less in diameter

## Scope

VITALink® 2000 is a unique cable which offers superior fire endurance capabilities along with the well-established benefits and features associated with NEC Type TC cable designs. This cable is suitable for use in circuits where the maintenance of circuit integrity is an absolute necessity to allow the operation of systems or equipment vital to life or safety under emergency conditions. It has applications in the petroleum industry for MOVs, fire pumps and other critical functions where fire survivability is essential.

## Construction

**Conductor:** Stranded, nickel coated copper

**Thermal Barrier:** Inorganic layer

**Insulation System:** Proprietary Low Smoke Zero Halogen thermoset Fire-Roc layer and thermoset low smoke zero halogen covering

**Circuit Identification:** ICEA Method 3 Table E2: Black insulation with printed numbers and color names. In addition, legs other than black have colored stripe in the named color. Circuits of four conductor cables are identified black, red, blue, and green.

**Jacket:** Black Low-Smoke Zero Halogen Polyolefin (colors available on request)



# Fire Resistive Control/Power Cable

## 600 Volt – Multiconductor

**Note:** Part number for four conductors has an insulated ground (TC-ER)

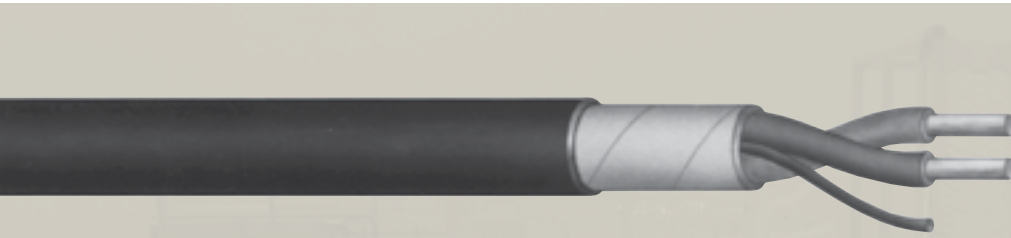
Product Code	Number of Conductors	Jacket Thickness (inch)	Jacket Thickness (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (Amps)
<b>Size: 14 AWG</b> – 19/0.0142" nickel-coated copper; thermal barrier layer, 0.045" thermoset ceramifiable insulation; and 0.015" black low smoke zero halogen thermoset conductor jacket (nominal diameter 0.248", 6.3 mm)										
VP03014-004	3	.060	1.52	0.68	17.3	234	0.348	2.72	6.9	15
VP04014-006	4	.060	1.52	0.74	18.8	268	0.399	2.96	7.5	15
VP07014-002	7	.080	2.03	0.93	23.6	442	0.658	3.72	9.4	10.5
VP12014-001	12	.080	2.03	1.22	31.0	703	1.046	9.76	24.8	7
<b>Size: 12 AWG</b> – 19/0.0179" nickel-coated copper; thermal barrier layer, 0.045" thermoset ceramifiable insulation; and 0.015" black low smoke zero halogen thermoset conductor jacket (nominal diameter 0.265", 6.7 mm)										
VP02012-004	2	.060	1.52	0.68	17.3	224	0.333	2.72	6.9	18
VP03012-006	3	.060	1.52	0.72	18.3	273	0.406	2.88	7.3	18
VP04012-001	4	.060	1.52	0.78	19.8	317	0.472	3.12	7.9	18
VP07012-003	7	.080	2.03	0.98	24.9	525	0.781	3.92	10.0	12.6
<b>Size: 10 AWG</b> – 49/0.0142" nickel-coated copper; thermal barrier layer, 0.045" thermoset ceramifiable insulation; and 0.015" black low smoke zero halogen thermoset conductor jacket (nominal diameter 0.303", 7.7 mm)										
VP02010-001	2	.060	1.52	0.76	19.3	287	0.427	3.04	7.7	25
VP03010-002	3	.060	1.52	0.80	20.3	355	0.528	3.20	8.1	25
VP04010-002	4	.080	2.03	0.92	23.4	453	0.674	3.68	9.3	25
VP07010-004	7	.080	2.03	1.10	27.9	692	1.030	4.40	11.2	17.5
<b>Size: 8 AWG</b> – 133/0.0113" nickel-coated copper; thermal barrier layer, 0.060" thermoset ceramifiable insulation; and 0.030" black low smoke zero halogen thermoset conductor jacket (nominal diameter 0.392", 10.0 mm)										
VP03008-004	3	.080	2.03	1.03	26.2	550	0.818	4.12	10.5	32
VP04008-001	4	.080	2.03	1.13	28.7	665	0.990	4.52	11.5	32
<b>Size: 6 AWG</b> – 133/0.0142" nickel-coated copper; thermal barrier layer, 0.060" thermoset ceramifiable insulation; and 0.030" black low smoke zero halogen thermoset conductor jacket (nominal diameter 0.434", 11.0 mm)										
VP03006-004	3	.080	2.03	1.11	28.2	688	1.024	4.44	11.3	41
VP04006-003	4	.080	2.03	1.22	31.0	843	1.254	4.88	12.4	41
<b>Size: 4 AWG</b> – 133/0.0179" nickel-coated copper; thermal barrier layer, 0.060" thermoset ceramifiable insulation; and 0.030" black low smoke zero halogen thermoset conductor jacket (nominal diameter 0.495", 12.6 mm)										
VP03004-001	3	.080	2.03	1.24	31.5	915	1.362	4.96	12.6	53
VP04004-001	4	.080	2.03	1.37	34.8	1129	1.680	5.48	13.9	53
<b>Size: 2 AWG</b> – 665/0.0100" nickel-coated copper; thermal barrier layer, 0.060" thermoset ceramifiable insulation; and 0.030" black low smoke zero halogen thermoset conductor jacket (nominal diameter 0.556", 14.1 mm)										
VP03002-000	3	.080	2.03	1.37	34.8	1223	1.820	5.48	13.9	73
VP04002-000	4	.080	2.03	1.52	38.6	1526	2.271	6.08	15.4	73

<sup>1</sup> Minimum Bending Radii are instructive for permanent training.

<sup>2</sup> Ampacity based on API 14FZ for nickel-coated copper conductor (27% nickel), 75°C, 600V adjustment factors from NEC 2011 Table 310.15(b)(2)(a) for more than three current carrying conductors.



# VITALink® TC/NCC Instrumentation



## Features

- Fire Rated Circuit Integrity Cable
- Installed on steel tray with steel fittings
- Moisture Resistant Suitable for wet locations
- Low Smoke, Halogen free design
- Flexible for ease of installation
- Easy stripability
- Available in long lengths
- No special tools, connectors, or installation procedures
- Easily pulled (low friction jacket)

## Performance Standards

- Third party qualification for 30 minutes at 2000°F (1093°C) Rapid Rise test witnessed by UL, modified IEC 60331 with side bricks and light bulb load
- Passes IEC 60331-11 flame test modified to 3 hours @ 2000°F
- UL Listed, NEC Type TC in accordance with UL Standard No. 1277
- Approved and marked with the “Sunlight Resistant” designation
- Singles tested per UL44/CSA 22.2 No. 38 Section 5.4 Long Term Insulation Resistance in Water Test
- Singles UL Type RFHH-3
- Approved and marked with the “FT-4” flame test designation
- CUL Listed as CEC Type CIC in accordance with CSA Standard C22.2 No. 239
- CUL Listed as CEC Type TC in accordance with CSA Standard C22.2 No. 230
- ABS Recognized for marine shipboard
- -ER meets the crush and impact requirement of Type MC cable and can be used per NEC 336.10 (7) for extended runs
- -HL for Class 1 Division 1 locations for constructions one inch and less in diameter

## Scope

VITALink® TC/NCC is a unique cable which offers absolute necessity to allow the operation of systems or superior fire endurance capabilities along with the well-established benefits and features associated with NEC Type TC-ER cable designs. This cable is suitable for use in circuits where the maintenance of circuit integrity is an equipment vital to life or safety under emergency conditions. It has applications in the petroleum industry for MOV instrumentation, communication systems and other critical functions where fire survivability is essential.

## Construction

**Conductor:** Stranded, nickel coated copper

**Insulation System:** Proprietary Low Smoke Zero Halogen thermoset Fire-Roc layer and thermoset low smoke zero halogen covering

**Circuit Identification:** ICEA Method 3 Table E1: Black insulation with printed pair numbers and color names — black and white for pairs — black, white and red for triads. In addition, legs other than black have colored stripe in the named color.

**Optional Shielding:** Components and overall cable shields, if required, accomplished by copper polyester tape shield in contact with stranded copper drain wires.

**Binder Tape:** Helically applied binder tape applied over unshielded and multi-pair or multi-triad cable cores.

**Jacket:** Black Low-Smoke Zero Halogen Polyolefin (colors available on request)

# Fire Resistive Instrumentation Cable

## 600 Volt – Pairs

**Size: 16 AWG** – 19/29 nickel-coated copper, .030" low-smoke zero-halogen thermoset ceramifiable insulation and .015" black low-smoke zero-halogen thermoset conductor jacket (nominal diameter 0.151", 3.84 mm)

Product Code	Number of Pairs	Shields	Jacket Thickness (inch)	Jacket Thickness (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (Amps)
VP02016-000	1	NS	.045	1.14	0.40	10.2	85	0.126	1.75	4.4	8
VP02016-001	1	SP	.045	1.14	0.41	10.4	97	0.144	3.50	8.9	8
VP04016-001	2	SP/OS	.060	1.52	0.71	18.0	264	0.393	5.75	14.6	6.4
VP04016-000	2	OS	.060	1.52	0.67	17.0	208	0.310	5.50	14.0	6.4
VP08016-001	4	SP/OS	.080	2.03	0.86	21.8	353	0.525	7.0	17.8	5.6
VP08016-002	4	OS	.060	1.52	0.75	19.1	282	0.420	6.0	15.2	5.6
VP16016-003	8	SP/OS	.080	2.03	1.12	28.5	598	0.89	9.0	22.9	4
VP16016-004	8	OS	.080	2.03	1.06	26.9	502	0.747	8.50	21.6	4
VP24016-010	12	SP/OS	.080	2.03	1.36	34.5	927	1.38	11.0	27.9	3.6
VP24016-000	12	OS	.080	2.03	1.2	32.5	682	1.015	9.75	24.8	3.6

## 600 Volt – Triads

**Size: 16 AWG** – 19/29 nickel-coated copper, .030" low-smoke zero-halogen thermoset ceramifiable insulation and .015" black low-smoke zero-halogen thermoset conductor jacket (nominal diameter 0.151", 3.84 mm)

Product Code	Number of Triads	Shields	Jacket Thickness (inch)	Jacket Thickness (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (Amps)
VP03016-000	1	NS	.045	1.14	0.43	10.9	104	0.155	3.50	8.9	8
VP03016-001	1	ST	.045	1.14	0.44	11.2	110	0.164	3.75	9.52	8

Shields: NS = not shielded. SP = shielded pair. ST = shielded triad. OS = overall shield.

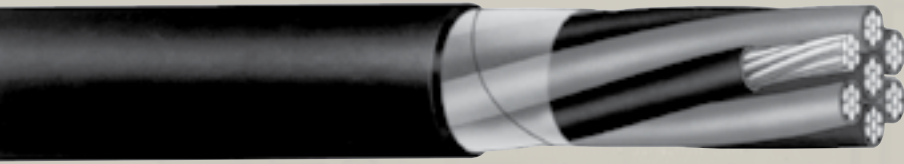
Drain wires are 16 AWG 26/0.010" bare copper.

Maximum direct current resistance of each leg of one pair or triad cable is 6.3896 Ohms/1000 feet at 20°C.

<sup>1</sup> Minimum Bending Radii are instructive for permanent training.

<sup>2</sup> Ampacity based on API 14FZ for nickel-coated copper conductor (27% nickel), 75°C, 600V adjustment factors from NEC 2011 Table 310.15(b)(2)(a) for more than three current carrying conductors.

# VITALink® TC/NCC Power & Control



## Features

- Fire Rated Circuit Integrity Cable
- Installed on steel tray with steel fittings
- Moisture Resistant Suitable for wet locations
- Low Smoke, Halogen free design
- Flexible for ease of installation
- Easy stripability
- Available in long lengths
- No special tools, connectors, or installation procedures
- Easily pulled (low friction jacket)

## Performance Standards

- Third party qualification for 30 minutes at 2000°F (1093°C) Rapid Rise Test witnessed by UL, modified IEC60331 with side bricks and 15A load
- Passes IEC 60331-11 flame test modified to 3 hours @ 2000°F
- UL Listed, NEC Type TC in accordance with UL Standard No. 1277
- Approved and marked with the “Sunlight Resistant” designation
- Singles wet rated per UL44/CSA 22.2 No. 38 Section 5.4 Long Term Insulation Resistance in Water Test and listed as UL/CUL Type RHW-2/RW90
- Approved and marked with the “FT-4” flame test designation
- CSA Listed R90 in accordance with CSA C22.2 No. 38/UL44
- CUL Listed as CEC Type CIC in accordance with CSA Standard C22.2 No. 239
- CUL Listed as CEC Type TC in accordance with CSA Standard C22.2 No. 230
- ABS Recognized for marine shipboard
- -ER meets the crush and impact requirement of Type MC cable and can be used per NEC 336.10 (7) for extended runs
- -HL for Class 1 Division 1 locations for constructions one inch and less in diameter

## Scope

VITALink® TC/NCC is a unique cable which offers superior fire endurance capabilities along with the well-established benefits and features associated with NEC Type TC cable designs. This cable is suitable for use in circuits where the maintenance of circuit integrity is an absolute necessity to allow the operation of systems or equipment vital to life or safety under emergency conditions. It has applications in the petroleum industry for MOVs, fire pumps and other critical functions where fire survivability is essential.

## Construction

**Conductor:** Stranded, nickel coated copper through 4 AWG, bare copper larger than 4 AWG

**Insulation System:** Proprietary Low Smoke Zero Halogen thermoset Fire-Roc® layer and thermoset low smoke zero halogen covering

**Circuit Identification:** ICEA Method 3 Table E2: Black insulation with printed numbers and color names. In addition, legs other than black have colored stripe in the named color. Circuits of four conductor cables are identified black, red, blue, and green.

**Ground Wire:** Insulated ground wire upon request

**Binder Tape:** Helically applied

**Jacket:** Black Low-Smoke Zero Halogen Polyolefin (other colors available on request)



# Fire Resistive Control/Power Cable

## 600 Volt – Multiconductor

**Note:** Part number for four conductors has an insulated ground (TC-ER)

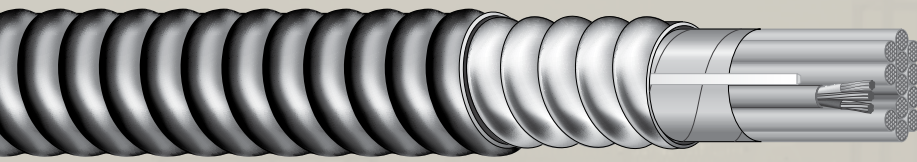
Product Code	Number of Conductors	Jacket Thickness (inch)	Jacket Thickness (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (Amps)
<b>Size: 14 AWG</b> – 19/0.0179" nickel-coated copper; 0.045" thermoset ceramifiable insulation; and 0.015" black low smoke, zero halogen thermoset conductor jacket (nominal diameter 0.213", 5.4 mm)										
VP03014-000	3	.060	1.52	0.57	14.5	175	0.260	2.28	5.8	15
VP04014-000	4	.060	1.52	0.60	15.2	220	0.329	2.50	6.35	15
VP07014-000	7	.060	1.52	0.72	18.3	316	0.470	3.0	7.62	10.5
VP12014-000	12	.080	2.03	0.99	25.1	514	0.765	4.0	10.2	7
<b>Size: 12 AWG</b> – 19/0.0179" nickel-coated copper; 0.045" thermoset ceramifiable insulation; and 0.015" black low smoke, zero halogen thermoset conductor jacket (nominal diameter 0.213", 5.4 mm)										
VP02012-000	2	.060	1.52	0.56	14.2	171	0.254	2.25	5.7	18
VP03012-000	3	.060	1.52	0.59	15.0	209	0.34	2.50	6.35	18
VP04012-000	4	.060	1.52	0.64	16.3	242	0.36	2.75	7.0	18
VP07012-001	7	.060	1.52	0.77	19.6	363	0.54	3.25	8.26	12.6
<b>Size: 10 AWG</b> – 49/0.0142" nickel-coated copper; 0.045" thermoset ceramifiable insulation; and 0.015" black low smoke, zero halogen thermoset conductor jacket (nominal diameter 0.254", 6.45 mm)										
VP02010-000	2	.060	1.52	0.64	16.3	222	0.33	2.75	7.0	25
VP03010-000	3	.060	1.52	0.68	17.3	277	0.412	2.75	7.0	25
VP04010-000	4	.060	1.52	0.75	19.1	327	0.487	3.0	7.62	25
VP07010-000	7	.080	2.03	0.94	23.9	551	0.82	4.0	10.16	17.5
<b>Size: 8 AWG</b> – 133/0.0113" nickel-coated copper; 0.060" thermoset ceramifiable insulation; and 0.030" black low smoke, zero halogen thermoset conductor jacket (nominal diameter 0.352", 8.94 mm)										
VP03008-005	3	.080	2.03	0.93	23.6	536	0.798	3.75	9.53	32
VP04008-004	4	.080	2.03	1.02	25.9	585	0.870	4.25	10.8	32
<b>Size: 6 AWG</b> – 133/0.0142" nickel-coated copper; 0.060" thermoset ceramifiable insulation; and 0.030" black low smoke, zero halogen thermoset conductor jacket (nominal diameter 0.411", 10.44 mm)										
VP03006-005	3	.080	2.03	1.01	25.7	672	1.000	4.04	10.3	41
VP04006-002	4	.080	2.03	1.16	29.5	779	1.160	4.75	12.1	41
<b>Size: 4 AWG</b> – 133/0.0179" nickel-coated copper; 0.060" thermoset ceramifiable insulation; and 0.030" black low smoke, zero halogen thermoset conductor jacket (nominal diameter 0.495", 12.6 mm)										
VP03004-002	3	.080	2.03	1.14	29.0	894	1.330	4.56	11.6	53
VP04004-003	4	.080	2.03	1.26	32.0	1052	1.565	5.04	12.8	53

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<sup>1</sup> Minimum Bending Radii are instructive for permanent training.

<sup>2</sup> Ampacity based on API 14FZ for nickel-coated copper conductor (27% nickel), 75°C, 600V adjustment factors from NEC 2011 Table 310.15(b)(2)(a) for more than three current carrying conductors.

# VITALink® MC/NCC Instrumentation



## Features

- Replaces expensive fireproofing methods
- Low smoke, Halogen free design
- Installation ease of Type MC cables
- Utilizes commercially available MC stainless steel connectors
- Termination simplicity
- Requires conventional stripping tools
- Extruded “moisture resistant” insulation
- Wide variety of sizes & configurations
- Available in long lengths
- Welded armor forms an impervious barrier
- Armor is impact & crush resistant
- Armor sheath capacity exceeds the UL requirement for equipment ground
- Class 1 Division 1

## Performance Standards

- Third party qualification for 30 minutes at 2000°F Rapid Rise test witnessed by UL, Modified IEC 60331-11 with side bricks and 0.3A load (light bulbs)
- Insulation resistance is in excess of 10,000 ohms in 60 minute 2000°F flame test per Mil-W-25038 (Shake & Bake)
- Passes IEC 60331-11 flame test modified to 3 hours @ 2000°F
- UL Listed, NEC Type MC in accordance with UL Standard No. 1569 and MC-HL per UL Standard No. 2225
- UL Rated as -40°C (PVC jacket)
- Weather and sunlight resistant
- UL Listed for CT (Cable Tray) use
- Approved and marked with “FT-4” flame test designation
- UL Listed as Type CWCMC to IEEE as IEEE 1580 and UL 1309/CSA C22.2 No. 245 as marine shipboard cable
- cUL listed as CEC type ACIC IAW CSA 22.2 No. 239

## Scope

VITALink® MC/NCC is a unique cable which offers superior fire endurance capabilities along with the well-established benefits and features associated with NEC Type MC-HL cable designs. This cable is suitable for use in circuits where the maintenance of circuit integrity is an absolute necessity to allow the operation of systems or equipment vital to life or safety under emergency conditions. It has applications in the petroleum industry for MOV's, fire pumps and other critical functions where fire survivability is essential.

## Construction

**Conductor:** Stranded, Nickel Coated Copper

**Insulation System:** Proprietary Low Smoke Zero Halogen thermoset Fire-Roc layer and thermoset low smoke zero halogen covering

**Circuit Identification:** ICEA Method 3: Black insulation with printed numbers; Black and White for pairs; Black, White and Red for triads

**Pair/Triad:** Copper/mylar tape with drain/ground

**Binder:** Helically applied

**Armor:** Continuously welded and corrugated aluminum

**Outer Jacket:** Flame Retardant Polyvinyl Chloride (PVC) or optional Low Smoke Zero Halogen (LSZH) polyolefin

# Fire Resistive Instrumentation Cable

**Size: 16 AWG** – 19/.0113" nickel-coated copper, .030" low-smoke zero-halogen thermoset Fire-Roc® insulation, .015" black low-smoke zero-halogen thermoset conductor jacket (nom. diameter 0.150", 3.8 mm)

Product Code	Number of Pairs	Shields	Core Diameter (inch)	Core Diameter (mm)	Armor Diameter (inch)	Armor Diameter (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (see note)
VP02016-010	1	NS	0.32	8.1	0.62	15.7	0.72	18.3	178	0.265	4.50	11.4	8
VP02016-007	1	SP	0.32	8.4	0.62	15.7	0.72	18.3	189	0.282	4.50	11.4	8
VP04016-002	2	SP/OS	0.58	14.7	0.92	23.4	1.03	26.2	352	0.523	6.50	16.5	6.5
VP08016-000	4	SP/OS	0.70	17.8	1.07	27.2	1.18	30.0	441	0.656	7.50	19.0	5.5
VP16016-002	8	SP/OS	0.95	24.1	1.33	33.8	1.44	36.6	711	1.060	9.50	24.1	4
VP24016-006	12	SP/OS	1.19	30.2	1.64	41.7	1.77	45.0	980	1.460	11.50	29.2	3.5

Product Code	Number of Pairs	Shields	Core Diameter (inch)	Core Diameter (mm)	Armor Diameter (inch)	Armor Diameter (mm)	Nominal Diameter (inch)	Nominal Diameter (mm)	Net Weight (lbs./1000 ft.)	Net Weight (kg/m)	Minimum Bending Radii <sup>1</sup> (inch)	Minimum Bending Radii <sup>1</sup> (cm)	Ampacity <sup>2</sup> (see note)
VP03016-005	1	NS	0.34	8.6	0.62	15.7	0.73	18.5	199	0.296	4.50	11.4	8
VP03016-004	1	ST	0.34	8.6	0.62	15.7	0.73	18.5	209	0.311	4.50	11.4	8

Shields: NS = not shielded. SP = shielded pair. ST = shielded triad. OS = overall shield.

Drain wires are 18 AWG 16/.010" Bare copper.

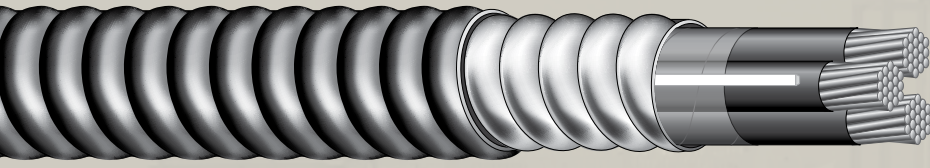
Maximum direct current resistance of each leg of one pair or triad cable is 6.51 Ohms / 1000 feet at 20°C.

<sup>1</sup> Minimum Bending Radii are instructive for permanent training.

<sup>2</sup> Ampacity based on API 14FZ for nickel-coated copper conductor (27% nickel), 75°C, 600V.



# VITALink<sup>®</sup> MC/NCC Power & Control



## Features

- Replaces expensive fireproofing methods
- Low smoke, Halogen free design
- Installation ease of Type MC cables
- Utilizes commercially available MC stainless steel connectors
- Termination simplicity
- Requires conventional stripping tools
- Extruded “moisture resistant” insulation
- Wide variety of sizes & configurations
- Available in long lengths
- Welded armor forms an impervious barrier
- Armor is impact & crush resistant
- Armor sheath capacity exceeds the UL requirement for equipment ground
- Class 1 Division 1

## Performance Standards

- Third party qualification for 30 minutes at 2000°F (1093°C) Rapid Rise test witnessed by UL, Modified IEC 60331-11 with side bricks and 15A load.
- Insulation resistance is in excess of 10,000 ohms in 60 minute 2000°F flame test per Mil-W-25038 (Shake & Bake)
- Passes IEC 60331-11 flame test modified to 3 hours @ 2000°F
- UL Listed, NEC Type MC in accordance with UL Standard No. 1569 and MC-HL per UL Standard No. 2225
- UL Rated as -40°C (PVC jacket)
- Weather and sunlight resistant
- UL Listed for CT (Cable Tray) use
- Approved and marked with “FT-4” flame test designation
- UL Listed as Type CWCMC to IEEE 1580 and UL 1309/ CSA C22.2 No. 245 as marine shipboard cable
- cUL listed as CEC type ACIC IAW CSA 22.2 No. 239

## Scope

VITALink<sup>®</sup> MC/NCC is a unique cable which offers superior fire endurance capabilities along with the well-established benefits and features associated with NEC Type MC-HL cable designs. This cable is suitable for use in circuits where the maintenance of circuit integrity is an absolute necessity to allow the operation of systems or equipment vital to life or safety under emergency conditions. It has applications in the petroleum industry for MOV's, fire pumps and other critical functions where fire survivability is essential.

## Construction

**Conductor:** Stranded, nickel coated copper through 4 AWG, bare copper larger than 4 AWG

**Insulation System:** Proprietary Low Smoke Zero Halogen thermoset Fire-Roc layer and thermoset low smoke zero halogen covering

**Circuit Identification:** ICEA Method 3 K-2: Black insulation with printed numbers and colors

**Ground:** Insulated ground

**Binder:** Helically applied

**Extruded Silicone Filler:** Used in the air gap between the cable core and the aluminum armor to meet UL 1569 requirement for “tightness of armor on Conductors”

**Armor:** Continuously welded and corrugated aluminum

**Outer Jacket:** Flame Retardant Polyvinyl Chloride (PVC) or optional Low Smoke Zero Halogen (LSZH) polyolefin

# Fire Resistive Control/Power Cable

**Size: 14 AWG** – 19/.0142" nickel-coated copper, .045" low-smoke zero-halogen thermoset Fire-Roc® insulation, .015" black low-smoke zero-halogen thermoset conductor jacket (nominal diameter 0.200", 5.08 mm).

Product Code	Number of Conductors	Core Diameter (inch) (mm)		Armor Diameter (inch) (mm)		Nominal Diameter (inch) (mm)		Net Weight (lbs./1000 ft.) (kg/m)		Minimum Bending Radii <sup>1</sup> (inch) (cm)		Ampacity <sup>2</sup> (see note)
VP03014-003	3	0.43	10.90	0.740	18.8	0.84	21.3	251	0.374	5.25	13.3	15
VP04014-002	4	0.50	12.70	0.840	21.3	0.95	24.1	308	0.458	6.00	15.2	12
VP07014-006	7	0.61	15.50	0.965	24.5	1.07	27.2	433	0.644	6.75	17.1	10.5
VP12014-004	12	0.82	20.83	1.190	30.2	1.29	32.8	623	0.927	8.50	21.6	7.5

Conductor count includes one conductor identified as a grounding conductor.

**Size: 12 AWG** – 19/.0179" nickel-coated copper, .045" low-smoke zero-halogen thermoset Fire-Roc® insulation, .015" black low-smoke zero-halogen thermoset conductor jacket (nominal diameter 0.213", 5.41 mm).

Product Code	Number of Conductors	Core Diameter (inch) (mm)		Armor Diameter (inch) (mm)		Nominal Diameter (inch) (mm)		Net Weight (lbs./1000 ft.) (kg/m)		Minimum Bending Radii <sup>1</sup> (inch) (cm)		Ampacity <sup>2</sup> (see note)
VP03012-005	3	0.48	12.19	0.84	21.3	0.94	23.9	306	0.455	6.00	15.2	18
VP04012-003	4	0.52	13.20	0.84	21.3	0.94	23.9	347	0.516	6.00	15.2	14.5
VP07012-005	7	0.64	16.30	1.02	25.9	1.12	28.4	503	0.749	7.25	18.4	12.5

Conductor count includes one conductor identified as a grounding conductor.

**Size: 10 AWG** – 49/.0142" nickel-coated copper, .045" low-smoke zero-halogen thermoset Fire-Roc® insulation, .015" black low-smoke zero-halogen thermoset conductor jacket (nom. diameter 0.254", 6.45 mm).

Product Code	Number of Conductors	Core Diameter (inch) (mm)		Armor Diameter (inch) (mm)		Nominal Diameter (inch) (mm)		Net Weight (lbs./1000 ft.) (kg/m)		Minimum Bending Radii <sup>1</sup> (inch) (cm)		Ampacity <sup>2</sup> (see note)
VP03010-005	3	0.55	14.0	0.92	23.4	1.02	25.9	376	0.560	6.50	16.5	25
VP04010-001	4	0.62	15.7	0.97	24.6	1.07	27.2	435	0.647	7.00	17.8	20
VP07010-003	7	0.77	19.6	1.13	28.7	1.23	31.2	641	0.954	8.00	20.3	17.5

Conductor count includes one conductor identified as a grounding conductor.

<sup>1</sup>Minimum Bending Radii are instructive for permanent training.

<sup>2</sup>Ampacity based on API 14FZ for nickel-coated copper conductor (27% nickel), 75°C, 600V.

# VITALink® Petrochemical Frequently Asked Questions

**Q** *What are the recommended installation practices for these VITALink products?*

**A** All components of the installation should be steel in order to meet the potential of a 2000°F hydrocarbon pool fire. This includes cable tray, cable glands, cable connectors, cable ties, etc. This requirement is only necessary as the cable is installed inside the designated fire zone.

**Q** *Are the cable configurations listed on the data sheets all that are available?*

**A** No. Configurations listed are most common, however RSCC offers best fitting, custom solutions.

**Q** *What are the minimum order quantities of VITALink petrochemical products?*

**A** As low as 1000 ft for 16-10 AWG multi-conductor sizes. Sizes larger than AWG vary but rarely exceed 2000 ft minimums. RSCC does not offer smaller than 16 AWG.

**Q** *What temperature are the VITALink cable products tested to?*

**A** RSCC petrochemical VITALink products pass minimum 2000°F circuit integrity tests.

**Q** *What is API 2218 and how does it relate to fire rated cable?*

**A** API 2218, *Fireproofing Practices in Petroleum and Petrochemical Processing Plants*. It contains the industry recommended cable performance level (UL 1709) for potential fire conditions in such facilities.

**Q** *How do the three different VITALink petrochemical products vary in performance in circuit integrity testing?*

**A** VITALink 2000 – UL 1709 fire conditions in an enclosed furnace as recommended in API 2218. This test protocol best simulates an actual hydrocarbon pool fire.

VITALink TC/NCC and VITALink MC/NCC – Modified hydrocarbon pool fire test with ribbon burner and side bricks. Comparable set-up to the IEC 60331 test modified to 2000°F however, increasingly more harsh in order to better simulate an actual hydrocarbon pool fire.

**Q** *So what about the IEC 60331 test modified to 2000°F for 3 Hours?*

**A** All of our VITALink products meet this test, however this circuit integrity test does a poor job of simulating a hydrocarbon pool fire. VITALink is at the forefront of advancing more accurate tests.

**Q** *Should I include a ground wire in my VITALink power/control cable product?*

**A** Operating equipment and installation practices determine ground wire requirements. VITALink ground wires are insulated like other conductors in the cable.

- VITALink 2000 and VITALink TC/NCC
  - No Ground = Type TC
  - With Designated Ground = Type TC-ER
- VITALink MC/NCC
  - No Ground = Type MC
  - With Designated Ground = Type MC-HL

For more information on these cable type designations, please contact RSCC.



# Full Range of Wire & Cable for the Most Demanding Fire-Rated Applications

- Critical Circuit Cable for Emergency Shut Down during a Fire Event
- Meets UL1709 Rapid Rise Flame test to 2000°F within 5 minutes @65,000 BTU h-ft<sup>3</sup> heat Flux
- Ease of Installation
- NEC Tray Cable Listed Type TC and TC-ER Type MC and Type MC-HL
- Flexible
- Available in Long Lengths
- Preferred Fire Rated Cable Solution Throughout the World
- Save Downtime, Save Lives!



## American Petroleum Institute

NOTE: The API strongly recommends in Document Title:

### **API 2218 FIREPROOFING PRACTICES IN PETROLEUM AND PETROCHEMICAL PROCESSING PLANTS**

*"This document recommends using cable that meets UL 1709 fire test with light bulbs set up to test for circuit integrity."*



# Marmon Engineered Wire & Cable LLC

A Berkshire Hathaway Company

RSCC Wire and Cable, manufacturers of VITALink®, Exane®, and other recognized cable products, is part of Marmon Engineered Wire & Cable, a unique group of 15 major cable manufacturers with 1600 employees whose synergy offers tremendous breadth of product offering, advanced R&D, continuous innovation and the financial strength of The Marmon Group and Berkshire Hathaway Inc., making the organization the most progressive cable manufacturing force in the industry.



Marmon Engineered Wire & Cable manufactures electrical and electronic wire and cable for energy related markets and other industries. Applications include industrial power and instrumentation; aerial and underground utility distribution; and environments where exposure to harsh elements is anticipated. Markets also include aerospace, telecommunications, computers, transit and appliances.





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