Manufacturer's Instructions for Lifeline® Power Cables

Lifeline® RHW-2 Two-Hour Fire Resistive Cables in EMT Conduit and BreathSaver® XW Phenolic Conduit

Technical Information Sheet #301H

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This Technical Information Sheet (TIS) covers Lifeline® RHW-2 Cables: UL Certified and Listed Two Hour Fire Resistive Cable for use in EMT Conduit and BreathSaver® XW Phenolic Conduit

Applications

Lifeline® Power Cables have been qualified and listed to the demanding requirements of UL 2196, Tests for Fire Resistive Cables, and are UL Listed Type RHW-2.

Lifeline® Power Cables meet various industry code requirements (NFPA 70, NFPA 72, NFPA 101, NFPA 130, and NFPA 502) for fire resistance according to UL Standard 2196 when selected and installed per applicable codes including federal, state, local and municipal rules, laws and regulations as well as Electrical Circuit Integrity System 25C (FHIT 25C). Note that Authorities Having Jurisdiction (AHJ) should be consulted for approval prior to cable purchase and installation.

Requirements

1) Codes / Laws / Regulations

Selection and installation compliance is dependent on the applicable issue of any codes or addendums which cover the use of Lifeline® RHW-2 Cables, Fire Resistive Cables.

2) UL Electrical Circuit Integrity System #25C (FHIT 25C)

The most current listing details and supporting information applicable to Lifeline® Cables' fire resistive rating classification can be obtained from UL's UL Product IQ website by searching for keyword: "FHIT 25C".

3) Manufacturer's Instructions – TIS #301H

All Lifeline® Cable products are covered by specific datasheets and supporting Technical Information Sheets that provide the user with information to properly select and install Lifeline® Cables in a reliable and trouble-free manner. Do not hesitate to contact your Lifeline® Cable representative should you have any questions.

Installation Parameters

1) Cable: Lifeline® RHW-2

Code compliant cable certified as two-hours fire resistive with 480 volts utilization per testing according to UL 2196 and listed in FHIT 25C. Appropriate cable selection is required for systems requiring a fire resistive rating.

2) Fire Resistive Cable System

Code compliant conduit system which meets the following requirements:

a. Horizontal installations must use either BreathSaver® XW Phenolic Conduit with optional ResolveOne NEMA 4X Enclosures as pull boxes with BreathSaver® XW Phenolic conduit assembly components, or Allied or Western EMT conduit with optional Wiegmann NEMA 3R enclosures as pull boxes with Raco steel compression assembly components. Vertical Installations must use BreathSaver® XW Phenolic Conduit with optional ResolveOne NEMA 4X Enclosures as pull boxes with BreathSaver® XW Phenolic assembly components. EMT and NEMA 3R components are not approved for 2-hour rated vertical installations. Maximum allowable vertical distance is 24 feet. For easier installation Polywater LZ pulling lubricant may be used. No substitute components are allowed and Lifeline cables shall be installed in dedicated raceway.

b. Conduit assemblies shall be secured to a fire rated structure comprised of steel or other fire rated components proven to meet the required fire resistance ratings (i.e. two hours). Conduit shall be secured to structure using steel two-piece single-bolt pipe clamps. Clamps shall be 1-1/4 in. wide with minimum thickness of 14-gauge.

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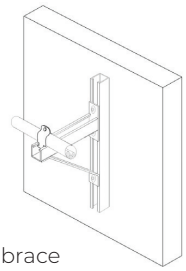

Note: Installations where BreathSaver® XW Phenolic Conduits run parallel to and extend away from the support structure require additional support. In such an installation, the horizontal support members shall be reinforced with a knee brace or equivalent. The drawing to the right shows an example installation with knee brace installed. The knee brace shall be secured to vertical and horizontal structural members using 3/8in. or larger steel bolts. Recommended bracing material is steel at least ¼ inch thick with cross sectional area 0.3 in.² or greater.

c. Maximum support spacing shall be

- EMT conduit shall be supported every 5ft. OC
- BreathSaver® XW Phenolic Conduit shall be supported every 5ft. OC.

d. When enclosures are used as pull boxes, two-piece steel clamps shall be used to secure conduit within one foot from enclosure. When BreathSaver® XW Phenolic Conduit is used conduit connectors shall also be secured using two-piece steel clamps.

3) Conduit Sizing

Minimum allowable conduit sizes for installation of Lifeline® RHW-2 cables classified in FHIT.25C are listed in Table 2, where the conduit sizes listed shall be used lieu of maximum conduit cross-sectional area requirements of National Electrical Code. Conduit bends shall be equal or greater than minimum conduit bend radius listed in Table 3.

4) Pull Boxes

If pull boxes are used, enclosure size shall be at least 8 times the raceway trade size in accordance with National Electric Code article 314.28. Installations in EMT conduit shall use Wiegmann NEMA 3R enclosures. For enclosures 12 inches or less across, Wiegmann series RSC with lift-off screw cover or RHC with hinged cover may be used and enclosers 16 inches or greater across shall use Wiegmann a RHC with hinged cover. Order model number comprised of series number prefix followed by two digit height, width and depth dimensions.

Examples:

An installation with 1-1/4 inch EMT requires an enclosure 10 inches across and Wiegmann RSC101004 enclosure shall be used.

An installation with 3 inch EMT requires an enclosure 24 inches across and Wiegmann RHC242408 enclosure shall be used.

4) Pull Boxes (Continued)

Installation in BreathSaver® XW Phenolic conduit shall use Resolve One Stainless Steel NEMA 4X enclosures. ResolveOne 4X JIC Style JHFX series enclosures shall be used for sizes 12 inches or less across and 4X NEMA Style NFX series shall be used for enclosures 16 inches or greater across. Order model number comprised of AB-R prefix followed by two digit height, width and depth dimensions JHFX or NFX style series, 3 or 4 to describe finish polish, T304 for grade of stainless steel, and HT suffix denoting high temperature gasket.

Examples:

An installation with 1-1/4 inch BreathSaver® XW Phenolic conduit requires an enclosure 10 inches across and ResolveOne AB-R101004JHFX3T304HT enclosure shall be used.

An install installation with 3 inch BreathSaver® XW Phenolic conduit requires an enclosure 24 inches across and ResolveOne AB-R242406NFX3T304HT enclosure shall be used.

Installations using NEMA 4X enclosures shall include an Eaton Crouse - Hinds breather/drain P/N DPE1029S3 installed on the bottom of pull box enclosure.

5) Connector Insulation Bushing

When NEMA 3R pull boxes are installed in applications using EMT conduit, the EMT connector shall have insulating bushing installed after cable has been pulled in. Insulation bushings are flexible silica insulation that is installed under cable and inside connector nipple. The bushing dimensions shall be 3 inches by at least half the connector nipple internal circumference. The installed cables shall be lifted and insulating bushing inserted 2½ inches into connector with ½ inch outside connector folded over connector threads. The bushing shall be secured in connector by circumferentially wrapping connector threads and exposed bushing with at least three layers of 3M 69 Glass Cloth tape. Insulating bushings are available from Prysmian, order part number CUSEMT-DDD, where DDD is conduit trade size

Examples:

An installation with 1-1/4 inch EMT requires one kit of CUSEMT-125

An installation with 3 inch EMT requires one kit of CUSEMT-300

6) Raceway Transitions

Raceway transitions between EMT and BreathSaver XW® Phenolic conduit shall use Stainless Steel NEMA 4X enclosures described above for use with BreathSaver XW® Phenolic conduit at point of raceway transition. The enclosure shall be at least 8 times trade size of largest raceway. Instructions above to secure raceways and install EMT connector insulation bushings shall be done as applicable to each raceway at transition.

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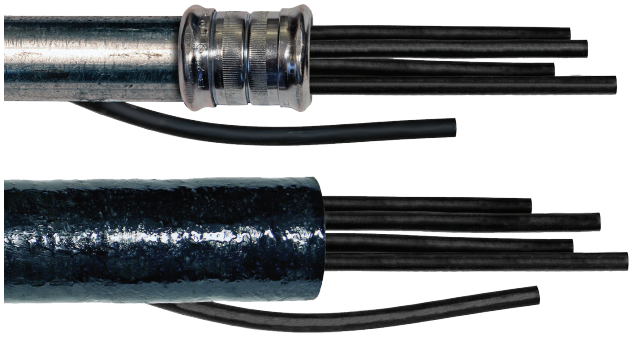
UL 2196 Certified Fire Resistive Cable for Survivability in a Fire



SPECIFICATIONS & RATINGS

- Listed to UL 44, *Thermoset Insulated Wires and Cables*, as the following type:
  - RHW-2, 600 Volt, Rated 90°C Dry/90°C Wet
- Classified to UL 2196, Standard for Tests for Fire Resistive Cables, for two-hours.
- Electrical Circuit Integrity System (FHIT) No. 25C of the UL Fire Resistance Directory for horizontal installations in EMT conduit or BreathSaver® XW Phenolic conduit and vertical installations in BreathSaver® XW Phenolic conduit
- Sunlight Resistant
- FT4 Rated
- ST1
- IEEE 1202
- NFPA 70, NFPA 72, NFPA 101, NFPA 130 and NFPA 502

DESIGN PARAMETERS

CONDUCTORS: Bare stranded copper, 8 AWG through 750kcmil

FIRE BARRIER: High Temperature Mica Tapes

INNER INSULATION: Ceramifiable silicone, Low Smoke Zero Halogen (LSZH)

OUTER INSULATION: Cross-linked polyolefin (XLPO), Low Smoke Zero Halogen

IDENTIFICATION:

ORIGIN USA PRYSMIAN MA P/N [######] [X]AWG ([Y]mm²)
LIFELINE® (UL) RHW-2 600V FT4 ST1 VW1 (UL) 2196 FHIT25C FRR 2 HR 480V UTILIZATION ([mm]/[yr]) [2ft]

Notes: [#] is cable part number
[X] is cable size in AWG or kcmil
[Y] is cable size in mm²

CLASSIFIED UL

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RoHS COMPLIANT

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UL 2196 Certified Fire Resistive Cable for Survivability in a Fire

Table 1 - Cable Description

LIFELINE® Part Number	Conductor Size AWG /MCM	Number of Strands	Insulation Thickness in (mm)	Overall Diameter in (mm)	Approximate Weight lbs./Mft (kg/km)	Ampacity[1] 75°C Amps	Ampacity[1] 90°C Amps
G30064	8	7	0.060 (1.5)	0.31 (7.8)	84 (125)	50	55
G30065	6	7	0.075 (1.9)	0.37 (9.5)	129 (192)	65	75
G30066	4	7	0.075 (1.9)	0.42 (10.7)	185 (275)	85	95
G30067	3	7	0.075 (1.9)	0.45 (11.4)	224 (333)	100	115
G30068	2	7	0.075 (1.9)	0.48 (12.2)	269 (400)	115	130
G30069	1	19	0.100 (2.5)	0.57 (14.5)	364 (542)	130	145
G30070	1/0	19	0.100 (2.5)	0.61 (15.5)	441 (656)	150	170
G30071	2/0	19	0.100 (2.5)	0.65 (16.6)	535 (796)	175	195
G30072	3/0	19	0.100 (2.5)	0.70 (17.9)	656 (976)	200	225
G30073	4/0	19	0.100 (2.5)	0.76 (19.2)	803 (1195)	230	260
G30074	250	37	0.130 (3.3)	0.86 (21.9)	987 (1469)	255	290
G31501	300	37	0.130 (3.3)	0.92 (23.4)	1160 (1726)	285	320
G30075	350	37	0.130 (3.3)	0.97 (24.7)	1306 (1943)	310	350
G31496	400	37	0.130 (3.3)	1.02 (25.9)	1500 (2232)	335	380
G30076	500	37	0.130 (3.3)	1.10 (27.9)	1820 (2708)	380	430
G30077	600	61	0.145 (3.7)	1.21 (30.6)	2199 (3272)	420	475
G30078	750	61	0.145 (3.7)	1.31 (33.3)	2699 (4016)	475	535

[1] Ampacities are based on Table 310.16 of the National Electrical Code (NFPA 70) for 3 current carrying conductors at 30°C ambient.

The above dimensions are approximate and subject to normal manufacturing tolerances. Information subject to change without notice.

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Table 2 - Minimum Allowable Conduit Size

Conductor Size	Minimum Allowable Conduit Size											
	Horizontal Installation in EMT Conduit - Number of Conductors				Horizontal Installation in XW BreathSaver Conduit - Number of Conductors				Vertical Installation in XW BreathSaver Conduit - Number of Conductors			
	1	2	3	4	1	2	3	4	1	2	3	4
8	1/2	1	1-1/4	1-1/4	3/4	3/4	1	1	3/4	1	1-1/4	1-1/4
6	3/4	1-1/4	1-1/4	1-1/2	3/4	1	1-1/4	1-1/4	1	1-1/2	2-1/2	2-1/2
4	1	1-1/4	1-1/2	2	3/4	1	1-1/4	1-1/2	1-1/4	2	2-1/2	3
3	1	1-1/4	1-1/2	2	3/4	1-1/4	1-1/4	1-1/2	1-1/4	2	2-1/2	3
2	1	1-1/4	1-1/2	2	3/4	1-1/4	1-1/2	1-1/2	1-1/4	2-1/2	3	3
1	1-1/4	2	2	2-1/2	1	1-1/2	2	2-1/2	1-1/2	2-1/2	3-1/2	3-1/2
1/0	1-1/4	2	2-1/2	2-1/2	1-1/4	1-1/2	2-1/2	2-1/2	2	3	3-1/2	3-1/2
2/0	1-1/2	2	2-1/2	3	1-1/4	2	2-1/2	3	2	3	3-1/2	4
3/0	1-1/2	2-1/2	2-1/2	3	1-1/4	1-1/2	2-1/2	2-1/2	2-1/2	3-1/2	4	4
4/0	2	2-1/2	3	3	1-1/4	2	2-1/2	3	2-1/2	3-1/2	4	5
250	2	2-1/2	3	3	1-1/4	2-1/2	3	3	2-1/2	3-1/2	4	5
300	2	2-1/2	3	3-1/2	1-1/2	2-1/2	3	3-1/2	2-1/2	3-1/2	5	5
350	2	2-1/2	3	3-1/2	1-1/2	2-1/2	3	3-1/2	3	3-1/2	5	5
400	2	3	4	4	1-1/2	2-1/2	3-1/2	4	3	4	5	6
500	2-1/2	3	3-1/2	4	2	3	3-1/2	4	2-1/2	3-1/2	5	6
600	2-1/2	3	4	--	2-1/2	3	4	5	3	4	5	5
750	2-1/2	3-1/2	--	--	2-1/2	3-1/2	4	5	3	4	5	6

For questions regarding installation and conduit size, including the use of ECG, contact the Lifeline team at Prysmian Cables & Systems USA, LLC (800) 333-4248 x2600.

Table 3 - Minimum Allowable Conduit Bend Radius

Trade Size	EMT Conduit	XW Breathsaver
1/2	4"	N/A
3/4	4-1/2"	12"
1	5-3/4"	12"
1-1/4	7-1/4"	12"
1-1/2	8-1/4"	12"
2	9-1/2"	12"
2-1/2	10-1/2"	12"
3	13"	24"
3-1/2	15"	24"
4	16"	24"
5	N/A	48"
6	N/A	48"

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