-GENESIS-

Installing Genesis Cable

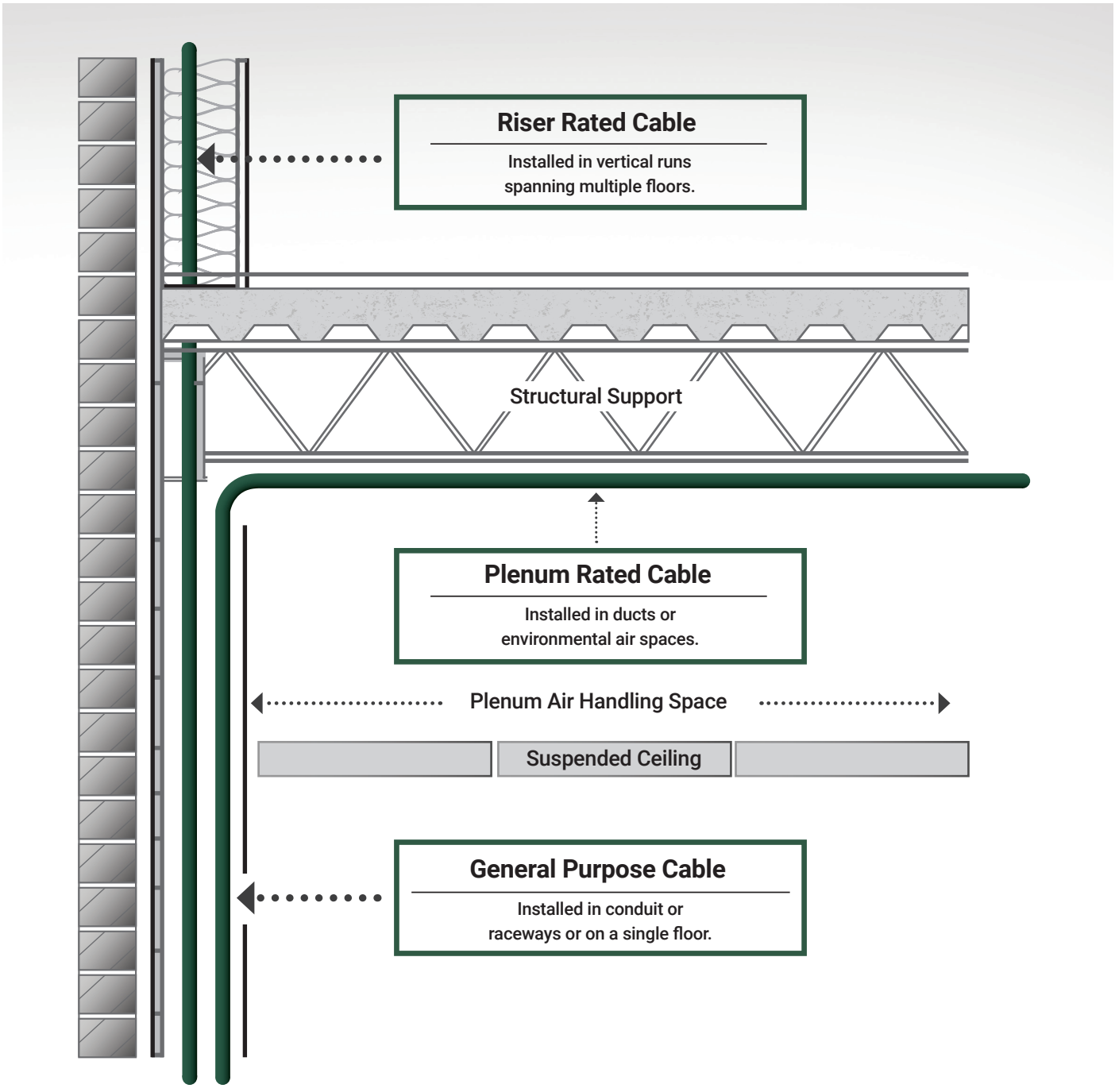
Tips to protect your cable investment, get you in and out of jobs faster and uphold code compliance.

Table of Contents

INDOOR INSTALLATIONS

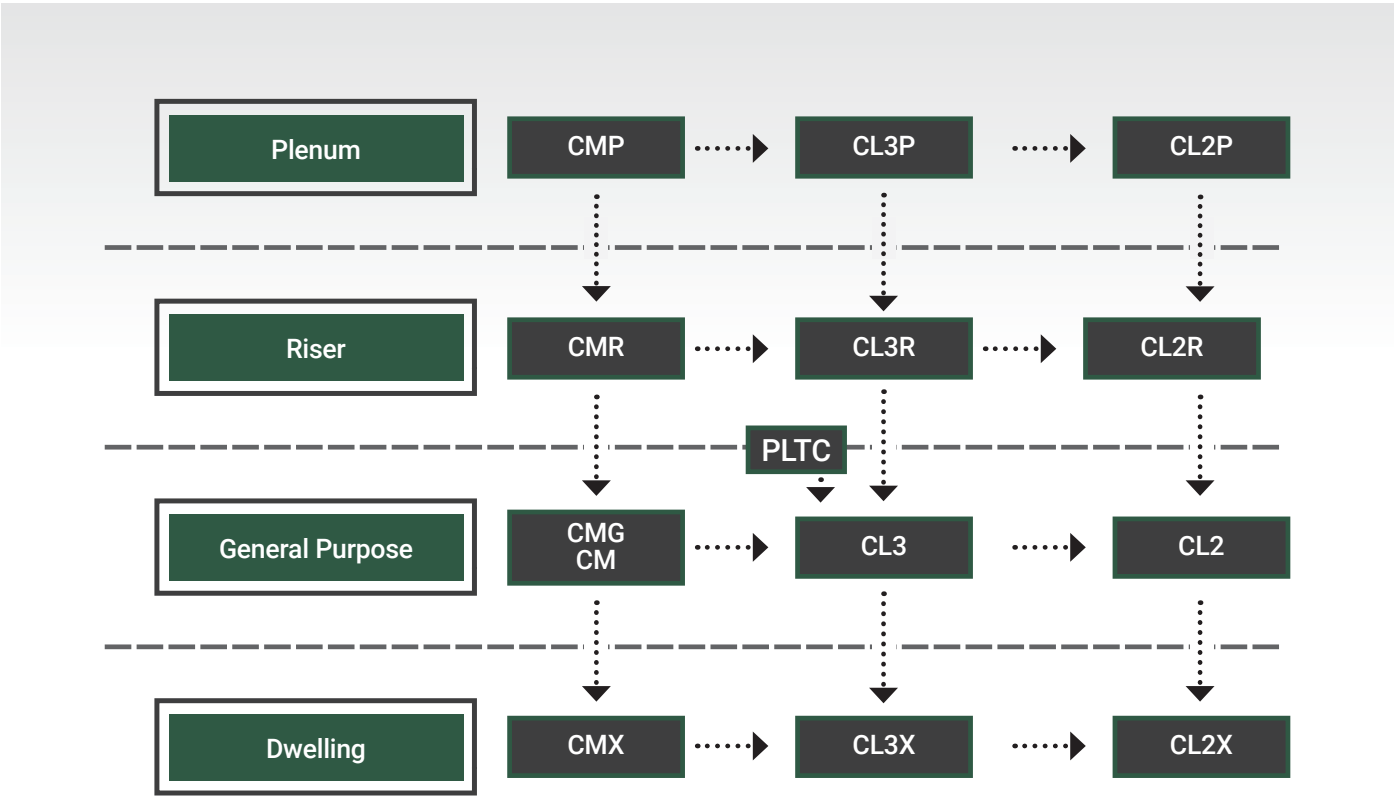
The following resources are designed to support the indoor cable selection and installation process. Use them as an ongoing reference to ensure you choose the right cable for your next installation.

Cable Ratings & Installation Requirements



National Electric Code: Cable Substitution Hierarchy

Substitution Hierarchy for Class 2 and Class 3 Cables



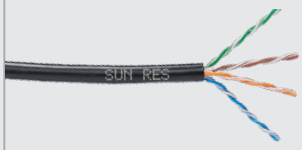
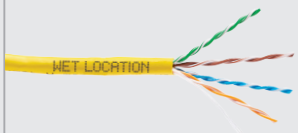
CMP – Communications Plenum	CMG/CM – Communications
CL3P – Class 3 Plenum	CL3 – Class 3
CL2P – Class 2 Plenum	CL2 – Class 2
CMR – Communications Riser	CMX – Communications Residential
CL3R – Class 3 Riser	CL3X – Class 3 Residential
CL2R – Class 2 Riser	CL2X – Class 2 Residential
PLTC – Power Limited Tray Cable	

The wiring requirements of Article 725, Parts I and III, apply where substitute cable is installed.

OUTDOOR INSTALLATIONS

The following resources are designed to support the outdoor cable selection and installation process. Use them as an ongoing reference to ensure you choose the right cable for your next installation.

Outdoor Ratings

Rating/Feature	Cable Marking	Applications	Testing & Additional Information
Sunlight Resistant	Sunlight Resistant, Sun Res or SR 	May be installed in locations exposed to sunlight.	Informally known as UV Rated cable. Evaluated for long-term (720 hours) exposure to UV light and light moisture.
CMX-Outdoor	CMX-Outdoor 	Suitable for installations outdoors on a 1- or 2-family dwelling. Not suitable for burial applications.	Evaluated for long-term (300 hours) exposure to UV light and light moisture.
Wet Location	Wet or Wet Location 	Often combined with other features like sunlight resistance and water blocking for expanded installation versatility.	Insulated conductors evaluated for long-term exposure to water.
Direct Burial	Direct Burial, Dir Burial or Dir Bur 	Suitable for burial with or without conduit. Often combined with other features like sunlight resistance and water blocking for expanded installation versatility.	Evaluated for water absorption and crush resistance.
Water Blocked	Noted in Cable Specification 	Install for added protection of sensitive connected equipment and devices.	Prevents the flow of water along length of cable in unlikely event of compromised cable jacket. Achieved through various methods including gels, tapes, and powders.

Cold Weather Cable Installations

When exposed to colder temperatures, cable becomes temporarily rigid and brittle, increasing the risk of cracks and breaks. Follow these simple guidelines to make your cold weather installation the easiest yet.

Preparing for a Cold Weather Installation

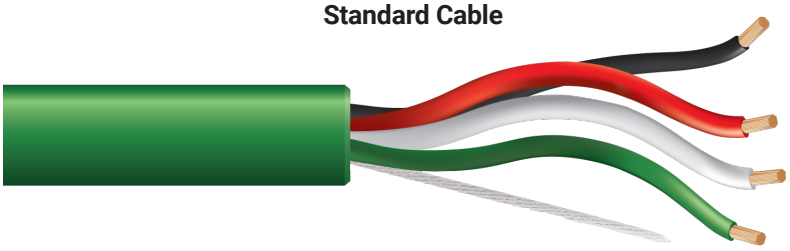
Successful cold weather installations begin 24 hours before a job.
The following steps should be taken prior to and during an installation.

- Store cable in a heated location for at least 24 hours prior to the installation.
- Review cable specs to confirm approved operating temperatures.
- Install cable when the environment's temperature is at least 10-20°C warmer than the cable's minimum listed temperature.
- Protect the cable from impact, kinks or bends to avoid cracks and breaks, mid-job.

Choosing the Correct Cable

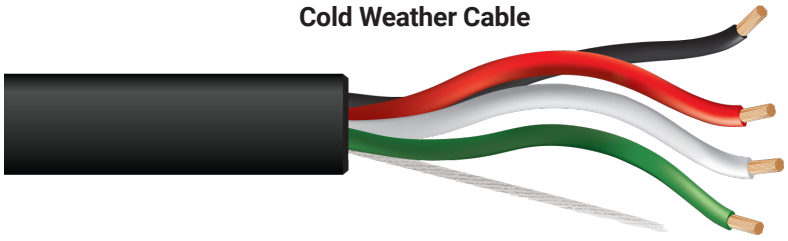
Jacket and conductor insulation materials impact how a cable reacts to colder weather.

Standard Cable



Standard cable can perform at temperatures from -20°C to 60°C. **Its thinner jacket increases its flexibility for easier installations but makes it prone to cracks and breaks when exposed to colder temperatures.**

Cold Weather Cable



Cable designed for cold weather can perform at temperatures as cold as -40°C to -60°C. **It tends to have a thicker jacket that makes cable less flexible, but also protects against cracks and breaks.** A greater bend radius is required to avoid kinks during installation.

PROTECTING SYSTEM PERFORMANCE

The following resources are designed protecting cable performance after the installation process. Use them as an ongoing reference to ensure you choose the right cable for your next installation.

Cable Listings

All Genesis Cables are UL- or ETL-listed. Cable listing marks show that products have been tested to industry-specific fire and safety standards by unbiased third-party organizations. Choosing listed cable will protect your cable investment - preventing rip outs, reinstallations and fire hazards.

Reputable Testing Partners
The two most recognized testing entities are UL and ETL. Both are certified as Nationally Recognized Testing Laboratories (NRTL), giving them the authority to test and certify products to widely accepted safety requirements.

Though different organizations, UL and ETL test to the same standards for any given listing and a listing from either organization has identical meaning.

Underwriters Laboratories (UL) is a global entity that tests and certifies products and helps develop industry standards through ongoing scientific research.

Intertek (ETL) is a globally recognized testing entity that tests and certifies products to published industry standards.

Manufacturers have the freedom to choose their NRTL, including a testing entity besides UL or ETL.

The Mark of Quality
Listed cables can be identified by the listing mark and unique file number placed on the product and its packaging. This mark is most often found on the front of boxes, circular flange or label of reels, and the file number is printed on the cable's jacket.

Unmarked products shouldn't be trusted and are a threat to device and personal safety.

ETL printed mark

UL holographic sticker

Conductor Sizing

The American Wire Gauge System (AWG) standardizes conductor sizing and all Genesis Cables follow this system. As the gauge number decreases, conductor size increases. This lowers resistance, increases the amount of power that can be safely transferred by the conductor and extends the length of runs. Choosing cable with the correct gauge is essential for system performance.

DC Resistance (at 20 °C)					
AWG	Conductor Comparison	Solid Conductor		Stranded Conductor	
		Ohms per 1000 feet	Ohms per kilometer	Ohms per 1000 feet	Ohms per kilometer
24		28.6	93.8	26.47	87.6
23		22.3	73.2	21.1	69.2
22		18	59.1	16.9	55.4
20		11.1	36.4	10.5	34.4
18		6.52	21.4	6.66	21.9
16		4.1	13.5	4.19	13.7
14		2.57	8.45	2.62	8.60
12		1.62	5.31	1.65	5.41
10		1.02	3.34	1.04	3.41
8		0.6407	2.102	0.6535	2.144

Conduit Capacity

EMT Conduit Trade Size		1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"
Diameter (in.)	Area (sq. in.)	Maximum Number of Cables Permitted @ 40% Fill									
0.100	0.00785	15	27	44	76	103	170	298	450	587	751
0.125	0.01227	9	17	28	48	66	109	190	288	376	480
0.150	0.01767	6	12	19	33	46	75	132	200	261	333
0.175	0.02405	5	8	14	24	33	55	97	147	191	245
0.200	0.03142	3	6	11	19	25	42	74	112	146	187
0.225	0.03976	3	5	8	15	20	33	58	88	116	148
0.250	0.04909	1	4	7	12	16	27	47	72	94	120
0.275	0.05940	1	3	5	10	13	22	39	59	77	99
0.300	0.07069	1	3	4	8	11	18	33	50	65	83
0.325	0.08296	1	3	4	7	9	16	28	42	55	71
0.350	0.09621	1	2	3	6	8	13	24	36	47	61
0.375	0.11045	1	2	3	5	7	12	21	32	41	53
0.400	0.12566	1	2	3	4	6	10	18	28	36	46
0.425	0.14186	1	1	3	4	5	9	16	24	32	41
0.450	0.15904	1	1	2	3	5	8	14	22	29	37
0.475	0.17721	0	1	2	3	4	7	13	19	26	33
0.500	0.19635	0	1	2	3	4	6	11	18	23	30
0.525	0.216	1	1	2	3	4	6	11	16	21	27
0.550	0.237	1	1	1	3	3	6	10	15	19	25
0.575	0.260	0	1	1	2	3	5	9	14	18	23
0.600	0.283	0	1	1	2	3	5	8	13	16	21
0.625	0.307	0	1	1	2	3	4	8	12	15	19
0.650	0.332	0	1	1	2	2	4	7	11	14	18
0.675	0.358	0	1	1	2	2	4	7	10	13	16
0.700	0.385	0	1	1	2	2	3	6	9	12	15
0.725	0.413	0	1	1	1	2	3	6	9	11	14
0.750	0.442	0	0	1	1	2	3	5	8	10	13
0.775	0.471	0	0	1	1	2	3	5	7	10	13

Painting Cables

Cable is often installed in new construction before painting is complete. However, it's critical to ensure that cable is protected from specific types of paint, as the chemicals can damage its physical properties and ultimately threaten cable performance, longevity and safety.

Plenum Cable

Plenum cable should never be painted. All types of paint compromise the fire-resistant properties of plenum cable, increasing the risk of fire-related injury and damage.

Latex + Water-Based Paints

Latex and water-based paints are safe for use on non-plenum Genesis Cable. They will not impact the physical properties of the cable insulation or jacket.

Oil + Solvent-Based Paints

Oil and solvent-based paints are not safe for use on Genesis Cable. The chemicals in oil and solvent-based paint attack insulation and jacketing materials over time, leading to cracked, brittle cable.

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