Harsh Environment Attributes

Champlain Cable focuses on products to service harsh environments.

We categorize harsh environments into three groups, designated to help customers understand what conditions a wire or cable may be exposed to. There are many applications where all three groups apply.

End Use: The environment that the cable is normally exposed to while it is in service. For example:

- Extreme heat or cold
- Limited space
- Exposure to sunlight
- High current draw
- Vibration / Abrasion / Crush / Impact
- Exposure to solvents, oils and corrosive fluids
- Excessive bending and flexing

Harsh end-use environments include:

- Refineries; Mills, Mines
- Internal Combustion Engines
- Oil Rigs; Factories, Ovens, Commercial Implements
- Engine Compartments, Transmissions

OEM Processing: An environment that a cable is subjected to when processed by the OEM. This is usually a one time process, but sometimes these processes can destroy inferior cables. For example:

- Exposure to harsh chemicals
- Extreme heat or cold
- Over-molding
- Encapsulating Varnish and Oven Cures
- Crush / Pinch / Impact / Cut-Through

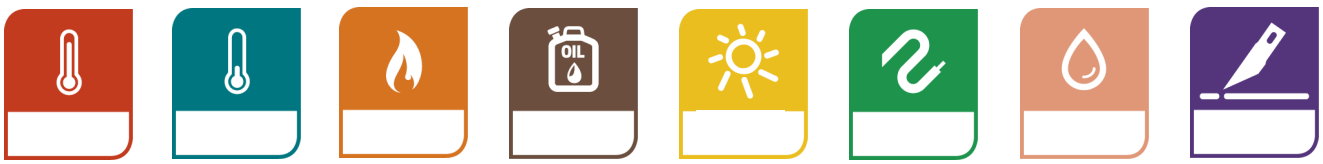
Harsh processes environments include:

- Cable installation over sharp edges
- Cleaning operations
- Varnish bake for motors and transformers
- Connector over-molding; Heat curing.

Potential Risk: An environment for which preparation for potential risks or disasters is required. These situations may never occur, however it is important to design the wire or cable to ensure safety and not to make the problem worse. For example:

- Exposure to Fire
- Excessive heat due to short circuits
- Radiation exposure
- Fluid / Water / Oil ingress through the cable
- Smoke / Halogen emission

Champlain Cable uses icons on its' datasheets to make it easier to determine the performance attributes. Some of these icons have specific attribute information, such as temperature rating or flame performance, and others are rated on a scale of 1 -5. With 1 being the worst and 5 being the best.



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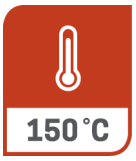
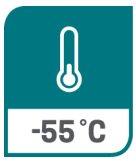
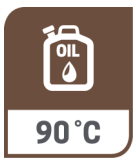


High Temperature Rating: The high temperature rating is based on a 3,000 hour heat age test in air at rated temperature. This test is well recognized in the Automotive Industry world wide. The UL 1581 standard is 3,600 hours.



Low Temperature Rating: The low temperature rating is based on mandrel wind test at the rated temperature. Cold bend tests are well recognized in by UL / CSA and the Automotive industry world wide.

Flame Resistance: The flame resistance ratings are based on standards recognized world wide. Typical ratings: UL758 Horizontal; FT-1 and VW-1 Vertical Flame Tests; FT-4 and IEEE-383 Vertical Flame Tests for Tray Cables; FT-6 Horizontal Flame



Temperature Rating in Oil: The temperature rating in oil is based on appropriate industry standards. Oils differ dramatically. Champlain recommends that customers perform testing in their specific oil prior to use.

Ultra Violet Light Resistance: This is a yes or no criteria based on 1,000 hours exposure to Xenon light. Test specimens must retain color and a minimum 50% retention of tensile and elongation. "Black / Orange Only" indicate insulations will perform in these colors only.

Flexibility: This is a subjective attribute rating of "1 - 5". 1 being the least flexible and 5 being the most flexible. An example of the least flexible insulation is FEP. An example of a highly flexible insulation is silicone rubber.

Fluid Resistance: This is a subjective attribute rating of "1 - 5". 1 being the least fluid resistant and 5 being the most fluid resistant. This is based on actual test data in accordance to ISO 6722-1, SAE, or UL. Insulation materials are not uniformly resistant to all chemicals. Specific chemical resistance is found on the back of the data sheets.

Cut-through Resistance: This is a subjective attribute rating of "1 - 5". 1 being the least cut through resistant and 5 being the most resistant. This is based on actual test data in accordance to ISO 6722-1 or SAE. An example of a low cut-through resistant insulation is silicone rubber. An example of a highly cut-through resistant material is polyurethane. (R1 11-19)