

General Outdoor Suitability for Wire and Cable

TECHNICAL BULLETIN 

This technical bulletin is a guide for anyone involved in specifying or selecting cables to be used outdoors. It not only raises awareness of the variety of outdoor conditions to potentially account for, but also describes Belden's use and limited scope of what is meant by General Outdoor Suitability.

It is important to remind that manufacturers consider **system designers and architects** to be responsible for the proper specification of their overall systems. Therefore, **their requirements and specifications need to include conditions each component is expected to face.** Standards are necessary and useful in determining the relevant requirements for selecting the right cable designs. When a standard is not explicitly called out, manufacturer guidelines must then lead the way in defining the products that will meet their needs.

When considering any outdoor environment, one must consider the large variety of potential environmental exposure. Although generally including sun radiation, moisture and occasional rain, outdoor environments may also include immersion in water or exposure to chemically active substances, rodents, or micro-organisms. Additionally, care must be taken to consider the potentially extended temperature range and occasional impact or stress during transportation, installation, and operation.

Since most outdoor locations commonly require at least protection against sunlight, moisture, and occasionally rain, Belden helps customers to select these generally outdoor suitable products by using the compact and widely recognized "Outdoor" keyword as part of the technical datasheet and filter.

Therefore, **Belden's definition of General Outdoor Suitability is a product that withstands sunlight, moisture, and occasional rain.**

This definition does not cover any harsher outdoor environmental exposure such as water immersion. Wire and cable and its installation shall comply with the requirements of the authority having jurisdiction and shall be consulted for any code or regulation questions or interpretations. Please reach out to your Belden representative for additional advice and solutions.



For a clearer awareness of the protection associated to a General Outdoor suitable product, here are additional insights on what is meant by resistance to:

- **Sunlight:** The Ultraviolet (UV) spectrum of the sunlight is the main concern as it tends to damage the properties of the cable sheath (jacket). The jacket material shall therefore be resistant to UV. UV resistance can be tested by exposing the material or cable to an artificial UV source for a length of time (like UL1581).
- **Resistance to moisture and occasional rain:** most standard Belden jacket materials can withstand occasional rain and moisture provided the jacket is allowed to dry in a timely manner. For UL outdoor ratings like CMX-outdoor or SUN RES, there is additional 'weatherometer' testing that includes a water spray in combination with UV exposure.
- **Temperature:** The wire or cable cannot be operated outside its specified range. Therefore, a wire or cable shall be selected having a temperature rating that covers the expected installation and operational needs. The following considerations are critical for ensuring the integrity of a cable.
 - » Low temperature: The cable shall be able to withstand at least a typical bend occurring during installation and operation at the lowest temperature.
 - » High temperature: The main concern here is that high operating or storage temperatures accelerate the aging of the wire or cable. This can lead to brittleness, and cracking of the sheath or insulation. High temperature can be caused either by general air temperature of the area, local temperature for instance cause by the heat of the sun and heating up through resistance heating of the cable itself (typically +10°C).
 - » Note on indoor installation: typically -20°C to 60°C is generally recommended for indoor cable when installed in semi-open constructions within a "moderate" climate.

