

**TEMPERATURE CONSIDERATIONS:**

***Exposure to High or Low Temperatures***



Performance characteristics of engineered polymers such as those used in cable ties and their associated fixing devices can be affected by temperature. Exposure to extreme temperature conditions and widely variable temperature cycles can be experienced year-round in climates around the world; outdoors, in harsh industrial environments, and even within manufactured equipment in normal and abnormal operation. The assembly of a nonmetallic cable tie in cold temperatures also requires special considerations.

**Operating Temperatures**

The maximum and minimum temperature in the operating environment is among the most important criteria to consider when deciding the use of a cable tie product.

Cable ties and their associated fixing devices are typically rated for both maximum and minimum operating temperatures. These are the temperature extremes for which the products are expected to continuously maintain their intended function in normal use. Prolonged exposure to temperatures that are higher or lower than those declared for the product eventually will result in a loss of mechanical properties and failure. This is most commonly seen as a loss in tensile strength and/or polymer embrittlement.

Cable ties and their associated fixing devices are commonly available in materials having a wide range of declared temperature ratings. Metallic cable ties, as might be imagined, have the widest temperature range but even nonmetallic products are available with declared operating temperatures of 170° C or higher and -40° C or lower.

**Installation Temperature**

The temperature in the application environment in which nonmetallic cable ties and their associated fixing devices are to be installed is an important consideration for user satisfaction and possibly their overall performance. Usually assembly at low temperatures is of greatest concern. If the temperature is too low, most nonmetallic materials will become brittle which can lead to breakage during assembly of the product. Typically, due to the nature of their design and size, a cable tie will break rather than crack or degrade under this condition. Unless the manufacturer declares a lower temperature, the minimum recommended installation temperature should be considered to be 0° C.



If the application requires the installation of cable ties at lower temperatures, assembly can be aided by storing the products in a controlled temperature environment up until the time of assembly or possibly by extremely careful handling during the assembly process.

There are no particular high installation temperature recommendations, other than what would be a reasonable environment in which a person could safely work and of course the maximum operating temperature declared for the product.

### **Other Considerations**

The maximum and minimum temperature ratings for cable ties and their associated fixing devices, particularly those made from polymeric materials, may not fully take into account the effects of other elements present in the application environment. Continuous exposure to temperatures approaching the declared limits for the products can contribute to material degradation or reduced performance if the environment also contains certain chemicals, sees high or low levels of moisture, or is subject to dynamic forces such as vibration. In these cases, consideration should be given to de-rating of the declared temperature rating of the product as a safety factor.

The manufacturer should always be consulted if there is a question about the proper application of a cable tie or associated fixing device.

NEMA members provide high value, consistent quality, safe and efficient use for cable ties and their associated fixing devices that meet the expectations of a wide variety of users. Visit us at <http://www.nema.org/prod/be/cable-ties/> for current information on our industry and for the names of NEMA member cable tie manufacturers.



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