

Flex Testing

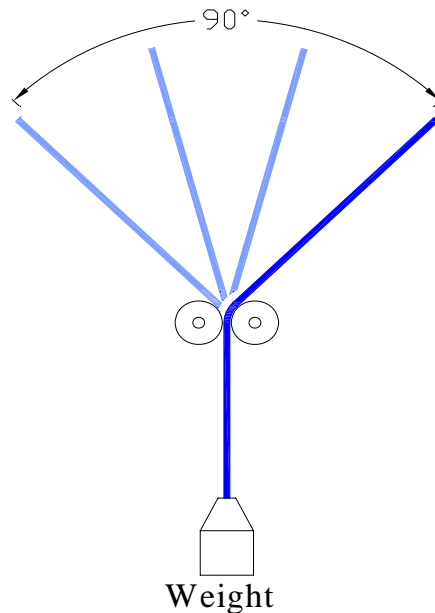
Reliability Tests for 4 basic kinds of flexing

High performance cable should be considered when specifying a cable for automation. Conductors under constant motion can break due to heat generated from friction. Just because a cable is very flexible does not mean it will have a long life. In some cases, a more rigid outer cable jacket allows the conductors to move more freely inside resulting in less friction. The outer jacket not only needs to withstand constant flexing but provide protection against mechanical abrasion and environmental conditions like: chemical, moisture, and temperature. If the cables components have been designed for increased flexibility, jacket material can be determined respective to these environmental conditions.

There are four basic types of flexing that most cables experience, they are: Bending, Rolling, Torsional, and Variable. These tests are basic guidelines to help with cable design associated to its function. Many cable manufactures have specific testing for their products. These examples are meant for a general understanding of basic flex testing

Bend

Bend flexing is when the cable is flexed back and forth in one general place. This can come from many applications. Motion cameras are a very popular in this type of flexing. The cable is usually stationary while just behind the camera the cable will flex at the same place every time. This type of test is commonly referred to as "Tick Tock test" and "Flex test".

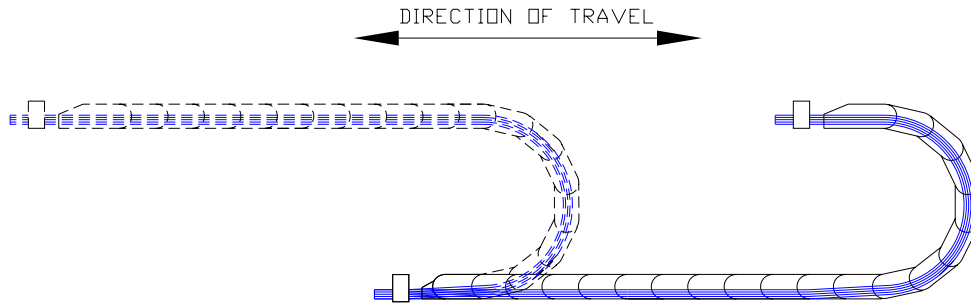


Bend testing guidelines

The cable is affixed to a pendulum type device and weighted. The amount of weight and size of the bend radii is dependant on the size of cable and its inner conductors. Every conductor is monitored and in the event of a failure, the test automatically stops. The cable is then flexed back and forth and counted until there is a failure within the cable.

Roll

Roll flexing is most common in automated equipment. The cable is harnessed in a flexible cable track and moved in a linear direction. This type of application will usually have an abrasion resistant jacket because of the constant rubbing against other wires, cables as well as the cable track itself. It is important to specify the correct cable to the bend radius of the cable track. A larger radius on the cable track can result in longer cable life.

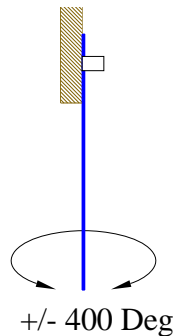


Roll testing guidelines

The cable is installed and anchored within the cable track. Every conductor is monitored and in the event of failure, the test will stop. The cable track will be operated back and forth and counted until there is a failure within the cable.

Torsional

Torsional flexing is when a cable twists around its axis'. This is common to robotic applications and hand held devices with a cord. It is one of the more demanding mechanical stresses. The strain created by the twisting motion is different than that of a bend or roll flex. Because of this, standard high flex cables may not be suitable for these applications. For maximum performance, a cable designed specifically for torsion should be utilized.

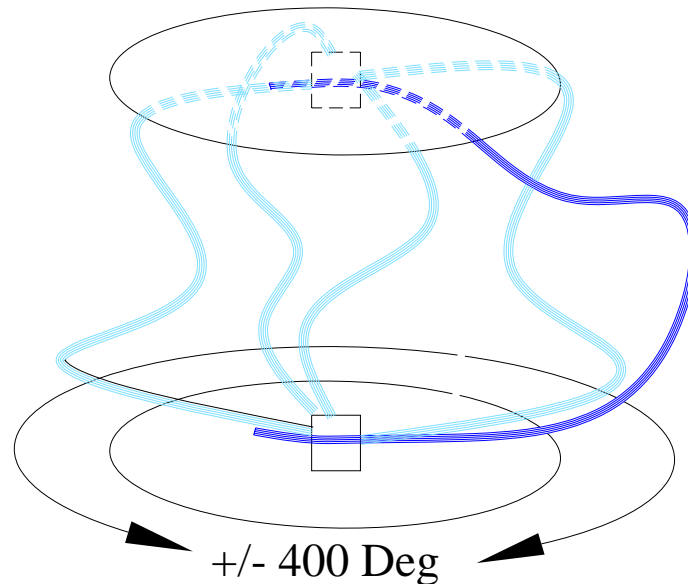


Torsional testing guidelines

The cable is anchored to a surface and then twisted 400 degrees in each direction from its relaxed state. Test requirements may change slightly for cable design and function. Some alterations may include: adding weight, length of cable, or amount of twist. Every conductor is monitored and in the event of failure the test will stop.

Variable

Variable flexing is when the cable is fixed in two positions and has the freedom to bend and move in any direction. This is usually found in robotic applications. With this freedom of movement, cable selection is critical.



Variable testing guidelines

The cable is anchored in two separate places and then one end is rotated 400 degrees in each direction from its relaxed state. Test requirements may change slightly for specific cable design. Some alterations may include: length of cable or amount of twist. Every conductor is monitored and in the event of failure the test will stop.

General guidelines

Consider the applications voltage, current, bend radius, physical location, environmental conditions, and flex cycle when choosing a cable. This can increase the life cycle which results in less downtime and longer maintenance intervals.

When troubleshooting a deteriorated cable, there are a few general things to look for.

Twisted Cable Jacket- The outside jacket generally starts to twist when the internal conductors have begun to unwind due to improper cable selection, installation, or shielding

Outer Jacket Wear- Many times this is due to incorrect cable selection or installation. If the cable can contact any other surface while in motion, it will give opportunity for abrasion wear.

General Cable Failure- This happens most often because of harsh environmental conditions. The introduction to hazards like: moisture, welding spatter, oils, chemicals, temperature, and sunlight can degrade a cable assembly prematurely if it is not specified for the correct conditions.