

# design Properly selecting and installing continuous flex cable

# FAQs

## FREQUENTLY ASKED QUESTIONS

### Q: Where are continuous flex cables used?

**A:** Continuous flex cables are found in a wide variety of industries in applications where equipment designers need to supply power, transmit control signals, or maintain communication to moving equipment. Such cables are commonly found in applications in automotive and semiconductor manufacturing, and in the material handling, packaging, and machine tool industries.

### Q: If a cable is very flexible, is it a continuous flex cable?

**A:** Not all flexible cables, even ones that behave like cooked spaghetti, are true continuous flex cables. Cable experts define cables as continuous flex, flexible, and torsion cables based on elements of their design.

The first such design element is how the copper conductor is stranded. Cables with greater numbers of copper strands perform better when flexed. Cables designated as continuous flex or torsion have a higher number of copper strands than their flexible counterparts.

The geometry of the twists of the conductors within the cable is another key design element. This is specified as lay length. The distance required to complete one revolution of the conductor around the axis of the cable core. Continuous flex cables have the shortest lay length, while

torsion cables have the fewest twists.

Cable manufacturers use other design features to get the desired flex performance from a cable. Slipper agents like talc and fleece tapes may be placed between the



**Not all cables that flex are the same. Continuous flex cables have the shortest lay length, the distance to complete a 360-degree twist while torsion cables have the longest.**

conductors so they can easily slide past each other when flexing. At the same time, a pressure extruded jacket encases the whole assembly to keep all the conductors together.

### Q: How can I choose the best cable for my application?

**A:** Such specialized design options can make choosing the right cable daunting. In addition to deciding on continuous flex, torsion, or flexible cable, you will also want to specify other cabling aspects. The number of conductors, for instance, can range from one to 65 for continuous flex cables and two to 41 for torsion cables.

When specifying your cable, you will also want to choose materials such as those for conductor insulation,

cable jacket, and even the class of copper used in the conductors. Depending on your application, you may also need a cable that is certified to meet standards recognized by your region and industry.

Cable manufacturers like SAB allow you to search their websites for the products that fit your needs. Calling a manufacturer can also put you in touch with a cable expert who can guide you through the selection process.

### Q: What factors affect cable life?

**A:** Design engineers most often run into premature cable failure when they have not adequately considered the factors that affect cable performance. For continuous flex cables, bend radius is one of the most important factors.

A cable forced to bend at a smaller radius than the minimum specified can experience premature failure as insulation and conductors crack and as internal friction wears down protective insulation.

Cable electrical requirements are another consideration. Be sure the cable you select can handle your application voltage and current. Also take care that electrical connectors on the cable ends do not damage the conductors.

The installation and operating environment can also affect the life of your cable. Cables in industrial environments are often exposed to abrasion and sharp edges that can degrade jacket materials. Environmental and

chemical stresses can also shorten the life of cable components that are not chosen carefully.

**Q: What's the best way to install my cable?**

**A:** Installation errors commonly shorten cable life, too. You may wish to consult cable experts for application-specific questions, but some general guidelines can help avoid common problems.

For instance, cable tracks are a good way to protect flexible cables from mechanical damage. Multiple cables should be installed side-by-side and kept apart with separators. The goal is to have plenty of space within the installation to let cables freely flex to the smallest radius in their motion.

In fact, throughout the installation, the cable should be able to flex without tensile stress or friction. For this reason, don't forget to include a strain relieving feature at both ends of the cable.

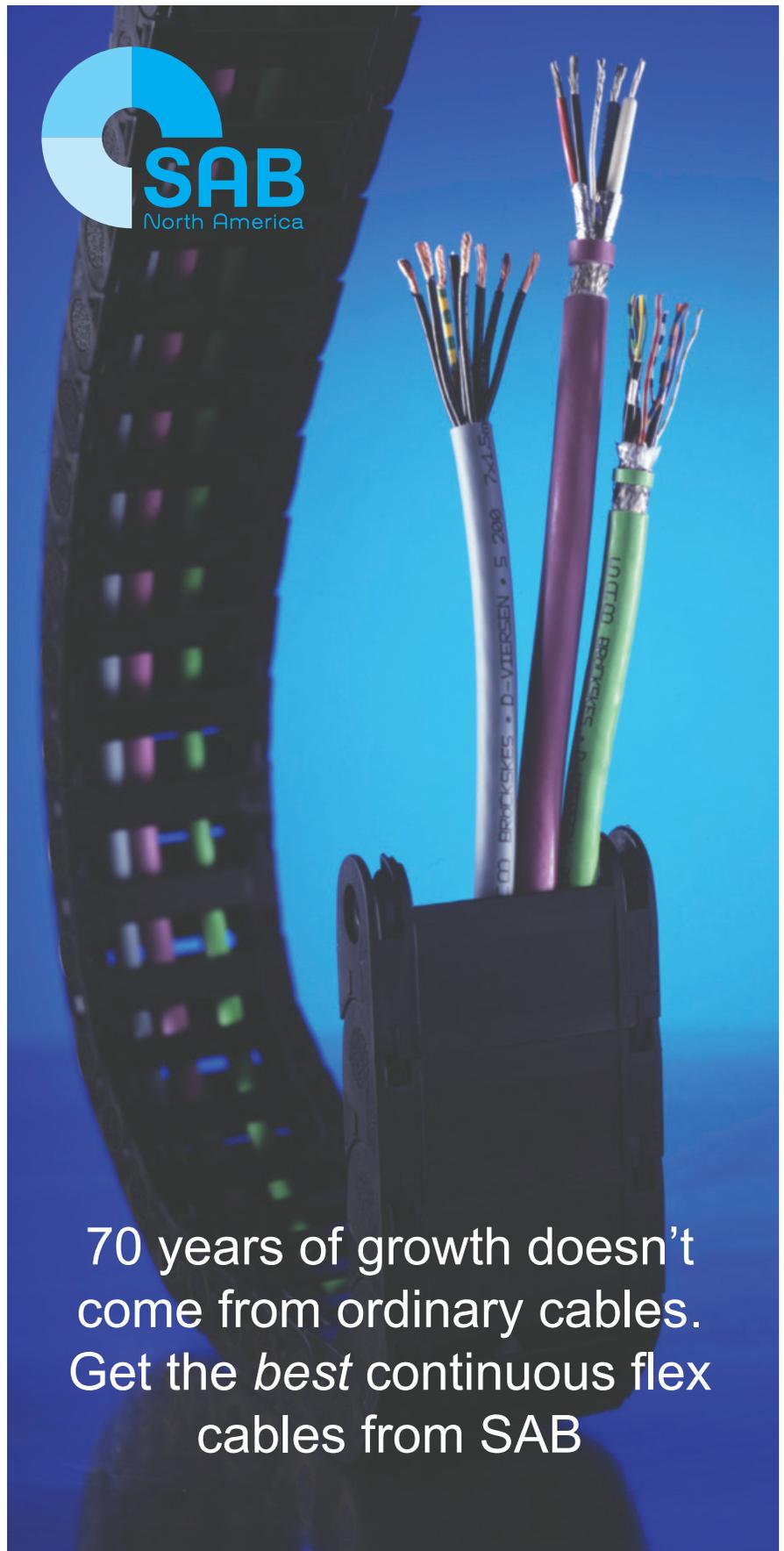
It's also important to ensure your installation is torsion free. That's why cable manufacturers recommend unwinding cables from reels before installation. Taking the cable off the manufacturer-supplied reel in loops introduces unwanted torsion.

Cable manufacturers, like SAB, can provide installation guidelines for your specific application upon request.

**Q: How do operating conditions and environmental factors affect continuous flexible cables?**

**A:** As with any industrial product, the service life of a continuous flex cable is affected by its operating conditions. When considering your application, be sure to note if the cables will be outdoors; subject to extremely high or low temperatures; in contact with microbes, acids, alkalis, salts, oils, solvents, or moisture; or exposed to radiation, flame, or abrasion. Any of these exposures can shorten cable life by degrading the performance of the cable jacket if materials are not selected carefully.

The websites and data sheets of cable manufacturers like SAB detail the capabilities of jacket materials to help you make the best choice for your application. ■



70 years of growth doesn't  
come from ordinary cables.  
Get the *best* continuous flex  
cables from SAB