

# 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.

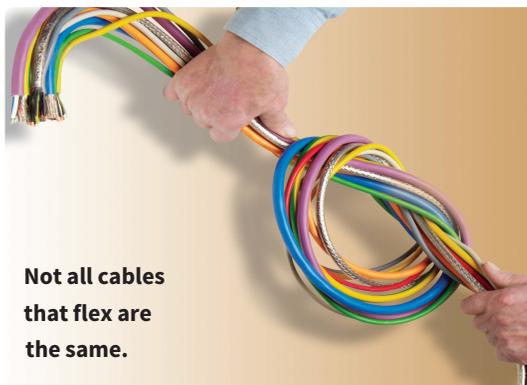
**Q: If a cable is very flexible, is it a continuous flex cable?**

**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. Not all stranding is the same. Of course the finest tinned or bare copper stranding should be utilized for most continuous flex applications, however selecting the type of stranding should be application specific and should be determined by the cable manufacturer. SAB, a manufacturer of continuous flex cable, draws its own copper to strand to satisfy this requirement. Drawing a specific size of strand and twisting the appropriate number of strands is imperative when designing conductors for continuous flex applications. Sometimes using standard classes of strand such as Class 5 or Class 6 is not enough when designing continuous flex cable, requiring cable manufacturers to draw their own special strand or bundle of strands to meet certain flexing criteria. The stranding selection is one of the single

most important design elements of any continuous flex cable.

Cable manufacturers use other design techniques to get the desired flex performance by arrainging the conductors in such a way that optimizes cable longevity. Manufacturers, like SAB, have developed specific conductor



**Not all cables that flex are the same.**

configurations for specific applications to prolong the life of cable in dynamic flexing applications. No two applications or flexing requirements are the same, therefore discussing the behavior of cable movement to your cable manufacture is critical in designing the correct cable. Once the behavior of the cable is known, the internal conductors can be positioned properly to ensure proper cable life.

Another element to consider prior to jacketing would be the use of slipping agents designed to allow the conductors to move freely, to minimize friction. Since conductors are intended to move freely in flexing applications, cable manufactures will suggest the appropriate agent for the specific application. Moreover a pressure extruded jacket ensures not only protection for the conductors but keeps the conductors positioned properly when continuously flexed.

**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 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.

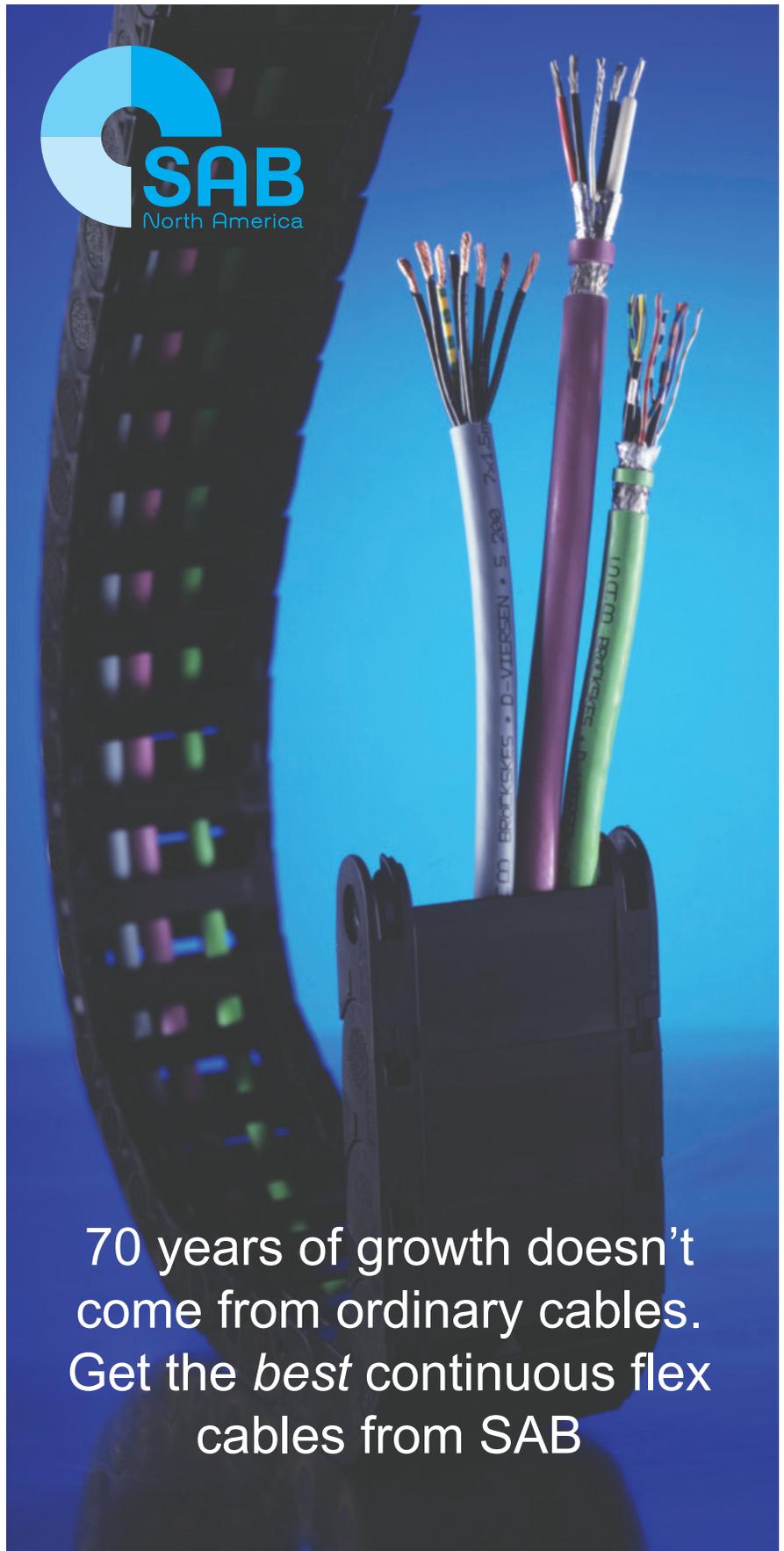
It's also important to ensure your installation is torsion free. That's why cable manufacturers recommend unwinding cables from reels before installation. Taking the cable off the manufacturer-supplied reel in loops introduces unwanted torsion.

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