

molex

BRAD M12 TPE HIGH-FLEX CORDSETS

The severe conditions of industrial applications can destroy most electrical cordsets, increasing replacement costs, downtime and safety hazards.

BUSINESS CHALLENGE

OEM plant managers often have a difficult time finding electrical cordsets rugged enough to withstand the punishment inflicted by robotic assembly lines and drag-chain conveyors. Even relatively rugged cordsets have short lives when used in these continual motion applications because constant bending and flexing can cause shorts and premature failure.

Other realities of industrial environments also present threats. Weld splatter often melts cable jackets, exposing wires and causing shorts; chemicals, like oils and coolants, saturate cable jackets, affecting mechanical properties and weight due to swelling. As a result, plant managers face burdensome replacement costs and other problems when electrical cordsets fail.

SOLUTION

Molex engineers designed and tested Brad M12 TPE High-Flex Cordsets with Flamar Industrial Cabling to withstand drag-chain conveyors and other continual motion industrial applications, along with just about anything else an industrial environment can throw at them. This premium cable can last millions of cycles under the harshest conditions, reducing replacement costs and downtime as a result.

Below is a summary of the tests performed on the Brad M12 TPE Cordsets, each one recreating a specific industrial hazard that threatens durability and performance.

Tick-Tock Bending Test

Brad M12 TPE High-Flex Cordsets endured the Tick-Tock Bending Test, which used pulleys with a 150.00mm diameter, creating about 50 cycles per minute. The Flamar Cabling used in the cordset passed the requirement of enduring 180-degree back-and-forth bending for at least 6.5 million cycles, illustrating its ability to withstand extreme repetitive motion.

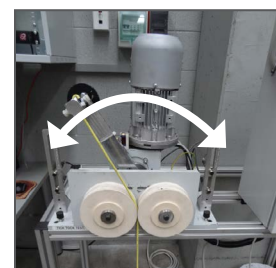
Drag Chain Test

To further prove its durability in a continual-motion application, the Brad M12 TPE Cordset also underwent a Drag Chain Test. At 120 cycles per minute, the cordset was dragged horizontally 0.5m at maximum acceleration of 50m/s² (50 meters per second squared). The results showed that the Brad M12 TPE Cordset can withstand:

- At least 7 million cycles under the most severe conditions
- At least 11 million cycles under severe conditions
- At least 20 million cycles under the least severe conditions

Torsion Test

Cordsets in industrial automation applications often undergo constant torsion, which can wear down jackets and damage cables. The Flamar Cabling of the Brad M12 TPE Cordset was put through the paces to see how it stood up to extreme twisting. With a torsion angle of $\pm 270^\circ$, a 1.0m sample length and a speed of about 30 cycles per minute, the Flamar Cabling passed the requirement of lasting at least 5 million cycles.



Tick-Tock Bending Test



Drag Chain Test



Oils and Coolant Compatibility Test

Industrial environments often include the presence of chemicals, such as oils and coolants. If a cordset experiences ingress of these chemicals, its jacket could become saturated, compromising mechanical properties.

Die cut samples of the Brad M12 TPE Cordset cable jackets and those of a competitor were each submerged into 10 glass tubes filled with various industrial oils and coolants for 6 weeks (1,000 hours) and 12 weeks (2,000 hours) at 20°C. After the samples were removed from the test tubes, they were washed with distilled water and dried with pressurized air.

The results showed that after 12 weeks of immersion, the Brad M12 TPE Cordset jacket sample's weight variation was within $\pm 10\%$, the elongation variation was within $\pm 25\%$ and tensile strength was also within $\pm 25\%$ as compared to non-immersed versions, meeting the market's needs and delivering results significantly better than standard products such as PVC and PUR jacketed cables.

Weld Slag Test

Welding is common in industrial environments, presenting yet another hazard to electrical cordsets. To test how well Flamar TPE Cabling hold up to weld splattering, technicians placed seven 2.54m cables 1.0m apart and subjected them to 10 minutes of random weld splatter at a height of 1.52m from the welding plate.

The weld splatter did not adhere to the cable, and there were only superficial imprints on the jacket. As a result, no short circuit was detected, illustrating the tugged TPE jacket can withstand even the threat of weld splatter.

BENEFITS

Rigorous testing ensures Brad M12 TPE Cordsets deliver these tough, industrial-proof features:

- High flexibility (10 million cycles)
- Drag-chain resilience
- Weld-slag resistance
- UV resistance
- FT4 flame rating

And these attributes result in significantly reduced replacement rates for cordsets in industrial settings, less downtime due to damaged cordsets and decreased labor time replacing cordsets. Rugged cables also improve the safety of workers handling them, due to the decreased risk of shock.



Torsion Test



Oils and Coolant Compatibility Test

To learn more www.molex.com/link/m12.html

Molex is a registered trademark of Molex, LLC in the United States of America and may be registered in other countries; all other trademarks listed herein belong to their respective owners.