



Aerospace Umbilical Cable Protection

PROBLEM:

A large aerospace company was looking for a way to reduce costs and save time associated with re-working and re-building their specialized umbilical cables after each rocket launch. During a launch, these custom built cables are attached directly to the vehicle right up until lift-off. These important cables are designed to detach from the rocket with a lanyard connector but still remain fairly close to it. So close in fact that they would often be damaged by the hot exhaust gases from the vehicle as it traveled upward from the launch pad.

REQUIREMENTS:

The engineers were looking for a way to protect their cables from the intense heat created by the rocket engines and prevent melting or scorching of the wiring and connectors. This solution needed to be very flexible so as not to restrict the movement of the umbilical cables; their orientation from the launch tower to the rocket was very particular. The integration team was also hoping for something that could be installed after the wiring harnesses were attached to the vehicle and their final tests were complete. Finally, a late additional requirement was added to include EMI shielding to this jacketing to protect the cables and prevent any build-up of electrical charge that could affect the vehicle.

SOLUTION:

Custom Zipper-Mesh (ALHTG-65)

Zippertubing design engineers started with their proven Zipper-Mesh sleeving that would supply the foundation for this custom solution. The knitted wire mesh is flexible, durable, and conductive; all of which were desired by this customer. For the thermal protection, ALHTG-65 was chosen because of its extremely high temperature resistance. The aluminized outer layer reflects heat while the durable woven fiberglass inner layer provides insulation and support. The finished jacketing would be installed with a high temperature metal zipper so the sleeve could be installed or removed with ease at any point during vehicle integration.

CONCLUSION:

The customer was very satisfied with the high temperature Zipper-Mesh solution and Zippertubing's ability to make this custom product in a large enough diameter to cover all of their cables in one sleeve. The customer's integration team asked for one addition to the product, which was to include pre-terminated grounding leads onto the shielding. Zippertubing was happy to incorporate this modification and crimp the appropriate terminal lugs onto the ground braid and further reduce the customer's installation time.

