

AmerCable Jackets: Low Temperature Properties

Thermoset jackets for the mining industry are available in several base polymers. They have been specially compounded to withstand the rigorous mining environment. Of particular interest to rubber compounding chemists are: tensile strength, elongation at rupture, tear strength, abrasion resistance, oil resistance, and sunlight resistance. Jackets also need to be capable of performing at relatively high temperatures as well as low temperatures to withstand the climate of northern latitudes in North America. Compounding of this type is not an easy task. A wide range of field operating parameters and trade-offs in the laboratory challenge the best of chemists. The latest developments in rubber compounding have been helpful.

A jacket meeting the wide range of properties has been developed by AmerCable chemists. Chlorinated Polyethylene (CPE) as the base polymer has developed into the current jacket of choice. It has very good tensile strength, elongation at rupture, excellent resistance to abrasion, oil, sunlight, and heat. This broad range of properties includes meeting or exceeding the minimum requirements of the Insulated Cable Engineers Association (ICEA) and Canadian Standards Association (CSA). Low temperature testing was at -50° Celsius with a minimum of 2 hours pre-conditioning. The tests were: 1) cold bend, within 15 seconds of removal, around a mandrel 8 times the cable diameter, and 2) cold impact, immediately upon removal from temperature chamber, with 9 pound-feet of force. As can be seen, these are rigorous requirements of which AmerCable meets.

AmerCable guarantees the CPE jacketed cables to -50° Celsius, and there is some margin of safety built in. CPE jacketed cables have now been in use 4 to 5

years in both the U.S. and Canada. In particular, the states of Wyoming and Montana, and the provinces of Alberta and British Columbia are using Chlorinated Polyethylene jacketed Type SHD-GC. Field performance and acceptance has been excellent. The combination of laboratory results and field usage proves the correlation between the two.

Under field conditions, there should nearly always be some current applied to the cable even over a weekend or maintenance shift. Conductors and insulation will reach some temperature above that of the ambient. This will help immensely in the handling of cables. As with all equipment, the pace of handling must be slowed as the ambient drops. Sudden movements of any equipment, including trucks and shovels, can fracture materials or welds. Impact can be very detrimental. Education and caution to employees regarding cable pulling tensions and especially bend radii is of great importance going into the winter season.

In conclusion, it is believed that commonly established laboratory tests are representative of actual field use. Existing standards, when coupled with a common sense approach to power cable handling, are adequate. Guaranteed low temperature performance numbers would be nearly impossible to predict based upon both human factors and the unpredictable mechanical environment of mining.

