

## **Technical Insight: Universal Jointing High Voltage Testing**

The Universal Joint is currently qualified to 15kV (15,000 volts D.C.), subject to the limits of the cables connected, and based upon the use of Common Component Kit KIT09002 or KITH9002, assembled in accordance with the UJ Construction Manual by trained and qualified jointers. In the past, Universal Joints using Common Component Kit KIT09001 were qualified to 10kV subject to the limits of the cables connected.

When the UJ Consortium engineers are carrying out a full qualification of a joint combination, they construct a full joint sample and then subject it to a regime of tests that simulate deployment and recovery at maximum depth under arduous sea conditions. When mechanical testing is complete, the sample is subjected to high voltage (HV) testing to ensure that the joint insulation will remain reliable under these arduous conditions.

In preparation for HV testing, the joint casing and armor are removed. The joint is submerged in a grounded water bath and a very high voltage is gradually applied to the center conductor and then held for a pre-determined period of time. The cable and joint insulation, between the center conductor and grounded water bath, should withstand the voltage for the entire period, thus proving that the molding process is satisfactory and mechanical joint protection is performing correctly.

In the event that a failure occurs, the voltage 'flashes' from the center conductor to the grounded water bath, burning a hole through the insulation. Fortunately such an occurrence is extremely rare and would always be followed by analysis and then further development of the molding preparation process or the mechanical protection and re-testing to ensure test success and the reliability of operational cable joints in the field.