

Testing of THERMOLIGN® Repair Splice

For

675TW-kcmil 3M™ Composite Conductor

Prepared by:

Robert Whapham

Preformed Line Products, Principal Investigator



Scope

This report will cover the description and results of laboratory testing of PLP's THERMOLIGN® Repair Splice and 675TW-kcmil 3M™ Composite Conductor (also known as ACCR – Aluminum Conductor Composite Reinforced) manufactured by 3M Company.

The specific tests included in this report are:

- Sustained Load Test

Sustained Load Test

The PLP Repair Splice is intended for repair of conductor with up to 1/3 of the aluminum strands broken. After completing the design of the Repair Splice for the 675TW ACCR conductor, a room temperature sustained load test was conducted to verify the holding strength.

The purpose of this test is to determine that the 675TW ACCR Repair Splice will hold at a high tension level (77% RBS) at room temperature (20°C) for an extended period of time (168 continuous hours), per ANSI C119.4.

The test sample consisted of a 50 ft. length of 675TW ACCR conductor terminated on both ends with PLP Dead-End Assemblies. To simulate the maximum repairable damage, 6 strands (30% of the 20 aluminum strands) were cut. The PLP Repair Splice consists of one layer of aluminum alloy rods. These were directly applied over the ACCR conductor in the region to be repaired.

The tension (17,315 lbs) was maintained throughout the test period with the 55K Tensile Equipment. The test sample successfully completed the 168 continuous hours, and then was tensioned in the same 55K Tensile Equipment until a failure occurred. The sample failed at a load of 23,270 lbs (103% RBS). ANSI C119.4 requires the connector to hold at least 95% RBS, therefore the repair splice satisfies this requirement.

Acknowledgement

This material is based upon work supported by the U.S. Department of Energy under Award No. DE-FC02-02CH11111.

Disclaimer

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Department of Energy.

TECHNICAL INFORMATION AND DATA; PRODUCT USE. Technical information and data, recommendations, and other statements provided by 3M are based on information, tests, or experience which 3M believes to be reliable, but the accuracy or completeness of such information is not guaranteed. Some of the standard industry tests conducted by 3M were originally designed for conventional conductors and were adapted by 3M for use with composite conductors; references to such

tests should be considered in light of this fact. Such technical information and data are intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this information. Buyer is responsible for evaluating and determining whether the 3M product is suitable and appropriate for Buyer's particular use and intended application. The conditions of evaluation, selection, and use of a 3M product can vary widely and affect the use and intended application of a 3M product. Because many of these conditions are uniquely within Buyer's knowledge and control, Buyer must evaluate and determine whether the 3M product is suitable and appropriate for a particular use and intended application. 3M products are sold or provided to Buyer solely for Buyer's internal manufacturing use or consumption and may not be repackaged, resold, or redistributed in any manner without the prior written consent of 3M.

WARRANTY AND LIMITED REMEDY. Unless stated otherwise in 3M's product literature, packaging inserts or product packaging for individual products, 3M warrants that each 3M product meets the applicable specifications at the time 3M ships the product. Individual products may have additional or different warranties as stated on product literature, package inserts or product packages. **3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE.** User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's application. If the 3M product is defective within the warranty period, your exclusive remedy and 3M's and seller's sole obligation will be, at 3M's option, to repair the product, replace the product, or refund the purchase price.

LIMITATION OF LIABILITY. Except where prohibited by law, 3M and seller will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.