

## Letter Report

February 25, 2015

Intertek Report No. 101958618COQ-001  
Intertek Project No. G101958618

John Franzman  
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Ph: (916) 834-7633

**Subject:** ETL Testing of the CTS Fabrication USA flange model - 2" BF002

Dear Mr. Franzman,

This letter report represents the results of our testing of the above referenced product to the specified requirements contained in the following standards:

*-ASTM D149 Issue:2009/11/01 Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies*

This investigation was authorized by quote number 500571545, dated 12/17/2014. Production samples was received on 12/30/2014, and tested on 02/03/2015 at the Intertek Coquitlam facility.

The requested scope of work was to conduct Dielectric Strength tests on a copper / steel flange assembly, both with and without an 'electrolysis insulator'. The test voltage was increased until breakdown occurred. See Appendix A for photos indicating the failure points.

### TEST METHOD

Description of test specimen	Copper / steel flange assembly, with and without an 'electrolysis insulator'
Conditioning and specimen preparation	None
Ambient atmosphere temperature and relative humidity	20°C, 49 % RH
Surrounding medium	Transformer Oil - Imperial Oil VOLTESSO 35
Description of electrodes	Electrode Type 3 Table 1
Method of voltage application	Method A, Short Time Test – The Cu adapter was placed on 3 x 6.4 mm metal studs, 1 of which was connected to the ground wire of the HV test set. The "blue" coating was ground off the backing flange to expose the bare metal where the other 6.4 mm lead was placed vertically. This apparatus was submerged in a container of transformer oil. The voltage was induced until breakdown occurred.
Voltage rate of rise	2000 V/s
The failure criteria of the current	10 mA
Deviation from test procedure :	None



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#### TEST RESULTS

SPECIMEN	Dielectric Breakdown Voltage (kV)	Time to trip (Sec)	Location of failure
-001 (Non-insulated)	4	2.5	*Edge of flange (photo 1)
-002 (Insulated)	20	10	**Edge of flange (photo 2 & 3)

If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact your dedicated Intertek Project Manager.

Completed by:	Paul Saunier	Reviewed by:	Jeff Edwards
Title:	Project Engineer	Title:	Reviewer
Signature:		Signature	
Date	February 25, 2015	Date:	25-Feb-2015

Please note: this Letter Report does not represent authorization for the use of any Intertek certification marks.

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**APPENDIX A**

**PHOTOS**

**Photo 1**



Without 'electrolysis insulator'

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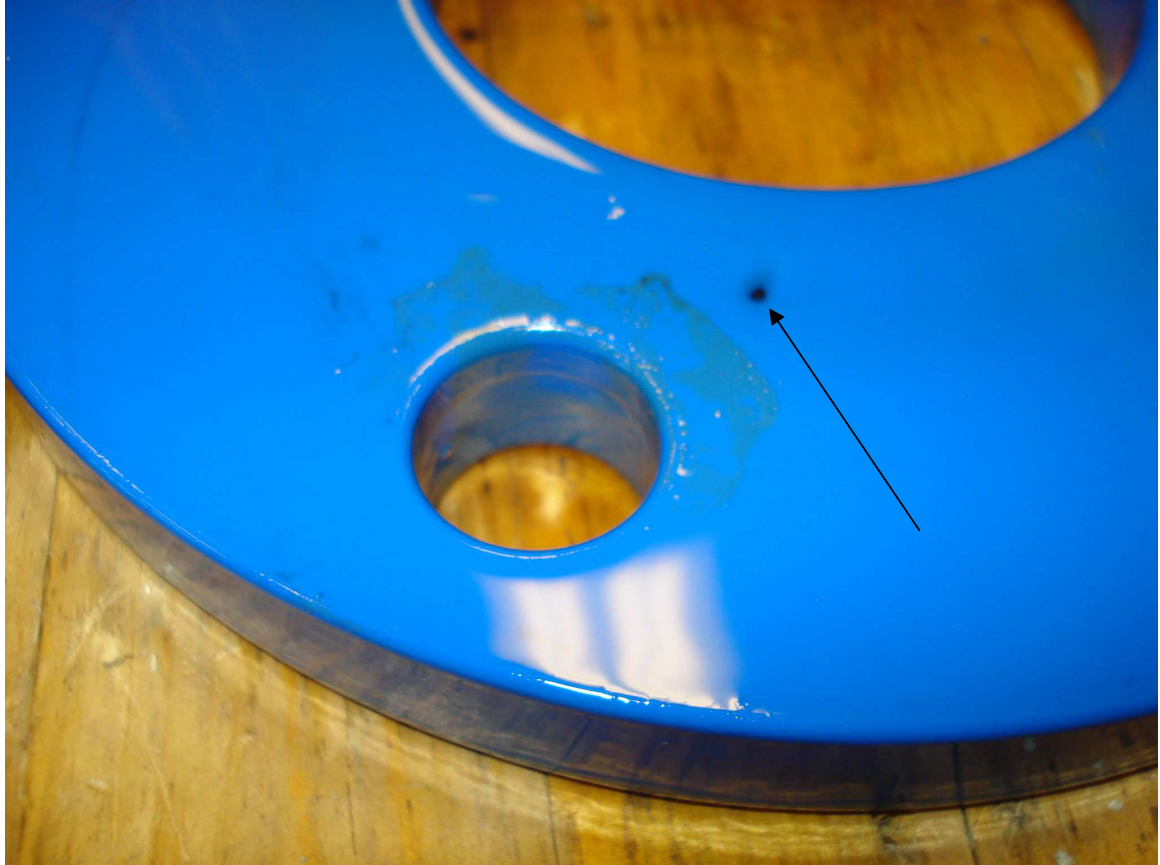
**Photo 2**



With 'electrolysis insulator'

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**Photo 3**



With 'electrolysis insulator'