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FIRE PERFORMANCE EVALUATION OF *PROSOL PFP FIRE JACKET SYSTEM* INSTALLED ON A 4-IN. VALVE AND ACTUATOR, AND TESTED IN GENERAL ACCORDANCE WITH UL 1709, FIFTH EDITION, DATED FEBRUARY 24, 2017, *STANDARD FOR RAPID RISE FIRE TESTS OF PROTECTION MATERIALS FOR STRUCTURAL STEEL*

FINAL REPORT
Consisting of 14 Pages

SwRI® Project No. 01.24102.19.204
Test Date: April 8, 2019
Report Date: April 25, 2019

Prepared for:

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Cypress, TX 77429

SW Submitted by:

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1.0 OBJECTIVE

The objective of the test described in this report was to evaluate the fire resistance performance of *ProSol PFP Fire Jacket System* when applied to a 4-in. steel ball valve and valve actuator. The test was conducted in general accordance with UL 1709, *Standard for Rapid Rise Fire Tests of Protection Materials for Structural Steel,* since the sample was not a structural steel member and the temperature measurement of the sample was not as required when testing a structural member. Testing was conducted by Southwest Research Institute's (SwRI) Fire Technology Department, located in San Antonio, Texas for Protective Concepts Inc., located in Cypress, Texas.

2.0 TEST METHOD

The UL 1709 fire test method for the protection of structural steel columns is intended to evaluate the duration for which material can thermally protect structural steel columns during a predetermined fire exposure time. This test measures the response of the assembly to exposure in terms of the transmission of heat into the assembly.

This standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions, and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of fire risk assessment, which takes into account all the factors that are pertinent to an assessment of the fire hazard of a particular end use.

This report contains a description of the test procedure followed, assembly tested, and the results obtained. The results presented in this report apply only to the assemblies tested, in the manner tested, and not to any similar assemblies or material combinations.

3.0 TEST ASSEMBLY

Materials:	Provide By:	Received On:
4-in. steel valve and actuator	Client	March 26, 2019
ProSol PFP Fire Jacket System	Client	March 26, 2019

4.0 SAMPLE DESCRIPTION AND CONSTRUCTION

The tested assembly was a 4-in. steel ball valve with a valve actuator. The assembly was protected with *ProSol PFP Fire Jacket System* insulation, installed by Protective Concepts Inc.

The *ProSol PFP Fire Jacket System* was a two-piece system that was secured in place with straps and buckles.

5.0 FURNACE

SwRI's small-scale horizontal furnace, which was used to expose the assembly, is 5 × 5 × 5 ft and is equipped with a total of four premixed air/natural gas burners. The burners are 12 in. above the furnace floor and controlled by a variable gas ratio regulator.

6.0 RESULTS

Test Date:	April 8, 2019
Test Witnesses:	Ms. Natalie Ester, representing Protective Concepts Inc. Mr. Adam Ester, representing Protective Concepts Inc. Mr. Wayne "Doug" Whitaker, representing SwRI Mr. Bill Bendele, representing SwRI
Ambient Temperature:	67.6 °F
Relative Humidity:	60.6%
Instrumentation:	A total of four ⅛-in. Type K Inconel Sheath Ground Junction thermocouples (TCs) were used to measure the temperature of the valve actuator body and the surface of the actuator on opposite sides of the actuator. Two TCs were at the surface of the actuator and two TCs were embedded into the actuator body. Four additional bare wire TCs were included within the furnace to monitor and control the furnace atmosphere during testing. One differential pressure probe was included within the furnace to measure the internal furnace pressure.
Load:	Not required.
Observations:	No visual observations were made during the test since the assembly was sealed in the horizontal furnace.
Hose Stream Test:	Not required.
Results:	The test assembly was immersed in SwRI's horizontal furnace for testing. Instrumentation connections were verified, and the UL 1709 exposure was initiated. The assembly was exposed to the UL 1709 exposure conditions for 1 h. The performance criteria, according to UL 1709, is worded such that the transmission of heat through the protection material during the period of fire exposure for which classification is desired shall not raise the average temperature above 538 °C and no TC shall indicate a temperature greater than 649 °C.

At 1 h, the average temperature of the embedded TCs was 183.3 °C, which was measured at TCs 1 and 3.

At 1 h, the average temperature of surface TCs was 197.3 °C, which was measured at TCs 2 and 4.

At 1 h, the maximum temperature of the embedded TC was 184.3 °C, which was measured at TC 3.

At 1 h, the maximum temperature of the surface TC was 203.3 °C, which was measured at TC 4.

Calibrated equipment list is located in Appendix A. Photographic documentation can be found in Appendix B. Graphical data from the test can be found in Appendix C. Client-provided product information is located in Appendix D.

Rating Obtained: 1 h

7.0 CONCLUSION

Based on the test results, the 4-in. steel ball valve actuator protected with the *ProSol PFP Fire Jacket System* installed as described in this report, achieved a fire resistance rating of 1 h.

APPENDIX A

CALIBRATED EQUIPMENT DOCUMENTATION

(CONSISTING OF 1 PAGE)

Table A-1. Equipment Calibration Documentation.

Item	Manufacturer	Model	Serial Number	Next Cal Due
Humidity/Temperature	Vaisala	HM 34	W2420016	Sept. 26, 2019
Pressure Transducer	Setra	264	2708707	Oct. 24, 2019
Input Module	Yokogawa	DU100-11	12WC38058A	Jan. 22, 2020
Stopwatch	Control Company	1051	170774578/KC	Nov. 3, 2019

APPENDIX B

PHOTOGRAPHIC DOCUMENTATION

(CONSISTING OF 2 PAGES)

Figure B-1. Assembly Protected with *ProSol PFP Fire Jacket System* Insulation.

Figure B-2. Assembly Positioned in the Furnace.

Figure B-3. Exterior View of the Furnace.

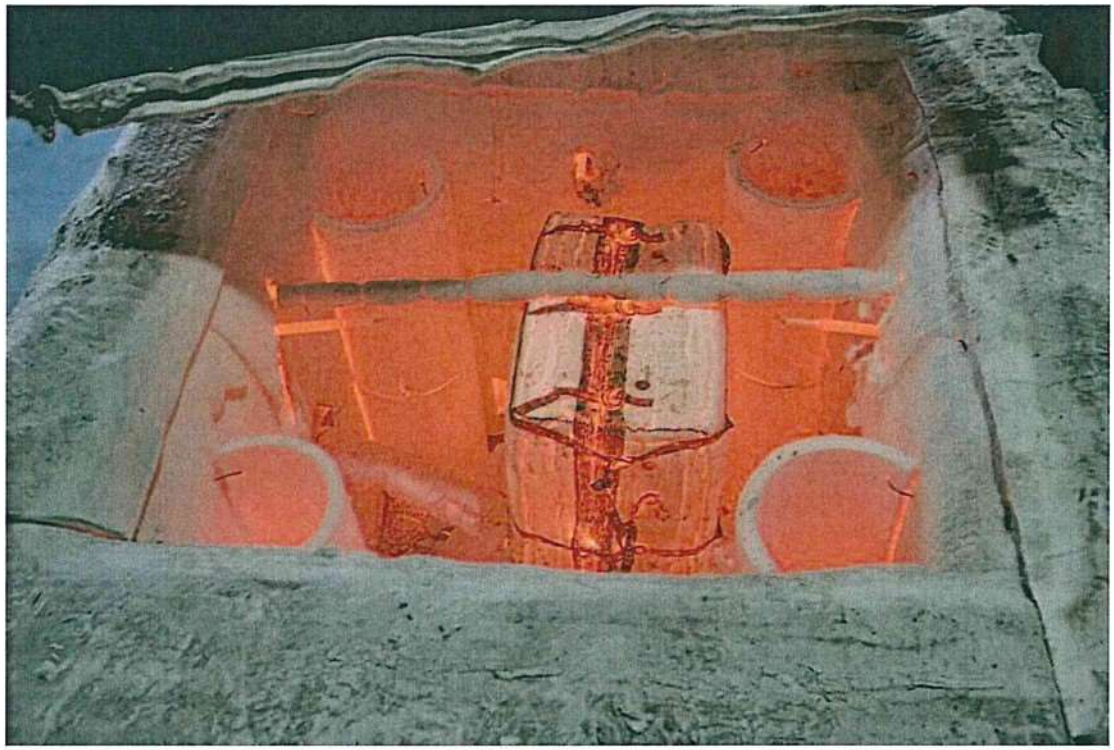

Figure B-4. Assembly after Exposure.

APPENDIX C

GRAPHICAL DATA

(CONSISTING OF 2 PAGES)

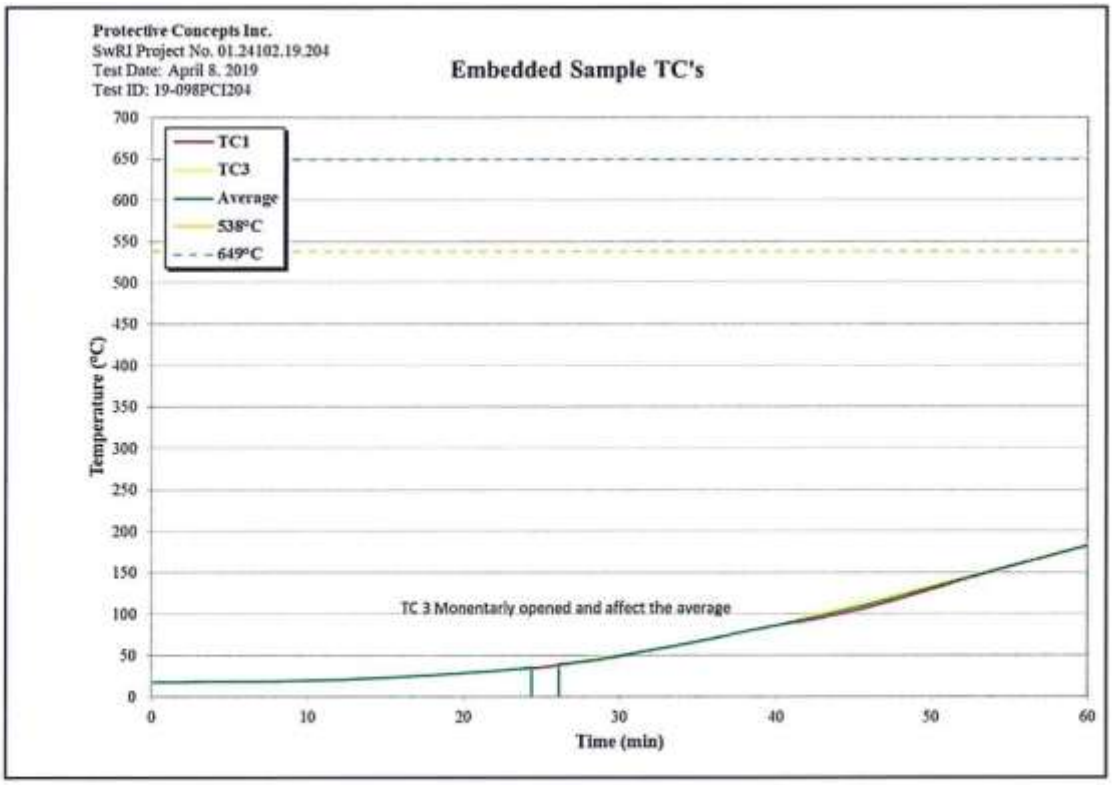

Figure C-1. Embedded Sample TC's.

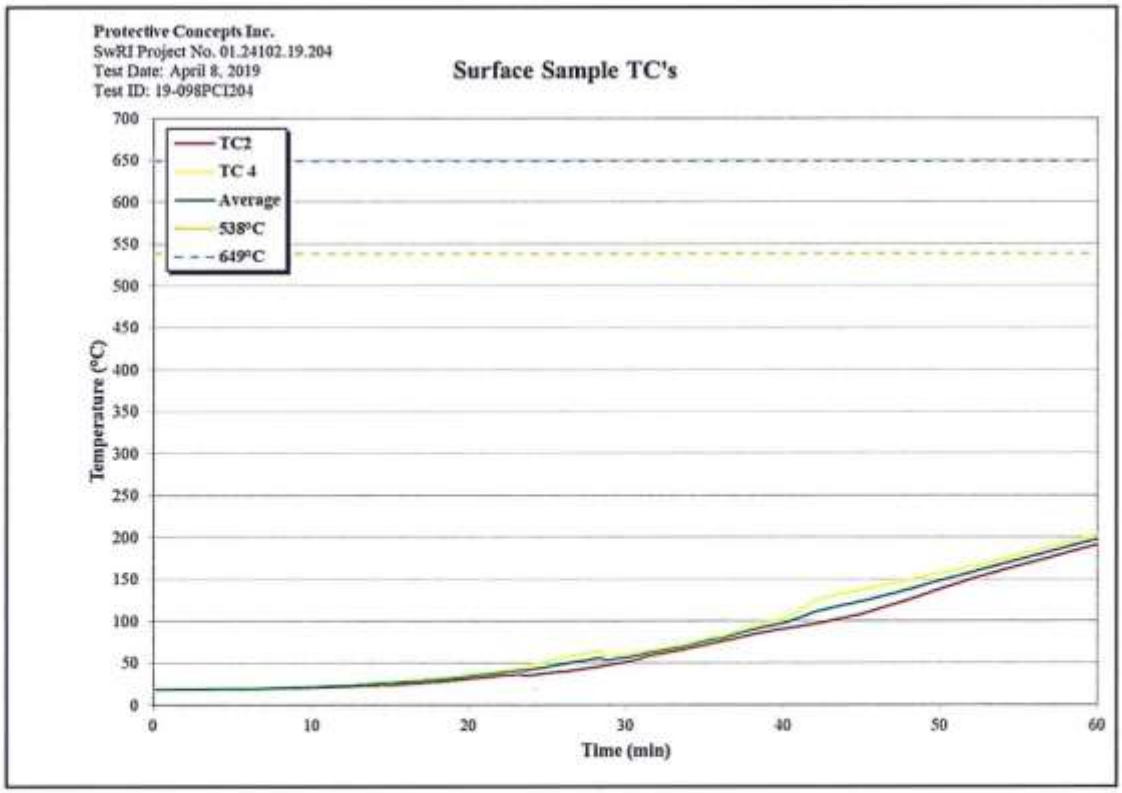

Figure C-2. Surface Sample TC's.

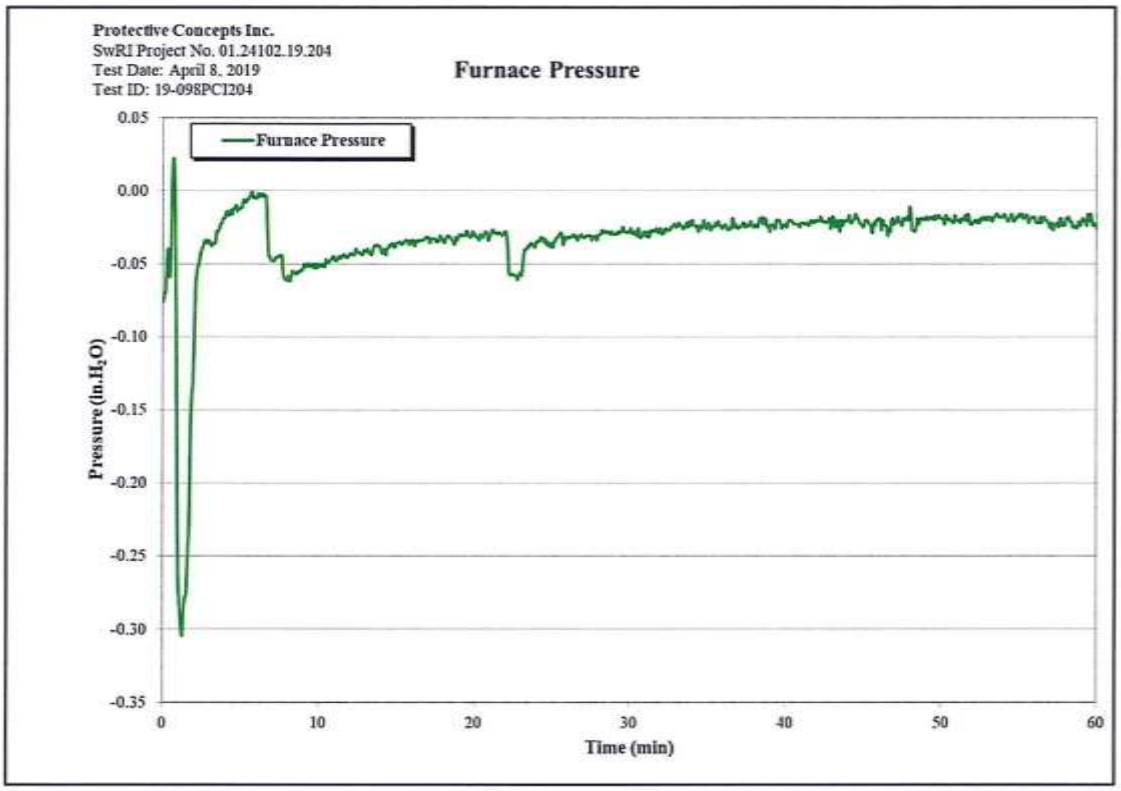

Figure C-3. Furnace Pressure.

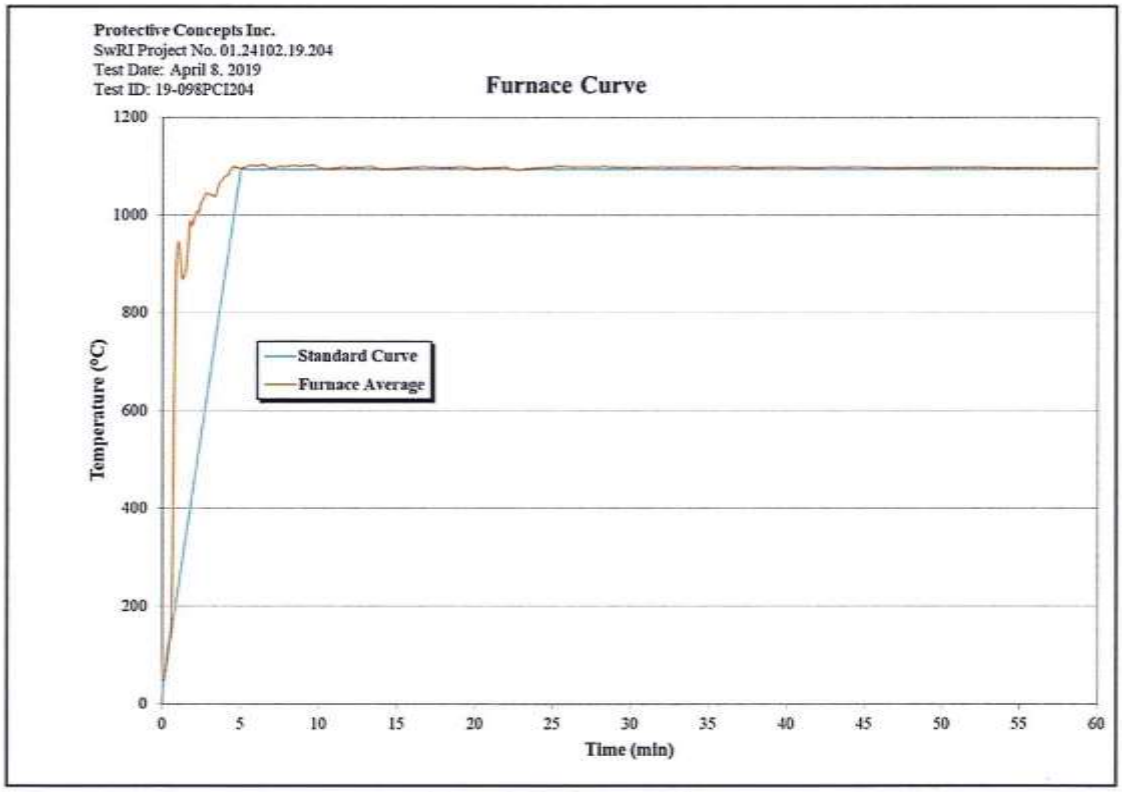

Figure C-4. Furnace Curve.

APPENDIX D

CLIENT-PROVIDED INFORMATION

(CONSISTING OF 1 PAGE)

Appendix D contains proprietary information that cannot be released.