

Test Report

Pressure and Temperature

TR-052217-2A

Test Date: 8/14/17

COMPANY:

W-Technology Link
119515 Oil Center Blvd.
Houston, TX 77073

COMPANY REPS:

Bob Funk, Michael Babin

DYNAQUAL TEST TECH:

Lee Rider

PRODUCT(S) TESTED:

Feedthrough Connectors

The undersigned have produced and reviewed the data collected and presented in the following report. By signing below, DynaQual Test Labs technical staff verifies that the data is accurate and obtained from functioning and calibrated equipment. Also, the undersigned determine that all data collection techniques are authentic and the observations and conclusions are true results of the tests performed on the dates indicated above.

APPROVAL SIGNATURE SECTION:

Test Performed by:



Lee Rider, Lab Technician

Approved By:



Bob Joyce, President

8/18/2017
Date

PROJECT SCOPE

W-Technologies requested that DynaQual Test Labs conduct a pressure test on two (2) feedthrough Connectors. The goal of the test was to study the effects of pressure and temperature over a soak period on the performance of these configurations. The units tested were secured to the pressure head with bailing wire and lowered into the pressure vessel with nonconductive high temperature hydraulic oil as the medium.

The following test report covers the test program and describes the tests performed. The testing was performed at DynaQual's testing lab with calibrated equipment and trained, qualified personnel.

Definitions

UUT – Unit(s) Under Test

UUT Identification

The UUT and dates the units were subjected to testing is shown in Table 1.

Table 1 – Product Identifiers

UUT	Description	Date Tested
1	Pressure housing with 1 feedthrough connector	8/14/17
2	Pressure housing with 1 feedthrough connector	8/14/17

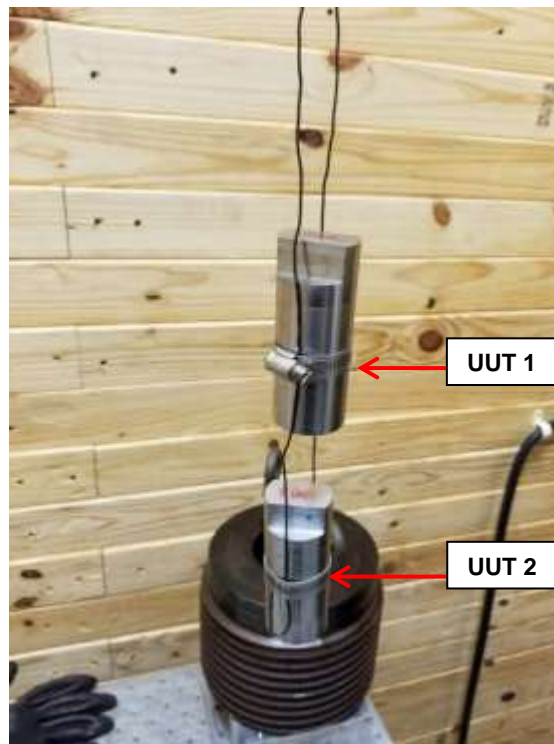


Figure 1: Two connectors, one in each of the fixtures – 8/14/17

PRESSURE TESTING PARAMETERS/SETUP

Table 2 – Description of Test Equipment

Description	Manufacturer	Model	S/N	Cal Due
Temperature Control	Watlow	F4	049678	10/24/2017
Pressure Transducer	GP:50	312C-SZ	153240	7/14/2018
Data Logger	Yokogawa	n/a	S5NC05865	7/14/2018

*Note: All measuring equipment has traceable calibrations available upon request



Figure 2: Pressure system components; Pressure Vessel, data logger, temperature control and transducer.

Testing Program – Pressure Test

The UUT were subjected to testing per the following test plan, as outlined by the customer.

1. Connectors were installed into the connector fixture.
2. Attached the UUT to the head and lowered into the pressure chamber. Sealed and checked all connections for leaks. Verified all connections have proper torque.
3. Applied temperature at a rate of $\sim 2\text{-}3^{\circ}\text{C}/\text{min}$. until the set point of 200°C was reached. The pressure increased during the temperature ramp up.
4. The pressure was monitored so that it did not pass 20,000psi during the temperature ramp up.
5. Dwelled at 20,000psi and 200°C for four (4) hours.
6. At the end of the dwell, removed the temperature and allowed the chamber to cool. The pressure was bled off slowly with the drop in temperature.
7. Removed the UUT from the chamber and inspected for damage or changes. (Figures 4 and 5)
8. Hot and cold IR tests to qualify the NEB Products' 10 pin KTK Connectors (Figures 6 & 7)

The Pressure profile can be seen below in Figures 3.

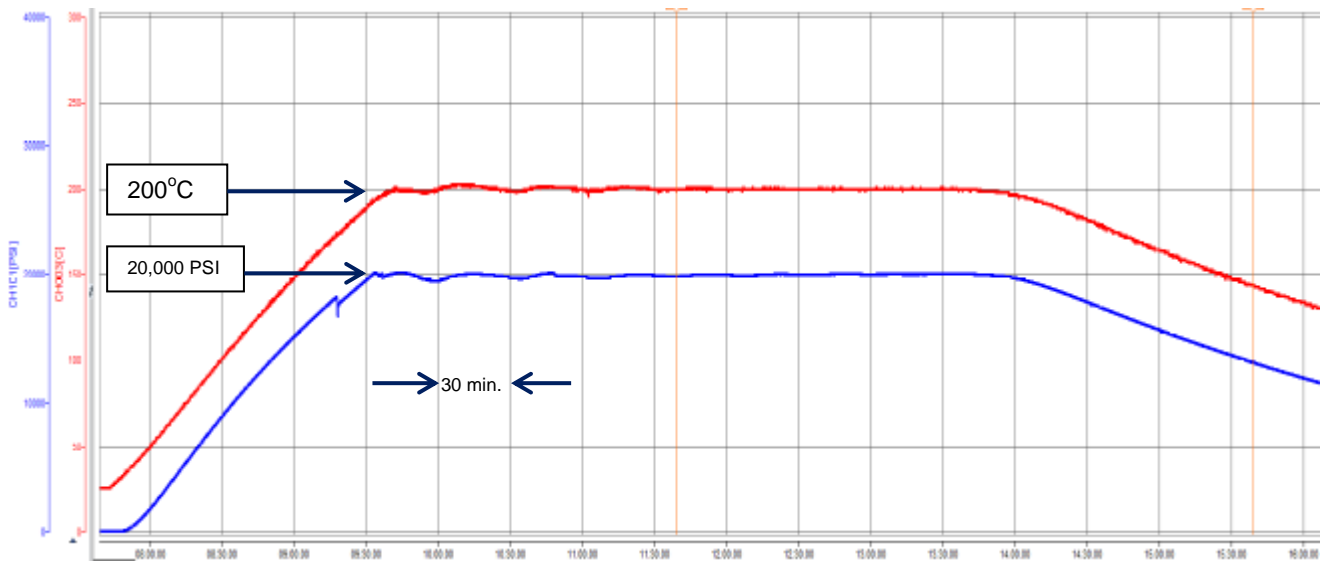


Figure 3: Pressure (blue) and Temperature (red) Profile for Feedthrough connector test. (8/14/17)

TESTING SUMMARY/CONCLUSIONS

The following summarizes the pressure testing performed for W-Technology on their feedthrough connectors on 8/14/2017.

The UUT were tested for 4 hours at 200°C and 20,000 psi.

1. **PASS/FAIL CRITERIA:** a) The feedthrough connectors should not leak oil through the seal to the void space. b) All connectors to pass post continuity tests.
2. **RESULTS: PASS and FAIL**
 - a. (8/14/17) – **PASS**; Both connectors appeared to be clean with no oil intrusion. (Figures 4 & 5).
 - b. Continuity – **PASS**; The customer performed a hot and cold continuity check after the pressure and temperature testing. Those results are shown below in figures 6 & 7. All measurements are within specification for the product.

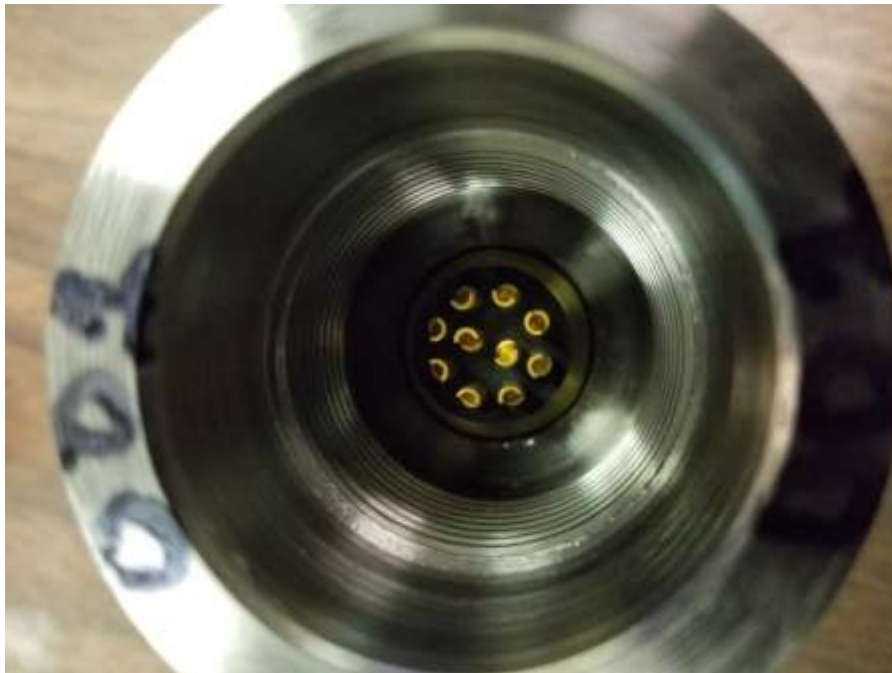


Figure 4: UUT 1 – 8/14/17 Post Test Checks

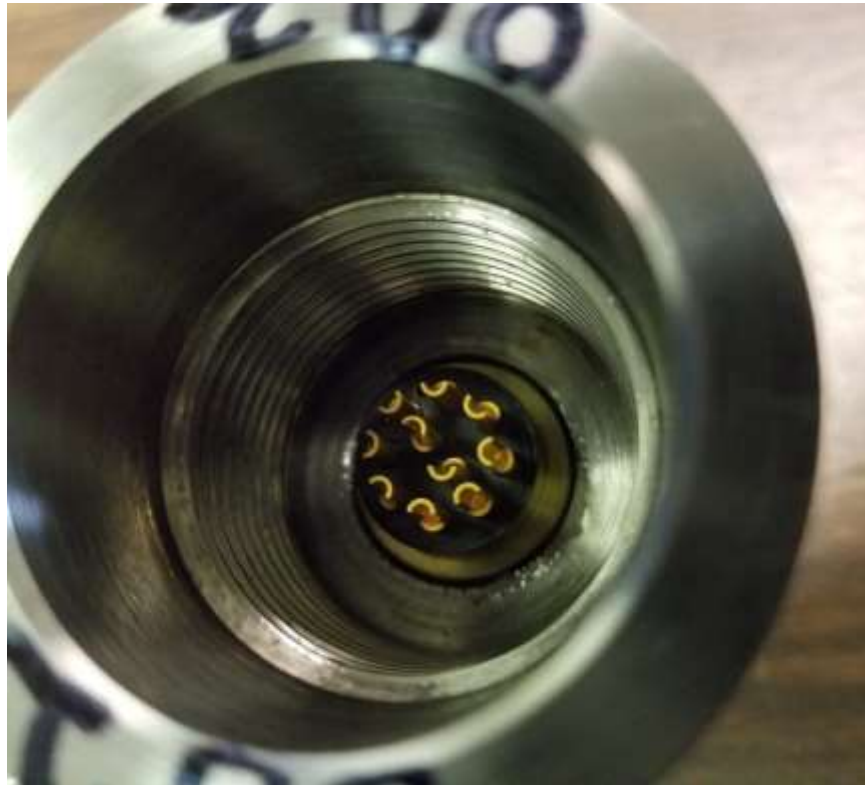


Figure 5: UUT 2 – 8/14/17 Post Test Checks

INSPECTION ELECTRICAL REPORT



19515 Oil Center Boulevard, Houston, Tx, 77073
 Phone: 281-209-9111 Fax: 281-209-9191



DATE		8/15/2017		P.O NUMBER				HI-POT	GΩ / MΩ		
CUSTOMER NAME		NEB								INSULATION TEST CRITERIA - COLD TEST	
CONNECTOR #		1		ORD #				VOLT	500 V		
PART NUMBER				REV				TEMP	75° F		
DRAWING NUMBER				REV							
4 PIN 6 SOCKET											
PIN		1	2	3	4	5	6	7	8	9	10
CONTINUITY		Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White
		0.3 Ω	0.2 Ω	0.3 Ω	0.2 Ω	0.3 Ω	0.2 Ω	0.3 Ω	0.4 Ω	0.2 Ω	0.2 Ω
Colors Code		Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White
1	Black		9.6 GΩ	8.3 GΩ	6.6 GΩ	7.5 GΩ	8.3 GΩ	7.7 GΩ	8.9 GΩ	9.2 GΩ	9.9 GΩ
2	Brown			5.2 GΩ	3.47 GΩ	4.20 GΩ	4.70 GΩ	4.21 GΩ	5.2 GΩ	5.7 GΩ	6.6 GΩ
3	Red				1.15 GΩ	1.33 GΩ	1.67 GΩ	1.54 GΩ	1.65 GΩ	2.29 GΩ	1.40 GΩ
4	Orange					1.25 GΩ	1.77 GΩ	1.55 GΩ	1.76 GΩ	2.03 GΩ	1.66 GΩ
5	Yellow						1.49 GΩ	1.61 GΩ	2.76 GΩ	3.88 GΩ	2.53 GΩ
6	Green							1.34 GΩ	2.44 GΩ	1.40 GΩ	2.43 GΩ
7	Blue								4.30 GΩ	4.00 GΩ	1.50 GΩ
8	Violet									5.3 GΩ	5.6 GΩ
9	Gray										1.44 GΩ
10	White										

[Signature]
 Sr. Quality Inspector - CIT

08/15/2017
Date

[Signature]
 Technician

08/15/17
Date

W-Technologies Link

Figure 6: Cold IR tests 10 pin KTK Connectors

INSPECTION ELECTRICAL REPORT



W-TECHNOLOGY
LINK

19515 Oil Center Boulevard, Houston, Tx, 77073
Phone: 281-209-9111 Fax: 281-209-9191



DATE		8/15/2017	P.O NUMBER				HI-POT	GΩ / MΩ			
CUSTOMER NAME		NEB				INSULATION TEST CRITERIA - HOT TEST					
CONNECTOR #		1		ORD #		VOLT		500 V			
PART NUMBER				REV		TEMP		200 °C / 392 ° F			
DRAWING NUMBER				REV							
4 PIN 6 SOCKET											
INSULATION RESISTANCE (IR)											
Colors Code	Black	Brown	Red	Orange	Yellow	Green	Blue	Violet	Gray	White	
1	Black	27 GΩ	29 GΩ	35 GΩ	35 GΩ	40 GΩ	35 GΩ	25 GΩ	20 GΩ	25 GΩ	
2	Brown		24 GΩ	29 GΩ	35 GΩ	40 GΩ	30 GΩ	35 GΩ	27 GΩ	30 GΩ	
3	Red			19 GΩ	27 GΩ	30 GΩ	27 GΩ	35 GΩ	22 GΩ	21 GΩ	
4	Orange				20 GΩ	28 GΩ	30 GΩ	30 GΩ	25 GΩ	18 GΩ	
5	Yellow					21 GΩ	30 GΩ	35 GΩ	25 GΩ	17 GΩ	
6	Green						23 GΩ	30 GΩ	27 GΩ	20 GΩ	
7	Blue							22 GΩ	20 GΩ	21 GΩ	
8	Violet								21 GΩ	25 GΩ	
9	Gray									15 GΩ	
10	White										

[Signature]
Sr. Quality Inspector _CIT



[Signature]
Engineer

08/15/2017
Date

8/15/2017
Date

W-Technologies Link

Figure 7: Hot IR tests on 10 pin KTK Connectors