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TEST REPORT

REPORT NUMBER: 101276459SAT-008
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EVALUATION CENTER
16015 Shady Falls Road
Elmendorf, TX 78112
(voice) 210-635-8100
(fax) 210-635-8101
www.intertek.com

RENDERED TO

AREVA NP Inc.
4100 International Plaza
Fort Worth, TX 76109

AREVA	AREVA NP Inc.
	58-9224199-000

PRODUCTS EVALUATED: Quantum Silicones QSil 5558MC Silicone Elastomer and Dow Corning® Sylgard 170 Silicone Elastomer

EVALUATION PROPERTY: Pressure Resistance (Pressure Test 8)

Report of Testing pressure resistance capabilities for compliance with the applicable requirements of AREVA NP Inc. Test Plan, Document No. 51-9207462-000.

1 Table of Contents

2 Introduction

Intertek Testing Services NA (Intertek) has conducted testing for AREVA NP Inc., on the pressure resistance capabilities of Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) and Dow Corning® Sylgard 170 Silicone Elastomer (Sylgard 170) through a 12" thick concrete deck for compliance with the applicable requirements of and in accordance with AREVA NP Inc. Document No. 51-9207462-000, *Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)*. This evaluation took place on December 12, 2013.

This project was undertaken to evaluate the pressure resistance capability of silicone elastomer seals when installed within a bare concrete (or metal sleeve insert) with piping commodities passing through at the specified air pressure increments above atmospheric pressure.

3 Test Samples

3.1. SAMPLE SELECTION

The sealant materials were not independently selected for testing; they were supplied by AREVA NP Inc., and were received in two shipments, one on July 8, 2013, the other on October 4, 2013. The samples were received with Certificates of Conformance and are considered traceable. Basic information on sealant material(s) is presented in the table below.

Sealant Material	Lot /Batch#	Expiration Date
QSil 5558 MC	130912	9/30/2014
DC-170	073B01	7/31/2014

Information regarding receiving dates and origin can be found in Appendix F: Quality Documents. All samples were received in good condition at the Evaluation Center.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The test deck was used to simulate a confinement zone or HVAC boundary in which the penetration seal assemblies may be installed. The test deck was not considered an integral part of the penetration seal assembly being tested and therefore was not intended to replicate MOX-specific plant conditions and not considered integral in bounding the performance of the penetration seal assemblies (e.g., concrete blend, compressive strength, rebar size and spacing). The test deck was composed of normal weight reinforced concrete.

The openings cast into the test deck simulated certain features consistent with MOX penetrations (e.g., painted or coated interior finishes, beveled edges, etc.). The concrete test deck used for Pressure Test 8 was the same concrete test deck previously used in Pressure Test 6 and Seismic Pressure Test 4 (see Intertek Test Report No. 101276459SAT-001B; AREVA document 58-9223133-000 for Pressure Test 6 and Intertek Test Report No. 101276459SAT-005; AREVA document 58-9224039-000 for Seismic Pressure Test 4).

A detailed description of each penetration in Pressure Test 8 can be found in Appendix D, AREVA NP Inc. Engineering Information Record, Document No. 51-9207462-000. Included in that document is a table of revision history with a description of changes made to the approved plan. The installation and documentation of penetration seal assemblies contained within the test slab was performed by AREVA under AREVA's Quality Assurance Program [Reference 12.4 in the test plan found in Appendix D].

The test deck consisted of nominal 96" x 96" x 12" thick normal weight concrete constructed using 1/4" thick perimeter steel channel and reinforced with #7 steel rebar spaced 12" o.c. with minimum 3" embedment. Within the test deck, precast openings were formed as described below.

For the purpose of Pressure Test 8, the boot seal assemblies from Pressure Test 6 / Seismic Pressure Test 4 were removed and commodities resealed using the silicone elastomer seal material in accordance with Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Test Plan Reference 12.5]. The sleeve extension and sleeve insert installed in Pressure Test 6 were not removed and were re-used along with the test slab (refer to Appendix G for additional information). There were four penetrations in Pressure Test 8.

- Penetration P1: This penetration was a round 12" diameter precast opening with a 16 gauge galvanized sheet metal sleeve sized to fit the precast opening. The sheet metal sleeve was approximately 18" long and installed such that the sleeve extended approximately 3" on both sides of the test slab. The sheet metal sleeve was adhered to the concrete opening in accordance with AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Test Plan Reference 12.5]. An 8" diameter schedule 40 carbon steel pipe passed through the sleeve. The pipe was capped on one side. The pipe cap was made air tight, so that any leakage during the test had to pass though the seal assembly and not internal to the pipe. The gap between the sleeve and the pipe was sealed using an eight (8) inch thick Dow Corning Sylgard® 170 Silicone Elastomer (DC-170) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Test Plan Reference 12.5].
- Penetration P2: This penetration was a 16"x16" square precast opening with a 2" diameter schedule 40 carbon steel pipe, a 2" diameter S-40S stainless steel pipe, a 2" diameter calibrate type 304 stainless steel conduit, and a 2" diameter calconduit rigid galvanized steel conduit penetrating the opening. The pipes and conduits were capped on one side. The caps were made air tight, so that any leakage during the test had to pass though the seal assembly and not internal to the pipe or conduit. The opening was sealed using an eight (8) inch thick Dow Corning Sylgard® 170 Silicone Elastomer (DC-170) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Test Plan Reference 12.5].
- Penetration P3: This penetration was a 16"x16" square precast opening with a 2" diameter schedule 40 carbon steel pipe, a 2" diameter S-40S stainless steel pipe, a 1 ¼" diameter S-40S titanium pipe, and a 2" diameter S-40S zirconium pipe

penetrating the opening. The pipes were capped on one side. The caps were made air tight, so that any leakage during the test had to pass though the seal assembly and not internal to the pipe. The opening was sealed using an eight (8) inch thick Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Test Plan Reference 12.5].

- Penetration P4: This penetration was a round opening with a 12" diameter cast-in-place schedule 40 steel pipe sleeve with a galvanized steel sleeve extension on the top side of the barrier. An 8" diameter schedule 40 carbon steel pipe passed through the sleeve. The pipe was capped on one side. The pipe cap was made air tight, so that any leakage during the test had to pass though the seal assembly and not internal to the pipe. The gap between the cast-in-place sleeve and the pipe was sealed using an eight (8) inch thick Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Test Plan Reference 12.5].

4 Testing and Evaluation Methods

The Test Plan defines the test methods, acceptance criteria and test report documentation requirements for penetration seal Pressure Test 8. Additionally, this detailed Test Plan defines the roles and responsibilities of MOX Services, AREVA, the selected testing laboratory, and any other subcontracted entity engaged in support of pressure testing efforts.

The detailed Test Plan also describes the procurement plan for materials associated with penetration seal Pressure Test 8 and identifies the entities responsible for procuring the various components of the test assemblies based on the quality level assigned to each component.

The Test Plan also establishes minimum quality requirements for the penetration seal materials used in the test assemblies and links quality requirements in the AREVA QA program to customer/project quality requirements.

4.1. TEST APPARATUS

In the absence of any consensus codes or standards related to the pressure testing of penetration seal assemblies, the MOX Penetration Seal Program has developed a standardized method for conducting pressure testing of MOX penetration seal designs. In support of this effort, Intertek assisted in the design and construction of a pressure test apparatus to be use in the conduct of MOX penetration seal pressure tests.

The pressure chamber apparatus consists of two hemispherical 72" diameter steel pressure vessels, calibrated equipment and a data acquisition system. The apparatus accurately maintains the desired air pressure, using one of two sensitive, manually adjustable pressure regulators; a high (0-15 psi) and a low (0-2 psi) range. The sealed collection chamber feeds any leakage air back to the test device, where it is channeled through one of two calibrated flow meters, once again, a high (0-200 L/min) and a low (0-20 L/min) range. A calibrated electronic

pressure transducer (0-5 psi) measures the differential pressure between the two chambers and the data acquisition software determines the net pressure drop across the test seal and the leakage through the seal. The chambers are interchangeable and the direction can be reversed very quickly so both can serve as the pressure or the collection chamber.

The primary components described above include the following devices:

Pressure Chamber — 2-piece hemispherical 72” diameter steel vessel
3 connection ports per piece
16 flange attachment points per piece
Flange attachment via 3/8” diameter holes @ 22-1/2° spacing

Pressure Cart — Stainless steel rolling cart with control equipment and associated Data Acquisition System

Regulator (low)	Control Air, Inc., Amherst, NH Type 700 0-2 psi
Regulator (high)	Control Air, Inc., Amherst, NH Type 700 0-15 psi

Mass Flow Meter Omega Engineering, Inc., Stamford, CT
Model No. FMA-872A-V-NIST
Serial No. 4270050001001
0-20 lpm

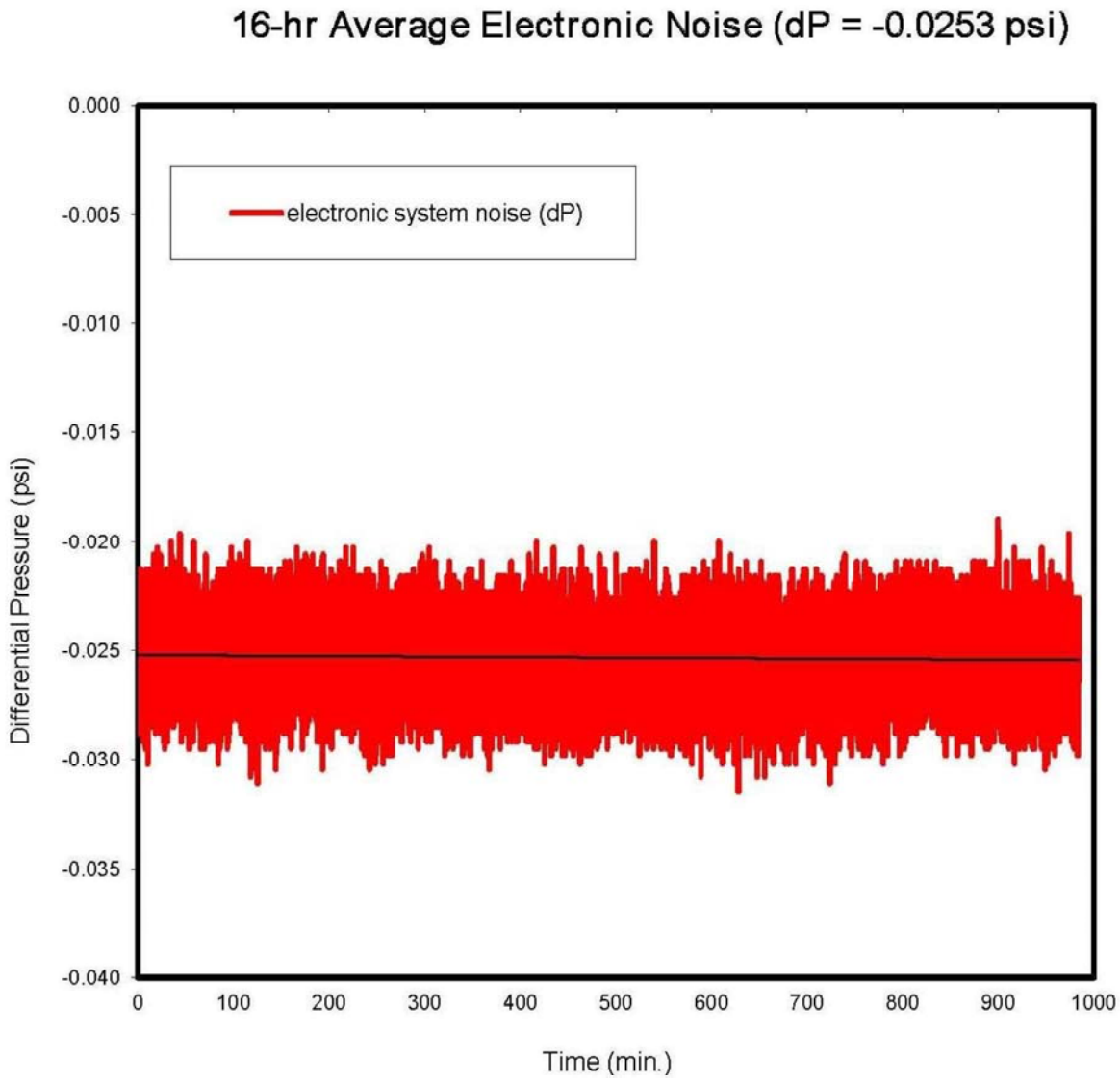
Mass Flow Meter Omega Engineering, Inc., Stamford, CT
Model No. FMA-875A-V-NIST
Serial No. 4270050003001
0-200 lpm

Pressure Transducer	Omegadyne Inc., Sunbury, OH Model No. PX409-005 DWUV Serial No. 406707 Pressure Range: 0-5 psi Input 0-100mVdc

Power Supply	Omega Engineering, Inc., Stamford, CT Model No. PSS-10 +10V @ 400 mA Input 115 VAC 50/60 Hz
Multifunction DAQ	National Instruments, Model No. NI USB-6210 16 Input, 16-bit, 250 kS/s, Multifunction I/O

Dedicated CPU HP Compaq Pro-6300 Microtower
Serial No. MXL3090LN6
OS Windows 7 Pro

Additionally, during initial system start-up testing and verification, it was discovered that the data acquisition system (DAQ) was so sensitive that “signal noise” resulted in data fluctuations for reported differential pressure even when the system was at equilibrium (i.e., both high side and low side pressure chambers were at atmospheric conditions). After collecting data for 16 hours overnight, the average fluctuation was -0.025 psi.



Since the initial pressure stage prescribed by the AREVA NP Test Plan is 1.0 inches of water (0.0361 psi) and the average data fluctuation due to “signal noise” was almost 70% of this value (-0.025 psi), it was decided that an inclined-plane manometer would be used to ensure that the Stage 1 differential pressure was applied at precisely 1.0 inches of water.

For subsequent pressure stages (i.e., Stages 2-5), the Test Plan required pressure was applied and maintained using the DAQ reported differential pressure without consideration for any "signal noise". Since the "signal noise" always reported some level of negative pressure at the beginning of the test, this method assured that the tests were conducted with additional margin, as the actual differential pressure that the test specimen was subjected to was equal to the DAQ reported differential pressure plus the additional pressure needed to overcome the negative "signal noise" reported at the beginning of the test when both pressure chambers were at atmospheric conditions.

4.2. TEST STANDARD

AREVA NP Inc. Document No. 51-9207462-000

Pressure rated penetration seals at the MOX facility are required to remain "sufficiently leak-tight" at various pressure levels in order to support the functional goals of the various pressure rating requirements (i.e., confinement, suppression system clean agent concentration, fire induced pressure loads or HVAC pressure boundary loads). The term "sufficiently leak-tight" indicated that the penetration seal meets the predetermined acceptance criteria for the pressure level(s) being tested.

The acceptance criterion that constitutes "sufficiently leak-tight" varies based on the pressure requirement and the operating mode of the plant. For most pressure conditions and operating modes, "sufficiently leak-tight" means that the penetration seal assembly must remain in place but is allowed to leak (i.e., the penetration seal cannot become dislodged from the opening or otherwise catastrophically fail such that a substantial leakage path is created.)

Per MOX Services Calculation *Confinement Boundary Air Leakage Criteria* [Test Plan Reference 12.1], penetration seals that function as confinement zone 3b boundary components must maintain a leakage rate less than 0.01 cfm/sq. ft. of penetration area when tested at a pressure that bounds C3b to non-C3b zone pressures during normal operating conditions.

The table below identifies the differential pressure levels (stages) for conducting pressures tests, as well as, the acceptance criteria in order to be considered "sufficiently leak-tight".

Differential Pressure Test Levels

Test Stage	Differential Pressure (inch w.g.)	Required Hold Time (minutes)	Acceptance Criteria	Basis for the Selected Differential Pressure
1	1.0	30	Leakage $\leq$ 0.01 cfm/sq. ft. of penetration area	Testing at this differential pressure bounds the 0.51 inches w.g. pressure for C3b to C2 areas during normal operation [Reference 12.10].

Test Stage	Differential Pressure (inch w.g.)	Required Hold Time (minutes)	Acceptance Criteria	Basis for the Selected Differential Pressure
2	5.0	30	Seal Remains In Place	Testing at this differential pressure bounds the 4.0 inches w.g. pressure anticipated as a result of clean agent suppression system discharge [Reference 12.8].
3	10.0	30	Seal Remains In Place	Testing at this differential pressure bounds the 7.0 inches w.g. pressure used as the screening pressure cutoff for fire induced pressures [Test Plan References 12.8 and 12.9] and some of the HVAC pressure boundaries [Test Plan Reference 12.10].
4	20.0	30	Seal Remains In Place	Testing at this differential pressure bounds all of the calculated fire induced pressures [Test Plan Reference 12.9] and many of the HVAC pressure boundaries [Reference 12.10].
5	40.0	30	Seal Remains In Place	Testing at this differential pressure bounds all of the HVAC pressure boundaries [Test Plan Reference 12.10].

The test assembly shall be attached to the pressure test apparatus and subjected to air pressure tests at the select pressure levels identified in the table above beginning with the Stage 1 pressure of 1.0 inches w.g. Once this pressure has been obtained, the pressure shall be maintained for the hold time specified. The maximum leakage rate observed during the hold time shall be recorded. If the leakage rate exceeds the acceptance criteria during Stage 1 testing, the time of failure shall be noted and the test shall be continued, since leakage alone does not constitute failure after Stage 1.

Once the designated hold time has been achieved, the pressure shall be increased to the next pressure level identified (Stage 2, then Stage 3, then Stage 4 and finally Stage 5) and held for the designated hold time. The maximum leakage rate observed during each hold time shall be recorded.

Following completion of Stage 5 pressure testing, the test may continue at the discretion of the AREVA test engineer and the testing laboratory manager in charge. Subsequent pressures, hold times and maximum leakage rates shall be recorded as directed by the AREVA test engineer.

If at any pressure level (or test stage) the penetration seal becomes dislodged from the opening or otherwise catastrophically fails, the pressure test shall be terminated and the time to failure and pressure at which the failure occurred shall be recorded.

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

The test deck was mounted horizontally between two 72" diameter hemispherical pressure vessels. The deck was fixed to the pressure chamber using (16) 5/16" x 2-1/2" long sleeve anchors (Red Head) through 16 pre-drilled holes. Silicone II caulk (GE) was used to create a pressure tight seal between the pressure chamber and the test deck.

The test was initiated at 10:08 a.m. on December 12, 2013. Scott Groesbeck, representing AREVA NP Inc., was present to witness the test. The ambient temperature at the start of the test was 48°F, with a relative humidity of 50%.

The test procedure followed that presented in Section 9.0 of the Test Plan. Within a few seconds of pressure being introduced into the top side pressure chamber, leakage was detected. As the differential pressure was increased, the leakage rate increased. The pressure in the chamber was increased to 1.0 inches w.g. (~0.036 psi) per the inclined-plane manometer, and at this point the leakage was reported as ~17.3 LPM (refer to Appendix B data at Time (min) = 21.2). This leakage was almost 12 times the allowable value (17.3 LPM vs. a limit of 1.453 LPM). Throughout the 30 minute hold period for Stage 1 (Time (min) = 21.2 to Time (min) = 51.2 in the Appendix B data), the input air pressure had to be increased to maintain the required differential pressure, as the leakage rate appeared to increase.

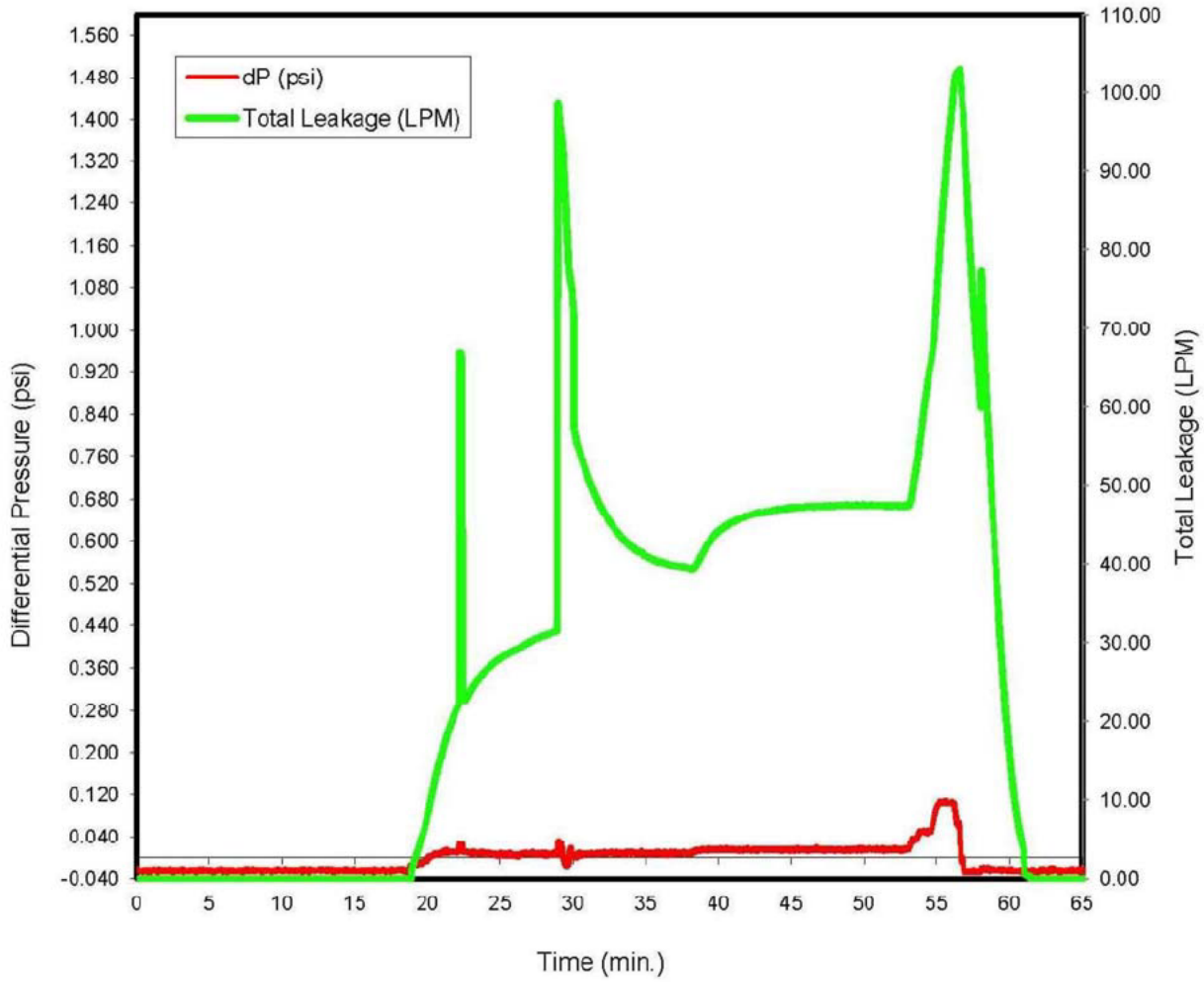
Following Stage 1, an attempt was made to move to Stage 2 (0.181 psi required pressure). Despite using large pressure regulator at full open, the Stage 2 pressure could not achieved due to excessive leakage. At Time (min) = 56.1, the decision was made to terminate the test.

The graph and table on the following page(s) provides a summary of results and observations for this test, the observed leakage, and the maximum leakage.

It should be noted that the leakage spikes depicted in the graph below at approximately 1 minute and again at 8 minutes into the 30 minute hold time (Time (min) = 22 minutes 29 minutes, respectively, per in the Appendix B data), were as a result of both mass flow meters being opened at the same time.

When changing between mass flow meters during a pressure a test, valve lineups and flow path routes are changed. The time it takes to manipulate the valves, differences in tubing sizes, orifice sizes and mass flow meter throughput capacity all affect bonnet pressure on the leakage side of the test assembly which can affect recorded leakage values. Generally, the input air on the opposite side of the test assembly remains constant during this time period, since manipulation of the input pressure regulator would require additional operator action. This results in reported differential pressure fluctuations which typically show up as pressure spikes when the raw data is graphed. Within a few minutes of mass flow meter switchover, the system stabilizes to the new lineup and the data results in a more uniform graph.

Chamber Differential Pressure and Seal Leakage
Pressure Test 8



Test Results and Observations

Test Stage	Differential Pressure inch w.g. (psi)	Required Hold Time (minutes)	Acceptance Criteria	PASS/ FAIL	Max Leakage (Total LPM)	Max Leakage (Total cfm)
1	1.0 (0.036)	30	Leakage $\leq$ 0.01 cfm/sq. ft. of penetration area	FAIL[1]	47.61	1.682
2	5.0 (0.181)	30	Seal Remains In Place	IND[2]	N/A	N/A
3	10.0 (0.361)	30	Seal Remains In Place	IND[2]	N/A	N/A

Test Stage	Differential Pressure inch w.g. (psi)	Required Hold Time (minutes)	Acceptance Criteria	PASS/ FAIL	Max Leakage (Total LPM)	Max Leakage (Total cfm)
4	20.0 (0.722)	30	Seal Remains In Place	IND[2]	N/A	N/A
5	40.0 (1.44)	30	Seal Remains In Place	IND[2]	N/A	N/A

[1] Based on the table above and the allowable leakage for Pressure Test 8 per the Test Plan, the test specimen was allowed to have up to 0.0513 cfm (1.453 LPM) of leakage at Stage 1 vs. 1.682 cfm (47.61 LPM) of actual leakage. Therefore, the seal was leaking almost 33 times the allowable leak rate at a differential pressure of 1.0 inch w.g. For this reason, the test assembly is considered to have failed the Stage 1 test.

[2] Because there was insufficient supply air to overcome the amount of leakage such that Stage 2-5 pressures could be achieved, the test specimen is considered to be indeterminate for these stages.

5.2. POST TEST EXAMINATION

Following completion of the pressure test, a visual post-test examination was performed. The top pressure chamber was removed, soapy water was applied to the seal surface, and the bottom chamber was pressurized to determine leakage paths. These examinations included, but were not limited to, the following:

- Integrity of seal and conditions on the exposed side of the penetration
  - ➢ No visual changes were observed.
- Integrity of seal and conditions on the unexposed side of the penetration
  - ➢ No visual changes were observed.
- Location of any penetration seal degradation
  - ➢ No visual changes were observed.
- Condition of seal to barrier interface
  - ➢ No visual changes were observed.
- Condition of seal to penetrating item interfaces
  - ➢ P1: no leakage around sleeve or pipe but minor leakage inside the pipe plug.
  - ➢ P2: leakage around the stainless steel conduit
  - ➢ P3: leakage around all pipes
  - ➢ P4: leakage at the seal / pipe interface; with minor leakage inside the pipe plug

6 Conclusion

Intertek Testing Services NA (Intertek) has conducted testing for AREVA NP Inc., on the pressure resistance capabilities of Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) and Dow Corning® Sylgard 170 Silicone Elastomer (Sylgard 170) through a 12" thick concrete deck for compliance with the applicable requirements of and in accordance with AREVA NP Inc. Document No. 51-9207462-000, *Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)*. This evaluation took place on December 12, 2013.

The seals in Pressure Test 8 failed to meet the acceptance criteria for Stage 1 leakage. Stages 2-5 were indeterminate because the leakage air exceeded the supply air prior to reaching the required pressures.

This project was undertaken to evaluate the pressure resistance capabilities of various elastomer seals at five different air pressure increments above atmospheric pressure.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK TESTING SERVICES NA

Reported by: [redacted]
Mike Dey
Staff Engineer

Reviewed by: [redacted]
Joseph Zatopek
Engineering Team Leader, Fire Resistance

Reviewed by: [redacted]
Michael A. Brown
Quality Supervisor

APPENDIX A
Assembly Drawings

APPENDIX A: TEST DECK/TEST SLAB DRAWINGS

The test deck (test slab) for Pressure Test 8 is depicted on page A-2.

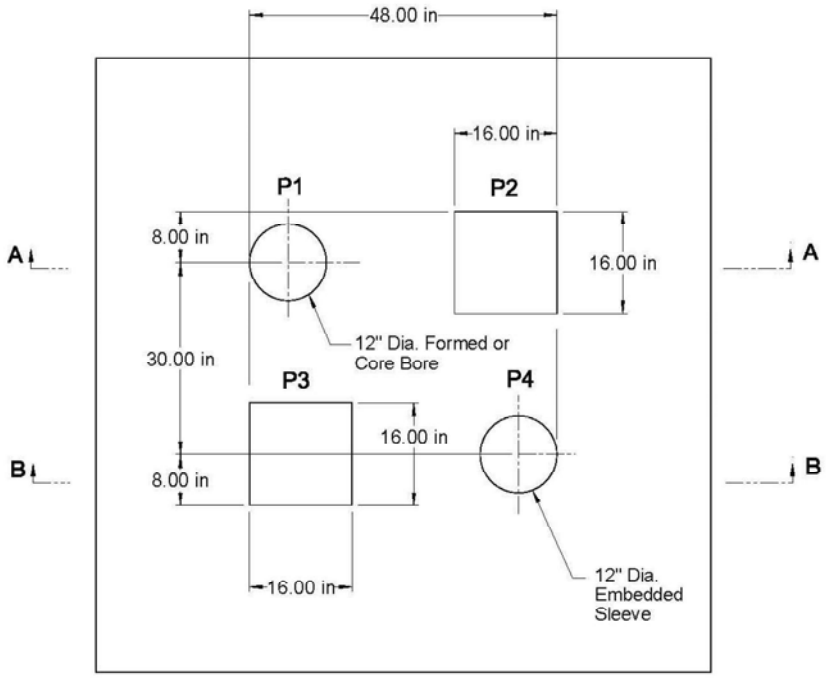
AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Pressure Test P8 Test Deck

Pressure Test P8

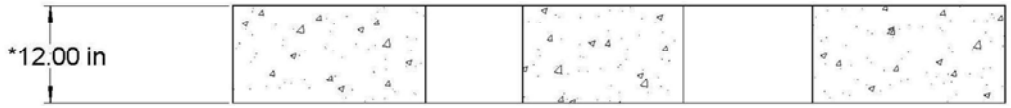


Section Views are on
Page A-3.

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC.
3. 12" EMBEDDED SLEEVE TO BE CAST IN PLACE WITH STEEL LUGS.

Pressure Test P8



Section A-A

Section B-B

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC.

APPENDIX B: TEST PENETRATION DRAWINGS

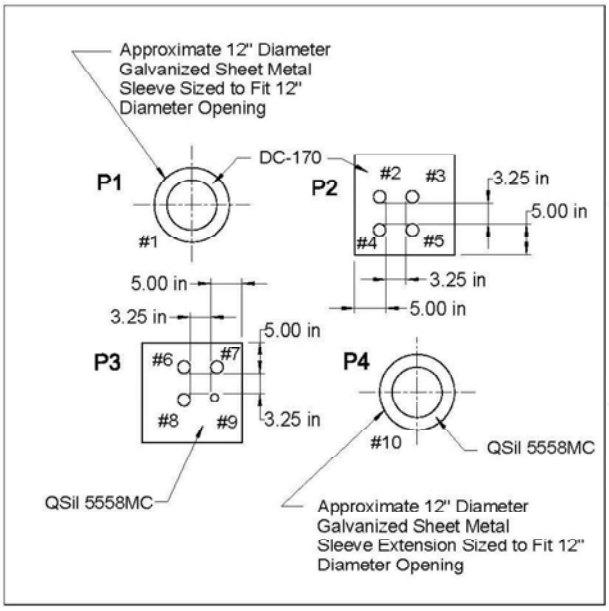
This appendix contains Test Penetration drawings. These drawings identify penetrating item locations within the test penetration, as well as, the penetration seal design for each test penetration.

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Pressure Test P8



Section Views are on
Pages B-4, and B-5.

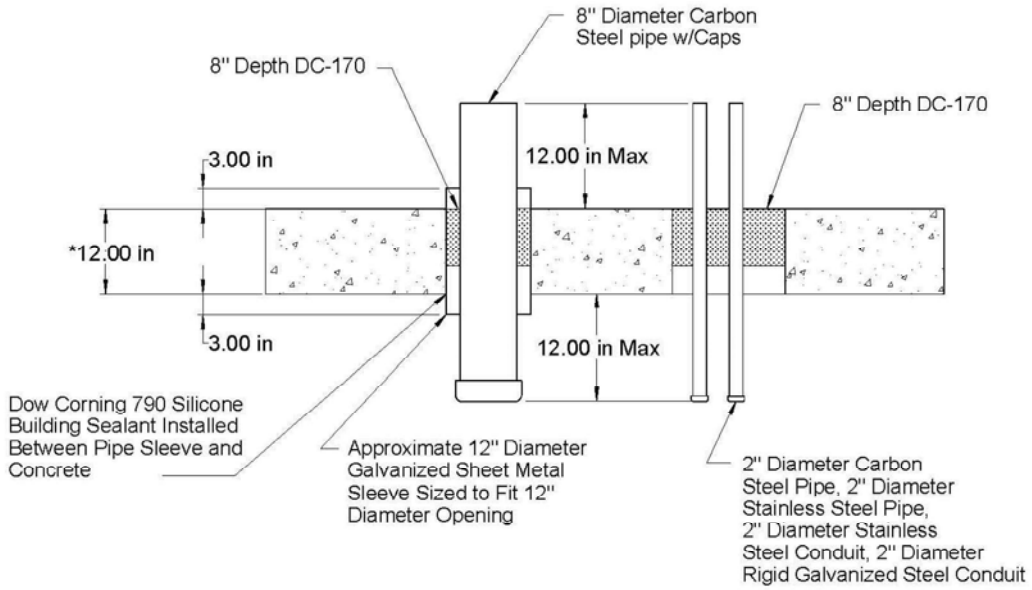
NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC.
3. 12" EMBEDDED SLEEVE TO BE CAST IN PLACE WITH STEEL LUGS.
4. FOR PENETRANT DESCRIPTIONS SEE PAGE P-3.

Intertek

THE FOLLOING PIPING AND CONDUIT PENETRANTS ARE SHOWN ON PAGE B-2.

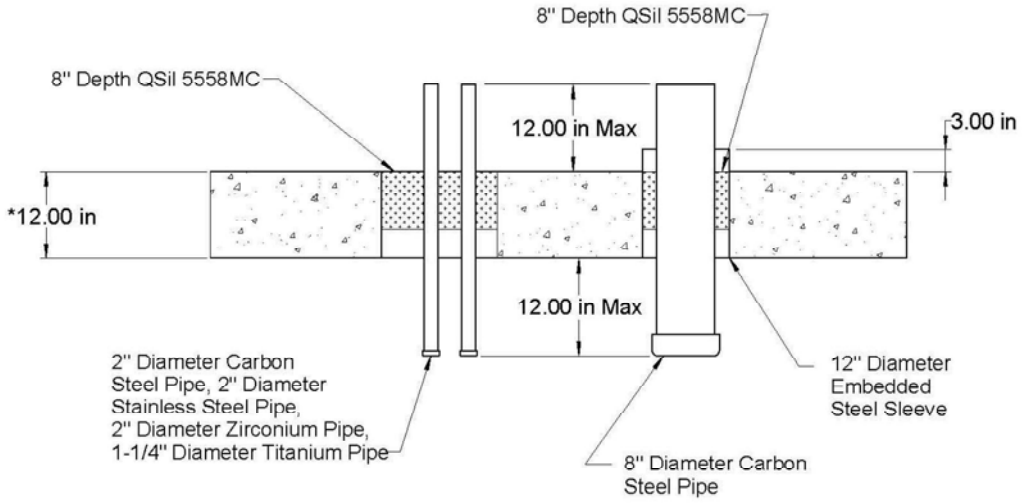
#1 8" DIAMETER CARBON STEEL PIPE
#2 2" DIAMETER CARBON STEEL PIPE
#3 2" DIAMETER STAINLESS STEEL PIPE
#4 2" DIAMETER STAINLESS STEEL CONDUIT
#5 2" DIAMETER RIGID GALVANIZED STEEL CONDUIT
#6 2" DIAMETER CARBON STEEL PIPE
#7 2" DIAMETER STAINLESS STEEL PIPE
#8 2" DIAMETER ZIRCONIUM PIPE
#9 1-1/4" DIAMETER TITANIUM PIPE
#10 8" DIAMETER CARBON STEEL PIPE



Section A-A

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC



Section B-B

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC

APPENDIX B
Test Data

AREVA NP, Inc. Project No. G101276459SAT-008 December 12, 2013

Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
0	-0.0246	0.0091	0	0.0091
0.0333	-0.0259	0	0	0
0.0667	-0.0226	0	0	0
0.1	-0.0249	0.0091	0	0.0091
0.1333	-0.0265	0	0	0
0.1667	-0.0246	0	0	0
0.2	-0.0255	0	0.0008	0.0008
0.2333	-0.0269	0	0	0
0.2667	-0.0249	0	0	0
0.3	-0.0252	0.0091	0.0021	0.0112
0.3333	-0.0262	0	0.0008	0.0008
0.3667	-0.0255	0.0091	0.0008	0.0099
0.4	-0.0255	0	0	0
0.4333	-0.0252	0	0.0008	0.0008
0.4667	-0.0282	0	0	0
0.5	-0.0239	0	0	0
0.5333	-0.0265	0	0.0008	0.0008
0.5667	-0.0275	0	0.0008	0.0008
0.6	-0.0262	0	0	0
0.6333	-0.0232	0	0.0008	0.0008
0.6667	-0.0239	0	0.0008	0.0008
0.7	-0.0275	0	0.0008	0.0008
0.7333	-0.0249	0	0.0008	0.0008
0.7667	-0.0246	0	0.0008	0.0008
0.8	-0.0249	0.0091	0.0008	0.0099
0.8333	-0.0269	0	0	0
0.8667	-0.0292	0	0.0008	0.0008
0.9	-0.0239	0	0	0
0.9333	-0.0288	0	0.0008	0.0008
0.9667	-0.0265	0	0.0008	0.0008
1	-0.0242	0	0.0008	0.0008
1.0333	-0.0259	0.0091	0.0021	0.0112
1.0667	-0.0239	0	0	0
1.1	-0.0239	0	0.0008	0.0008
1.1333	-0.0255	0.0091	0.0008	0.0099
1.1667	-0.0259	0.0091	0.0008	0.0099
1.2	-0.0226	0	0.0008	0.0008
1.2333	-0.0236	0.0223	0.0008	0.0231
1.2667	-0.0242	0	0.0008	0.0008
1.3	-0.0249	0	0.0008	0.0008
1.3333	-0.0246	0.0091	0.0008	0.0099
1.3667	-0.0265	0	0	0
1.4	-0.0239	0	0	0

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
1.4333	-0.0282	0	0.0021	0.0021
1.4667	-0.0265	0	0.0008	0.0008
1.5	-0.0249	0	0.0021	0.0021
1.5333	-0.0223	0	0.0008	0.0008
1.5667	-0.0252	0	0	0
1.6	-0.0246	0	0.0008	0.0008
1.6333	-0.0229	0	0.0008	0.0008
1.6667	-0.0249	0	0.0008	0.0008
1.7	-0.0239	0	0.0021	0.0021
1.7333	-0.0265	0	0.0008	0.0008
1.7667	-0.0249	0	0.0008	0.0008
1.8	-0.0252	0	0	0
1.8333	-0.0262	0.0091	0	0.0091
1.8667	-0.0275	0	0.0008	0.0008
1.9	-0.0236	0	0	0
1.9333	-0.0255	0	0	0
1.9667	-0.0252	0.0091	0.0008	0.0099
2	-0.0246	0	0.0008	0.0008
2.0333	-0.0252	0	0.0021	0.0021
2.0667	-0.0265	0.0091	0	0.0091
2.1	-0.0262	0	0.0008	0.0008
2.1333	-0.0242	0	0	0
2.1667	-0.0269	0.0091	0	0.0091
2.2	-0.0249	0	0	0
2.2333	-0.0242	0	0	0
2.2667	-0.0223	0	0.0008	0.0008
2.3	-0.0239	0.0091	0	0.0091
2.3333	-0.0229	0	0	0
2.3667	-0.0242	0	0	0
2.4	-0.0259	0	0.0008	0.0008
2.4333	-0.0252	0	0	0
2.4667	-0.0229	0	0	0
2.5	-0.0292	0.0091	0.0008	0.0099
2.5333	-0.0236	0.0091	0.0008	0.0099
2.5667	-0.0262	0.0091	0	0.0091
2.6	-0.0259	0	0.0021	0.0021
2.6333	-0.0259	0.0091	0.0008	0.0099
2.6667	-0.0232	0	0	0
2.7	-0.0232	0	0	0
2.7333	-0.0275	0.0091	0	0.0091
2.7667	-0.0269	0	0.0008	0.0008
2.8	-0.0265	0	0.0021	0.0021
2.8333	-0.0269	0.0091	0.0008	0.0099

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
2.8667	-0.0252	0.0091	0	0.0091
2.9	-0.0259	0	0	0
2.9333	-0.0236	0.0091	0	0.0091
2.9667	-0.0249	0.0091	0.0008	0.0099
3	-0.0249	0	0	0
3.0333	-0.0269	0	0.0008	0.0008
3.0667	-0.0259	0	0	0
3.1	-0.0252	0	0.0008	0.0008
3.1333	-0.0252	0	0	0
3.1667	-0.0209	0	0.0034	0.0034
3.2	-0.0232	0	0.0008	0.0008
3.2333	-0.0282	0.0091	0.0008	0.0099
3.2667	-0.0229	0	0.0021	0.0021
3.3	-0.0269	0	0	0
3.3333	-0.0246	0	0.0008	0.0008
3.3667	-0.0249	0	0.0021	0.0021
3.4	-0.0269	0.0091	0.0008	0.0099
3.4333	-0.0269	0	0.0008	0.0008
3.4667	-0.0246	0	0.0008	0.0008
3.5	-0.0246	0	0.0021	0.0021
3.5333	-0.0262	0.0091	0.0008	0.0099
3.5667	-0.0249	0	0	0
3.6	-0.0255	0	0	0
3.6333	-0.0272	0	0.0008	0.0008
3.6667	-0.0239	0	0	0
3.7	-0.0229	0	0.0034	0.0034
3.7333	-0.0246	0	0	0
3.7667	-0.0255	0.0091	0.0008	0.0099
3.8	-0.0232	0.0091	0.0008	0.0099
3.8333	-0.0239	0	0.0008	0.0008
3.8667	-0.0229	0	0	0
3.9	-0.0265	0	0	0
3.9333	-0.0249	0	0.0008	0.0008
3.9667	-0.0269	0.0091	0.0008	0.0099
4	-0.0239	0	0	0
4.0333	-0.0239	0	0	0
4.0667	-0.0282	0.0091	0	0.0091
4.1	-0.0239	0	0	0
4.1333	-0.0255	0	0.0021	0.0021
4.1667	-0.0265	0	0	0
4.2	-0.0265	0.0091	0	0.0091
4.2333	-0.0246	0	0.0008	0.0008
4.2667	-0.0249	0	0.0008	0.0008

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
4.3	-0.0223	0	0.0008	0.0008
4.3333	-0.0249	0	0.0008	0.0008
4.3667	-0.0265	0	0.0008	0.0008
4.4	-0.0249	0	0	0
4.4333	-0.0249	0	0	0
4.4667	-0.0232	0	0.0008	0.0008
4.5	-0.0242	0	0.0008	0.0008
4.5333	-0.0223	0	0.0008	0.0008
4.5667	-0.0269	0	0	0
4.6	-0.0223	0	0.0008	0.0008
4.6333	-0.0262	0	0.0008	0.0008
4.6667	-0.0246	0.0091	0.0008	0.0099
4.7	-0.0239	0	0.0021	0.0021
4.7333	-0.0259	0	0.0008	0.0008
4.7667	-0.0242	0.0223	0	0.0223
4.8	-0.0229	0.0091	0.0008	0.0099
4.8333	-0.0259	0.0091	0	0.0091
4.8667	-0.0246	0.0091	0.0008	0.0099
4.9	-0.0259	0.0091	0.0008	0.0099
4.9333	-0.0265	0	0	0
4.9667	-0.0249	0	0.0008	0.0008
5	-0.0269	0	0.0008	0.0008
5.0333	-0.0242	0.0091	0.0008	0.0099
5.0667	-0.0272	0	0.0008	0.0008
5.1	-0.0252	0.0091	0	0.0091
5.1333	-0.0242	0.0091	0	0.0091
5.1667	-0.0236	0	0.0008	0.0008
5.2	-0.0279	0	0.0008	0.0008
5.2333	-0.0269	0	0.0021	0.0021
5.2667	-0.0249	0	0.0008	0.0008
5.3	-0.0249	0	0.0008	0.0008
5.3333	-0.0249	0	0.0008	0.0008
5.3667	-0.0279	0	0.0008	0.0008
5.4	-0.0259	0.0091	0.0008	0.0099
5.4333	-0.0262	0	0.0021	0.0021
5.4667	-0.0255	0	0.0008	0.0008
5.5	-0.0272	0.0091	0.0008	0.0099
5.5333	-0.0239	0.0091	0	0.0091
5.5667	-0.0255	0	0.0008	0.0008
5.6	-0.0252	0.0091	0	0.0091
5.6333	-0.0239	0	0.0008	0.0008
5.6667	-0.0252	0	0.0008	0.0008
5.7	-0.0236	0	0	0

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
5.7333	-0.0242	0.0091	0.0008	0.0099
5.7667	-0.0259	0	0	0
5.8	-0.0223	0.0091	0.0008	0.0099
5.8333	-0.0236	0	0	0
5.8667	-0.0259	0	0.0008	0.0008
5.9	-0.0229	0	0.0021	0.0021
5.9333	-0.0282	0.0223	0.0008	0.0231
5.9667	-0.0265	0	0	0
6	-0.0252	0.0091	0.0021	0.0112
6.0333	-0.0246	0.0091	0.0008	0.0099
6.0667	-0.0246	0	0.0021	0.0021
6.1	-0.0232	0	0.0008	0.0008
6.1333	-0.0265	0	0.0008	0.0008
6.1667	-0.0242	0.0091	0	0.0091
6.2	-0.0279	0	0	0
6.2333	-0.0265	0	0	0
6.2667	-0.0269	0	0.0008	0.0008
6.3	-0.0246	0	0.0008	0.0008
6.3333	-0.0265	0	0.0021	0.0021
6.3667	-0.0232	0	0.0021	0.0021
6.4	-0.0239	0	0.0008	0.0008
6.4333	-0.0232	0	0.0021	0.0021
6.4667	-0.0252	0.0223	0	0.0223
6.5	-0.0262	0.0091	0	0.0091
6.5333	-0.0236	0	0.0008	0.0008
6.5667	-0.0262	0	0.0008	0.0008
6.6	-0.0242	0	0.0008	0.0008
6.6333	-0.0269	0	0.0008	0.0008
6.6667	-0.0249	0	0.0021	0.0021
6.7	-0.0269	0	0.0008	0.0008
6.7333	-0.0246	0	0.0008	0.0008
6.7667	-0.0246	0	0.0021	0.0021
6.8	-0.0259	0	0.0008	0.0008
6.8333	-0.0255	0	0.0008	0.0008
6.8667	-0.0269	0	0.0008	0.0008
6.9	-0.0275	0.0091	0.0008	0.0099
6.9333	-0.0255	0	0.0008	0.0008
6.9667	-0.0269	0	0	0
7	-0.0252	0	0.0008	0.0008
7.0333	-0.0275	0	0.0021	0.0021
7.0667	-0.0259	0.0091	0.0008	0.0099
7.1	-0.0229	0.0223	0	0.0223
7.1333	-0.0229	0	0	0

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
7.1667	-0.0246	0	0	0
7.2	-0.0252	0	0	0
7.2333	-0.0249	0	0.0008	0.0008
7.2667	-0.0288	0	0.0008	0.0008
7.3	-0.0255	0	0	0
7.3333	-0.0236	0	0.0008	0.0008
7.3667	-0.0239	0	0	0
7.4	-0.0282	0	0.0008	0.0008
7.4333	-0.0272	0	0.0021	0.0021
7.4667	-0.0262	0	0.0008	0.0008
7.5	-0.0239	0	0.0008	0.0008
7.5333	-0.0226	0	0.0008	0.0008
7.5667	-0.0242	0	0.0021	0.0021
7.6	-0.0213	0	0.0008	0.0008
7.6333	-0.0252	0	0.0008	0.0008
7.6667	-0.0255	0.0091	0.0008	0.0099
7.7	-0.0249	0.0091	0	0.0091
7.7333	-0.0269	0.0091	0	0.0091
7.7667	-0.0269	0	0.0008	0.0008
7.8	-0.0242	0	0.0008	0.0008
7.8333	-0.0262	0.0091	0.0034	0.0125
7.8667	-0.0246	0	0.0008	0.0008
7.9	-0.0272	0	0.0008	0.0008
7.9333	-0.0246	0.0091	0.0008	0.0099
7.9667	-0.0226	0.0091	0.0008	0.0099
8	-0.0262	0	0.0008	0.0008
8.0333	-0.0255	0	0.0021	0.0021
8.0667	-0.0229	0	0.0008	0.0008
8.1	-0.0259	0	0.0008	0.0008
8.1333	-0.0269	0	0.0008	0.0008
8.1667	-0.0242	0.0091	0.0008	0.0099
8.2	-0.0262	0	0	0
8.2333	-0.0259	0	0.0008	0.0008
8.2667	-0.0255	0	0.0008	0.0008
8.3	-0.0229	0.0091	0.0008	0.0099
8.3333	-0.0242	0.0091	0.0008	0.0099
8.3667	-0.0249	0.0223	0.0008	0.0231
8.4	-0.0242	0	0.0008	0.0008
8.4333	-0.0246	0	0	0
8.4667	-0.0232	0	0	0
8.5	-0.0242	0.0091	0.0008	0.0099
8.5333	-0.0232	0	0.0008	0.0008
8.5667	-0.0288	0	0.0008	0.0008

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
8.6	-0.0249	0.0091	0.0021	0.0112
8.6333	-0.0239	0.0091	0	0.0091
8.6667	-0.0232	0	0.0008	0.0008
8.7	-0.0246	0	0.0008	0.0008
8.7333	-0.0262	0	0	0
8.7667	-0.0255	0.0091	0.0008	0.0099
8.8	-0.0239	0.0091	0.0008	0.0099
8.8333	-0.0269	0	0.0021	0.0021
8.8667	-0.0259	0	0.0021	0.0021
8.9	-0.0239	0	0	0
8.9333	-0.0255	0.0091	0	0.0091
8.9667	-0.0252	0	0.0008	0.0008
9	-0.0229	0	0	0
9.0333	-0.0232	0	0.0008	0.0008
9.0667	-0.0255	0	0.0021	0.0021
9.1	-0.0259	0	0.0008	0.0008
9.1333	-0.0242	0.0091	0	0.0091
9.1667	-0.0246	0	0	0
9.2	-0.0262	0	0	0
9.2333	-0.0249	0	0.0008	0.0008
9.2667	-0.0246	0	0	0
9.3	-0.0279	0	0	0
9.3333	-0.0288	0	0.0021	0.0021
9.3667	-0.0255	0.0091	0	0.0091
9.4	-0.0262	0	0.0008	0.0008
9.4333	-0.0252	0	0.0008	0.0008
9.4667	-0.0265	0	0.0008	0.0008
9.5	-0.0259	0	0.0008	0.0008
9.5333	-0.0275	0	0	0
9.5667	-0.0229	0	0	0
9.6	-0.0232	0	0	0
9.6333	-0.0255	0	0	0
9.6667	-0.0252	0	0.0008	0.0008
9.7	-0.0249	0.0091	0.0008	0.0099
9.7333	-0.0226	0.0091	0	0.0091
9.7667	-0.0259	0	0.0008	0.0008
9.8	-0.0252	0	0.0008	0.0008
9.8333	-0.0255	0	0.0008	0.0008
9.8667	-0.0259	0.0091	0.0008	0.0099
9.9	-0.0236	0	0.0008	0.0008
9.9333	-0.0242	0	0	0
9.9667	-0.0259	0.0091	0	0.0091
10	-0.0275	0	0.0021	0.0021

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
10.0333	-0.0242	0	0.0008	0.0008
10.0667	-0.0275	0	0.0021	0.0021
10.1	-0.0236	0	0.0021	0.0021
10.1333	-0.0232	0	0.0008	0.0008
10.1667	-0.0252	0	0	0
10.2	-0.0223	0	0.0021	0.0021
10.2333	-0.0239	0	0	0
10.2667	-0.0232	0	0.0008	0.0008
10.3	-0.0232	0.0091	0.0008	0.0099
10.3333	-0.0252	0	0	0
10.3667	-0.0229	0	0.0008	0.0008
10.4	-0.0229	0	0.0008	0.0008
10.4333	-0.0232	0.0091	0.0008	0.0099
10.4667	-0.0269	0.0091	0.0021	0.0112
10.5	-0.0252	0.0223	0.0008	0.0231
10.5333	-0.0255	0	0.0008	0.0008
10.5667	-0.0252	0	0.0008	0.0008
10.6	-0.0239	0	0.0008	0.0008
10.6333	-0.0249	0	0.0021	0.0021
10.6667	-0.0232	0	0	0
10.7	-0.0249	0	0.0008	0.0008
10.7333	-0.0265	0	0.0008	0.0008
10.7667	-0.0259	0.0091	0.0008	0.0099
10.8	-0.0269	0.0091	0.0008	0.0099
10.8333	-0.0249	0	0.0008	0.0008
10.8667	-0.0232	0	0.0008	0.0008
10.9	-0.0249	0.0091	0.0008	0.0099
10.9333	-0.0239	0.0091	0.0021	0.0112
10.9667	-0.0272	0.0091	0.0008	0.0099
11	-0.0269	0	0	0
11.0333	-0.0259	0	0	0
11.0667	-0.0246	0.0091	0.0008	0.0099
11.1	-0.0246	0	0.0008	0.0008
11.1333	-0.0239	0	0.0021	0.0021
11.1667	-0.0249	0.0091	0.0021	0.0112
11.2	-0.0236	0	0.0021	0.0021
11.2333	-0.0239	0	0	0
11.2667	-0.0249	0	0.0008	0.0008
11.3	-0.0226	0	0.0034	0.0034
11.3333	-0.0242	0	0.0008	0.0008
11.3667	-0.0262	0	0.0008	0.0008
11.4	-0.0246	0	0.0008	0.0008
11.4333	-0.0282	0	0.0008	0.0008

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
11.4667	-0.0252	0.0091	0.0021	0.0112
11.5	-0.0246	0.0223	0	0.0223
11.5333	-0.0219	0	0.0008	0.0008
11.5667	-0.0259	0.0091	0.0008	0.0099
11.6	-0.0259	0	0	0
11.6333	-0.0265	0	0.0021	0.0021
11.6667	-0.0242	0	0.0021	0.0021
11.7	-0.0265	0	0.0008	0.0008
11.7333	-0.0229	0.0091	0.0008	0.0099
11.7667	-0.0246	0	0.0021	0.0021
11.8	-0.0246	0.0091	0	0.0091
11.8333	-0.0255	0	0.0008	0.0008
11.8667	-0.0282	0.0091	0.0008	0.0099
11.9	-0.0216	0	0	0
11.9333	-0.0249	0.0091	0.0008	0.0099
11.9667	-0.0275	0	0.0008	0.0008
12	-0.0236	0	0.0008	0.0008
12.0333	-0.0246	0.0091	0	0.0091
12.0667	-0.0239	0	0.0008	0.0008
12.1	-0.0259	0	0.0021	0.0021
12.1333	-0.0232	0	0.0021	0.0021
12.1667	-0.0255	0	0	0
12.2	-0.0262	0.0091	0	0.0091
12.2333	-0.0239	0.0091	0.0008	0.0099
12.2667	-0.0252	0	0.0021	0.0021
12.3	-0.0259	0	0	0
12.3333	-0.0252	0	0.0008	0.0008
12.3667	-0.0252	0	0.0021	0.0021
12.4	-0.0249	0.0091	0.0008	0.0099
12.4333	-0.0249	0	0.0008	0.0008
12.4667	-0.0255	0	0	0
12.5	-0.0259	0	0.0008	0.0008
12.5333	-0.0246	0.0091	0	0.0091
12.5667	-0.0226	0.0091	0.0008	0.0099
12.6	-0.0213	0.0091	0	0.0091
12.6333	-0.0262	0.0091	0.0021	0.0112
12.6667	-0.0232	0.0091	0.0008	0.0099
12.7	-0.0255	0	0.0021	0.0021
12.7333	-0.0236	0	0	0
12.7667	-0.0236	0	0.0008	0.0008
12.8	-0.0226	0	0.0034	0.0034
12.8333	-0.0229	0	0.0008	0.0008
12.8667	-0.0259	0	0	0

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
12.9	-0.0229	0	0.0008	0.0008
12.9333	-0.0239	0	0.0021	0.0021
12.9667	-0.0262	0.0091	0	0.0091
13	-0.0272	0	0.0008	0.0008
13.0333	-0.0242	0	0.0008	0.0008
13.0667	-0.0219	0	0.0008	0.0008
13.1	-0.0223	0.0091	0	0.0091
13.1333	-0.0236	0.0091	0	0.0091
13.1667	-0.0262	0	0.0008	0.0008
13.2	-0.0252	0	0.0008	0.0008
13.2333	-0.0223	0	0.0008	0.0008
13.2667	-0.0239	0	0	0
13.3	-0.0232	0.0091	0	0.0091
13.3333	-0.0236	0	0	0
13.3667	-0.0239	0	0	0
13.4	-0.0262	0	0.0008	0.0008
13.4333	-0.0246	0.0091	0.0021	0.0112
13.4667	-0.0223	0	0.0008	0.0008
13.5	-0.0232	0	0.0008	0.0008
13.5333	-0.0246	0	0.0021	0.0021
13.5667	-0.0242	0	0	0
13.6	-0.0288	0	0	0
13.6333	-0.0242	0	0.0008	0.0008
13.6667	-0.0246	0	0.0008	0.0008
13.7	-0.0252	0	0.0008	0.0008
13.7333	-0.0239	0.0091	0.0021	0.0112
13.7667	-0.0232	0.0091	0.0008	0.0099
13.8	-0.0275	0	0.0008	0.0008
13.8333	-0.0242	0	0	0
13.8667	-0.0252	0.0091	0.0008	0.0099
13.9	-0.0272	0	0.0021	0.0021
13.9333	-0.0229	0.0091	0.0021	0.0112
13.9667	-0.0246	0	0	0
14	-0.0252	0	0.0008	0.0008
14.0333	-0.0246	0.0091	0.0008	0.0099
14.0667	-0.0239	0	0.0008	0.0008
14.1	-0.0246	0	0.0008	0.0008
14.1333	-0.0249	0	0.0008	0.0008
14.1667	-0.0259	0	0.0008	0.0008
14.2	-0.0262	0	0	0
14.2333	-0.0252	0	0.0008	0.0008
14.2667	-0.0265	0	0	0
14.3	-0.0239	0	0.0008	0.0008

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
14.3333	-0.0239	0	0.0008	0.0008
14.3667	-0.0213	0	0	0
14.4	-0.0265	0	0.0021	0.0021
14.4333	-0.0255	0	0	0
14.4667	-0.0255	0	0	0
14.5	-0.0275	0.0091	0.0008	0.0099
14.5333	-0.0226	0	0.0021	0.0021
14.5667	-0.0236	0	0	0
14.6	-0.0232	0	0.0008	0.0008
14.6333	-0.0249	0	0	0
14.6667	-0.0239	0.0091	0	0.0091
14.7	-0.0232	0.0091	0	0.0091
14.7333	-0.0262	0.0091	0.0008	0.0099
14.7667	-0.0232	0	0.0008	0.0008
14.8	-0.0265	0.0091	0.0021	0.0112
14.8333	-0.0239	0.0091	0.0008	0.0099
14.8667	-0.0242	0.0091	0.0021	0.0112
14.9	-0.0262	0	0	0
14.9333	-0.0226	0	0	0
14.9667	-0.0262	0	0.0008	0.0008
15	-0.0242	0	0.0034	0.0034
15.0333	-0.0246	0	0.0021	0.0021
15.0667	-0.0272	0	0	0
15.1	-0.0272	0	0.0008	0.0008
15.1333	-0.0262	0	0.0008	0.0008
15.1667	-0.0272	0	0.0008	0.0008
15.2	-0.0252	0.0091	0.0034	0.0125
15.2333	-0.0259	0.0223	0.0008	0.0231
15.2667	-0.0255	0	0.0008	0.0008
15.3	-0.0239	0.0091	0	0.0091
15.3333	-0.0265	0	0.0021	0.0021
15.3667	-0.0252	0	0	0
15.4	-0.0236	0	0.0008	0.0008
15.4333	-0.0272	0.0091	0.0021	0.0112
15.4667	-0.0269	0	0.0021	0.0021
15.5	-0.0262	0.0091	0.0021	0.0112
15.5333	-0.0232	0.0091	0.0021	0.0112
15.5667	-0.0249	0.0091	0.0008	0.0099
15.6	-0.0236	0.0091	0	0.0091
15.6333	-0.0265	0	0.0008	0.0008
15.6667	-0.0282	0	0.0008	0.0008
15.7	-0.0255	0	0.0008	0.0008
15.7333	-0.0269	0	0	0

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
15.7667	-0.0246	0	0.0008	0.0008
15.8	-0.0275	0	0.0008	0.0008
15.8333	-0.0239	0	0.0008	0.0008
15.8667	-0.0269	0	0.0021	0.0021
15.9	-0.0249	0	0	0
15.9333	-0.0255	0	0.0021	0.0021
15.9667	-0.0262	0	0.0008	0.0008
16	-0.0262	0	0.0008	0.0008
16.0333	-0.0249	0.0091	0.0008	0.0099
16.0667	-0.0242	0.0091	0.0021	0.0112
16.1	-0.0232	0	0	0
16.1333	-0.0239	0	0.0008	0.0008
16.1667	-0.0236	0	0.0008	0.0008
16.2	-0.0265	0	0.0034	0.0034
16.2333	-0.0246	0	0.0008	0.0008
16.2667	-0.0242	0	0.0008	0.0008
16.3	-0.0288	0.0091	0.0008	0.0099
16.3333	-0.0259	0.0091	0.0021	0.0112
16.3667	-0.0226	0	0.0021	0.0021
16.4	-0.0265	0.0091	0	0.0091
16.4333	-0.0249	0	0	0
16.4667	-0.0269	0	0.0008	0.0008
16.5	-0.0252	0.0091	0.0008	0.0099
16.5333	-0.0236	0	0.0021	0.0021
16.5667	-0.0239	0.0091	0	0.0091
16.6	-0.0255	0	0	0
16.6333	-0.0262	0	0.0008	0.0008
16.6667	-0.0246	0	0	0
16.7	-0.0259	0	0.0008	0.0008
16.7333	-0.0262	0.0091	0.0021	0.0112
16.7667	-0.0249	0.0091	0.0008	0.0099
16.8	-0.0246	0	0.0008	0.0008
16.8333	-0.0259	0.0091	0	0.0091
16.8667	-0.0242	0	0	0
16.9	-0.0232	0	0.0008	0.0008
16.9333	-0.0226	0	0.0008	0.0008
16.9667	-0.0259	0.0091	0.0021	0.0112
17	-0.0259	0.0091	0.0008	0.0099
17.0333	-0.0262	0.0091	0	0.0091
17.0667	-0.0229	0	0.0021	0.0021
17.1	-0.0282	0.0091	0.0008	0.0099
17.1333	-0.0239	0.0091	0.0008	0.0099
17.1667	-0.0246	0	0.0008	0.0008

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
17.2	-0.0265	0.0091	0.0008	0.0099
17.2333	-0.0259	0.0091	0	0.0091
17.2667	-0.0269	0.0223	0.0008	0.0231
17.3	-0.0255	0.0091	0	0.0091
17.3333	-0.0249	0	0.0008	0.0008
17.3667	-0.0249	0.0091	0.0034	0.0125
17.4	-0.0259	0.0091	0.0008	0.0099
17.4333	-0.0279	0.0091	0	0.0091
17.4667	-0.0259	0.0091	0	0.0091
17.5	-0.0219	0	0.0008	0.0008
17.5333	-0.0239	0	0.0021	0.0021
17.5667	-0.0252	0	0	0
17.6	-0.0259	0.0091	0.0008	0.0099
17.6333	-0.0242	0	0.0008	0.0008
17.6667	-0.0239	0	0.0008	0.0008
17.7	-0.0255	0	0	0
17.7333	-0.0269	0	0.0008	0.0008
17.7667	-0.0249	0.0091	0.0021	0.0112
17.8	-0.0255	0	0.0008	0.0008
17.8333	-0.0229	0	0.0008	0.0008
17.8667	-0.0249	0	0.0021	0.0021
17.9	-0.0252	0.0091	0.0008	0.0099
17.9333	-0.0239	0	0.0008	0.0008
17.9667	-0.0255	0	0.0021	0.0021
18	-0.0226	0.0091	0.0021	0.0112
18.0333	-0.0229	0	0.0008	0.0008
18.0667	-0.0236	0	0.0008	0.0008
18.1	-0.0249	0	0.0008	0.0008
18.1333	-0.0223	0	0	0
18.1667	-0.0226	0	0	0
18.2	-0.0259	0	0.0021	0.0021
18.2333	-0.0249	0	0.0008	0.0008
18.2667	-0.0216	0	0.0008	0.0008
18.3	-0.0265	0	0	0
18.3333	-0.0213	0	0	0
18.3667	-0.0259	0	0.0021	0.0021
18.4	-0.0269	0	0	0
18.4333	-0.0242	0	0.0008	0.0008
18.4667	-0.0252	0	0	0
18.5	-0.0282	0.0091	0	0.0091
18.5333	-0.0249	0.0091	0.0008	0.0099
18.5667	-0.0239	0	0.0021	0.0021
18.6	-0.0269	0	0.0021	0.0021

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
18.6333	-0.0252	0	0	0
18.6667	-0.0239	0	0.0008	0.0008
18.7	-0.0282	0	0.0008	0.0008
18.7333	-0.0249	0	0	0
18.7667	-0.0239	0.0091	0.0008	0.0099
18.8	-0.0193	0	0.0021	0.0021
18.8333	-0.014	0	0.0008	0.0008
18.8667	-0.017	0.0091	0.0021	0.0112
18.9	-0.0157	0.0091	1.0107	1.0198
18.9333	-0.0153	0	1.2619	1.2619
18.9667	-0.016	0	1.5051	1.5051
19	-0.014	0	1.7339	1.7339
19.0333	-0.016	0	1.947	1.947
19.0667	-0.0144	0.0091	2.1639	2.173
19.1	-0.013	0	2.3625	2.3625
19.1333	-0.015	0	2.565	2.565
19.1667	-0.0134	0.0091	2.753	2.7622
19.2	-0.0163	0	2.9385	2.9385
19.2333	-0.0157	0.0091	3.112	3.1211
19.2667	-0.0137	0	3.2882	3.2882
19.3	-0.0147	0	3.4592	3.4592
19.3333	-0.014	0	3.6236	3.6236
19.3667	-0.0114	0	3.8129	3.8129
19.4	-0.0107	0	4.0181	4.0181
19.4333	-0.013	0	4.2153	4.2153
19.4667	-0.0094	0	4.4283	4.4283
19.5	-0.0074	0	4.6335	4.6335
19.5333	-0.0071	0.0091	4.8412	4.8503
19.5667	-0.0091	0.0091	5.0503	5.0594
19.6	-0.0127	0	5.2515	5.2515
19.6333	-0.0101	0.0091	5.4566	5.4657
19.6667	-0.0078	0	5.6355	5.6355
19.7	-0.0094	0	5.8275	5.8275
19.7333	-0.0097	0	6.0168	6.0168
19.7667	-0.0091	0.0091	6.239	6.2481
19.8	-0.0081	0	6.4731	6.4731
19.8333	-0.0065	0.0223	6.7256	6.7478
19.8667	-0.0055	0.0091	6.9596	6.9687
19.9	-0.0055	0	7.1977	7.1977
19.9333	-0.0051	0	7.433	7.433
19.9667	-0.0015	0	7.6776	7.6776
20	-0.0071	0.0091	7.9446	7.9537
20.0333	-0.0009	0.0091	8.2194	8.2285

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
20.0667	0.0021	0	8.5034	8.5034
20.1	-0.0009	0	8.7743	8.7743
20.1333	-0.0012	0	9.0728	9.0728
20.1667	-0.0012	0	9.3713	9.3713
20.2	0.0005	0	9.6724	9.6724
20.2333	0.0028	0	9.9683	9.9683
20.2667	0.0011	0.0091	10.2418	10.2509
20.3	0.0014	0	10.5285	10.5285
20.3333	0.0031	0.0091	10.8336	10.8427
20.3667	0.0041	0	11.1255	11.1255
20.4	0.0024	0	11.4135	11.4135
20.4333	0.0034	0	11.7028	11.7028
20.4667	0.0054	0	11.9828	11.9828
20.5	0.0054	0.0091	12.2629	12.272
20.5333	0.008	0	12.5272	12.5272
20.5667	0.0051	0.0091	12.8021	12.8112
20.6	0.007	0	13.0756	13.0756
20.6333	0.0067	0	13.3281	13.3281
20.6667	0.0037	0.0223	13.5911	13.6133
20.7	0.0064	0	13.8462	13.8462
20.7333	0.007	0.0091	14.0697	14.0788
20.7667	0.0037	0.0091	14.3301	14.3392
20.8	0.0044	0	14.5668	14.5668
20.8333	0.0093	0	14.8087	14.8087
20.8667	0.0097	0.0091	15.0559	15.065
20.9	0.0087	0	15.2966	15.2966
20.9333	0.0087	0	15.5372	15.5372
20.9667	0.0103	0	15.7687	15.7687
21	0.009	0.0091	15.9935	16.0026
21.0333	0.0087	0	16.2157	16.2157
21.0667	0.0126	0	16.459	16.459
21.1	0.0093	0	16.6826	16.6826
21.1333	0.008	0	16.9101	16.9101
21.1667	0.0077	0	17.1218	17.1218
21.2	0.0107	0	17.3414	17.3414
21.2333	0.012	0	17.5478	17.5478
21.2667	0.0087	0.0091	17.774	17.7831
21.3	0.0139	0	17.9699	17.9699
21.3333	0.011	0	18.1724	18.1724
21.3667	0.0084	0	18.3841	18.3841
21.4	0.0087	0	18.588	18.588
21.4333	0.011	0	18.7931	18.7931
21.4667	0.0084	0	18.9456	18.9456

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
21.5	0.0097	0	19.1376	19.1376
21.5333	0.0116	0	19.3217	19.3217
21.5667	0.0116	0	19.5058	19.5058
21.6	0.0103	0	19.6728	19.6728
21.6333	0.0087	0	19.853	19.853
21.6667	0.0113	0	20.0226	20.0226
21.7	0.012	0	20.1725	20.1725
21.7333	0.0103	0	20.3421	20.3421
21.7667	0.0087	0	20.5157	20.5157
21.8	0.0113	0	20.6656	20.6656
21.8333	0.0107	0	20.809	20.809
21.8667	0.0103	0	20.9654	20.9654
21.9	0.012	0	21.1075	21.1075
21.9333	0.009	0.0091	21.2784	21.2875
21.9667	0.0107	0	21.3994	21.3994
22	0.01	0	21.5638	21.5638
22.0333	0.008	0	21.69	21.69
22.0667	0.009	0.0091	21.8373	21.8464
22.1	0.0113	0	21.974	21.974
22.1333	0.01	0	22.0963	22.0963
22.1667	0.0235	50.1359	16.8351	66.971
22.2	0.0271	49.3732	17.0376	66.4108
22.2333	0.0248	52.7264	0.0008	52.7272
22.2667	0.0232	52.7001	0.0021	52.7022
22.3	0.0271	47.861	19.1021	66.9631
22.3333	0.0271	47.9004	18.6984	66.5988
22.3667	0.0268	47.7295	18.2093	65.9387
22.4	0.0265	47.7426	17.9791	65.7217
22.4333	0.0182	0	23.1878	23.1878
22.4667	0.0113	0	22.9682	22.9682
22.5	0.0097	0.0091	22.788	22.7971
22.5333	0.0087	0.0091	22.6986	22.7077
22.5667	0.0103	0	22.6841	22.6841
22.6	0.0093	0	22.7591	22.7591
22.6333	0.0113	0	22.8077	22.8077
22.6667	0.0097	0	22.9537	22.9537
22.7	0.0093	0.0091	23.0484	23.0575
22.7333	0.0113	0	23.1628	23.1628
22.7667	0.008	0	23.2667	23.2667
22.8	0.009	0	23.3876	23.3876
22.8333	0.0084	0	23.4941	23.4941
22.8667	0.0087	0	23.6348	23.6348
22.9	0.009	0	23.7466	23.7466

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
22.9333	0.008	0	23.8544	23.8544
22.9667	0.0093	0	23.9531	23.9531
23	0.0067	0	24.0609	24.0609
23.0333	0.0097	0.0091	24.199	24.2081
23.0667	0.0113	0	24.2805	24.2805
23.1	0.0113	0.0091	24.387	24.3961
23.1333	0.0064	0	24.4817	24.4817
23.1667	0.0107	0	24.5737	24.5737
23.2	0.0116	0	24.6816	24.6816
23.2333	0.01	0	24.7789	24.7789
23.2667	0.0097	0	24.8486	24.8486
23.3	0.01	0	24.9656	24.9656
23.3333	0.0077	0	25.0471	25.0471
23.3667	0.009	0.0091	25.1458	25.1549
23.4	0.0067	0.0091	25.2233	25.2324
23.4333	0.0057	0.0091	25.297	25.3061
23.4667	0.0054	0	25.3601	25.3601
23.5	0.0077	0	25.4587	25.4587
23.5333	0.0087	0	25.5376	25.5376
23.5667	0.006	0	25.6099	25.6099
23.6	0.0064	0	25.6744	25.6744
23.6333	0.007	0	25.7638	25.7638
23.6667	0.0074	0	25.8466	25.8466
23.7	0.0107	0.0091	25.9098	25.9189
23.7333	0.0051	0	25.9847	25.9847
23.7667	0.008	0	26.0373	26.0373
23.8	0.0107	0	26.1294	26.1294
23.8333	0.0064	0	26.2056	26.2056
23.8667	0.0074	0	26.2714	26.2714
23.9	0.009	0	26.3542	26.3542
23.9333	0.009	0.0091	26.395	26.4041
23.9667	0.0084	0	26.4568	26.4568
24	0.0084	0.0091	26.5107	26.5198
24.0333	0.0087	0	26.5646	26.5646
24.0667	0.0064	0.0091	26.6462	26.6553
24.1	0.008	0	26.6895	26.6895
24.1333	0.0077	0	26.7684	26.7684
24.1667	0.0041	0	26.821	26.821
24.2	0.006	0	26.8671	26.8671
24.2333	0.01	0	26.9249	26.9249
24.2667	0.007	0	26.9802	26.9802
24.3	0.008	0	27.0683	27.0683
24.3333	0.0051	0	27.0946	27.0946

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
24.3667	0.0064	0.0091	27.1669	27.176
24.4	0.007	0	27.1932	27.1932
24.4333	0.0057	0	27.2747	27.2747
24.4667	0.0084	0	27.3036	27.3036
24.5	0.0054	0	27.3668	27.3668
24.5333	0.0067	0	27.4036	27.4036
24.5667	0.008	0	27.4536	27.4536
24.6	0.0077	0.0091	27.5351	27.5442
24.6333	0.0054	0.0091	27.5627	27.5718
24.6667	0.0074	0	27.5956	27.5956
24.7	0.0041	0	27.6613	27.6613
24.7333	0.0064	0	27.7192	27.7192
24.7667	0.0024	0	27.7455	27.7455
24.8	0.0054	0	27.7915	27.7915
24.8333	0.0064	0	27.8599	27.8599
24.8667	0.0021	0	27.8743	27.8743
24.9	0.007	0	27.9191	27.9191
24.9333	0.0044	0	27.9717	27.9717
24.9667	0.0047	0	28.0111	28.0111
25	0.0077	0	28.0545	28.0545
25.0333	0.0034	0	28.0939	28.0939
25.0667	0.009	0	28.1413	28.1413
25.1	0.0047	0	28.1702	28.1702
25.1333	0.0037	0	28.1965	28.1965
25.1667	0.0034	0	28.2596	28.2596
25.2	0.0034	0	28.2754	28.2754
25.2333	0.0077	0	28.3517	28.3517
25.2667	0.0077	0	28.3714	28.3714
25.3	0.0077	0	28.3938	28.3938
25.3333	0.0044	0	28.4687	28.4687
25.3667	0.0067	0	28.4661	28.4661
25.4	0.0047	0	28.4766	28.4766
25.4333	0.0021	0	28.5121	28.5121
25.4667	0.0057	0	28.5713	28.5713
25.5	0.0054	0	28.6121	28.6121
25.5333	0.0067	0	28.6673	28.6673
25.5667	0.0064	0	28.6923	28.6923
25.6	0.0051	0	28.7041	28.7041
25.6333	0.0093	0	28.7409	28.7409
25.6667	0.0028	0	28.7843	28.7843
25.7	0.0024	0	28.8027	28.8027
25.7333	0.0034	0	28.8422	28.8422
25.7667	0.0054	0	28.8593	28.8593

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
25.8	0.0028	0	28.8803	28.8803
25.8333	0.0064	0	28.9211	28.9211
25.8667	0.0031	0	28.9645	28.9645
25.9	0.0067	0	28.9802	28.9802
25.9333	0.0018	0	29.0289	29.0289
25.9667	0.0037	0.0091	29.0328	29.0419
26	0.0047	0	29.0815	29.0815
26.0333	0.0031	0.0091	29.0999	29.109
26.0667	0.0057	0.0223	29.0933	29.1156
26.1	0.0011	0	29.1578	29.1578
26.1333	0.0054	0	29.1604	29.1604
26.1667	0.0057	0	29.1683	29.1683
26.2	0.0031	0.0091	29.1867	29.1958
26.2333	0.0047	0.0091	29.2051	29.2142
26.2667	0.0047	0	29.2524	29.2524
26.3	0.0014	0	29.288	29.288
26.3333	0.0064	0	29.3274	29.3274
26.3667	0.0034	0	29.3498	29.3498
26.4	0.0044	0	29.3682	29.3682
26.4333	0.0047	0	29.4379	29.4379
26.4667	0.0034	0	29.4642	29.4642
26.5	0.008	0	29.4615	29.4615
26.5333	0.0057	0	29.526	29.526
26.5667	0.006	0	29.5536	29.5536
26.6	0.006	0	29.5917	29.5917
26.6333	0.007	0	29.6548	29.6548
26.6667	0.007	0.0223	29.6654	29.6876
26.7	0.009	0	29.7245	29.7245
26.7333	0.0057	0	29.7495	29.7495
26.7667	0.0064	0	29.7969	29.7969
26.8	0.0087	0.0091	29.8429	29.852
26.8333	0.0064	0	29.8902	29.8902
26.8667	0.0054	0	29.8981	29.8981
26.9	0.0064	0	29.9454	29.9454
26.9333	0.0057	0	29.9836	29.9836
26.9667	0.0057	0	30.0296	30.0296
27	0.0064	0	30.0243	30.0243
27.0333	0.0074	0	30.094	30.094
27.0667	0.0077	0	30.1085	30.1085
27.1	0.0084	0	30.1401	30.1401
27.1333	0.0093	0	30.1874	30.1874
27.1667	0.0054	0	30.1743	30.1743
27.2	0.0074	0.0091	30.2426	30.2517

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
27.2333	0.0087	0	30.2584	30.2584
27.2667	0.0103	0	30.2992	30.2992
27.3	0.009	0.0091	30.3215	30.3306
27.3333	0.0037	0	30.3689	30.3689
27.3667	0.0087	0	30.4123	30.4123
27.4	0.0077	0	30.4228	30.4228
27.4333	0.0077	0	30.4635	30.4635
27.4667	0.0074	0.0091	30.4846	30.4937
27.5	0.0037	0	30.5109	30.5109
27.5333	0.0077	0	30.5424	30.5424
27.5667	0.008	0	30.5595	30.5595
27.6	0.009	0	30.6227	30.6227
27.6333	0.0074	0	30.6292	30.6292
27.6667	0.0054	0	30.6476	30.6476
27.7	0.008	0	30.6858	30.6858
27.7333	0.0051	0.0091	30.7055	30.7146
27.7667	0.0047	0	30.7423	30.7423
27.8	0.0064	0	30.7542	30.7542
27.8333	0.009	0	30.791	30.791
27.8667	0.0067	0	30.8094	30.8094
27.9	0.007	0.0091	30.8107	30.8198
27.9333	0.0051	0.0091	30.8791	30.8882
27.9667	0.0051	0	30.8646	30.8646
28	0.0057	0	30.8975	30.8975
28.0333	0.006	0	30.8922	30.8922
28.0667	0.0097	0	30.9646	30.9646
28.1	0.0021	0	30.9646	30.9646
28.1333	0.008	0	30.9909	30.9909
28.1667	0.0067	0	31.0172	31.0172
28.2	0.0084	0	31.0198	31.0198
28.2333	0.008	0	31.0303	31.0303
28.2667	0.0028	0.0091	31.0961	31.1052
28.3	0.0064	0	31.0803	31.0803
28.3333	0.0054	0.0091	31.1	31.1091
28.3667	0.0054	0	31.1447	31.1447
28.4	0.008	0	31.1368	31.1368
28.4333	0.0037	0	31.1855	31.1855
28.4667	0.006	0	31.1815	31.1815
28.5	0.0077	0	31.2065	31.2065
28.5333	0.0064	0.0091	31.2552	31.2643
28.5667	0.0074	0	31.2539	31.2539
28.6	0.0057	0	31.3038	31.3038
28.6333	0.0057	0	31.3157	31.3157

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
28.6667	0.0084	0	31.3314	31.3314
28.7	0.0051	0.0091	31.3367	31.3458
28.7333	0.0087	0	31.3472	31.3472
28.7667	0.0037	0	31.3683	31.3683
28.8	0.0074	0	31.3814	31.3814
28.8333	0.006	0	31.3919	31.3919
28.8667	0.0067	0	31.4117	31.4117
28.9	0.0054	0	31.4314	31.4314
28.9333	0.0034	0	31.4695	31.4695
28.9667	0.0149	46.112	27.6219	73.7339
29	0.0278	74.0421	24.6198	98.6618
29.0333	0.0314	72.8191	25.2996	98.1188
29.0667	0.0271	71.7014	25.6415	97.3429
29.1	0.0294	70.8467	25.8085	96.6552
29.1333	0.0274	70.1892	25.8295	96.0188
29.1667	0.0284	69.7421	25.8111	95.5532
29.2	0.0278	69.2424	25.6994	94.9418
29.2333	0.0232	68.769	25.5915	94.3606
29.2667	0.0169	68.3482	25.4416	93.7899
29.3	0.0093	67.9669	25.2799	93.2468
29.3333	-0.0012	67.3226	25.0182	92.3408
29.3667	-0.0055	66.4021	24.6395	91.0416
29.4	-0.0061	65.4947	24.2792	89.7739
29.4333	-0.0097	64.6269	23.9136	88.5405
29.4667	-0.0144	63.6801	23.5467	87.2268
29.5	-0.0137	62.7859	23.1667	85.9526
29.5333	-0.0147	61.7734	22.813	84.5864
29.5667	-0.0186	60.8134	22.4277	83.2411
29.6	-0.0163	59.8667	22.0253	81.892
29.6333	-0.014	58.9462	21.6755	80.6217
29.6667	-0.0147	57.9994	21.2824	79.2818
29.7	-0.0104	57.2893	20.9668	78.2561
29.7333	-0.0104	56.382	20.6683	77.0502
29.7667	0.0139	55.9612	20.567	76.5282
29.8	0.0139	55.7113	20.4605	76.1718
29.8333	0.0182	55.3958	20.375	75.7708
29.8667	0.0149	55.2643	20.3369	75.6011
29.9	0.0051	54.8698	20.208	75.0778
29.9333	0.0021	54.449	20.0121	74.4611
29.9667	0.0005	53.8967	19.7465	73.6431
30	0.0024	53.3444	19.5584	72.9028
30.0333	0.0011	52.8184	19.2888	72.1073
30.0667	0.0005	57.1973	0.0008	57.1981

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
30.1	0.0021	56.9474	0.0008	56.9482
30.1333	-0.0018	56.3688	0	56.3688
30.1667	0.0008	56.0138	0.0008	56.0146
30.2	0.0001	55.7639	0	55.7639
30.2333	-0.0009	55.3958	0.0008	55.3966
30.2667	0.0074	55.1854	0.0008	55.1862
30.3	0.0077	55.0144	0	55.0144
30.3333	0.0031	54.7251	0	54.7251
30.3667	0.006	54.6462	0	54.6462
30.4	0.0041	54.449	0.0008	54.4498
30.4333	0.0093	54.2649	0.0008	54.2657
30.4667	0.0024	54.1728	0.0008	54.1736
30.5	0.006	53.923	0.0021	53.9251
30.5333	0.0041	53.6994	0.0008	53.7003
30.5667	0.0024	53.5416	0.0021	53.5438
30.6	0.006	53.3312	0	53.3312
30.6333	0.0054	53.1735	0.0008	53.1743
30.6667	0.0064	53.2129	0	53.2129
30.7	0.0077	52.9236	0.0008	52.9244
30.7333	0.0047	52.6475	0.0008	52.6483
30.7667	0.0041	52.4897	0	52.4897
30.8	0.0077	52.345	0	52.345
30.8333	0.0067	52.1346	0.0008	52.1354
30.8667	0.0064	51.8716	0.0008	51.8724
30.9	0.008	51.8585	0.0008	51.8593
30.9333	0.0064	51.6481	0	51.6481
30.9667	0.007	51.4245	0.0021	51.4267
31	0.0074	51.2799	0.0008	51.2807
31.0333	0.0064	51.1089	0	51.1089
31.0667	0.0051	50.8722	0	50.8722
31.1	0.006	50.7671	0.0008	50.7679
31.1333	0.0054	50.5172	0	50.5172
31.1667	0.0057	50.4252	0.0008	50.426
31.2	0.0057	50.3068	0.0021	50.3089
31.2333	0.0084	50.0833	0.0008	50.0841
31.2667	0.009	49.886	0.0008	49.8868
31.3	0.0057	49.8071	0	49.8071
31.3333	0.0084	49.7151	0.0008	49.7159
31.3667	0.0077	49.5178	0.0008	49.5186
31.4	0.0077	49.268	0.0008	49.2688
31.4333	0.007	49.1628	0.0008	49.1636
31.4667	0.0074	49.1102	0	49.1102
31.5	0.0074	49.0181	0.0008	49.0189

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
31.5333	0.0067	48.7814	0	48.7814
31.5667	0.007	48.6499	0.0008	48.6508
31.6	0.009	48.5316	0.0008	48.5324
31.6333	0.0064	48.3344	0	48.3344
31.6667	0.0067	48.2423	0.0008	48.2431
31.7	0.0047	48.0845	0	48.0845
31.7333	0.008	47.9399	0	47.9399
31.7667	0.007	47.7952	0	47.7952
31.8	0.0074	47.7295	0.0021	47.7316
31.8333	0.0074	47.5717	0.0008	47.5725
31.8667	0.01	47.4796	0.0008	47.4804
31.9	0.008	47.2429	0.0021	47.245
31.9333	0.0064	47.1509	0.0008	47.1517
31.9667	0.0084	47.0851	0	47.0851
32	0.01	46.9799	0	46.9799
32.0333	0.008	46.8747	0	46.8747
32.0667	0.007	46.7301	0.0008	46.7309
32.1	0.0084	46.6643	0.0008	46.6651
32.1333	0.006	46.4802	0.0008	46.481
32.1667	0.0103	46.3619	0.0021	46.364
32.2	0.009	46.2961	0.0008	46.297
32.2333	0.0051	46.1909	0.0008	46.1918
32.2667	0.0087	46.1515	0.0008	46.1523
32.3	0.0057	46.0726	0.0008	46.0734
32.3333	0.01	46.02	0.0008	46.0208
32.3667	0.0064	45.7965	0.0021	45.7986
32.4	0.0074	45.757	0.0021	45.7591
32.4333	0.008	45.5072	0	45.5072
32.4667	0.0077	45.4151	0.0008	45.4159
32.5	0.009	45.3231	0.0008	45.3239
32.5333	0.007	45.3494	0	45.3494
32.5667	0.009	45.2442	0.0021	45.2463
32.6	0.0084	45.139	0	45.139
32.6333	0.0107	45.139	0	45.139
32.6667	0.0087	44.9286	0	44.9286
32.7	0.0064	44.8497	0.0021	44.8518
32.7333	0.0084	44.7708	0	44.7708
32.7667	0.0093	44.6919	0	44.6919
32.8	0.0087	44.5735	0.0008	44.5743
32.8333	0.0067	44.4815	0.0021	44.4836
32.8667	0.0077	44.4026	0.0008	44.4034
32.9	0.01	44.3105	0	44.3105
32.9333	0.0087	44.2448	0	44.2448

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
32.9667	0.0054	44.1922	0.0021	44.1943
33	0.011	44.0475	0.0008	44.0483
33.0333	0.007	43.9686	0	43.9686
33.0667	0.0064	44.0081	0.0021	44.0102
33.1	0.0084	43.916	0.0008	43.9169
33.1333	0.006	43.824	0.0008	43.8248
33.1667	0.0077	43.7319	0.0021	43.7341
33.2	0.009	43.6925	0.0008	43.6933
33.2333	0.0074	43.6004	0.0008	43.6013
33.2667	0.0064	43.561	0.0008	43.5618
33.3	0.0067	43.4953	0.0008	43.4961
33.3333	0.006	43.3638	0	43.3638
33.3667	0.0093	43.298	0.0021	43.3001
33.4	0.0051	43.1797	0.0008	43.1805
33.4333	0.009	43.1797	0.0008	43.1805
33.4667	0.0034	43.1139	0.0008	43.1147
33.5	0.0087	43.0876	0.0021	43.0897
33.5333	0.01	43.035	0.0008	43.0358
33.5667	0.0087	42.9561	0.0034	42.9596
33.6	0.0057	42.8641	0.0021	42.8662
33.6333	0.0067	42.8509	0.0008	42.8517
33.6667	0.0077	42.7589	0.0008	42.7597
33.7	0.0064	42.7457	0	42.7457
33.7333	0.0093	42.68	0.0008	42.6808
33.7667	0.0116	42.6142	0.0008	42.615
33.8	0.008	42.5222	0.0008	42.523
33.8333	0.0087	42.4696	0	42.4696
33.8667	0.01	42.3644	0	42.3644
33.9	0.0074	42.3512	0	42.3512
33.9333	0.007	42.2986	0.0008	42.2994
33.9667	0.0087	42.2723	0.0008	42.2731
34	0.007	42.1803	0.0021	42.1824
34.0333	0.0074	42.1408	0.0021	42.143
34.0667	0.0107	42.1408	0.0008	42.1416
34.1	0.0074	42.0882	0.0008	42.089
34.1333	0.01	41.9962	0.0034	41.9996
34.1667	0.0087	41.9567	0.0008	41.9575
34.2	0.0093	41.9962	0	41.9962
34.2333	0.0097	41.8384	0.0021	41.8405
34.2667	0.0087	41.72	0	41.72
34.3	0.01	41.8515	0.0008	41.8523
34.3333	0.006	41.6937	0	41.6937
34.3667	0.0087	41.7595	0.0008	41.7603

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
34.4	0.0087	41.6674	0.0008	41.6682
34.4333	0.008	41.6017	0	41.6017
34.4667	0.0057	41.5491	0.0008	41.5499
34.5	0.0074	41.6411	0.0008	41.6419
34.5333	0.0074	41.6674	0.0021	41.6696
34.5667	0.0051	41.5359	0.0008	41.5368
34.6	0.0051	41.4833	0	41.4833
34.6333	0.0064	41.457	0	41.457
34.6667	0.0123	41.4307	0	41.4307
34.7	0.01	41.4307	0.0008	41.4316
34.7333	0.0074	41.457	0.0021	41.4592
34.7667	0.0097	41.3255	0	41.3255
34.8	0.0093	41.3255	0.0021	41.3277
34.8333	0.01	41.1546	0.0008	41.1554
34.8667	0.0087	41.1546	0.0021	41.1567
34.9	0.0064	41.0231	0	41.0231
34.9333	0.0093	41.0889	0.0034	41.0923
34.9667	0.0087	40.9837	0.0008	40.9845
35	0.0067	41.01	0	41.01
35.0333	0.0074	40.9705	0.0008	40.9713
35.0667	0.0057	40.9574	0.0008	40.9582
35.1	0.008	40.9311	0	40.9311
35.1333	0.008	40.9179	0.0008	40.9187
35.1667	0.0074	40.8259	0.0008	40.8267
35.2	0.0054	40.8127	0.0008	40.8135
35.2333	0.0074	40.8259	0.0008	40.8267
35.2667	0.01	40.7996	0	40.7996
35.3	0.0044	40.747	0	40.747
35.3333	0.0097	40.7338	0.0021	40.7359
35.3667	0.0087	40.6418	0.0008	40.6426
35.4	0.008	40.6812	0	40.6812
35.4333	0.0097	40.6549	0.0021	40.657
35.4667	0.0077	40.6549	0.0008	40.6557
35.5	0.0084	40.6155	0.0008	40.6163
35.5333	0.008	40.576	0	40.576
35.5667	0.0087	40.5366	0	40.5366
35.6	0.006	40.4971	0.0008	40.4979
35.6333	0.008	40.484	0.0008	40.4848
35.6667	0.0087	40.484	0.0021	40.4861
35.7	0.0064	40.3919	0	40.3919
35.7333	0.0051	40.3393	0.0008	40.3401
35.7667	0.0103	40.3919	0.0008	40.3927
35.8	0.007	40.2867	0.0034	40.2902

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
35.8333	0.0087	40.2736	0.0008	40.2744
35.8667	0.0077	40.3262	0.0021	40.3283
35.9	0.007	40.3525	0.0008	40.3533
35.9333	0.0103	40.2604	0.0021	40.2625
35.9667	0.008	40.2473	0.0008	40.2481
36	0.0077	40.1947	0	40.1947
36.0333	0.006	40.2736	0	40.2736
36.0667	0.0097	40.2341	0.0008	40.2349
36.1	0.0077	40.1947	0.0008	40.1955
36.1333	0.0044	40.2736	0.0008	40.2744
36.1667	0.0087	40.221	0.0008	40.2218
36.2	0.0097	40.1421	0	40.1421
36.2333	0.0057	40.1815	0	40.1815
36.2667	0.008	40.1026	0.0021	40.1047
36.3	0.0107	40.1421	0.0008	40.1429
36.3333	0.0087	40.0632	0.0021	40.0653
36.3667	0.0087	40.1158	0.0008	40.1166
36.4	0.006	40.05	0.0021	40.0521
36.4333	0.0064	40.0369	0.0008	40.0377
36.4667	0.0084	40.0369	0.0021	40.039
36.5	0.0067	39.9843	0.0008	39.9851
36.5333	0.0034	39.8791	0.0021	39.8812
36.5667	0.0087	39.9054	0	39.9054
36.6	0.009	39.958	0.0008	39.9588
36.6333	0.0044	39.8659	0.0021	39.8681
36.6667	0.0087	39.8396	0	39.8396
36.7	0.0103	39.8659	0.0008	39.8667
36.7333	0.009	39.8396	0.0008	39.8404
36.7667	0.0077	39.8002	0	39.8002
36.8	0.0047	39.8265	0.0008	39.8273
36.8333	0.008	39.7739	0.0008	39.7747
36.8667	0.01	39.8528	0	39.8528
36.9	0.0057	39.7607	0	39.7607
36.9333	0.0074	39.787	0	39.787
36.9667	0.0103	39.7081	0	39.7081
37	0.0067	39.695	0	39.695
37.0333	0.0064	39.7344	0.0008	39.7352
37.0667	0.006	39.6687	0.0021	39.6708
37.1	0.01	39.7344	0.0008	39.7352
37.1333	0.0054	39.6687	0.0008	39.6695
37.1667	0.0093	39.7213	0.0021	39.7234
37.2	0.0067	39.6818	0	39.6818
37.2333	0.006	39.6555	0	39.6555

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
37.2667	0.0093	39.695	0.0021	39.6971
37.3	0.0074	39.6818	0.0021	39.684
37.3333	0.0077	39.6687	0	39.6687
37.3667	0.009	39.6818	0.0008	39.6826
37.4	0.0067	39.6292	0.0021	39.6314
37.4333	0.0064	39.6818	0.0034	39.6853
37.4667	0.0067	39.5898	0.0021	39.5919
37.5	0.0074	39.6161	0	39.6161
37.5333	0.01	39.5372	0	39.5372
37.5667	0.0064	39.5635	0.0008	39.5643
37.6	0.008	39.6161	0	39.6161
37.6333	0.0077	39.6161	0.0008	39.6169
37.6667	0.0103	39.6818	0.0021	39.684
37.7	0.0087	39.5372	0.0008	39.538
37.7333	0.007	39.5635	0.0008	39.5643
37.7667	0.007	39.524	0.0008	39.5248
37.8	0.0067	39.6687	0.0008	39.6695
37.8333	0.009	39.524	0	39.524
37.8667	0.0064	39.5372	0.0021	39.5393
37.9	0.007	39.5503	0.0008	39.5511
37.9333	0.007	39.4846	0.0008	39.4854
37.9667	0.0093	39.4188	0	39.4188
38	0.0084	39.3662	0.0008	39.367
38.0333	0.0097	39.4188	0.0021	39.421
38.0667	0.01	39.432	0.0021	39.4341
38.1	0.008	39.3925	0.0021	39.3947
38.1333	0.0057	39.3925	0	39.3925
38.1667	0.0103	39.4714	0	39.4714
38.2	0.0103	39.3794	0.0021	39.3815
38.2333	0.0097	39.3268	0	39.3268
38.2667	0.0087	39.4188	0.0008	39.4196
38.3	0.012	39.432	0	39.432
38.3333	0.0107	39.5898	0	39.5898
38.3667	0.0097	39.6029	0.0008	39.6037
38.4	0.0133	39.7213	0.0008	39.7221
38.4333	0.0146	39.7344	0.0021	39.7366
38.4667	0.0143	39.9711	0	39.9711
38.5	0.0146	39.9974	0.0034	40.0009
38.5333	0.0133	40.0763	0.0021	40.0784
38.5667	0.012	40.221	0	40.221
38.6	0.0139	40.2867	0	40.2867
38.6333	0.0133	40.4708	0.0008	40.4716
38.6667	0.0139	40.5366	0.0034	40.54

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
38.7	0.0149	40.6286	0.0008	40.6294
38.7333	0.012	40.8259	0	40.8259
38.7667	0.0146	40.9705	0.0021	40.9726
38.8	0.0136	41.0757	0.0008	41.0765
38.8333	0.0153	41.1546	0	41.1546
38.8667	0.0146	41.3124	0.0021	41.3145
38.9	0.0163	41.4044	0.0008	41.4053
38.9333	0.0143	41.5096	0.0021	41.5118
38.9667	0.0153	41.5754	0.0008	41.5762
39	0.0146	41.7069	0	41.7069
39.0333	0.013	41.8252	0.0034	41.8287
39.0667	0.0136	41.9436	0.0008	41.9444
39.1	0.0153	42.0882	0.0008	42.089
39.1333	0.0139	42.246	0.0034	42.2495
39.1667	0.013	42.2986	0.0021	42.3008
39.2	0.012	42.3775	0	42.3775
39.2333	0.0166	42.3907	0	42.3907
39.2667	0.0176	42.4564	0	42.4564
39.3	0.0166	42.6405	0	42.6405
39.3333	0.0169	42.6274	0.0008	42.6282
39.3667	0.0126	42.7457	0.0008	42.7465
39.4	0.0143	42.7457	0	42.7457
39.4333	0.0139	42.9167	0	42.9167
39.4667	0.0133	42.9035	0	42.9035
39.5	0.0163	43.0745	0.0008	43.0753
39.5333	0.0153	43.2717	0.0008	43.2725
39.5667	0.0166	43.1665	0	43.1665
39.6	0.0156	43.3769	0.0008	43.3777
39.6333	0.0136	43.3638	0.0021	43.3659
39.6667	0.0166	43.5084	0.0008	43.5092
39.7	0.0153	43.5084	0	43.5084
39.7333	0.0139	43.5873	0.0008	43.5881
39.7667	0.0126	43.653	0.0008	43.6539
39.8	0.0169	43.7451	0	43.7451
39.8333	0.0163	43.7582	0	43.7582
39.8667	0.0163	43.8503	0.0008	43.8511
39.9	0.0133	43.8634	0.0021	43.8656
39.9333	0.0126	43.9555	0.0008	43.9563
39.9667	0.0159	43.9029	0.0008	43.9037
40	0.0153	44.0344	0	44.0344
40.0333	0.0126	44.179	0.0008	44.1798
40.0667	0.0156	44.1396	0.0021	44.1417
40.1	0.0156	44.1922	0.0008	44.193

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
40.1333	0.0163	44.2579	0.0008	44.2587
40.1667	0.0176	44.2579	0	44.2579
40.2	0.0159	44.2842	0.0021	44.2864
40.2333	0.0126	44.4026	0.0021	44.4047
40.2667	0.0156	44.4683	0.0021	44.4705
40.3	0.0153	44.4946	0	44.4946
40.3333	0.0139	44.5209	0.0008	44.5217
40.3667	0.0123	44.5867	0.0008	44.5875
40.4	0.0136	44.5341	0.0008	44.5349
40.4333	0.0172	44.7708	0	44.7708
40.4667	0.0169	44.6524	0.0008	44.6532
40.5	0.0133	44.8234	0.0008	44.8242
40.5333	0.0133	44.876	0.0008	44.8768
40.5667	0.0179	44.8234	0	44.8234
40.6	0.0126	44.7971	0.0008	44.7979
40.6333	0.0143	44.9417	0.0008	44.9425
40.6667	0.0156	45.0206	0	45.0206
40.7	0.0166	45.0338	0.0008	45.0346
40.7333	0.0149	44.9943	0	44.9943
40.7667	0.0136	45.1784	0	45.1784
40.8	0.0166	45.1127	0.0008	45.1135
40.8333	0.0149	45.1521	0.0008	45.1529
40.8667	0.0149	45.1653	0	45.1653
40.9	0.0143	45.2179	0.0008	45.2187
40.9333	0.013	45.2179	0	45.2179
40.9667	0.0153	45.2836	0.0008	45.2844
41	0.0126	45.3099	0.0021	45.312
41.0333	0.0163	45.3231	0	45.3231
41.0667	0.0146	45.3625	0	45.3625
41.1	0.0146	45.4546	0.0008	45.4554
41.1333	0.0149	45.4283	0	45.4283
41.1667	0.0146	45.494	0.0008	45.4948
41.2	0.0153	45.5861	0.0008	45.5869
41.2333	0.0133	45.4677	0.0034	45.4712
41.2667	0.0123	45.5992	0	45.5992
41.3	0.0146	45.6124	0.0008	45.6132
41.3333	0.0156	45.6518	0.0021	45.6539
41.3667	0.0116	45.7176	0.0021	45.7197
41.4	0.0166	45.6124	0	45.6124
41.4333	0.0149	45.7439	0.0008	45.7447
41.4667	0.0159	45.6781	0.0008	45.6789
41.5	0.0153	45.7833	0.0008	45.7841
41.5333	0.0136	45.7965	0.0021	45.7986

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
41.5667	0.0146	45.8228	0.0008	45.8236
41.6	0.013	45.8622	0	45.8622
41.6333	0.0149	45.7965	0	45.7965
41.6667	0.0139	45.928	0.0021	45.9301
41.7	0.0149	45.7965	0.0021	45.7986
41.7333	0.012	45.9017	0.0021	45.9038
41.7667	0.0146	45.9806	0.0008	45.9814
41.8	0.0159	45.9543	0.0008	45.9551
41.8333	0.0166	45.9148	0	45.9148
41.8667	0.013	45.9411	0.0008	45.9419
41.9	0.0149	45.9806	0.0021	45.9827
41.9333	0.013	46.0331	0.0008	46.034
41.9667	0.0126	46.1646	0.0008	46.1655
42	0.0159	46.1646	0.0008	46.1655
42.0333	0.0176	46.0989	0.0008	46.0997
42.0667	0.0143	46.1252	0.0008	46.126
42.1	0.0159	46.1778	0	46.1778
42.1333	0.013	46.1383	0	46.1383
42.1667	0.0149	46.1515	0.0008	46.1523
42.2	0.013	46.1909	0	46.1909
42.2333	0.0146	46.1909	0.0008	46.1918
42.2667	0.0143	46.2435	0	46.2435
42.3	0.0116	46.2304	0.0021	46.2325
42.3333	0.0139	46.3093	0.0008	46.3101
42.3667	0.0153	46.2698	0.0008	46.2707
42.4	0.013	46.3619	0	46.3619
42.4333	0.0149	46.3093	0.0008	46.3101
42.4667	0.0166	46.3619	0	46.3619
42.5	0.0156	46.3356	0.0008	46.3364
42.5333	0.0166	46.4802	0	46.4802
42.5667	0.0149	46.4671	0	46.4671
42.6	0.0156	46.4276	0.0021	46.4298
42.6333	0.0159	46.4671	0	46.4671
42.6667	0.011	46.5328	0.0008	46.5336
42.7	0.0163	46.5065	0.0021	46.5087
42.7333	0.0153	46.546	0.0021	46.5481
42.7667	0.0159	46.6643	0.0008	46.6651
42.8	0.0166	46.4539	0.0008	46.4548
42.8333	0.0149	46.5723	0.0008	46.5731
42.8667	0.0163	46.4276	0	46.4276
42.9	0.0143	46.5854	0.0008	46.5862
42.9333	0.0169	46.5723	0.0008	46.5731
42.9667	0.0156	46.6249	0.0008	46.6257

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
43	0.0166	46.5591	0.0008	46.5599
43.0333	0.0166	46.6117	0.0008	46.6125
43.0667	0.0159	46.6775	0.0021	46.6796
43.1	0.0139	46.6249	0.0008	46.6257
43.1333	0.0163	46.638	0	46.638
43.1667	0.0126	46.6249	0	46.6249
43.2	0.0143	46.5854	0.0034	46.5889
43.2333	0.013	46.6643	0	46.6643
43.2667	0.0123	46.7564	0.0021	46.7585
43.3	0.0172	46.7169	0	46.7169
43.3333	0.0133	46.7432	0.0008	46.744
43.3667	0.0153	46.7564	0.0008	46.7572
43.4	0.0143	46.6906	0.0008	46.6914
43.4333	0.0163	46.7432	0.0008	46.744
43.4667	0.013	46.7432	0	46.7432
43.5	0.0143	46.7564	0.0008	46.7572
43.5333	0.013	46.7564	0	46.7564
43.5667	0.0156	46.7958	0	46.7958
43.6	0.0149	46.7169	0.0008	46.7177
43.6333	0.0126	46.8484	0.0008	46.8492
43.6667	0.0156	46.8221	0.0008	46.8229
43.7	0.0146	46.8221	0	46.8221
43.7333	0.0153	46.8221	0.0008	46.8229
43.7667	0.0139	46.8747	0.0008	46.8755
43.8	0.0146	46.8747	0.0008	46.8755
43.8333	0.0153	46.901	0.0008	46.9018
43.8667	0.0133	46.901	0	46.901
43.9	0.0163	46.8616	0	46.8616
43.9333	0.0166	46.901	0.0008	46.9018
43.9667	0.0149	46.901	0.0008	46.9018
44	0.0146	46.8879	0.0008	46.8887
44.0333	0.0123	46.9799	0.0008	46.9807
44.0667	0.0133	47.0457	0.0008	47.0465
44.1	0.0163	46.9142	0.0008	46.915
44.1333	0.0172	46.9536	0.0008	46.9544
44.1667	0.0149	46.9536	0	46.9536
44.2	0.0159	46.9668	0.0008	46.9676
44.2333	0.0163	47.0457	0.0021	47.0478
44.2667	0.0156	47.0194	0.0021	47.0215
44.3	0.0169	46.9931	0	46.9931
44.3333	0.0146	47.0194	0.0008	47.0202
44.3667	0.0113	47.0194	0	47.0194
44.4	0.0113	47.0457	0.0008	47.0465

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
44.4333	0.0153	47.0194	0	47.0194
44.4667	0.0159	47.0194	0.0008	47.0202
44.5	0.0136	47.0062	0.0008	47.007
44.5333	0.0156	46.9799	0.0021	46.9821
44.5667	0.0159	47.0194	0.0008	47.0202
44.6	0.0143	47.0983	0.0034	47.1017
44.6333	0.0133	47.1246	0	47.1246
44.6667	0.0126	47.1903	0	47.1903
44.7	0.0153	47.1509	0.0008	47.1517
44.7333	0.0133	47.0588	0.0008	47.0596
44.7667	0.0169	47.0457	0.0008	47.0465
44.8	0.0156	47.1509	0	47.1509
44.8333	0.0133	47.072	0	47.072
44.8667	0.013	47.2429	0.0021	47.245
44.9	0.012	47.1509	0.0008	47.1517
44.9333	0.0139	47.1772	0.0008	47.178
44.9667	0.0146	47.1377	0	47.1377
45	0.0143	47.0983	0.0021	47.1004
45.0333	0.0146	47.1772	0.0021	47.1793
45.0667	0.0159	47.1377	0.0008	47.1385
45.1	0.0133	47.2561	0	47.2561
45.1333	0.0156	47.164	0.0021	47.1662
45.1667	0.0153	47.1377	0.0021	47.1399
45.2	0.0116	47.2429	0.0008	47.2437
45.2333	0.0113	47.1772	0.0008	47.178
45.2667	0.0136	47.2429	0.0008	47.2437
45.3	0.0159	47.1903	0.0008	47.1911
45.3333	0.013	47.2035	0	47.2035
45.3667	0.0159	47.1772	0.0021	47.1793
45.4	0.0182	47.1903	0	47.1903
45.4333	0.013	47.2298	0.0021	47.2319
45.4667	0.0153	47.1772	0.0008	47.178
45.5	0.0123	47.2035	0.0008	47.2043
45.5333	0.0126	47.2429	0.0008	47.2437
45.5667	0.0133	47.1772	0	47.1772
45.6	0.0139	47.2429	0	47.2429
45.6333	0.0169	47.2561	0	47.2561
45.6667	0.0172	47.1903	0.0008	47.1911
45.7	0.0169	47.2298	0	47.2298
45.7333	0.0156	47.2429	0.0008	47.2437
45.7667	0.0163	47.2429	0	47.2429
45.8	0.0153	47.1903	0	47.1903
45.8333	0.0153	47.2955	0.0008	47.2963

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
45.8667	0.0172	47.3218	0	47.3218
45.9	0.0123	47.2166	0	47.2166
45.9333	0.0139	47.2692	0	47.2692
45.9667	0.0159	47.3218	0.0034	47.3253
46	0.0163	47.3744	0.0021	47.3765
46.0333	0.0156	47.3481	0.0008	47.3489
46.0667	0.0156	47.2955	0.0008	47.2963
46.1	0.0136	47.3087	0.0008	47.3095
46.1333	0.0159	47.4007	0.0008	47.4015
46.1667	0.0103	47.3481	0.0008	47.3489
46.2	0.0116	47.3481	0	47.3481
46.2333	0.0153	47.335	0	47.335
46.2667	0.0153	47.3087	0.0008	47.3095
46.3	0.0143	47.335	0.0021	47.3371
46.3333	0.0149	47.3613	0.0008	47.3621
46.3667	0.0166	47.4139	0.0008	47.4147
46.4	0.0169	47.4007	0.0008	47.4015
46.4333	0.0149	47.3218	0	47.3218
46.4667	0.0123	47.3613	0	47.3613
46.5	0.0133	47.3481	0.0021	47.3502
46.5333	0.0139	47.3481	0.0008	47.3489
46.5667	0.0136	47.2561	0	47.2561
46.6	0.0139	47.335	0.0021	47.3371
46.6333	0.0126	47.3481	0	47.3481
46.6667	0.0156	47.3744	0.0008	47.3752
46.7	0.0146	47.3087	0.0008	47.3095
46.7333	0.0192	47.3481	0.0008	47.3489
46.7667	0.0166	47.427	0.0008	47.4278
46.8	0.013	47.4139	0.0021	47.416
46.8333	0.0123	47.3876	0.0008	47.3884
46.8667	0.0159	47.335	0.0008	47.3358
46.9	0.0172	47.2955	0	47.2955
46.9333	0.0159	47.4007	0.0021	47.4028
46.9667	0.0139	47.4007	0.0021	47.4028
47	0.0143	47.3876	0.0008	47.3884
47.0333	0.0163	47.3744	0.0008	47.3752
47.0667	0.0136	47.3218	0	47.3218
47.1	0.0149	47.3613	0.0008	47.3621
47.1333	0.0166	47.3744	0.0021	47.3765
47.1667	0.0153	47.4402	0.0008	47.441
47.2	0.0133	47.3087	0.0021	47.3108
47.2333	0.011	47.335	0	47.335
47.2667	0.0133	47.4402	0.0008	47.441

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
47.3	0.0143	47.335	0.0008	47.3358
47.3333	0.0159	47.4796	0.0008	47.4804
47.3667	0.013	47.427	0.0008	47.4278
47.4	0.0159	47.3481	0	47.3481
47.4333	0.0136	47.4007	0.0008	47.4015
47.4667	0.0166	47.3481	0	47.3481
47.5	0.0126	47.3481	0.0008	47.3489
47.5333	0.0159	47.4665	0	47.4665
47.5667	0.0159	47.4139	0.0021	47.416
47.6	0.0136	47.3876	0.0021	47.3897
47.6333	0.0156	47.4139	0	47.4139
47.6667	0.013	47.5059	0.0008	47.5067
47.7	0.0146	47.4007	0.0008	47.4015
47.7333	0.0163	47.4139	0.0021	47.416
47.7667	0.0143	47.4139	0.0034	47.4173
47.8	0.0146	47.4533	0.0008	47.4541
47.8333	0.0139	47.4007	0.0021	47.4028
47.8667	0.0149	47.3744	0	47.3744
47.9	0.0156	47.4533	0.0021	47.4554
47.9333	0.0139	47.4007	0.0021	47.4028
47.9667	0.0116	47.3744	0.0021	47.3765
48	0.0133	47.3876	0	47.3876
48.0333	0.0143	47.4139	0.0021	47.416
48.0667	0.0139	47.4533	0.0008	47.4541
48.1	0.0139	47.4533	0	47.4533
48.1333	0.0136	47.5585	0.0008	47.5593
48.1667	0.0172	47.4665	0.0021	47.4686
48.2	0.0156	47.4402	0.0021	47.4423
48.2333	0.0133	47.4928	0.0008	47.4936
48.2667	0.0139	47.4665	0.0008	47.4673
48.3	0.0163	47.5322	0.0034	47.5357
48.3333	0.0139	47.4665	0	47.4665
48.3667	0.0163	47.5585	0.0021	47.5606
48.4	0.0139	47.4665	0.0021	47.4686
48.4333	0.0139	47.4928	0	47.4928
48.4667	0.0149	47.5717	0.0008	47.5725
48.5	0.0143	47.4533	0.0008	47.4541
48.5333	0.0143	47.4139	0.0008	47.4147
48.5667	0.0143	47.4533	0.0008	47.4541
48.6	0.013	47.5059	0.0008	47.5067
48.6333	0.0153	47.5059	0	47.5059
48.6667	0.0107	47.5191	0	47.5191
48.7	0.0139	47.4665	0.0008	47.4673

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
48.7333	0.0139	47.5717	0.0008	47.5725
48.7667	0.0146	47.4139	0	47.4139
48.8	0.0156	47.4533	0.0008	47.4541
48.8333	0.0153	47.6111	0	47.6111
48.8667	0.0146	47.4665	0.0008	47.4673
48.9	0.0156	47.5322	0.0008	47.533
48.9333	0.0153	47.5454	0.0021	47.5475
48.9667	0.0163	47.4665	0.0021	47.4686
49	0.0149	47.4533	0	47.4533
49.0333	0.0116	47.4402	0.0008	47.441
49.0667	0.0153	47.5059	0.0008	47.5067
49.1	0.0139	47.4402	0.0008	47.441
49.1333	0.0166	47.4139	0.0021	47.416
49.1667	0.0143	47.4402	0	47.4402
49.2	0.0133	47.4665	0	47.4665
49.2333	0.0159	47.4665	0.0008	47.4673
49.2667	0.0166	47.427	0.0008	47.4278
49.3	0.0136	47.4796	0	47.4796
49.3333	0.0159	47.5322	0.0008	47.533
49.3667	0.0149	47.4533	0.0008	47.4541
49.4	0.0156	47.5191	0	47.5191
49.4333	0.0159	47.5454	0.0021	47.5475
49.4667	0.0146	47.5848	0.0008	47.5856
49.5	0.0116	47.4402	0.0021	47.4423
49.5333	0.0146	47.4533	0.0008	47.4541
49.5667	0.0176	47.4796	0.0021	47.4817
49.6	0.0156	47.5191	0.0008	47.5199
49.6333	0.0153	47.4796	0	47.4796
49.6667	0.0153	47.5585	0.0008	47.5593
49.7	0.0153	47.5191	0.0021	47.5212
49.7333	0.0163	47.5717	0	47.5717
49.7667	0.0182	47.4928	0.0021	47.4949
49.8	0.0126	47.5191	0.0021	47.5212
49.8333	0.0179	47.5322	0	47.5322
49.8667	0.0153	47.5322	0.0008	47.533
49.9	0.0146	47.5848	0.0008	47.5856
49.9333	0.0156	47.5585	0.0008	47.5593
49.9667	0.0159	47.5585	0	47.5585
50	0.0146	47.5717	0.0008	47.5725
50.0333	0.0156	47.4928	0.0008	47.4936
50.0667	0.0169	47.5191	0.0008	47.5199
50.1	0.0143	47.5059	0	47.5059
50.1333	0.0123	47.4665	0.0008	47.4673

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
50.1667	0.0156	47.5717	0	47.5717
50.2	0.0156	47.4533	0.0034	47.4568
50.2333	0.0133	47.4007	0.0021	47.4028
50.2667	0.0172	47.4533	0.0008	47.4541
50.3	0.0146	47.4402	0	47.4402
50.3333	0.0169	47.4796	0.0021	47.4817
50.3667	0.0139	47.5191	0	47.5191
50.4	0.0176	47.4796	0.0021	47.4817
50.4333	0.0159	47.5322	0	47.5322
50.4667	0.0139	47.4928	0.0021	47.4949
50.5	0.0163	47.4533	0	47.4533
50.5333	0.0156	47.5848	0.0008	47.5856
50.5667	0.0153	47.5717	0.0021	47.5738
50.6	0.0133	47.5322	0.0008	47.533
50.6333	0.0146	47.5585	0.0008	47.5593
50.6667	0.0153	47.5191	0.0021	47.5212
50.7	0.0163	47.4533	0.0008	47.4541
50.7333	0.0139	47.4928	0	47.4928
50.7667	0.0143	47.427	0.0008	47.4278
50.8	0.0136	47.4796	0.0008	47.4804
50.8333	0.0133	47.4928	0	47.4928
50.8667	0.0146	47.5191	0.0021	47.5212
50.9	0.0176	47.4533	0.0008	47.4541
50.9333	0.0159	47.4533	0	47.4533
50.9667	0.0149	47.4533	0.0008	47.4541
51	0.0126	47.4796	0.0021	47.4817
51.0333	0.0156	47.4533	0.0034	47.4568
51.0667	0.0146	47.5454	0.0008	47.5462
51.1	0.0139	47.4533	0	47.4533
51.1333	0.0156	47.4796	0	47.4796
51.1667	0.0153	47.4533	0	47.4533
51.2	0.0146	47.4928	0.0008	47.4936
51.2333	0.0153	47.4928	0.0008	47.4936
51.2667	0.0176	47.5585	0.0008	47.5593
51.3	0.0179	47.427	0.0008	47.4278
51.3333	0.0146	47.4928	0.0021	47.4949
51.3667	0.0116	47.4139	0.0021	47.416
51.4	0.0139	47.4007	0.0008	47.4015
51.4333	0.0133	47.4402	0	47.4402
51.4667	0.0143	47.3876	0.0008	47.3884
51.5	0.0133	47.4007	0.0008	47.4015
51.5333	0.0143	47.4533	0.0008	47.4541
51.5667	0.0159	47.4796	0	47.4796

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
51.6	0.0126	47.5585	0	47.5585
51.6333	0.0159	47.4007	0	47.4007
51.6667	0.0166	47.4402	0.0008	47.441
51.7	0.0143	47.3481	0.0008	47.3489
51.7333	0.0163	47.4665	0	47.4665
51.7667	0.0153	47.4928	0.0008	47.4936
51.8	0.013	47.4796	0.0021	47.4817
51.8333	0.0166	47.3613	0	47.3613
51.8667	0.013	47.4796	0.0008	47.4804
51.9	0.0156	47.427	0.0008	47.4278
51.9333	0.0136	47.3218	0.0008	47.3226
51.9667	0.0146	47.4665	0	47.4665
52	0.0149	47.4139	0.0008	47.4147
52.0333	0.0156	47.5059	0.0021	47.508
52.0667	0.0153	47.427	0.0008	47.4278
52.1	0.0179	47.427	0.0008	47.4278
52.1333	0.0143	47.5322	0.0008	47.533
52.1667	0.013	47.5059	0.0008	47.5067
52.2	0.0166	47.5322	0	47.5322
52.2333	0.0133	47.427	0.0021	47.4291
52.2667	0.0163	47.4402	0.0008	47.441
52.3	0.0133	47.427	0.0008	47.4278
52.3333	0.0139	47.3613	0.0008	47.3621
52.3667	0.0156	47.427	0.0008	47.4278
52.4	0.0172	47.5059	0.0021	47.508
52.4333	0.0159	47.3876	0.0008	47.3884
52.4667	0.0172	47.4796	0.0021	47.4817
52.5	0.011	47.3613	0.0021	47.3634
52.5333	0.0153	47.4402	0.0021	47.4423
52.5667	0.0156	47.4533	0.0008	47.4541
52.6	0.0113	47.4533	0.0008	47.4541
52.6333	0.0156	47.4402	0.0021	47.4423
52.6667	0.0172	47.3481	0.0008	47.3489
52.7	0.0139	47.3876	0.0008	47.3884
52.7333	0.0136	47.4139	0.0008	47.4147
52.7667	0.0163	47.4928	0.0021	47.4949
52.8	0.0143	47.3744	0.0021	47.3765
52.8333	0.0149	47.4533	0.0034	47.4568
52.8667	0.0176	47.4796	0	47.4796
52.9	0.0136	47.4402	0.0008	47.441
52.9333	0.0159	47.3218	0.0008	47.3226
52.9667	0.0143	47.3744	0.0021	47.3765
53	0.0163	47.427	0.0008	47.4278

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
53.0333	0.0166	47.3613	0.0008	47.3621
53.0667	0.0143	47.4402	0.0021	47.4423
53.1	0.0169	47.4402	0	47.4402
53.1333	0.0192	47.4665	0.0008	47.4673
53.1667	0.0205	47.69	0.0034	47.6935
53.2	0.0251	47.9004	0.0008	47.9012
53.2333	0.0288	48.0714	0.0008	48.0722
53.2667	0.0284	48.387	0	48.387
53.3	0.0311	48.742	0	48.742
53.3333	0.0288	49.1496	0.0021	49.1518
53.3667	0.0373	49.4521	0.0008	49.4529
53.4	0.033	49.8992	0.0008	49.9
53.4333	0.033	50.4909	0.0008	50.4917
53.4667	0.0357	50.6224	0.0008	50.6232
53.5	0.0363	51.0958	0	51.0958
53.5333	0.0321	51.4377	0.0021	51.4398
53.5667	0.0363	51.7401	0.0021	51.7423
53.6	0.0344	52.1872	0	52.1872
53.6333	0.0344	52.4634	0.0021	52.4655
53.6667	0.0399	52.8842	0.0008	52.885
53.7	0.0406	53.3707	0.0008	53.3715
53.7333	0.0442	53.6994	0.0008	53.7003
53.7667	0.0446	54.3043	0.0008	54.3051
53.8	0.0492	54.8698	0	54.8698
53.8333	0.0511	55.3563	0	55.3563
53.8667	0.0485	55.9086	0	55.9086
53.9	0.0482	56.5003	0	56.5003
53.9333	0.0482	57.0395	0	57.0395
53.9667	0.0488	57.526	0	57.526
54	0.0505	58.0389	0	58.0389
54.0333	0.0495	58.5517	0	58.5517
54.0667	0.0505	59.1303	0.0008	59.1311
54.1	0.0521	59.6563	0.0008	59.6571
54.1333	0.0505	59.9061	0.0021	59.9082
54.1667	0.0498	60.3927	0.0008	60.3935
54.2	0.0508	60.9055	0	60.9055
54.2333	0.0472	61.2342	0	61.2342
54.2667	0.0515	61.7997	0.0008	61.8005
54.3	0.0488	62.0627	0.0021	62.0648
54.3333	0.0515	62.5229	0	62.5229
54.3667	0.0465	62.8122	0.0008	62.813
54.4	0.0521	63.1541	0.0008	63.1549
54.4333	0.0534	63.6932	0	63.6932

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
54.4667	0.0508	64.0088	0	64.0088
54.5	0.0502	64.377	0.0008	64.3778
54.5333	0.0518	64.7715	0.0034	64.775
54.5667	0.0518	65.0214	0.0008	65.0222
54.6	0.0525	65.3501	0.0008	65.3509
54.6333	0.0498	65.9287	0	65.9287
54.6667	0.0541	66.1785	0	66.1785
54.7	0.06	66.6256	0.0008	66.6264
54.7333	0.0633	67.0464	0.0008	67.0472
54.7667	0.0666	67.7565	0.0008	67.7573
54.8	0.0722	68.2693	0.0008	68.2701
54.8333	0.0775	69.1109	0.0021	69.113
54.8667	0.0788	69.821	0.0008	69.8218
54.9	0.0834	70.7546	0.0021	70.7568
54.9333	0.0867	71.5962	0.0021	71.5983
54.9667	0.091	72.5167	0	72.5167
55	0.0929	73.3977	0.0021	73.3999
55.0333	0.0969	74.1736	0	74.1736
55.0667	0.0969	75.1335	0.0008	75.1343
55.1	0.0985	76.0803	0	76.0803
55.1333	0.1005	76.8561	0.0021	76.8582
55.1667	0.1022	77.8818	0	77.8818
55.2	0.1022	78.9075	0	78.9075
55.2333	0.1058	79.8411	0.0008	79.8419
55.2667	0.1071	80.709	0	80.709
55.3	0.1061	81.6032	0.0021	81.6053
55.3333	0.1048	82.4842	0	82.4842
55.3667	0.1048	83.3784	0.0008	83.3792
55.4	0.1038	84.1937	0.0008	84.1945
55.4333	0.1028	85.1404	0	85.1404
55.4667	0.1045	85.9163	0.0008	85.9171
55.5	0.1054	86.6395	0	86.6395
55.5333	0.1041	87.56	0.0021	87.5621
55.5667	0.1051	88.1517	0	88.1517
55.6	0.1081	88.9407	0.0021	88.9428
55.6333	0.1064	89.7954	0	89.7954
55.6667	0.1058	90.3609	0	90.3609
55.7	0.1041	91.2419	0.0008	91.2427
55.7333	0.1031	91.9126	0.0008	91.9134
55.7667	0.1038	92.6884	0.0008	92.6892
55.8	0.1054	93.359	0.0021	93.3612
55.8333	0.1051	93.9639	0	93.9639
55.8667	0.1041	94.6214	0.0021	94.6235

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
55.9	0.1051	95.5156	0	95.5156
55.9333	0.1048	95.9627	0	95.9627
55.9667	0.1031	96.515	0.0008	96.5158
56	0.1031	97.5275	0.0008	97.5283
56.0333	0.1028	97.9088	0.0008	97.9096
56.0667	0.1058	98.4085	0.0008	98.4093
56.1	0.1022	99.2896	0.0034	99.293
56.1333	0.1005	99.9602	0	99.9602
56.1667	0.1038	100.6308	0.0008	100.6316
56.2	0.1005	100.907	0	100.907
56.2333	0.0913	101.5776	0	101.5776
56.2667	0.0883	102.051	0	102.051
56.3	0.0785	102.314	0.0008	102.3148
56.3333	0.0679	102.3403	0	102.3403
56.3667	0.0643	102.5638	0.0008	102.5647
56.4	0.064	102.6164	0	102.6164
56.4333	0.0627	102.5901	0.0021	102.5923
56.4667	0.06	102.84	0.0021	102.8421
56.5	0.0607	102.7479	0.0008	102.7487
56.5333	0.0663	102.8663	0.0008	102.8671
56.5667	0.059	102.9189	0.0008	102.9197
56.6	0.0482	103.0767	0.0008	103.0775
56.6333	0.0222	102.6296	0	102.6296
56.6667	-0.0025	101.8406	0.0021	101.8427
56.7	-0.0088	100.8412	0.0008	100.842
56.7333	-0.0101	99.6577	0	99.6577
56.7667	0.0008	98.6321	0.0008	98.6329
56.8	-0.0009	97.9483	0.0008	97.9491
56.8333	-0.0058	97.0147	0.0021	97.0168
56.8667	-0.0236	95.7786	0	95.7786
56.9	-0.0285	94.5031	0.0021	94.5052
56.9333	-0.0279	93.267	0.0021	93.2691
56.9667	-0.0262	91.9915	0	91.9915
57	-0.0272	90.5844	0	90.5844
57.0333	-0.0246	89.5456	0	89.5456
57.0667	-0.0275	88.441	0	88.441
57.1	-0.0272	87.2444	0	87.2444
57.1333	-0.0285	86.0478	0.0021	86.0499
57.1667	-0.0282	84.7854	0	84.7854
57.2	-0.0265	83.8518	0	83.8518
57.2333	-0.0249	82.7603	0.0008	82.7612
57.2667	-0.0282	81.59	0	81.59
57.3	-0.0269	80.5512	0.0008	80.552

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
57.3333	-0.0269	79.4861	0.0021	79.4882
57.3667	-0.0292	78.4998	0.0021	78.502
57.4	-0.0275	77.3558	0.0008	77.3566
57.4333	-0.0262	76.3827	0.0008	76.3835
57.4667	-0.0282	75.357	0	75.357
57.5	-0.0275	74.4892	0	74.4892
57.5333	-0.0242	73.5555	0.0008	73.5563
57.5667	-0.0236	72.5299	0.0008	72.5307
57.6	-0.0282	71.5305	0.0021	71.5326
57.6333	-0.0272	70.6363	0.0021	70.6384
57.6667	-0.0282	69.5975	0.0021	69.5996
57.7	-0.0265	68.6507	0.0008	68.6515
57.7333	-0.0249	67.8617	0.0021	67.8638
57.7667	-0.0262	66.8492	0.0021	66.8513
57.8	-0.0282	66.0207	0.0008	66.0215
57.8333	-0.0269	65.0214	0.0008	65.0222
57.8667	-0.0262	64.2587	0.0021	64.2608
57.9	-0.0265	63.2724	0.0008	63.2733
57.9333	-0.0275	62.5624	0	62.5624
57.9667	-0.0282	61.6813	0.0008	61.6821
58	-0.0275	60.774	0.0021	60.7761
58.0333	-0.0265	59.8798	0	59.8798
58.0667	-0.0239	54.0019	23.406	77.4079
58.1	-0.0196	53.1603	22.2686	75.4289
58.1333	-0.0196	52.2924	20.8445	73.1369
58.1667	-0.0193	51.6086	19.7977	71.4064
58.2	-0.02	50.6487	18.9088	69.5575
58.2333	-0.0186	49.8992	18.2185	68.1176
58.2667	-0.02	49.0839	17.6741	66.7579
58.3	-0.0193	48.2029	17.1967	65.3996
58.3333	-0.0239	47.2955	16.7838	64.0793
58.3667	-0.0226	46.5854	16.4104	62.9958
58.4	-0.0249	45.6781	16.0395	61.7176
58.4333	-0.0196	44.8365	15.6529	60.4895
58.4667	-0.0186	43.9818	15.2453	59.2271
58.5	-0.0213	43.1139	14.9073	58.0213
58.5333	-0.0209	42.2723	14.572	56.8444
58.5667	-0.0252	41.5622	14.3209	55.8831
58.6	-0.0196	40.8653	14.004	54.8693
58.6333	-0.0265	40.0237	13.6594	53.6832
58.6667	-0.0239	39.261	13.3623	52.6233
58.7	-0.0209	38.4326	13.0006	51.4332
58.7333	-0.0236	37.7751	12.7311	50.5062

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
58.7667	-0.0226	36.9598	12.3708	49.3306
58.8	-0.0246	36.0657	12.021	48.0866
58.8333	-0.0232	35.4345	11.7751	47.2095
58.8667	-0.0226	34.7112	11.4476	46.1589
58.9	-0.0232	34.0406	11.157	45.1976
58.9333	-0.0232	33.1859	10.8165	44.0023
58.9667	-0.0223	32.4889	10.5245	43.0135
59	-0.0246	31.7788	10.2234	42.0023
59.0333	-0.0236	31.0162	9.9091	40.9253
59.0667	-0.0259	30.3324	9.6277	39.9601
59.1	-0.0239	29.6354	9.3332	38.9686
59.1333	-0.0246	28.9517	9.0176	37.9692
59.1667	-0.0236	28.1627	8.7086	36.8712
59.2	-0.0246	27.492	8.4298	35.9218
59.2333	-0.0242	26.9529	8.1983	35.1512
59.2667	-0.0242	26.2034	7.8617	34.0651
59.3	-0.0226	25.4933	7.5514	33.0447
59.3333	-0.0252	24.8226	7.2897	32.1123
59.3667	-0.0255	24.1257	6.9912	31.1169
59.4	-0.0265	23.5866	6.79	30.3766
59.4333	-0.0226	22.9028	6.4941	29.3969
59.4667	-0.0262	22.3373	6.2627	28.6001
59.5	-0.0249	21.7456	6.0313	27.7769
59.5333	-0.0255	21.0881	5.7827	26.8709
59.5667	-0.0219	20.4569	5.5579	26.0148
59.6	-0.0265	19.76	5.3264	25.0864
59.6333	-0.0255	19.2472	5.1147	24.3619
59.6667	-0.0239	18.5502	4.9083	23.4585
59.7	-0.0252	17.9716	4.6926	22.6643
59.7333	-0.0236	17.3404	4.4914	21.8319
59.7667	-0.0246	16.7487	4.2968	21.0455
59.8	-0.0255	16.1833	4.1075	20.2907
59.8333	-0.0236	15.6047	3.926	19.5307
59.8667	-0.0262	15.0918	3.7472	18.839
59.9	-0.0229	14.5001	3.571	18.0711
59.9333	-0.0229	14.0267	3.4013	17.428
59.9667	-0.0249	13.4481	3.237	16.6851
60	-0.0249	12.9484	3.0752	16.0237
60.0333	-0.0223	12.475	2.9293	15.4043
60.0667	-0.0252	11.9491	2.782	14.731
60.1	-0.0262	11.4625	2.6478	14.1104
60.1333	-0.0223	11.0023	2.5203	13.5226
60.1667	-0.0242	10.5552	2.3914	12.9466

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
60.2	-0.0252	10.0686	2.2691	12.3378
60.2333	-0.0265	9.6347	2.1534	11.7881
60.2667	-0.0252	9.1613	2.039	11.2003
60.3	-0.0249	8.8063	1.9259	10.7322
60.3333	-0.0262	8.4381	1.8273	10.2654
60.3667	-0.0246	8.0436	1.7287	9.7723
60.4	-0.0255	7.6622	1.6327	9.2949
60.4333	-0.0275	7.3204	1.5472	8.8676
60.4667	-0.0269	6.9785	1.4631	8.4415
60.5	-0.0252	6.676	1.3789	8.0549
60.5333	-0.0265	6.3604	1.3026	7.6631
60.5667	-0.0252	6.0448	1.2211	7.2659
60.6	-0.0252	5.7555	1.1567	6.9122
60.6333	-0.0269	5.4136	1.0804	6.494
60.6667	-0.0269	5.1638	1.0265	6.1903
60.7	-0.0269	4.9534	0.966	5.9194
60.7333	-0.0239	4.7036	0.9108	5.6143
60.7667	-0.0252	4.4537	0.8582	5.3119
60.8	-0.0265	4.1907	0.8082	4.9989
60.8333	-0.0285	4.0066	0.7648	4.7714
60.8667	-0.0239	3.8225	0.7267	4.5492
60.9	-0.0249	3.6384	0.6846	4.323
60.9333	-0.0259	3.4675	0.6465	4.1139
60.9667	-0.0242	3.2439	0.6096	3.8536
61	-0.0252	3.0993	0.5768	3.6761
61.0333	-0.0265	0	0.5452	0.5452
61.0667	-0.0282	0.0091	0.5189	0.528
61.1	-0.0269	0	0.4952	0.4952
61.1333	-0.0249	0	0.465	0.465
61.1667	-0.0232	0	0.4466	0.4466
61.2	-0.0246	0	0.4216	0.4216
61.2333	-0.0275	0	0.4071	0.4071
61.2667	-0.0259	0	0.3848	0.3848
61.3	-0.0262	0.0091	0.3651	0.3742
61.3333	-0.0265	0	0.3545	0.3545
61.3667	-0.0262	0	0.3348	0.3348
61.4	-0.0285	0	0.3217	0.3217
61.4333	-0.0255	0.0091	0.3085	0.3176
61.4667	-0.0259	0	0	0
61.5	-0.0252	0	0.0021	0.0021
61.5333	-0.0255	0	0	0
61.5667	-0.0252	0.0091	0.0008	0.0099
61.6	-0.0269	0	0	0

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
61.6333	-0.0229	0	0.0008	0.0008
61.6667	-0.0246	0	0.0021	0.0021
61.7	-0.0252	0	0.0008	0.0008
61.7333	-0.0321	0.0091	0	0.0091
61.7667	-0.0302	0	0.0034	0.0034
61.8	-0.0318	0.0091	0.0021	0.0112
61.8333	-0.0308	0	0.0021	0.0021
61.8667	-0.0318	0.0091	0.0008	0.0099
61.9	-0.0311	0	0.0008	0.0008
61.9333	-0.0298	0	0	0
61.9667	-0.0262	0	0.0021	0.0021
62	-0.0259	0.0091	0.0008	0.0099
62.0333	-0.0249	0.0091	0.0021	0.0112
62.0667	-0.0262	0	0	0
62.1	-0.0242	0	0	0
62.1333	-0.0252	0	0.0021	0.0021
62.1667	-0.0262	0	0.0021	0.0021
62.2	-0.0226	0	0.0008	0.0008
62.2333	-0.0249	0.0091	0.0008	0.0099
62.2667	-0.0265	0.0091	0.0021	0.0112
62.3	-0.0269	0.0091	0.0021	0.0112
62.3333	-0.0226	0	0.0008	0.0008
62.3667	-0.0242	0	0	0
62.4	-0.0269	0	0	0
62.4333	-0.0259	0	0	0
62.4667	-0.0242	0	0.0008	0.0008
62.5	-0.0259	0.0091	0.0008	0.0099
62.5333	-0.0246	0.0091	0.0034	0.0125
62.5667	-0.0275	0	0	0
62.6	-0.0236	0	0	0
62.6333	-0.0279	0.0091	0.0021	0.0112
62.6667	-0.0232	0.0223	0.0021	0.0244
62.7	-0.0262	0.0091	0.0008	0.0099
62.7333	-0.0259	0.0091	0	0.0091
62.7667	-0.0269	0.0223	0	0.0223
62.8	-0.0262	0	0.0008	0.0008
62.8333	-0.0203	0.0091	0.0008	0.0099
62.8667	-0.0239	0.0091	0.0008	0.0099
62.9	-0.0219	0.0091	0	0.0091
62.9333	-0.0242	0.0091	0.0008	0.0099
62.9667	-0.0265	0	0.0008	0.0008
63	-0.0206	0.0091	0.0008	0.0099
63.0333	-0.0252	0.0091	0.0021	0.0112

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
63.0667	-0.0249	0.0091	0.0034	0.0125
63.1	-0.0236	0	0.0008	0.0008
63.1333	-0.0242	0	0.0008	0.0008
63.1667	-0.0255	0	0	0
63.2	-0.0252	0	0.0021	0.0021
63.2333	-0.0262	0.0091	0.0021	0.0112
63.2667	-0.0249	0	0.0008	0.0008
63.3	-0.0239	0	0	0
63.3333	-0.0282	0	0.0008	0.0008
63.3667	-0.0259	0.0223	0.0008	0.0231
63.4	-0.0262	0	0.0008	0.0008
63.4333	-0.0236	0	0.0008	0.0008
63.4667	-0.0255	0.0091	0.0008	0.0099
63.5	-0.0275	0.0091	0.0008	0.0099
63.5333	-0.0265	0.0091	0.0008	0.0099
63.5667	-0.0282	0	0	0
63.6	-0.0252	0	0.0008	0.0008
63.6333	-0.0239	0.0091	0	0.0091
63.6667	-0.0265	0	0	0
63.7	-0.0252	0.0091	0.0021	0.0112
63.7333	-0.0255	0	0	0
63.7667	-0.0272	0	0	0
63.8	-0.0262	0	0.0008	0.0008
63.8333	-0.0269	0	0.0008	0.0008
63.8667	-0.0269	0	0	0
63.9	-0.0239	0	0.0021	0.0021
63.9333	-0.0246	0	0.0008	0.0008
63.9667	-0.0236	0.0223	0.0021	0.0244
64	-0.0232	0	0.0008	0.0008
64.0333	-0.0265	0	0.0021	0.0021
64.0667	-0.0232	0.0091	0	0.0091
64.1	-0.0239	0	0.0008	0.0008
64.1333	-0.0265	0	0.0021	0.0021
64.1667	-0.0265	0	0	0
64.2	-0.0236	0	0.0021	0.0021
64.2333	-0.0242	0.0091	0.0021	0.0112
64.2667	-0.0226	0	0.0021	0.0021
64.3	-0.0272	0	0.0008	0.0008
64.3333	-0.0275	0	0.0008	0.0008
64.3667	-0.0223	0	0.0021	0.0021
64.4	-0.0236	0.0091	0.0021	0.0112
64.4333	-0.0255	0.0223	0.0008	0.0231
64.4667	-0.0236	0.0091	0.0021	0.0112

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
64.5	-0.0262	0	0	0
64.5333	-0.0249	0	0.0008	0.0008
64.5667	-0.0252	0.0091	0.0008	0.0099
64.6	-0.0259	0.0091	0.0008	0.0099
64.6333	-0.0246	0	0	0
64.6667	-0.0249	0	0	0
64.7	-0.0239	0	0.0008	0.0008
64.7333	-0.0262	0.0091	0.0008	0.0099
64.7667	-0.0226	0	0.0034	0.0034
64.8	-0.0259	0	0	0
64.8333	-0.0252	0	0.0021	0.0021
64.8667	-0.0226	0	0.0008	0.0008
64.9	-0.0252	0	0.0008	0.0008
64.9333	-0.0246	0	0	0
64.9667	-0.0269	0.0091	0.0008	0.0099
65	-0.0252	0	0.0008	0.0008
65.0333	-0.0236	0.0091	0	0.0091
65.0667	-0.0259	0	0	0
65.1	-0.0249	0	0	0
65.1333	-0.0279	0	0	0
65.1667	-0.0209	0.0091	0	0.0091
65.2	-0.0223	0	0.0021	0.0021
65.2333	-0.0265	0	0.0021	0.0021
65.2667	-0.0252	0	0.0008	0.0008
65.3	-0.0252	0	0	0
65.3333	-0.0229	0	0.0008	0.0008
65.3667	-0.0209	0	0.0021	0.0021
65.4	-0.0236	0	0.0034	0.0034
65.4333	-0.0232	0.0091	0.0008	0.0099
65.4667	-0.0262	0.0091	0.0008	0.0099
65.5	-0.0249	0	0.0034	0.0034
65.5333	-0.0246	0.0091	0.0021	0.0112
65.5667	-0.0252	0.0091	0	0.0091
65.6	-0.0246	0.0091	0.0008	0.0099
65.6333	-0.0239	0.0091	0.0008	0.0099
65.6667	-0.0255	0	0.0008	0.0008
65.7	-0.0236	0	0	0
65.7333	-0.0262	0	0	0
65.7667	-0.0279	0.0091	0.0008	0.0099
65.8	-0.0259	0	0	0
65.8333	-0.0249	0.0091	0.0008	0.0099
65.8667	-0.0259	0	0	0
65.9	-0.0242	0	0.0021	0.0021

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
65.9333	-0.0279	0.0091	0.0008	0.0099
65.9667	-0.0242	0.0223	0.0021	0.0244
66	-0.0242	0	0.0008	0.0008
66.0333	-0.0229	0	0.0021	0.0021
66.0667	-0.0219	0.0091	0.0008	0.0099
66.1	-0.0262	0	0.0021	0.0021
66.1333	-0.0239	0	0	0
66.1667	-0.0226	0	0.0008	0.0008
66.2	-0.0242	0	0.0008	0.0008
66.2333	-0.0242	0	0.0021	0.0021
66.2667	-0.0275	0	0.0021	0.0021
66.3	-0.0269	0	0.0008	0.0008
66.3333	-0.0242	0	0.0021	0.0021
66.3667	-0.0216	0	0	0
66.4	-0.0265	0	0	0
66.4333	-0.0255	0.0091	0	0.0091
66.4667	-0.0246	0.0223	0	0.0223
66.5	-0.0246	0.0091	0.0008	0.0099
66.5333	-0.0252	0	0.0008	0.0008
66.5667	-0.0249	0.0091	0.0008	0.0099
66.6	-0.0279	0	0.0021	0.0021
66.6333	-0.0249	0.0091	0	0.0091
66.6667	-0.0255	0	0.0008	0.0008
66.7	-0.0262	0.0091	0.0008	0.0099
66.7333	-0.0249	0	0.0021	0.0021
66.7667	-0.0239	0.0091	0.0021	0.0112
66.8	-0.0275	0	0	0
66.8333	-0.0246	0	0.0008	0.0008
66.8667	-0.0239	0.0091	0.0008	0.0099
66.9	-0.0275	0.0091	0.0008	0.0099
66.9333	-0.0239	0	0.0008	0.0008
66.9667	-0.0239	0	0.0008	0.0008
67	-0.0242	0	0.0008	0.0008
67.0333	-0.0259	0	0.0008	0.0008
67.0667	-0.0246	0	0.0021	0.0021
67.1	-0.0246	0	0.0008	0.0008
67.1333	-0.0265	0	0	0
67.1667	-0.0239	0.0091	0.0008	0.0099
67.2	-0.0232	0.0091	0.0021	0.0112
67.2333	-0.0269	0	0.0008	0.0008
67.2667	-0.0272	0	0.0021	0.0021
67.3	-0.0236	0	0.0008	0.0008
67.3333	-0.0275	0.0091	0	0.0091

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
67.3667	-0.0249	0.0091	0.0008	0.0099
67.4	-0.0246	0	0.0021	0.0021
67.4333	-0.0226	0.0091	0	0.0091
67.4667	-0.0269	0.0091	0	0.0091
67.5	-0.0239	0.0091	0	0.0091
67.5333	-0.0242	0	0.0008	0.0008
67.5667	-0.0242	0.0091	0.0008	0.0099
67.6	-0.0269	0	0	0
67.6333	-0.0252	0	0.0008	0.0008
67.6667	-0.0236	0	0.0008	0.0008
67.7	-0.0279	0	0.0021	0.0021
67.7333	-0.0269	0	0.0021	0.0021
67.7667	-0.0219	0	0	0
67.8	-0.0269	0	0.0008	0.0008
67.8333	-0.0246	0.0091	0.0008	0.0099
67.8667	-0.0259	0	0.0008	0.0008
67.9	-0.0262	0	0.0008	0.0008
67.9333	-0.0272	0.0223	0.0008	0.0231
67.9667	-0.0229	0.0091	0.0021	0.0112
68	-0.0239	0	0.0008	0.0008
68.0333	-0.0262	0.0091	0	0.0091
68.0667	-0.0259	0	0.0008	0.0008
68.1	-0.0252	0.0091	0.0008	0.0099
68.1333	-0.0252	0	0.0008	0.0008
68.1667	-0.0242	0	0.0008	0.0008
68.2	-0.0262	0.0091	0.0034	0.0125
68.2333	-0.0239	0.0091	0	0.0091
68.2667	-0.0265	0.0091	0.0008	0.0099
68.3	-0.0242	0	0.0008	0.0008
68.3333	-0.0226	0.0091	0.0021	0.0112
68.3667	-0.0226	0.0091	0.0008	0.0099
68.4	-0.0236	0.0091	0.0008	0.0099
68.4333	-0.0262	0.0091	0.0008	0.0099
68.4667	-0.0242	0	0.0021	0.0021
68.5	-0.0269	0.0091	0.0008	0.0099
68.5333	-0.0269	0.0223	0.0008	0.0231
68.5667	-0.0239	0	0.0008	0.0008
68.6	-0.0246	0.0091	0	0.0091
68.6333	-0.0242	0.0091	0.0021	0.0112
68.6667	-0.0252	0	0.0021	0.0021
68.7	-0.0262	0.0223	0	0.0223
68.7333	-0.0216	0.0091	0.0034	0.0125
68.7667	-0.0219	0	0	0

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
68.8	-0.0259	0.0091	0.0008	0.0099
68.8333	-0.0213	0	0.0021	0.0021
68.8667	-0.0239	0.0091	0.0021	0.0112
68.9	-0.0252	0.0091	0	0.0091
68.9333	-0.0265	0.0091	0.0008	0.0099
68.9667	-0.0223	0.0091	0	0.0091
69	-0.0269	0	0.0021	0.0021
69.0333	-0.0252	0.0091	0.0008	0.0099
69.0667	-0.0265	0	0.0008	0.0008
69.1	-0.0269	0	0	0
69.1333	-0.0269	0	0.0008	0.0008
69.1667	-0.0246	0	0.0008	0.0008
69.2	-0.0242	0	0	0
69.2333	-0.0242	0	0.0008	0.0008
69.2667	-0.0249	0	0.0021	0.0021
69.3	-0.0232	0	0.0021	0.0021
69.3333	-0.0229	0	0.0008	0.0008
69.3667	-0.0242	0.0091	0.0008	0.0099
69.4	-0.0239	0	0	0
69.4333	-0.0246	0	0.0008	0.0008
69.4667	-0.0259	0.0091	0.0008	0.0099
69.5	-0.0259	0.0091	0.0021	0.0112
69.5333	-0.0262	0	0.0008	0.0008
69.5667	-0.0265	0	0.0008	0.0008
69.6	-0.0249	0.0091	0.0008	0.0099
69.6333	-0.0272	0.0091	0.0008	0.0099
69.6667	-0.0229	0.0091	0	0.0091
69.7	-0.0265	0.0091	0.0008	0.0099
69.7333	-0.0232	0	0.0021	0.0021
69.7667	-0.0242	0	0	0
69.8	-0.0246	0	0	0
69.8333	-0.0236	0	0.0034	0.0034
69.8667	-0.0255	0.0223	0.0008	0.0231
69.9	-0.0252	0.0223	0.0021	0.0244
69.9333	-0.0272	0.0091	0	0.0091
69.9667	-0.0246	0.0091	0.0008	0.0099
70	-0.0239	0	0.0021	0.0021
70.0333	-0.0265	0.0091	0.0008	0.0099
70.0667	-0.0249	0	0	0
70.1	-0.0226	0.0091	0	0.0091
70.1333	-0.0242	0.0091	0.0008	0.0099
70.1667	-0.0242	0	0.0008	0.0008
70.2	-0.0229	0	0.0008	0.0008

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Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
70.2333	-0.0246	0	0.0008	0.0008
70.2667	-0.0265	0	0.0008	0.0008
70.3	-0.0249	0.0091	0.0008	0.0099
70.3333	-0.0229	0	0.0008	0.0008
70.3667	-0.0255	0	0.0008	0.0008
70.4	-0.0229	0	0.0008	0.0008
70.4333	-0.0252	0	0	0
70.4667	-0.0249	0	0.0008	0.0008
70.5	-0.0223	0.0091	0.0008	0.0099
70.5333	-0.0239	0.0091	0.0021	0.0112
70.5667	-0.0255	0.0091	0.0021	0.0112
70.6	-0.0246	0.0091	0.0008	0.0099
70.6333	-0.0249	0.0091	0.0008	0.0099
70.6667	-0.0262	0	0.0021	0.0021
70.7	-0.0226	0	0.0021	0.0021
70.7333	-0.0249	0	0	0
70.7667	-0.0226	0.0223	0.0021	0.0244
70.8	-0.0255	0.0091	0	0.0091
70.8333	-0.0262	0	0	0
70.8667	-0.0262	0.0091	0.0008	0.0099
70.9	-0.0242	0	0.0008	0.0008
70.9333	-0.0259	0.0091	0.0021	0.0112
70.9667	-0.0272	0.0091	0.0008	0.0099
71	-0.0255	0	0.0008	0.0008
71.0333	-0.0259	0	0.0008	0.0008
71.0667	-0.0252	0	0.0008	0.0008
71.1	-0.0246	0	0.0008	0.0008
71.1333	-0.0239	0	0.0008	0.0008
71.1667	-0.0249	0	0.0008	0.0008
71.2	-0.0252	0	0.0008	0.0008
71.2333	-0.0236	0	0	0
71.2667	-0.0223	0	0.0021	0.0021
71.3	-0.0255	0	0.0021	0.0021
71.3333	-0.0242	0	0.0008	0.0008
71.3667	-0.0255	0	0.0021	0.0021
71.4	-0.0236	0.0091	0.0008	0.0099
71.4333	-0.0232	0.0091	0.0008	0.0099
71.4667	-0.0246	0.0091	0	0.0091
71.5	-0.0272	0.0091	0.0008	0.0099
71.5333	-0.0226	0.0091	0.0021	0.0112
71.5667	-0.0239	0	0	0
71.6	-0.0239	0.0091	0.0008	0.0099
71.6333	-0.0239	0	0.0008	0.0008

AREVA NP, Inc. Project No. G101276459SAT-008 December 12, 2013

Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
71.6667	-0.0246	0.0091	0.0021	0.0112
71.7	-0.0252	0	0.0008	0.0008
71.7333	-0.0242	0	0	0
71.7667	-0.0269	0.0091	0.0008	0.0099
71.8	-0.0259	0.0091	0.0008	0.0099
71.8333	-0.0275	0	0.0008	0.0008
71.8667	-0.0232	0	0.0021	0.0021
71.9	-0.0236	0.0091	0.0008	0.0099
71.9333	-0.0236	0.0091	0.0021	0.0112
71.9667	-0.0255	0	0.0021	0.0021
72	-0.0246	0.0091	0	0.0091
72.0333	-0.0259	0.0091	0	0.0091
72.0667	-0.0239	0	0	0
72.1	-0.0239	0	0.0008	0.0008
72.1333	-0.0255	0.0223	0.0021	0.0244
72.1667	-0.0252	0	0	0
72.2	-0.0223	0	0.0008	0.0008
72.2333	-0.0255	0	0.0021	0.0021
72.2667	-0.0236	0	0.0008	0.0008
72.3	-0.0259	0	0.0008	0.0008
72.3333	-0.0259	0	0.0008	0.0008
72.3667	-0.0259	0	0.0021	0.0021
72.4	-0.0249	0	0.0008	0.0008
72.4333	-0.0216	0.0091	0.0021	0.0112
72.4667	-0.0246	0	0.0008	0.0008
72.5	-0.0249	0.0091	0.0008	0.0099
72.5333	-0.0232	0.0091	0.0008	0.0099
72.5667	-0.0255	0.0091	0.0021	0.0112
72.6	-0.0285	0	0.0034	0.0034
72.6333	-0.0242	0	0.0008	0.0008
72.6667	-0.0255	0	0.0021	0.0021
72.7	-0.0262	0	0.0021	0.0021
72.7333	-0.0226	0	0	0
72.7667	-0.0232	0	0.0008	0.0008
72.8	-0.0265	0	0.0021	0.0021
72.8333	-0.0229	0.0091	0.0034	0.0125
72.8667	-0.0252	0.0091	0	0.0091
72.9	-0.0249	0.0091	0.0034	0.0125
72.9333	-0.0236	0.0091	0.0021	0.0112
72.9667	-0.0232	0	0	0
73	-0.0275	0	0	0
73.0333	-0.0239	0	0.0008	0.0008
73.0667	-0.0255	0.0091	0.0008	0.0099

AREVA NP, Inc. Project No. G101276459SAT-008 December 12, 2013

Time (min)	Ch 1 dP (psi)	Ch 2 High Flow (LPM)	Ch 3 Low Flow (LPM)	Total Flow (LPM)
73.1	-0.0236	0.0223	0.0008	0.0231
73.1333	-0.0239	0	0.0008	0.0008
73.1667	-0.0246	0	0.0008	0.0008
73.2	-0.0236	0	0.0008	0.0008
73.2333	-0.0252	0.0091	0.0008	0.0099
73.2667	-0.0249	0.0091	0.0008	0.0099
73.3	-0.0252	0	0.0021	0.0021
73.3333	-0.0242	0	0	0
73.3667	-0.0255	0	0.0008	0.0008
73.4	-0.0242	0.0091	0	0.0091

APPENDIX C
Photographs


2013/11/12


2013/11/13


2013/11/13


2013/12/04


2"
2"
2013/12/04


QSIL
2013/12/04


QSIL
2013/12/04


QSIL
ISG


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QSIL
2013/12/04


QSIL
9207462-P2
QSIL
DC-170
2013/12/04


QSIL
QSIL


2013/12/04


2013/12/04


2013/12/04


2013/12/04


9207462-P3
9207462-P4
PRESSURE TEST 8
2013/12/05


9207462-P3
9207462-P4
PRESSURE TEST 8
2013/12/05


[redacted] 12/4/13
9207462-P3
2013/12/05


QSIL
[redacted]
9207462-P4
2013/12/05


9207462-P1
2013/12/05


[redacted]
12/4/13
9207462-P2


462-P2
12/4/13
2013/12/05


2013/12/05


9207462-P3
9207462-P4
PRESSURE TEST 8
2013/12/11


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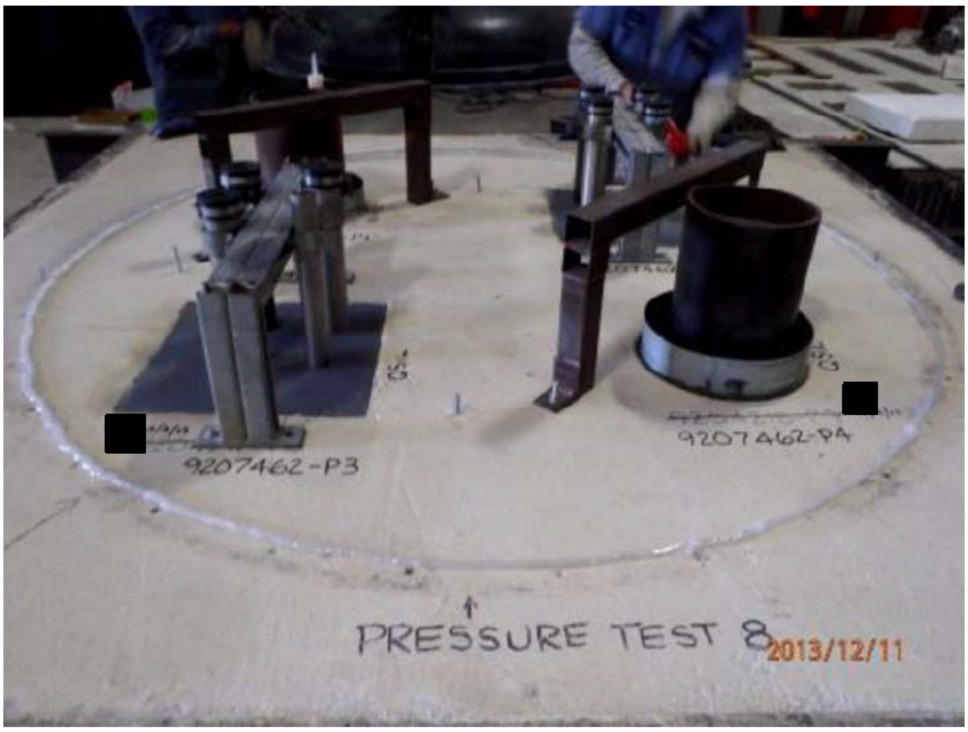
DC-170
0207462-P1
2013/12/11


DC-170
9207462-P3
2013/12/11


[redacted]
QSIL
9207462-P3
2013/12/11

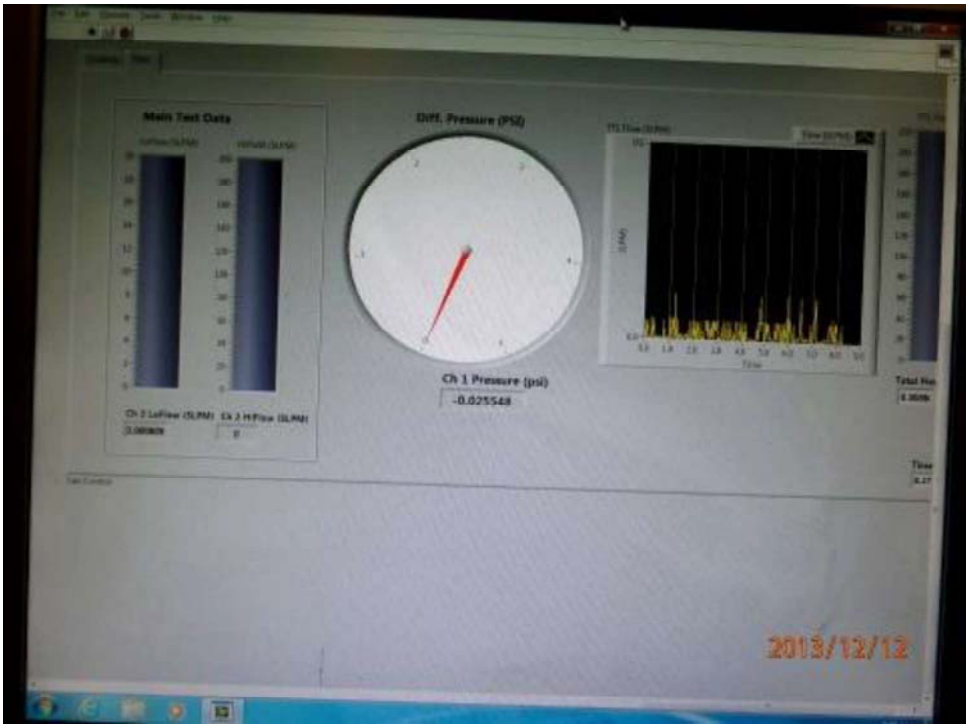

9207462-P4
2013/12/11

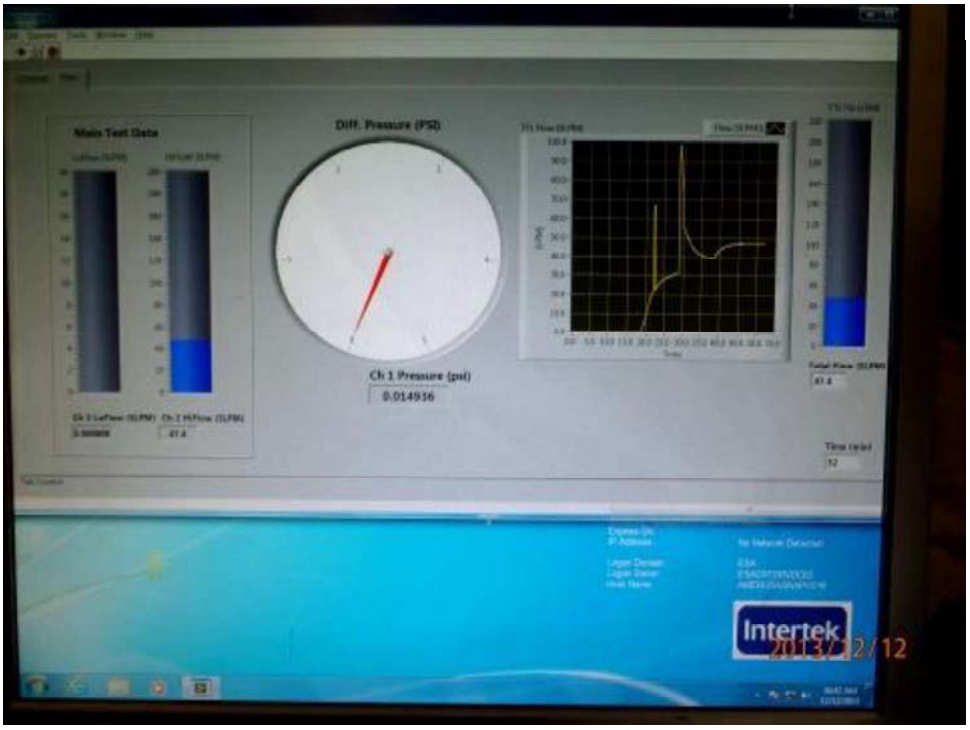

9207462-P3
9207462-P4
PRESSURE TEST 8
2013/12/11


9207462-P3
9207462-P4
PRESSURE TEST 8
2013/12/11


PRESSURE TEST 8
2013/12/12


2013/12/12


Main Test Data
Diff. Pressure (PSI)
Ch 1 Pressure (psi)
-0.025548
2013/12/12


Main Test Data
Diff. Pressure (PSI)
Ch 1 Pressure (psi)
0.014916
Intertek


2013/12/12


TEST GAUGE
2013/12/12


9207462-P3
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9207462-P2
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9207462-P2
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DC-170
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9207462-P2
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2013/12/12


[redacted]
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9207462-P3
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9207462-P3
2013/12/12


9207462-P4
2013/12/12

APPENDIX D
Test Plan

Controlled Document

20004-019 (11/20/2012)

AREVA

AREVA NP Inc.

Engineering Information Record

Document No.: 51 - 9207462 - 000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

[redacted]

Mike Dey
Staff Engineer

[redacted]

Michael A. Brown
Quality Supervisor

Page 1 of 34

AREVA

20004-019 (11/20/2012)
Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Safety Related? ☒ YES ☐ NO

Does this document establish design or technical requirements? ☐ YES ☒ NO

Does this document contain assumptions requiring verification? ☐ YES ☒ NO

Does this document contain Customer Required Format? ☐ YES ☒ NO

Signature Block

Name and Title/Discipline	Signature	P/LP, R/LR, A-CRF, A	Date	Pages/Sections Prepared/Reviewed/ Approved or Comments
Aaron Adrian Princ Des Eng Spec II / PEYF1-A	[redacted]	LP	10-10-13	All
Derrick Risner Engineer I / PEYF1-A	[redacted]	P	10-10-13	All
Victor Kaldenbach Princ Des Eng Spec II / PEYF1-A	[redacted]	R	10/10/2013	All
Scott Groesbeck Manager Tech Ops / PEYF1-A	[redacted]	A	10/10/13	All
Perry Calos Project Manager / IBL-A	[redacted]	A	10/10/13	All

Note: P/LP designates Preparer (P), Lead Preparer (LP)
R/LR designates Reviewer (R), Lead Reviewer (LR)
A-CRF designates Project Manager Approver of Customer Required Format (A-CRF)
A designates Approver/RTM – Verification of Reviewer Independence

MOX Services concurrence: [redacted] 10Oct13
Name / Title Date

AREVA

20004-019 (11/20/2012)
Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Record of Revision

Revision No.	Pages/Sections/ Paragraphs Changed	Brief Description / Change Authorization
000	All	Initial Issue. This document contains the main body of the report (pages 1-19), Appendix A (3 pages), Appendix B (5 pages), Appendix C (5 pages), Appendix D (2 pages), for a total of 34 pages.

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Table of Contents

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(continued)

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Page

ACRONYMS

CGD	Commercial Grade Dedication
CGI	Commercial Grade Item
IROFS	Items Relied On For Safety
MOX	Mixed Oxide
MFFF	Mixed Oxide Fuel Fabrication Facility
QL	Quality Level
SSC	Structures, Systems and Components
w.g.	Water Gauge

Penetration Seal Materials

DC 170	Dow Corning Sylgard® 170 Silicone Elastomer
QSil 5558MC	Quantum Silicones QSil 5558MC Silicone Elastomer

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

BACKGROUND

AREVA NP (AREVA) is assisting Shaw AREVA MOX Services (MOX Services) in the development and implementation of a penetration seal program for the Mixed Oxide Fuel Fabrication Facility (MFFF). One aspect of the MOX penetration seal program includes conducting various types of qualification tests of penetration seal assemblies to substantiate the performance capabilities of specific penetration seal designs. Pressure testing is one type of qualification testing that needs to be performed in order to demonstrate the pressure retaining capability of MOX penetration seal designs. The data collected during pressure testing is needed to determine acceptable levels of leakage to maintain the necessary pressure differentials between confinement zones within the MFFF under various conditions, such as normal operation or inadvertent clean agent discharge. Other types of qualification testing, such as fire testing and testing for seismic qualification of penetration seal assemblies, are addressed by other test plans.

1.0 PURPOSE

The purpose of this test plan is to define the test assembly, test methods and acceptance criteria for conducting pressure test in support of the MOX penetration seal program.

This test plan defines the test methods, acceptance criteria and test report documentation requirements for penetration seal Pressure Test 8. Additionally, this detailed test plan defines the roles and responsibilities of MOX Services, AREVA, the selected testing laboratory, and any other subcontracted entity engaged in support of pressure testing efforts.

This detailed test plan also describes the procurement plan for materials associated with penetration seal Pressure Test 8 and identifies the entities responsible for procuring the various components of the test assemblies based on the quality level assigned to each component.

This test plan also establishes minimum quality requirements for the penetration seal materials used in the test assemblies and links quality requirements in the AREVA QA program to customer/project quality requirements.

2.0 OBJECTIVE

The primary objective of this test plan is to evaluate the pressure resistance capability of silicone elastomer seals when installed within a bare concrete (or metal sleeve insert) with piping commodities passing through at the air pressure increments above atmospheric pressure provided in Section 9.2.

The specific configurations to be tested are described below. Critical characteristics and the associated limiting parameters that will be substantiated by a successful test are also provided.

2.1 Test Deck Description

The test deck will consist of a 12" thick concrete slab measuring approximately 96" x 96" (8' x 8') [Note: Final test slab size to be determined by Intertek and documented in the final test report]. Within this slab there will be four penetrations, two (2) 12" diameter openings, and two 16" x 16" blockouts. Details for the four penetrations are provided in Section 2.2. Three of the penetrations will be unlined (bare concrete) and one will be steel lined (cast in place 12" diameter pipe). The test deck will be horizontally oriented with a hemispherical 72" diameter steel pressure vessel mounted on each side of the precast openings in the slab.

Additionally, most of the openings (penetrations) in the MOX facility have been cast with a ¾" bevel on both sides of the opening. For testing and qualification purposes, this feature is considered aesthetic, and it has no adverse effect on the functional performance of the penetration seal installation. In fact for some applications, such as in the case of pressure resistant penetrations seals, the bevel provides a benefit

over non-beveled openings. Therefore, for the purposes of the penetration seal test program, the bevel feature will not be included for pressure tests covered in this test plan.

> **Note**: It is anticipated that the slab used for Pressure Test 6/Seismic Pressure Test 4 will not be damaged during Pressure Test 6 or Seismic Pressure Test 4 and will be available for reuse in this pressure test. For the purpose of Pressure Test 8, the boot seal assemblies from Pressure Test 6/Seismic Pressure Test 4 will be removed and commodities resealed using the silicone elastomer seal material in accordance with Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5]. See Section 2.2 for details on the penetrating item configuration and seal materials to be used.

Drawings showing the general layout of the test deck (test slab) for this pressure test can be found in Appendix A.

> **Note**: If the slab from Pressure Test 6 /Seismic Pressure Test 4 was damaged during testing or is otherwise not available, this test plan will require revision.

2.2 Test Description

There are four openings to be sealed and tested in Pressure Test 8.

- Penetration P1: This penetration is to be a round 12" diameter precast (or core-drilled) opening with a 16 gauge galvanized sheet metal sleeve sized to fit the precast opening. The sheet metal sleeve shall be approximately 18" long and installed such that the sleeve extends approximately 3" on both sides of the test slab. The sheet metal sleeve shall be fastened to the concrete opening in accordance with AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5]. An 8" diameter schedule 40 carbon steel pipe will pass through the sleeve. The pipe will be capped on at least one side or fitted with a welded cover plate (Note: caps and/or cover plates are construction aids only and are not being qualified by this pressure test). The cap/welded cover plate shall be made air tight, so that any leakage during the test must pass though the seal assembly and not internal to the pipe. The gap between the sleeve and the pipe will be sealed using an eight (8) inch thick Dow Corning Sylgard® 170 Silicone Elastomer (DC-170) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

- **Note**: If the sheet metal sleeve insert previously installed in Penetration P1 is damaged in Pressure Test 6 or Seismic Pressure Test 4 the sleeve insert will need to be repaired or replaced for this test.

- Penetration P2: This penetration is to be a 16"x16" square precast opening with a 2" diameter schedule 40 carbon steel pipe, a 2" diameter S-40S stainless steel pipe, a 2" diameter calbrite type 304 stainless steel conduit, and a 2" diameter calconduit rigid galvanized steel conduit penetrating the opening. The pipes and conduits will be capped on at least one side or fitted with a welded cover plate (Note: caps and/or cover plates are construction aids only and are not being qualified by this pressure test). The caps/welded cover plates shall be made air tight, so that any leakage during the test must pass though the seal assembly and not internal to the pipe or conduit. The opening will be sealed using an eight (8) inch thick Dow Corning Sylgard® 170 Silicone Elastomer (DC-170) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

- Penetration P3: This penetration is to be a 16"x16" square precast opening with a 2" diameter schedule 40 carbon steel pipe, a 2" diameter S-40S stainless steel pipe, a 1 ¼" diameter S-40S titanium pipe, and a 2" diameter S-40S zirconium pipe penetrating the opening. The pipes will be capped on at least one side or fitted with a welded cover plate or otherwise sealed internally (Note: caps and/or cover plates and/or internal seals are construction aids only and are not being

qualified by this pressure test). The caps/welded cover plates/internal seals shall be made air tight, so that any leakage during the test must pass though the seal assembly and not internal to the pipe. The opening will be sealed using an eight (8) inch thick Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

- Penetration P4: This penetration is to be a round opening with a 12" diameter cast-in-place schedule 40 steel pipe sleeve with a galvanized steel sleeve extension on the top side of the barrier. An 8" diameter schedule 40 carbon steel pipe will pass through the sleeve. The pipe will be capped on at least one side or fitted with a welded cover plate (Note: caps and/or cover plates are construction aids only and are not being qualified by this pressure test). The cap/welded cover plate shall be made air tight, so that any leakage during the test must pass though the seal assembly and not internal to the pipe. The gap between the cast-in-place sleeve and the pipe will be sealed using an eight (8) inch thick Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) penetration seal with no permanent damming, installed as described in AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

- **Note**: If the sheet metal sleeve extension previously installed in Penetration P4 is damaged in Pressure Test 6 or Seismic Pressure Test 4 the sleeve extension will need to be repaired or replaced for this test.

The penetrating items will be located within the openings as shown in Appendix B. The test will be performed with the test deck oriented in the horizontal position and in accordance with Section 9.0.

2.3 Critical Characteristics and Limiting Parameters Being Tested

The specific critical characteristics and associated limiting parameters being tested for Pressure Test 8 are as follows.

This test will evaluate pressure resistance capabilities of the following:

- An eight (8) inch thick Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) seal installed between a cast-in-place pipe sleeve with sleeve extension adhered with Dow Corning ® 732 Multi-Purpose Sealant and a carbon steel pipe with no permanent damming installed.
- An eight (8) inch thick Dow Corning Sylgard® 170 Silicone Elastomer (DC-170) seal installed between a 16 gauge galvanized sheet metal sleeve (adhered to a concrete opening using Dow Corning® 790 Silicone Building Sealant) and a carbon steel pipe with no permanent damming installed.
- An eight (8) inch thick Dow Corning Sylgard® 170 Silicone Elastomer (DC-170) seal with no permanent damming installed in an unlined (bare concrete) penetration. A carbon steel pipe, stainless steel pipe, stainless steel conduit and rigid galvanized conduit have been included to evaluate the pressure resistance capability of the silicone elastomer seal material at the interface of these commodities.
- An eight (8) inch thick Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) seal with no permanent damming installed in an unlined (bare concrete) penetration. A carbon steel pipe, stainless steel pipe, titanium pipe and zirconium pipe have been included to evaluate the pressure resistance capability of the silicone elastomer seal material at the interface of these commodities.

A successful test will substantiate the acceptability of these seal configurations to function as pressure seals when installed as an assembly around pipes and between pipe sleeves and pipe commodities.

3.0 ACCEPTANCE CRITERIA

Pressure rated penetration seals at the MOX facility are required to remain "sufficiently leak-tight" at various pressure levels in order to support the functional goals of the various pressure rating requirements (i.e., confinement, suppression system clean agent concentration, fire induced pressure loads or HVAC pressure boundary loads). The term "sufficiently leak-tight" indicated that the penetration seal meets the predetermined acceptance criteria for the pressure level(s) being tested.

The acceptance criterion that constitutes "sufficiently leak-tight" varies based on the pressure requirement and the operating mode of the plant. For most pressure conditions and operating modes, "sufficiently leak-tight" means that the penetration seal assembly must remain in place but is allowed to leak (i.e., the penetration seal cannot become dislodged from the opening or otherwise catastrophically fail such that a substantial leakage path is created.)

Per MOX Services Calculation *Confinement Boundary Air Leakage Criteria* [Reference 12.1], penetration seals that function as confinement zone 3b boundary components must maintain a leakage rate less than 0.01 cfm/sq. ft. of penetration area when tested at a pressure that bounds C3b to non-C3b zone pressures during normal operating conditions.

Table 9-1 identifies the differential pressure levels (stages) for conducting pressure tests, as well as, the acceptance criteria in order to be considered "sufficiently leak-tight".

4.0 RESPONSIBILITIES

The following roles and responsibilities apply to this test plan.

4.1 MOX Services

4.1.1 Provide review and concurrence of this detailed pressure test plan.

4.1.2 Provide concurrence for any revisions made to this test plan during test specimen construction activities.

4.1.3 Provide some of the materials for test assembly construction from MOX Services surplus or scrap (if available).

4.1.4 Witness pressure tests if desired.

4.2 AREVA

4.2.1 Develop and revise (if necessary) this detailed pressure test plan.

4.2.2 Provide management and oversight of all aspects of the MOX penetration seal test program.

4.2.3 Select the pressure testing facility and establish sub-contract agreements. The testing laboratory selected for performance of this pressure test is Intertek Testing Services NA, Inc., Elmendorf, TX.

4.2.4 Provide engineering instructions to the testing laboratory for performance of the test including test parameters, acceptance criteria, requirements for documenting the test results in a final test report, etc.

4.2.5 Procure all primary penetration seal materials, devices and components (i.e., any materials, devices and components intended to replicate future Safety Related (QL-1) designs to be installed in the MOX facility) as designated in the procurement plan section (Section 5.0) of this test plan.

4.2.6 Notify MOX Services at least 10 days prior to test date to facilitate MOX Services decision to witness the pressure test.

4.2.7 Witness pressure test.

4.2.8 Perform post-test examinations.

4.2.9 Review, approve and issue final test reports.

4.3 Testing Laboratory (Intertek Testing Services NA, Inc.)

4.3.1 Notify AREVA at least 5 days prior to the start of test assembly construction activities.

4.3.2 Construct test decks in accordance with this test plan and AREVA direction.

4.3.3 Procure test deck materials and any other test assembly components identified under the Testing Laboratory scope in the procurement plan section (Section 5.0) of this test plan.

4.3.4 Procure testing equipment necessary for pressure testing services in accordance with this test plan and verify that the testing equipment is properly calibrated.

4.3.5 Provide pressure testing services in accordance with this test plan.

4.3.6 Assist AREVA, as necessary, in conducting detailed post-test destructive examinations of the test assemblies.

4.3.7 Dispose of test assemblies upon completion of the pressure tests.

4.3.8 Generate final test reports in accordance with test plan requirements (Section 11.0).

4.4 Other Subcontracted Entities

There are no other Subcontractors for this pressure test plan.

5.0 PROCUREMENT PLAN

This penetration seal pressure test plan involves many elements beyond the penetration seal material being qualified. Some of these elements include the test deck or test slab, various fasteners for securing laboratory instrumentation to the test assembly, etc. Not all elements of the test assembly are required to be procured to the same quality level as the penetration seal material, which must be capable of satisfying the quality requirements of the end product (i.e., QL-1 qualified penetration seal assemblies for plant applications). The following procurement plan takes into consideration the required quality level of the various materials required for these penetration seal pressure tests and prescribes an approach for material procurement which considers cost, schedule and quality requirements.

5.1 Penetration Seal Materials

The vast majority of penetration seals that will be installed throughout the MFFF are designated QL-1. MOX Services defines QL-1 in PP9-1, *SSC Quality Levels & Marking Design Documents* [Reference 12.2] as follows:

> *QL 1 SSCs are typically IROFS (all IROFS are QL 1 and may be either SSCs or Administrative Controls) credited in the Integrated Safety Analysis with a required function to prevent or mitigate design basis events such that high-consequence events are made highly unlikely; intermediate-consequence events are made unlikely; or to prevent criticality. For example, the failure of an IROFS item could cause:*
>
> 1. *Loss of a primary confinement feature leading to release of material resulting in exceeding 10CFR70.61 performance requirements;*
> 2. *Failure to satisfy the double contingency principle for the prevention of a criticality accident; or*

3. *Loss of other safety function required to meet 10CFR70.61 performance requirements.*

This definition correlates with the following definition of "Nuclear Safety Related" in AREVA Administrative Procedure (AP) 1702-25, *Assignment of Nuclear Safety Classification to Products and Services* [Reference 12.3]:

Definition of "Nuclear Safety Related"

Company products and services are considered to be nuclear safety related if they involve the evaluation, specification, design or change in design, operation, or performance of structures, systems, and components which must function directly, or must support other systems which function, to ensure any of the following:

- *The integrity of the reactor coolant pressure boundary*
- *The capability to shut down the reactor and maintain it in a safe shutdown condition*
- *The capability to prevent or mitigate the consequences of accidents which could result in potential offsite radiation exposures greater than accepted limits.*

On this basis, permanent penetration seal materials used in this test program shall be procured by AREVA or supplied by MOX Services and suitably base-lined so that future procurements of the same commercial materials can undergo the commercial grade dedication process in support of Nuclear Safety Related (i.e., MOX QL-1) plant installations. Only the primary seal material specified as a part of the final seal design and which are left in place during testing become an integral part of the seal assembly and need to be base lined for future dedication of similarly procured materials.

The quality level of the penetration seal materials procured for this test plan is **Non-Safety**.

Note: Commercial Grade Dedication (CGD) must be performed for Commercial Grade Items (CGIs) used in Safety Related applications when procured from suppliers where specific quality controls for nuclear applications cannot be imposed in a practical manner in accordance with 56-9141754-001, *AREVA NP Inc. Quality Assurance Program* [Reference 12.4]. However, none of the seal materials to be procured and used in the test program are intended or approved for installation in the MOX facility. Therefore, CGD of penetration seal materials used for test purposes is not required.

For this pressure test, the following materials shall be procured by AREVA and base-lined for future dedication activities.

1. Dow Corning Sylgard® 170 Silicone Elastomer (DC-170)
2. Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC)
3. Dow Corning® 790 Silicone Building Sealant
4. Dow Corning® 732 Multi-Purpose Sealant

5.2 Test Deck/Test Slab

The test deck will be used to simulate a containment zone or HVAC boundary in which the penetration seal assemblies may be installed. The test deck is not considered an integral part of the penetration seal assembly being tested and therefore is not intended to replicate MOX-specific plant conditions and not considered integral in bounding the performance of the penetration seal assemblies (e.g., concrete blend, compressive strength, rebar size and spacing). The test deck will be comprised of normal weight reinforced concrete.

The openings cast into the test deck will simulate certain features consistent with MOX penetrations (e.g., painted or coated interior finishes, beveled edges, etc.) as defined by the test plan drawings contained in Appendix A.

The testing laboratory shall be responsible for procuring all materials and components associated with the construction of the test deck, unless otherwise specified below. The test deck shall comply with the

requirements of the approved test plan drawings contained in Appendix A, and in accordance with the testing facility's Quality Assurance Program.

The quality level of the test deck is **Non-safety**.

5.3 Penetrating Items

Penetrating items (e.g., pipe and sleeves) will be used in this pressure test to simulate MOX-specific plant commodities during the pressure test but are not considered an integral part of the penetration seal assemblies being tested. Therefore, the quality level of the penetrating items is **Non-safety**.

Penetrating items for this pressure test will come from one of two sources: MOX Services or the testing laboratory. MOX Services supplied items are identified on the MOX Services Bill of Materials in Section C.2 of Appendix C. Items provided by the testing laboratory are identified on the Testing Laboratory Bill of Materials in Section C.3 of Appendix C.

6.0 SPECIAL PRECAUTIONS

6.1 Precautions for Construction of Test Assemblies

Observe testing facilities safe work practices for construction, lifting, and moving of test assemblies.

6.2 Precautions for Installation of Seal Assemblies

Observe specific precautions recommended by seal material manufacturers as noted on product literature and material safety data sheets contained in AREVA NP Inc. Document 01-9198306, *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

6.3 Precautions for Conducting Pressure Tests

Proper safety precautions shall be exercised to preclude personnel from direct exposure to loss of pressure events, unexpected disengaging of testing equipment from the test deck, and all other related hazards.

7.0 PREREQUISITES

7.1 General Test Configuration Requirements

The test assembly, including slab layout and penetration seal configurations shall be as specified by AREVA and in accordance with the drawings and information contained in Appendix A of this test plan, and AREVA NP Inc. Document 01-9198306, *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

7.2 Safety Related Materials

Penetration seal materials that are purchased **Non-Safety** for this test program but are to be base-lined for future Nuclear Safety Related via the Commercial Grade Dedication process are indicated on the AREVA Bill of Materials (Appendix C.1).

7.3 Dimensioned Drawings

All test articles shall conform to the dimensioned drawings supplied by AREVA and contained in Appendix A & Appendix B of this test plan. Any differences between designed and constructed/tested assemblies shall be noted in final drawings contained within the test report.

7.4 Test Configuration

All test articles shall be securely fastened to the test apparatus by the laboratory. All openings shall be sealed in accordance with test plan instructions, drawings (Appendix A & Appendix B) and AREVA Document 01-9198306 [Reference 12.5].

8.0 TEST ASSEMBLY CONSTRUCTION

8.1 Test Slab Construction

The Testing Laboratory shall construct the test slab, including location and size of openings and placement of penetrating items, in accordance with the drawings contained in Appendix A of this Test Plan.

AREVA QC (or approved designee) shall conduct an inspection of the test slab for compliance with the approved Test Plan drawings prior to installation of individual penetration seal test assemblies. Any differences between the approved Test Plan drawings and the as-built test slab configuration shall be corrected (if deemed necessary by the ARVEA Test Engineer) or noted by the QC Inspector (if correction is not required). Completion of this verification shall be documented as required by AREVA NP Inc. Document 01-9198306, *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

8.2 Penetration Seal Installation

AREVA (or approved designee) shall install the penetration seal test assemblies in accordance with the drawings contained in Appendix A of this Test Plan and in accordance with AREVA NP Inc. Document 01-9198306, *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

QA/QC verification of penetration seal installations shall be documented as required by AREVA NP Inc. Document 01-9198306, *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

8.3 Pre-Test Verifications

Prior to conducting the pressure test for each test assembly, the AREVA Test Engineer shall sign-off indicating that the test article (test penetration) is complete and ready for testing as required by AREVA NP Inc. Document 01-9198306, *Installation Instruction Manual for MOX Penetration Seal Test Program* [Reference 12.5].

9.0 PROCEDURE

9.1 Pressure Test Apparatus

The pressure test apparatus to be used for these pressure tests shall be constructed and maintained by the testing laboratory. Two hemispherical 72" diameter steel pressure vessels shall be used to construct the assembly. One side shall be used to induce the testing pressures above atmospheric pressure based on Table 9-1, while the other side shall measure the pressure increase or "leakage" through the penetration. The test apparatus shall be "leak-tight" and substantial enough to withstand the pressures created for test purposes. Attachment shall be sufficient to withstand the forces imposed on the pressure vessels during the test.

9.2 Process

The anticipated differential pressures, as they apply to MFFF penetration seal designs, are discussed in DCS01-BRA-DS-TRD-B-01365-0 [Reference 12.6]. Depending upon its location in the plant, a penetration seal may be subjected to differential pressures from one or more of the following sources:

- Clean agent suppression system discharge (inadvertent or in response to a fire)
- Normal HVAC operation in support of facility confinement zone separation
- Fire induced pressure
- HVAC pressure boundary

The full range of differential pressures under various conditions is identified in Calculations DCS01-XGA-DS-CAL-B-01105-0 [Reference 12.7], DCS01-ASI-DS-CAL-R-10552-0 [Reference 12.8], and DCS01-QJJ-DS-CAL-V-10421-0 [Reference 12.9].

The pressure levels specified in Table 9-1 are to be used in the pressure tests. These pressures are intended to bound a range of calculated differential pressures anticipated based on the various pressure conditions described above and detailed in the referenced calculations, with additional margin. The bounding differential pressures to be used for each penetration seal pressure test, the test hold time at each pressure, the acceptance criteria to be considered "sufficiently leak-tight", and the basis for each pressure, are identified in Table 9-1.

A hold time of 30 minutes has been established for each pressure level to ensure that sufficient time at pressure is maintained to; 1) confirm that no leakage occurs at that pressure, or 2) stabilize make up air and attain reasonably accurate leakage rate information for those configurations where leakage is detected.

Table 9-1: Differential Pressure Test Levels

Test Stage	Differential Pressure (inch w.g.)	Required Hold Time (minutes)	Acceptance Criteria	Basis for the Selected Differential Pressure
1	1.0	30	Leakage ≤ 0.01 cfm/sq. ft. of penetration area	Testing at this differential pressure bounds the 0.51 inches w.g. pressure for C3b to C2 areas during normal operation [Reference 12.10].
2	5.0	30	Seal Remains In Place	Testing at this differential pressure bounds the 4.0 inches w.g. pressure anticipated as a result of clean agent suppression system discharge [Reference 12.8].
3	10.0	30	Seal Remains In Place	Testing at this differential pressure bounds the 7.0 inches w.g. pressure used as the screening pressure cutoff for fire induced pressures [References 12.8 and 12.9] and some of the HVAC pressure boundaries [Reference 12.10].
4	20.0	30	Seal Remains In Place	Testing at this differential pressure bounds all of the calculated fire induced pressures [Reference 12.9] and many of the HVAC pressure boundaries [Reference 12.10].
5	40.0	30	Seal Remains In Place	Testing at this differential pressure bounds all of the HVAC pressure boundaries [Reference 12.10].

Each test assembly shall be attached to the pressure test apparatus and subjected to the pressures identified in Table 9-1 as described below.

9.2.1 The test assembly shall be attached to the pressure test apparatus and subjected to air pressure tests at the select pressure levels identified in Table 9-1, beginning with the Stage 1 pressure of 1.0 inches w.g. Once this pressure has been obtained, the pressure shall be maintained for the hold time specified in Table 9-1. The maximum leakage rate observed during the hold time shall be recorded. If the leakage rate exceeds the acceptance criteria during Stage 1 testing, the time of failure shall be noted and the test shall be continued, since leakage alone does not constitute failure after Stage 1.

9.2.2 Once the designated hold time has been achieved, the pressure shall be increased to the next pressure level identified in Table 9-1 (Stage 2, then Stage 3, then Stage 4 and finally Stage 5) and held for the designated hold time. The maximum leakage rate observed during each hold time shall be recorded.

9.2.3 Following completion of Stage 5 pressure testing, the test may continue at the discretion of the AREVA test engineer and the testing laboratory manager in charge. Subsequent pressures, hold times and maximum leakage rates shall be recorded as directed by the AREVA test engineer.

9.2.4 If at any pressure level (or test stage) the penetration seal becomes dislodged from the opening or otherwise catastrophically fails, the pressure test shall be terminated and the time to failure and pressure at which the failure occurred shall be recorded.

NOTE: If at any time during any test stage leakage should occur such that there is insufficient make-up air to achieve/maintain the required differential pressure, then Pressure Test 8 test shall be stopped, the repair described below performed, and the test continued under the description of Pressure Test 8A to accumulate meaningful test data.

Test 8A Repair: Apply a bead of Dow Corning 732 caulk at the interface between leaking commodities and the silicone elastomer seal on the top side of the seal assembly. Re-install the top side pressure bonnet and allow the caulk to cure overnight before resuming the pressure test. All test data recorded from the repair forward shall be captured and classified as Pressure Test 8A.

9.3 Post Test Examination

Following completion of the pressure test, visual, non-destructive post-test examinations shall be performed. These examinations shall include, but not necessarily be limited to, the following:

Visual observations of penetration seal condition including:

- Integrity of seal and conditions on the exposed side of the penetration
- Integrity of seal and conditions on the unexposed side of the penetration
- Location of any penetration seal degradation
- Condition of seal to barrier interface
- Condition of seal to penetrating item interfaces

Once visual observations are complete, this test assembly shall be re-purposed for use in Seismic Pressure Test 6.

10.0 DATA SYSTEMS

During the pressure tests, the various data systems connected to the test apparatus (blowers, anemometers, manometers, etc.) shall be controlled and monitored by the testing laboratory. Data recorded for these components shall be compiled and contained in the pressure test report.

11.0 TEST REPORT

The testing laboratory shall submit a report on the results of the test. The test report shall contain the collected data and required quality control documentation. The final test report shall be prepared in sufficient detail to summarize the total testing activity. The final report shall include as a minimum:

- Date of test
- Location of test
- Description of test apparatus and test articles
- Calibration documentation for all data systems connected to the test apparatus
- Test procedures used
- Acceptance criteria
- Provide quality control records
- Results of the pressure test
- Color digital photographs of the test project

12.0 REFERENCES

12.1 Shaw AREVA MOX Services Calculation DCS01-QJJ-DS-CAL-V-13312-0, *Confinement Boundary Air Leakage Criteria*

12.2 Shaw AREVA MOX Services Procedure PP9-1, Revision 14, *SSC Quality Levels & Marking Design Documents*

12.3 AREVA NP Inc. Procedure 1702-25, Revision 018, *Assignment of Nuclear Safety Classification to Products and Services*

12.4 AREVA NP Inc. Document 56-9141754-001, *AREVA NP Inc. Quality Assurance Program*

12.5 AREVA NP Inc. Document 01-9198306 (latest revision), *Installation Instruction Manual for MOX Penetration Seal Test Program*

12.6 Shaw AREVA MOX Services Document DCS01-BRA-DS-TRD-B-01365-0, *Technical Requirements Document for MFFF Penetration Seals*

12.7 Shaw AREVA MOX Services Calculation DCS01-XGA-DS-CAL-B-01105-0, *BMF HVAC and Fire Induced Pressure Loads*

12.8 Shaw AREVA MOX Services Calculation DCS01-ASI-DS-CAL-R-10552-0, *Fire Induced Room Pressure Analysis*

12.9 Shaw AREVA MOX Services Calculation DCS01-QJJ-DS-CAL-V-10421-0, *Pressure Differentials Across Internal Barriers within the MOX Facility*

Retrieval of Reference Documents

References 12.1, 12.2, 12.6, 12.7, 12.8 and 12.9 of this document were not entered into the AREVA NP Records Management system because they can be retrieved using the Shaw AREVA MOX Services Records Management system. These documents have been authorized for use as design information in this document with the AREVA NP Project Manager's written authorization as indicated by the PM's signature on Page 2.

APPENDIX A: TEST DECK/TEST SLAB DRAWINGS

The test deck (test slab) for Pressure Test 8 is depicted on page A-2.

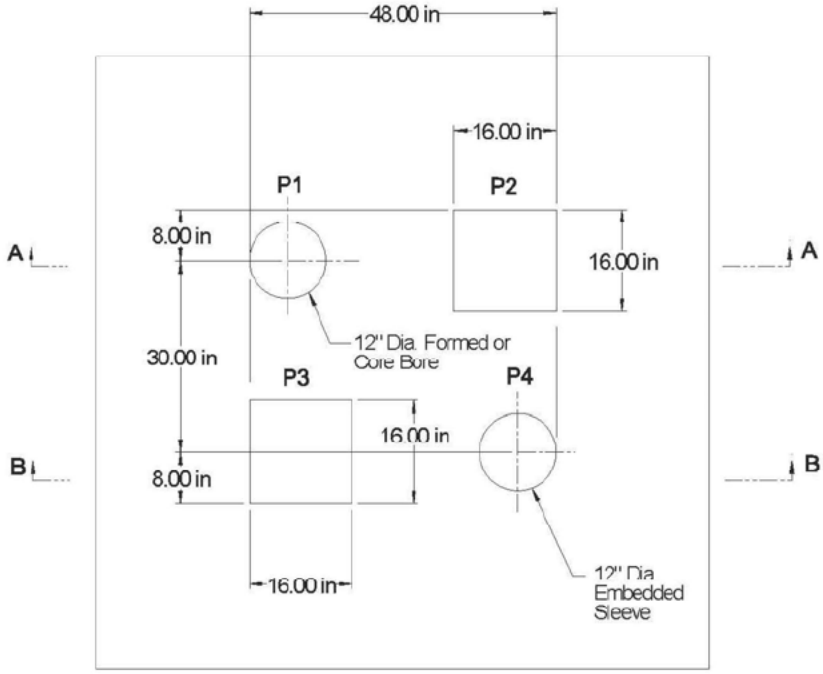
AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Pressure Test P8 Test Deck

Pressure Test P8



Section Views are on Page A-3.

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC.
3. 12" EMBEDDED SLEEVE TO BE CAST IN PLACE WITH STEEL LUGS.

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Pressure Test P8

Section A-A

Section B-B

NOTES.

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC.

Intertek

APPENDIX B: TEST PENETRATION DRAWINGS

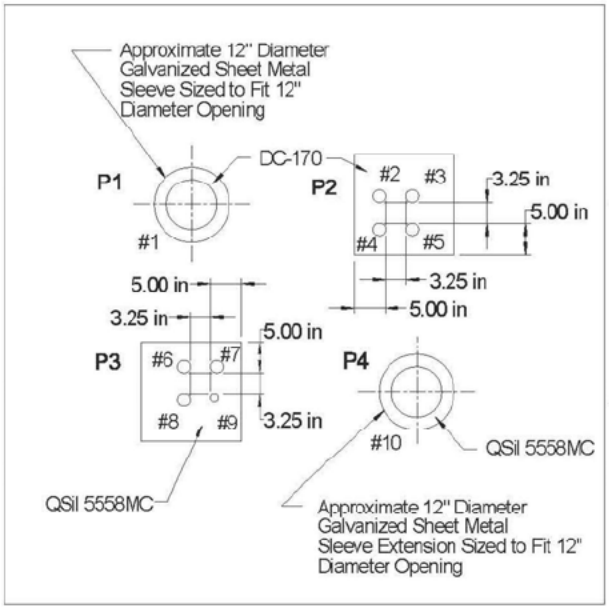
This appendix contains Test Penetration drawings. These drawings identify penetrating item locations within the test penetration, as well as, the penetration seal design for each test penetration.

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Pressure Test P8



Section Views are on
Pages B-4, and B-5.

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC.
3. 12" EMBEDDED SLEEVE TO BE CAST IN PLACE WITH STEEL LUGS.
4. FOR PENETRANT DESCRIPTIONS SEE PAGE P-3.

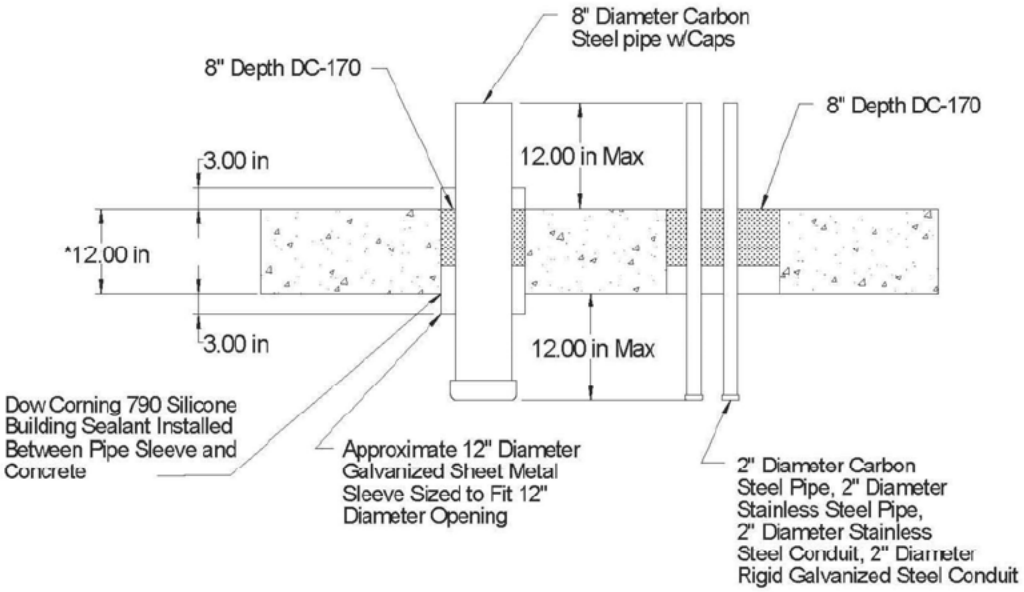
THE FOLLOING PIPING AND CONDUIT PENETRANTS ARE SHOWN ON PAGE B-2.

#1 8" DIAMETER CARBON STEEL PIPE
#2 2" DIAMETER CARBON STEEL PIPE
#3 2" DIAMETER STAINLESS STEEL PIPE
#4 2" DIAMETER STAINLESS STEEL CONDUIT
#5 2" DIAMETER RIGID GALVANIZED STEEL CONDUIT
#6 2" DIAMETER CARBON STEEL PIPE
#7 2" DIAMETER STAINLESS STEEL PIPE
#8 2" DIAMETER ZIRCONIUM PIPE
#9 1-1/4" DIAMETER TITANIUM PIPE
#10 8" DIAMETER CARBON STEEL PIPE

AREVA

Document No.: 51-9207462-000

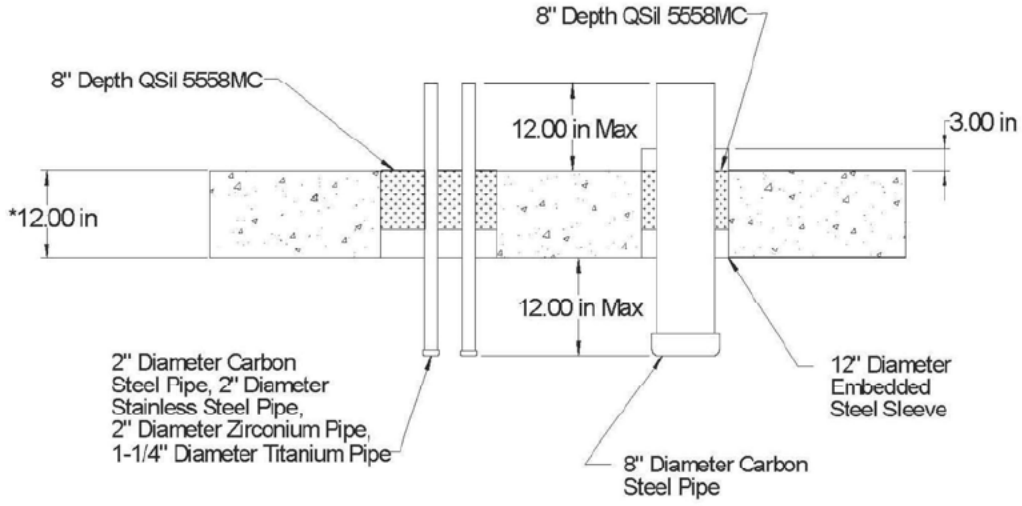
Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)



Section A-A

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC



Section B-B

NOTES:

1. TOLERANCE ON ALL SLAB DIMENSIONS IS +/- 1/4"
2. * INDICATES DIMENSIONS TO BE VERIFIED BY AREVA QC

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

APPENDIX C: BILL OF MATERIALS

This appendix contains the Bill of Materials for this fire test. The Bill of Materials in Section C.1 identifies materials to be provided by AREVA. The Bill of Materials in Section C.2 identifies materials to be provided by MOX Services. The Bill of Materials in Section C.3 identifies materials to be provided by Intertek.

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

C.1 Table Bill of Materials for AREVA Supplied Items

Bill of Material for AREVA Supplied Items					
Item	**Description**	**Part Number**	**Quantity**	**Units**	**Total**
1	Dow Corning® 790 Silicone Building Sealant	N/A	1	Case	1 Case*[2]
2	Quantum Silicones QSil 5558MC Silicone Elastomer (50lb part A, 50lb part B, 100lb set)	N/A	2	Set	2 Sets
3	Dow Corning Sylgard® 170 Silicone Elastomer (60lb part A, 60lb part B, 100lb set)	N/A	2	Set	2 Sets
4	Dow Corning® 732 Multi-Purpose Sealant	N/A	1	Case	1 Case*[2]

*[2] Previously purchased under other test plans.

C.2 Bill of Materials for MOX Services Supplied Items

Bill of Material for MOX Services Supplied Items					
Item	**Description**	**Part Number**	**Quantity**	**Units**	**Total**
	None				

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

C.3 Bill of Materials for Intertek Supplied Items

Bill of Material for Intertek Supplied Items*					
Item	**Description**	**Part Number**	**Quantity**	**Units**	**Total**
1	12" Diameter, 12' long, Schedule 40 Steel Pipe Sleeve (Cast-in-Place)	N/A	1	Sleeve	1 Sleeve *1
2	12-¼" Diameter, 18" long, 16 ga. galvanized sheet metal sleeve w/2" material overlap, open seam (not welded)	N/A	1	Sleeve	1 Sleeve *1
3	8" Diameter Schedule 40 Carbon Steel Pipe (2 @ 3 ft.)	N/A	6	Ft.	6 Ft *1
4	2" Diameter Schedule 40 Carbon Steel Pipe (2@ 3 ft.)	N/A	6	Ft.	6 Ft *1
5	2" Diameter Zirconium Pipe S-40S, Zirconium, SMLS, ASME SB658-R60702 (1@ 3 ft.)	N/A	3	Ft.	3 Ft *1
6	1 ¼" Diameter Titanium Pipe, S-40S, Titanium, SMLS, ASME SB861GR2 (1@ 3 ft.)	N/A	3	Ft.	3 Ft *1
7	2" Diameter Stainless Steel S-40S, 304L SS, SMLS, ASTM A312TP304L (2@ 3ft.)	N/A	6	Ft.	6 Ft *1
8	2" Diameter Galvanized Conduit- Calconduit or Equal (1@ 3ft.)	N/A	3	Ft.	3 Ft *1
9	2" Diameter Stainless Steel Conduit- Calbrite Stainless Steel Conduit Systems, Type 304 or Equal (1@ 3ft.)	N/A	3	Ft.	3 Ft *1

Page C-4

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

Bill of Material for Intertek Supplied Items*					
Item	**Description**	**Part Number**	**Quantity**	**Units**	**Total**
10	Steel Pipe Caps for 8" Diameter Schedule 40 Carbon Steel Pipe	N/A	2	Caps	2 Caps *1
11	Teflon Thread Seal Tape	N/A	1	Roll	1 Roll *1

* *This BOM applies to Intertek Supplied Items other than materials required to construct the test slab. Construction of the test slab, including procurement of any materials required for the test slab, is the responsibility of Intertek.*

*1 Check surplus and salvageable commodities from previous tests to determine if purchase is necessary.

Intertek

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

APPENDIX D: DESIGN VERIFICATION CHECKLIST

22410-8 (02/25/2013) *Page 1 of 2*

AREVA

DESIGN VERIFICATION CHECKLIST

Document Identifier 51 - 9207462 - 000

Title Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

1.	Were the inputs correctly selected and incorporated into design or analysis?	☒ Y	☐ N	☐ N/A
2.	Are assumptions necessary to perform the design or analysis activity adequately described and reasonable? Where necessary, are the assumptions identified for subsequent re-verifications when the detailed design activities are completed? Note: If there are no assumptions (of any type), then N/A shall be checked.	☐ Y	☐ N	☒ N/A
3.	Are the appropriate quality and quality assurance requirements specified? Or, for documents prepared per AREVA NP Inc. procedures, have the procedural requirements been met?	☒ Y	☐ N	☐ N/A
4.	If the design or analysis cites or is required to cite requirements or criteria based upon applicable codes, standards, specific regulatory requirements, including issue and addenda, are these properly identified, and are the requirements/criteria for design or analysis met?	☒ Y	☐ N	☐ N/A
5.	Have applicable construction and operating experience been considered?	☒ Y	☐ N	☐ N/A
6.	Have the design interface requirements been satisfied?	☒ Y	☐ N	☐ N/A
7.	Was an appropriate design or analytical method used?	☒ Y	☐ N	☐ N/A
8.	Is the output reasonable compared to inputs?	☒ Y	☐ N	☐ N/A
9.	Are the specified parts, equipment and processes suitable for the required application?	☒ Y	☐ N	☐ N/A
10.	Are the specified materials compatible with each other and the design environmental conditions to which the material will be exposed?	☒ Y	☐ N	☐ N/A
11.	Have adequate maintenance features and requirements been specified?	☐ Y	☐ N	☒ N/A
12.	Are accessibility and other design provisions adequate for performance of needed maintenance and repair?	☐ Y	☐ N	☒ N/A
13.	Has adequate accessibility been provided to perform the in-service inspection expected to be required during the plant life?	☐ Y	☐ N	☒ N/A
14.	Has the design properly considered radiation exposure to the public and plant personnel?	☐ Y	☐ N	☒ N/A
15.	Are the acceptance criteria incorporated in the design documents sufficient to allow verification that design requirements have been satisfactorily accomplished?	☒ Y	☐ N	☐ N/A
16.	Have adequate preoperational and subsequent periodic test requirements been appropriately specified?	☐ Y	☐ N	☒ N/A
17.	Are adequate handling, storage, cleaning and shipping requirements specified?	☒ Y	☐ N	☐ N/A
18.	Are adequate identification requirements specified?	☒ Y	☐ N	☐ N/A
19.	Is the document prepared and being released under the AREVA NP Inc. Quality Assurance Program? If not, are requirements for record preparation review, approval, retention, etc., adequately specified?	☒ Y	☐ N	☐ N/A

AREVA

Document No.: 51-9207462-000

Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)

22410-8 (02/25/2013) *Page 2 of 2*

AREVA

DESIGN VERIFICATION CHECKLIST

Document Identifier 51 - 9207462 - 000

Comments on the preceding responses:
N/A

Verified By:	Victor E. Kaldenbach	[redacted]	10/10/2013
(First, MI, Last)	Printed / Typed Name	Signature	Date

APPENDIX E
Commercial Grade Dedication-Related Documents

The vast majority of penetration seals that will be installed throughout the MFFF will be designated as quality level QL-1. For this reason, permanent penetration seal materials used in this test program were procured by AREVA or supplied by MOX Services and suitably base-lined so that future procurements of the same commercial materials can undergo the Commercial Grade Dedication process in support Nuclear Safety Related (i.e., MOX QL-1) plant installations.

Only the primary seal material(s) that were specified as a part of the final penetration seal design and left in place during the test needed to be base-lined for future dedication of similarly procured materials. For this fire test, the following AREVA documents contain information associated with materials that underwent the base-lining process. These documents establish material critical characteristics as a baseline for future Commercial Grade Dedication.

- AREVA Document 51-9212659-000, "Dow Corning Sylgard 170 Silicone Elastomer Critical Characteristics"
- AREVA Document 51-9212663-000, "Quantum Silicones QSil 5558MC Silicone Elastomer Critical Characteristics"

These documents are available from the AREVA Records Management System or the MOX Records Management System.

APPENDIX F
Quality Documents

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Seal Test Program

A.1 Quality Verification for Installation of Silicone Elastomer Penetration Seals

Page 1 of 2

01-9198306-F01 (QC-F01)

Attribute	Requirement	Initial / Date
7.1.2	Test Penetration Number 9207462 - P1	[redacted] 12/4/2013
QC	Verify critical attributes of the test slab and the applicable penetration are correct. Critical attributes are identified in the test plan (i.e., dimensions marked with an asterisk).	[redacted] 12/5/13
QC	Verify the dam depth is as specified in the test plan and confirm that the penetration is clean and free of dirt, oil, and any other foreign materials.	[redacted] 12/5/13
7.2.1.1	Record material type, lot number and shelf life for batch on Form QC-F01, Table A-1	Attached
7.2.1.3	Record the batch number on Form QC-F01, Table A-1	Attached
7.2.12	Record sample weight and sample density on Form QC-F01, Table A-1	Attached
QC	Verify the total sample weight recorded on the cup label, the sample weight recorded on the cup label and Form QC-F01, Table A-1, and sample density recorded on the cup label and Form QC-F01, Table A-1. Record acceptance on Form QC-F01, Table A-1.	Attached
7.3.2	Remove all temporary damming per Section 6.3	[redacted] 12/10/2013
QC	Verify that the completed seal assembly is in accordance with the test plan design (i.e., temporary damming has been removed, and the installed seal configuration(s) and depth(s) are per the test plan. **Any approved deviations from the test plan shall be clearly noted below.**	[redacted] 12/10/13

Comments (can be continued on back):

Penetration Seal Assembly Complete: [redacted] 12/11/13 Date

Penetration Ready for Testing: [redacted] 12/11/13 Date

AREVA Test Engineer

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Seal Test Program

Test Penetration Number 9207462-P1

Page 2 of 2

Form QC-F01, Table A-1: Silicone Elastomer Batch Sample Quality Control

Product Name	Lot Number	Shelf Life (Expiration)	Batch Number	Sample Weight (g)	Sample Density (lbs/ft^3)	QC Initial / Date
12/5 DC-170	073B01	09/31/14	073B01-DVR-130	140.9	79.5	[redacted] / 12-11-13

Intertek

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Seal Test Program

A.1 Quality Verification for Installation of Silicone Elastomer Penetration Seals

Page 1 of 2

01-9198306-F01 (QC-F01)

Attribute	Requirement	Initial / Date
7.1.2	Test Penetration Number 9207462-P2	[redacted] 12/4/2013
QC	Verify critical attributes of the test slab and the applicable penetration are correct. Critical attributes are identified in the test plan (i.e., dimensions marked with an asterisk).	[redacted] 12/5/13
QC	Verify the dam depth is as specified in the test plan and confirm that the penetration is clean and free of dirt, oil, and any other foreign materials.	[redacted] 12/5/13
7.2.1.1	Record material type, lot number and shelf life for batch on Form QC-F01, Table A-1	Attached
7.2.1.3	Record the batch number on Form QC-F01, Table A-1	Attached
7.2.12	Record sample weight and sample density on Form QC-F01, Table A-1	Attached
QC	Verify the total sample weight recorded on the cup label, the sample weight recorded on the cup label and Form QC-F01, Table A-1, and sample density recorded on the cup label and Form QC-F01, Table A-1. Record acceptance on Form QC-F01, Table A-1.	Attached
7.3.2	Remove all temporary damming per Section 6.3	[redacted] 12/10/2013
QC	Verify that the completed seal assembly is in accordance with the test plan design (i.e., temporary damming has been removed, and the installed seal configuration(s) and depth(s) are per the test plan. **Any approved deviations from the test plan shall be clearly noted below.**	[redacted] 12/10/13

Comments (can be continued on back):

Penetration Seal Assembly Complete: [redacted] 12/11/13 Date

Penetration Ready for Testing: [redacted] 12/11/13 Date

AREVA Test Engineer

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Seal Test Program

Test Penetration Number 920762-P2

Page 2 of 2

Form QC-F01, Table A-1: Silicone Elastomer Batch Sample Quality Control

	Product Name	Lot Number	Shelf Life (Expiration)	Batch Number	Sample Weight (g)	Sample Density (lbs/ft^3)	QC Initial / Date
12/5	DC-170	073B01	07/31/14	073B01-DVR-128	140.9	79.5	[redacted] / 12-11-13
"	"	"	"	" " -129	141.3	79.7	[redacted] / 12-11-13
"	"	"	"	" " -130	140.9	79.5	[redacted] / 12-11-13

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Seal Test Program

A.1 Quality Verification for Installation of Silicone Elastomer Penetration Seals

Page 1 of 2

01-9198306-F01 (QC-F01)

Attribute	Requirement	Initial / Date
7.1.2	Test Penetration Number 9207462-P3	[redacted] 12/4/2013
QC	Verify critical attributes of the test slab and the applicable penetration are correct. Critical attributes are identified in the test plan (i.e., dimensions marked with an asterisk).	[redacted] 12/4/13
QC	Verify the dam depth is as specified in the test plan and confirm that the penetration is clean and free of dirt, oil, and any other foreign materials.	[redacted] 12/4/13
7.2.1.1	Record material type, lot number and shelf life for batch on Form QC-F01, Table A-1	Attached
7.2.1.3	Record the batch number on Form QC-F01, Table A-1	Attached
7.2.12	Record sample weight and sample density on Form QC-F01, Table A-1	Attached
QC	Verify the total sample weight recorded on the cup label, the sample weight recorded on the cup label and Form QC-F01, Table A-1, and sample density recorded on the cup label and Form QC-F01, Table A-1. Record acceptance on Form QC-F01, Table A-1.	Attached
7.3.2	Remove all temporary damming per Section 6.3	[redacted] 12/10/2013
QC	Verify that the completed seal assembly is in accordance with the test plan design (i.e., temporary damming has been removed, and the installed seal configuration(s) and depth(s) are per the test plan. **Any approved deviations from the test plan shall be clearly noted below.**	[redacted] 12/10/13

Comments (can be continued on back):

Penetration Seal Assembly Complete: [redacted] 12/11/13 Date

Penetration Ready for Testing: [redacted] 12/11/13 Date

AREVA Test Engineer

Page A-2

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Seal Test Program

Test Penetration Number 9207462-P3

Form QC-F01, Table A-1: Silicone Elastomer Batch Sample Quality Control

	Product Name	Lot Number	Shelf Life (Expiration)	Batch Number	Sample Weight (g)	Sample Density (lbs/ft³)	QC Initial / Date
12/4	QSil5558MC	130912	09/30/14	130912-DVR-118	146.1	82.4	[redacted] 12-11-13
"	"	"	"	" " -119	141.3	79.7	[redacted] 12-11-13
"	"	"	"	" " -120	143.0	80.7	[redacted] 12-11-13

Intertek

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Seal Test Program

A.1 Quality Verification for Installation of Silicone Elastomer Penetration Seals

Page 1 of 2

01-9198306-F01 (QC-F01)

Attribute	Requirement	Initial / Date
7.1.2	Test Penetration Number 9207462-P4	[redacted] 12/4/2013
QC	Verify critical attributes of the test slab and the applicable penetration are correct. Critical attributes are identified in the test plan (i.e., dimensions marked with an asterisk).	12/4/13
QC	Verify the dam depth is as specified in the test plan and confirm that the penetration is clean and free of dirt, oil, and any other foreign materials.	12/4/13
7.2.1.1	Record material type, lot number and shelf life for batch on Form QC-F01, Table A-1	Attached
7.2.1.3	Record the batch number on Form QC-F01, Table A-1	Attached
7.2.12	Record sample weight and sample density on Form QC-F01, Table A-1	Attached
QC	Verify the total sample weight recorded on the cup label, the sample weight recorded on the cup label and Form QC-F01, Table A-1, and sample density recorded on the cup label and Form QC-F01, Table A-1. Record acceptance on Form QC-F01, Table A-1.	Attached
7.3.2	Remove all temporary damming per Section 6.3	[redacted] 12/10/2013
QC	Verify that the completed seal assembly is in accordance with the test plan design (i.e., temporary damming has been removed, and the installed seal configuration(s) and depth(s) are per the test plan. **Any approved deviations from the test plan shall be clearly noted below.**	[redacted] 12/10/13

Comments (can be continued on back):

Penetration Seal Assembly Complete: [redacted] 12/11/13 Date

Penetration Ready for Testing: [redacted] AREVA Test Engineer 12/11/13 Date

Page A-2

AREVA

Document No.: 01-9198306-004

Installation Instruction Manual for MOX Penetration Sea Test Program

Test Penetration Number 9207462-P4

Form QC-F01, Table A-1: Silicone Elastomer Batch Sample Quality Control

Product Name	Lot Number	Shelf Life (Expiration)	Batch Number	Sample Weight (g)	Sample Density (lbs/ft³)	QC Initial / Date
12/4 QSIL5558MC	130912	09/30/14	130912-DVR-120	143.0	80.7	[redacted] / 12-11-13

PCI PROMATEC

PO Box 710290, Houston, TX 77271-0290
11707 S Sam Houston Parkway W, Ste K, Houston, TX 77031
Phone: 281-933-7222 Fax: 281-933-7774
info@promatec.com
www.promatec.com

CERTIFICATE OF CONFORMANCE

CERTIFICATION NUMBER:	45550/13-671	CERT DATE:	JULY 17, 2013
JOB NUMBER:	2860	SHIP DATE:	JULY 17, 2013
CUSTOMER:	AREVA NP INC. c/o INTERTEK TESTING SERVICES NA, INC. 16015 SHADY FALLS ROAD ELMENDORF, TX 78112-9784	PRODUCT:	DC-170 Dow Corning® Sylgard 170 Elastomer; Part A&B 50/50 Blend
CUSTOMER ORDER NUMBER:	P.O. No. 1013037393, Rev. 01 ITEM 1	VENDOR:	PCI PROMATEC
CUSTOMER SPECIFICATION NUMBER:	N/A	QUANTITY:	5 SETS @ 100lbs PER SET (Consisting of 2 each 6 gallon pails per kit)
IDENTIFICATION NUMBER:	DC-170-073B01 PART A & B	EXPIRATION DATE:	31 JULY 2014

CERTIFICATION REQUIREMENTS:

We hereby certify that all items furnished herein meet the requirements of the applicable product specifications, the above referenced customer order number, and supporting specifications. Vendor material certification on file and available upon written request.

Shelf Life – Twelve (12) months from date of certification, last day of the month.

This material is provided in accordance with Promatec Quality Assurance Program QAM20188, Issue F, dated 06/20/03.

[redacted]

QUALITY ASSURANCE DEPT.
DORCAS SMITHWICK COMBS
QUALITY ASSURANCE MANAGER

Form QC-8
Rev. 5 – 11/01/88

WORLD-CLASS CONSTRUCTION®

QSil 5558MC Certificate of Conformance

Product	QSil 5558MC
Batch Identification	130912
Purchase Order	1013038872
Shipping Address	Areva
Quantity	1500
Specification Number	

Final Batch Physicals

Tests	Specifications	Results
Appearance "A"	Black	Black
Appearance "B"	Beige	Beige
Viscosity "A" component, cps #5 Spindle @ 20rpm	<4,000	2,940 cps
Viscosity "B" component, cps # 5 Spindle @ 20 rpm	<4,000	2,100 cps
Specific Gravity "A" component (g/cm^3)	1.35-1.40	1.38
Specific Gravity "B" component (g/cm^3)	1.35-1.40	1.37
Catalyzed Properties 1:1 Mix Ratio		
Work Time, (snap time), minutes	20-40	24 min
Shore A, 24 hour	>45	62
QSi Heat Cured Method 15 min. @ 150°C		
Tensile strength, psi	>400	436
Elongation, %	>75	78
Young's Modulus	Report	493
General Product Information		
Date of Manufacture	9/23/13	
Shelf Life, months	12 months from date of shipment if stored at ≤38C (100F).	

Storage Conditions: This material should be stored in the original, unopened container at less than 100F. Under these conditions, the material will be useful for a period of 12 months.

QSi Batch Release Authorization: [redacted]
Quality Control
QSi, LLC

Quantum Silicones certifies that the material described above has been tested in accordance with the company's standard lot acceptance procedures. This is to certify that the above shipment has been determined to meet all QSi specification requirements at the time of manufacture. This certification applies only to the material lot tested. Lot acceptance data are available for examination. This material has not been subjected to tests appropriate for medical device or pharmaceutical applications. QUANTUM SILICONES MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE WITH RESPECT TO THE PRODUCT TO WHICH THE ABOVE INFORMATION REFERS. [This Certificate is valid unsigned.]

Quantum Silicones, LLC
8021 Reycan Road
Richmond, VA 23237
(804)271-9010
Fax (804)271-9055
www.quantumsilicones.com

Date of shipment 9/30/2013

REV-3
9/26/13

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101147165SAT-001
Received From: Areva NP c/o PCI-Promatec
Project Location: INTERTEK –Elmendorf, TX

Report No: 19-G101147165SAT-001
Date Received: 7/18/2013
Date Inspected: 7/19/2013
Inspected By: MABrown [redacted]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cont. Matl Y/N	Cert. Recd Y/N	Safety Req'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
5 gallon pails - DC-170 Part "A" Lot # DC 170-073B01A	Client	5	5	–	SAT1307181752-001	Y	Y	Y	G	✓			Receiving Only: Stored in the Conditioning Room
5 gallon pails - DC-170 Part "B" Lot # DC 170-073B01B	Client	5	5	–	SAT1307151112-002	Y	Y	Y	G	✓			

9/12-NQAP-005.7.1

Intertek

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101266224SAT-003B
Received From: Areva NP c/o Texas Specialty Steel
Project Location: INTERTEK –Elmendorf, TX

Report No: 03-G101266224SAT-003B
Date Received: 10/4/2013
Date Inspected: 10/6/2013
Inspected By: MABrow[redacted]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cont Matl Y/N	Cert. Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
5 gallon pails - QSIL 5558 MC "A" (50 lbs) Batch ID: 130912; Exp 9/30/14	(Client)	15	15	--	SAT1310041503-001	Y	Y	Y	G	✓			Receiving Only: Stored in the conditioning room
5 gallon pails - QSIL 5558 MC "B" (50 lbs) Batch ID: 130912; Exp 9/30/14	(Client)	15	15	--	SAT1310041503-002	Y	Y	Y	G	✓			

9/12-NQAP-005.7.1

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101147165SAT-001
Received From: Texas Specialty Steel
Project Location: INTERTEK –Elmendorf, TX

Report No: 20-G101147165SAT-001
Date Received: 8/12/2013
Date Inspected: 8/12/2013
Inspected By: MABrown [redacted]

ITEM DESCRIPTION	P.O. NO	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cont Matl Y/N	Cert. Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
18" x 4" x 10' stainless steel solid bottom cable tray	217862	1	1	–	SAT1308121554-001	Y	N	N	G	✓			Receiving Only: Stored in the Conditioning Room
18" x 4" x 10' galvanized steel solid bottom cable tray	217862	1	1	–	SAT1308121554-002	Y	N	N	G	✓			
36" x 4" x 10' stainless steel ladder back cable tray	217699	1	1	–	SAT1308121554-003	Y	N	N	G	✓			
36" x 4" x 10' galvanized steel ladder back cable tray	217699	1	1	–	SAT1308121554-004	Y	N	N	G	✓			
2" x 5' pipe, Sch 80 A106B	217699	1	1	–	SAT1308121554-005	Y	N	N	G	✓			
3" x 5' pipe Sch 40 SS-304	217699	1	2	–	SAT1308121554-006	Y	N	N	G	✓			
4" x 5' pipe Sch 80 A106B	217699	1	1	–	SAT1308121554-007	Y	N	N	G	✓			
6' x 5' pipe, Sch 80 A106B	217699	1	1	–	SAT1308121554-008	Y	N	N	G	✓			
8" x 5' pipe, Sch 40 A-106B	217699	1	1	–	SAT1308121554-009	Y	N	N	G	✓			
12" x 3' pipe, .375 wall, A106B	217699	1	1	–	SAT1308121554-010	Y	N	N	G	✓			
2" x 18"' stainless steel pipe 304	217700	2	2	–	SAT1308121554-011	Y	N	N	G	✓			
2" x 3' 16 GA Stainless steel sleeve	217700	1	1	–	SAT1308121554-012	Y	N	N	G	✓			
1/2" x 5' stainless steel pipe	217700	27	27	–	SAT1308121554-013	Y	N	N	G	✓			
2" x 5' pipe, Sch 80 A106B	217700	1	1	–	SAT1308121554-014	Y	N	N	G	✓			
2" x 5' stainless steel pipe, Sch 40	217700	3	3	–	SAT1308121554-015	Y	N	N	G	✓			
6" x 5' pipe, Sch 80 A106B	217700	3	3	–	SAT1308121554-016	Y	N	N	G	✓			
6" x 5' stainless steel pipe, Sch 10	217700	2	2	–	SAT1308121554-017	Y	N	N	G	✓			
2" x 5' pipe, Sch 80 A106B (Extra)			1		SAT1308121554-018								

9/12-NQAP-005.7.1

Intertek

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101147165SAT-001
Received From: Areva NP c/oTexas Specialty Steel
Project Location: INTERTEK –Elmendorf, TX

Report No: 28-G101147165SAT-001
Date Received: 8/19/2013
Date Inspected: 8/19/2013
Inspected By: MABrown [redacted]

ITEM DESCRIPTION	P.O. NO	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cont Matl Y/N	Cert Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
3" x 5" SS plates	**		4	–	SAT1308191239-001	Y	N	N	G	✓			Receiving Only:
3/8" x 1" SS bolts and nuts	**		2 x 16	–	SAT1308191239-002	Y	N	N	G	✓			
3" x 5" Galvanized plates	**		4	–	SAT1308191239-003	Y	N	N	G	✓			
3/8" x 1" galv bolts and nuts	**		1 x 32	–	SAT1308191239-004	Y	N	N	G	✓			
6" Diam Galvanized conduit cap	7700	3	4	–	SAT1308191239-005	Y	N	N	G	✓			
12-1/2" x 18" 16GA galv sleeve (open)	7700	2	2	–	SAT1308191239-006	Y	N	N	G	✓			
10" x 10" x 5' 16GA galv box, no lid	7700	1	1	–	SAT1308191239-007	Y	N	N	G	✓			
** Not identified w/ specific P.O.													

9/12-NQAP-005.7.1

Intertek

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101276459SAT-001
Received From: Areva NP c/o Texas Specialty Steel
Project Location: INTERTEK –Elmendorf, TX

Report No: 01-G101276459SAT-001B
Date Received: 9/18/2013
Date Inspected: 9/19/2013
Inspected By: MABrown [redacted]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO. [redacted]	Cont Matl Y/N	Cert. Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
8in sch. 40 x 3ft. BPE Pipe	218650Q	3	3		SAT1309181354-001, 2, 3	Y	N	N	G	✓			
4in sch. 40 x 3ft. BPE Pipe	218650Q	1	1		SAT1309181354-004	Y	N	N	G	✓			
8in Weldon	218650Q	3	3		SAT1309181354-005	Y	N	N	G	✓			
4in sch. 40 pipe cap	218650Q	1	1		SAT1309181354-008	Y	N	N	G	✓			

Receiving Only:

9/12-NQAP-005.7.1

Intertek

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101276459SAT-008
Received From: c/o Texas Specialty Steel
Project Location: INTERTEK –Elmendorf, TX

Report No: 01-G101276459SAT-008
Date Received: 11/21/2013
Date Inspected: 11/22
Inspected By: MAB [redacted]

	ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cont Matl Y/N	Cert. Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
7	2" S-40 304 SS - 3ft.	219486Q	1	1	--	SAT1311211826-001	Y	N	N	G	✓			Receiving Only
4	2" s-40 Carbon Pipe - 3ft	219486Q	1	1	--	SAT1311211826-002	Y	N	N	G	✓			

9/12-NQAP-005.7.1

Intertek

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Arena NP
Client or Project No.: G100982213SAT-001; G101147165SAT-001
Received From: Areva Federal Services
Project Location: INTERTEK –Elmendorf, TX

Report No: 03-G101147165SAT-001
Date Received: 6/3/2013
Date Inspected: 6/4/2013
Inspected By: MAB [redacted]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cont Matl Y/N	Cert. Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
15 ft Cable, Power, 2C#16AWG, 7/S TC	NA	15'	15'		SAT1306031307-001	Y	N	N	G	✓			Receiving Only
20 ft Cable, Control, 2/C#20AWG, 7/S TC	NA	20'	20'		SAT1306031307-002	Y	N	N	G	✓			
25 ft Cable, Instrument, 1 Shielded twisted pair 20AWG	NA	25'	25'		SAT1306031307-003	Y	N	N	G	✓			
1025 ft Cable,Power, 1C#750 KCMIL, 61/S TC	NA	1025'	1025'		SAT1306031307-004	Y	N	N	G	✓			
35 FT Cable,Power, 1C#500 KCMIL, 37/S TC	NA	35'	35'		SAT1306031307-005	Y	N	N	G	✓			
55 ft Cable,Power, 1C#2/0AWG, 19/S TC	NA	55'	55'		SAT1306031307-006	Y	N	N	G	✓			
175 ft Cable,Power, 2C#12AWG, 7/S TC	NA	175'	175'		SAT1306031307-007	Y	N	N	G	✓			
190 FT Cable,Control, 5/C#14AWG, 7/S TC	NA	190'	190'		SAT1306031307-008	Y	N	N	G	✓			
1100 FT Cable,Control, 37/C#16AWG, 7/S TC	NA	1100'	1100'		SAT1306031307-009	Y	N	N	G	✓			
300 ft Cable,Instr, 95TP 16AWG 7/S TC	NA	300'	300'		SAT1306031307-010	Y	N	N	G	✓			
30 ft Cable,Power 4C#2AWG, 7/S TC	NA	30'	30'		SAT1306031307-011	Y	N	N	G	✓			
15 ft Cable,Power, 2C#6AWG, 7/S TC	NA	15'	15'		SAT1306031307-012	Y	N	N	G	✓			
1155 Ft Cable,Control, 37/C#16AWG, 7/S TC	NA	1155'	1155'		SAT1306031307-013	Y	N	N	G	✓			
200 ft Cable,Power, 9C#12AWG, 7/S TC	NA	200	200		SAT1306031307-014	Y	N	N	G	✓			
90 ft Cable,Instr, 9STP 16AWG,7S TC	NA	90'	90'		SAT1306031307-015	Y	N	N	G	✓			
5 ft Pipe, 2 in Dia	NA	1	1		SAT1306031307-016	Y	N	N	G	✓			
5 ft Pipe 2 in Dia	NA	1	1		SAT1306031307-017	Y	N	N	G	✓			

9/12-NQAP-005.7.1

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101147165SAT-001
Received From: Areva Federal Services
Project Location: INTERTEK –Elmendorf, TX

Report No: 04-G101147165SAT-001
Date Received: 6/3/2013
Date Inspected: 6/4/2013
Inspected By: MAB [redacted]

ITEM DESCRIPTION	P.O. NC.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cert Matl Y/N	Cert. Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
5 ft Pipe 1 1/4 in Dia	Client	5'	5'	–	SAT1306031307-018	Y	N	N	G	✓			Receiving Only
20 ft 3/4" Galvanized Conduit	Client	20'	2x10'	–	SAT1306031307-019	Y	N	N	G	✓			
10 ft 3/4" SS Conduit (#E230584-IN)	Client	10'	10'	–	SAT1306031307-020	Y	N	N	G	✓			
20 ft 3" Galvanized Conduit	Client	20'	2x10'	–	SAT1306031307-021	Y	N	N	G	✓			
10 ft 3" SS conduit	Client	10'	10'	–	SAT1306031307-022	Y	N	N	G	✓			
10ft 4" SS Conduit (#E230584-IN)	Client	10'	10'	–	SAT1306031307-023	Y	N	N	G	✓			
10 ft 12"x4" Galvanized Ladder back cable tray	Client	10'	10'	–	SAT1306031307-024	Y	N	N	G	✓			
10 ft 12"x4" Galvanized Solid back cable tray	Client	10'	10'	–	SAT1306031307-025	Y	N	N	G	✓			
10 ft 24"x4" Galvanized ladder back cable tray	Client	10'	10'	–	SAT1306031307-026	Y	N	N	G	✓			
10 ft 24"x4" Galvanized solid back cable tray	Client	10'	10'	–	SAT1306031307-027	Y	N	N	G	✓			
10 ft 1" Galvanized conduit	Client	10'	10'	–	SAT1306031307-028	Y	N	N	G	✓			
10 ft 1" SS Conduit (#E230584-IN)	Client	10'	10'	–	SAT1306031307-029	Y	N	N	G	✓			
10 ft 2" Galvanized conduit	Client	10'	10'	–	SAT1306031307-030	Y	N	N	G	✓			
10ft SS Conduit (#E230584-IN)	Client	10'	10'	–	SAT1306031307-031	Y	N	N	G	✓			
10 Ft 4" SS Conduit (#E230584-IN)	Client	10'	10'	–	SAT1306031307-032	Y	N	N	G	✓			
10 Ft 24"x4" Galvanized Solid back cable tray	Client	10'	10'	–	SAT1306031307-033	Y	N	N	G	✓			

9/12-NQAP-005.7.1

Intertek

Q/A RECEIVING REPORT

Intertek

Client/Project Name: Areva NP
Client or Project No.: G101276459SAT-001
Received From: Areva NP c/o Texas Specialty Steel
Project Location: INTERTEK –Elmendorf, TX

Report No: 02-G101276459SAT-001B
Date Received: 9/30/2013
Date Inspected: 10/1/2013
Inspected By: MABrow [redacted]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B/O	I.D. NO.	Cont Matl Y/N	Cert. Rec'd Y/N	Safety Rel'd Y/N	Con. Integrity	ACCEPTANCE Accpt.	ACCEPTANCE Rej.	ACCEPTANCE Hold	REMARKS
8" x 14" rolled 16GA galvanized Steel Metal Sleeve	218683Q	1pc	1pc		SAT1309301458-001	Y	N	N	G	✓			Receiving Only:
12" x 18" rolled 16GA galvanized Steel Metal Sleeve	218683Q	1pc	1pc		SAT1309301458-002	Y	N	N	G	✓			
12" x 9" rolled 16GA galvanized Steel Metal Sleeve	218683Q	1pc	1pc		SAT1309301458-003	Y	N	N	G	✓			
12" x 14" rolled 16GA galvanized Steel Metal Sleeve	218683Q	1pc	1pc		SAT1309301458-004	Y	N	N	G	✓			
1/2" x 260" Teflon Tape (Oatey)	218683Q	1 roll	4 rolls		SAT1309301458-005	Y	N	N	G	✓			

9/12-NQAP-005.7.1

Intertek

LIST OF CALIBRATED EQUIPMENT

Description	Serial No.	Calibration Due Date
Thermo-Hygrometer	130548237	9/19/2015
Data Acquisition System	18041FE	1/16/2014*
Pressure Transducer	406707	3/26/2014*
Mass Flowmeter	4270050001001	2/1/2014*
Mass Flowmeter	4270050003001	2/1/2014*
Stop watch	130176939	3/29/15

*See Intertek Corrective Action Request (CAR) 51-AMER-SAT-2014-INT and AREVA Contract Variation Approval Request (CVAR) 87-9224669-000

Build B
Horizontal

ilac-MRA

ACCREDITED
Calibration
Certificate No. 1750.01

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Cert. No.: 4096-5373559

Traceable® Certificate of Calibration for Digital Humidity/Temp. Meter

Manufactured for and distributed by: Fisher Scientific, 300 Industry Drive, Pittsburgh, PA 15275-1001

Instrument Identification:

Model Numbers: 11-661-13, FB61254, 245C5 S/N: 130548237 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Chilled Mirror Hygrometer	31874/H2048MCR	6/14/15	11081
Digital Thermometer	41334977/41335007	9/26/13	4000-4643062

Certificate Information:

Technician: 104 Procedure: CAL-17 Cal Date: 9/19/13 **Cal Due: 9/19/15**
Test Conditions: 23.0°C 51.0 %RH 1013 mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
%RH		N.A.		42.95	42	Y	39	47	1.30	3.1:1
°C		N.A.		24.218	24	Y	23	25	0.590	1.7:1

This instrument was calibrated in compliance with ISO/IEC 17025:2005 and ANSI/NCSL Z540-1-1994 Part 1.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

The calibration results published in this certificate were obtained using equipment capable of producing results that are traceable to NIST and through NIST to the International System of Units (SI).

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min = As Left Nominal(Rounded) - Tolerance; Max = As Left Nominal(Rounded) + Tolerance; Date=MM/DD/YY

[redacted]

[redacted]

Maintaining Accuracy:

In our opinion once calibrated your Digital Humidity/Temp. Meter should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Humidity/Temp. Meters change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

This device was calibrated using a single test point. Should additional test points be required, please contact Control Company for factory calibration and re-certification traceable to National Institute of Standards and Technology.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

Control Company is an ISO 17025:2005 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01.
Control Company is ISO 9001:2008 Quality Certified by (DNV) Det Norske Veritas, Certificate No. CERT-01805-2006-AQ-HOU-RvA.
International Laboratory Accreditation Cooperation (ILAC) - Multilateral Recognition Arrangement (MRA).

Page 1 of 1 Traceable® is a registered trademark of Control Company

Certificate of Calibration

Certificate Number:	2994344	**Date:**	28-MAY-2014
Serial Number: **Description:**	18041FE CCA,USB-6210	**Part Number:**	194710E-04L
Calibration Date: **Calibration Due Date*:**	06-DEC-2012 -	**Shelf Life:** **Recommended Calibration Interval:**	0 Days 12 Months
Temperature:	22.26 °C	**Humidity:**	40.7% RH

Standards Used

Manufacturer	Model	Tracking Number	Calibration Date	Calibration Due
NATIONAL INSTRUMENTS	PXI-4070	6712	26-JUN-12	26-JUN-13
NATIONAL INSTRUMENTS	PXI-6259	6871	27-JUN-12	27-JUN-13
NATIONAL INSTRUMENTS	PXI-5421	7591	25-JUN-12	25-JUN-13
VAISALA	HMT331	7885	24-MAY-12	24-MAY-13

National Instruments certifies that at the time of test, the above product was calibrated in accordance with applicable National Instruments procedures. Th procedures are designed to ensure that the product listed above meets or exceeds National Instruments specifications.

We further certify that the environment in which this product was calibrated is maintained within the operating specifications of the instrument(s) standards. The measurement standards used during calibration are traceable to NIST and/or other International Measurement Institutes (NMI's) that signatories of the International Committee of Weights and Measure (CIPM) Mutual Recognition Agreement (MRA).

The information shown on this certificate applies only to the instrument identified above and this certificate may not be reproduced, except in full, withou prior written consent of National Instruments.

*Optional field. ***Calibration Due Date***, may be established by combining the *Recommended Calibration Interval*, *Calibration Date* and, when applic accounting for *Shelf Life*. Shelf life defines how long an instrument may be stored, after calibration, without impact to its specifications.

The instrument's Calibration Due Date can be calculated using the following methods:

a) If date placed in service is within *Calibration Date + Shelf Life*: *Calibration Due Date* = date placed in service + *Recommended Calibration Interval*

b) If date placed in service is outside *Calibration Date + Shelf Life*: *Calibration Due Date* = *Calibration Date + Shelf Life + Recommended Calibration Interval*

For questions or comments, please contact National Instruments Technical Support.

[redacted]

Andrew Krupp
Vice President, Quality and Continuous Improvement

OMEGADYNE INC.
CERTIFICATE OF CALIBRATION

Model Number: PX409-005DWUV
Serial Number: 406707
Date: 7/15/2011
Job: R3274

Capacity: 5.00 PSID
Excitation: 10.00 Vdc
Technician: KAPOME

Pressure Connection: 1/4-18 NPT Male

WIRING CODE

Electrical Connection: Integral Cable 4-Cond
BLACK = - EXCITATION
WHITE = + SIGNAL
GREEN = - SIGNAL
RED = + EXCITATION

CALIBRATION WORKSHEET

NOTES

Pressure PSID	OUTPUT mVdc
0.00	0.007
2.50	50.008
5.00	100.016
2.50	50.007
0.00	0.007

NIST Traceable Number(s): C-1954, C-1289

Omegadyne Inc. certifies that the above instrumentation has been calibrated and tested to meet or to exceed the published specifications. This calibration was performed using instrumentation and standards that are traceable to the National Institute of Standards and Technology. This document also ensures that all testing performed complies with MIL-STD 45662-A, ISO 10012-1, and ANSI/NCSL Z540-1-1994 requirements. After Final Calibration our products are stored in an environmentally controlled stock room and are considered in bonded storage. Depending on environmental conditions and severity of use, factory calibration is recommended every one to three years after the initial service installation date.

[redacted]
Accepted and Certified By

7/15/2011
Date

OMEGA ENGINEERING, INC.
An OMEGA Technologies Company
ONE OMEGA DRIVE, BOX 4047, STAMFORD, CT, U.S.A. 06907-0047
(203) 359-1660 TELEX: 996404 CABLE: OMEGA FAX: (203) 359-7700
http://www.omega.com e-mail: info@omega.com

CERTIFICATE OF ACCURACY

This is to certify that meter serial number 4270050001001 is certified to an accuracy of +/- 1 % of 20 SCFM of N2 and has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (N.I.S.T.) according to our procedures.

All traceable certifications and related procedures for the equipment used are on file.

Barometer Number:	n/a
Vol-U-Meter Number:	Base 1920 Cell 1898
Type of Gas:	N2
Gas Used for Calibration:	N2
Pressure Gauge Number:	1122
Timer Number:	n/a
Thermometer Number:	n/a
Voltmeter:	NA
Calibrated By:	[redacted]
Date Calibrated:	2-1-13

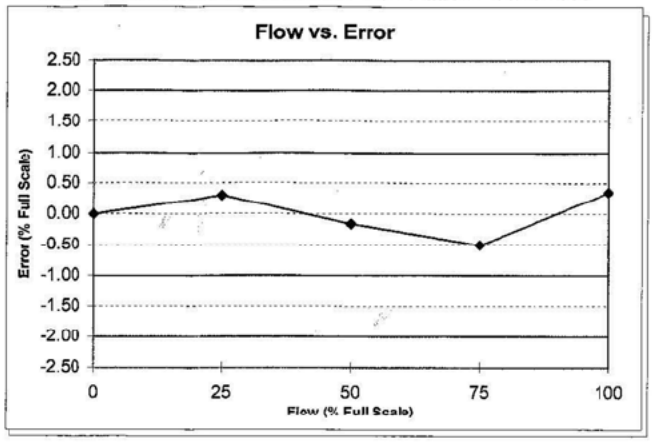
Uncertainty of measurements: +/- 0.3 % of reading

Calibrations were performed under a controlled Quality System Manual, which incorporates the requirements of ISO Guide 25, ISO 10012-1, ISO 9001 (1994) and ISO 13485. The released ISO 13485 registration (Medical Devices – Quality Management Systems – System Requirements for Regulatory Purposes) includes Design Controls and Metrology Systems.

0122220B FM-1011 REV B

OMEGA ENGINEERING, INC.
An OMEGA Technologies Company
ONE OMEGA DRIVE, BOX 4047, STAMFORD, CT, U.S.A. 06907-0047
(203) 359-1660 TELEX: 995404 CABLE OMEGA FAX: (203) 359-7700
http://www.omega.com e-mail: info@omega.com

Mass Flowmeter/Flow Controller Calibration Data Sheet



DATE	2/1/2013
TIME	7:59:59 AM
Shop Order No.	427005
Serial No.	4270050001001

Calibration Data

Setpoint (SLPM)	Flow Signal (Volts)	Device Flow (SLPM)	Actual Flow (SLPM)	% FS Error * (%)
00.00	0.000	00.00	00.00	0.00
05.00	1.253	05.01	05.07	0.30
10.00	2.502	10.01	09.98	-0.16
15.00	3.752	15.01	14.91	-0.50
20.00	5.000	20.00	20.07	0.35

* % Full Scale (FS) Error = (100)(Actual Flow - Device Flow) / Full Scale Flow

GAS

Nameplate (Actual)	Nitrogen
Surrogate (Calibration)	Nitrogen (N2)

STANDARD CONDITIONS

Std. Pressure	101.32 kPa (760 Torr)
Std. Temperature	21.1 °C

PRESSURE

Inlet (P_1)	20 PSIG
Outlet (P_2)	N/A

TEMPERATURE

Calib. Temperature	21.9 °C
Oper. Temperature	70 °F

Max. Flow Rate	20 SLPM
Gas Factor	1
Calibrator	MT
Flow Standard	PICO 1898-1
Unit Accuracy	1.0 FS & 0.0 Rate
Calib. Attitude	Horizontal (base down)

LEAK TEST DATA

Inboard (Externally Pressurized) Helium Leak Rate: < 1 x 10^{-8} atm cc/sec
Vacuum Pressure: < 5 milliTorr

Tested By: [redacted] **Date:** 1-1-13

FM-1119 Rev. K

OMEGA ENGINEERING, INC.
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ONE OMEGA DRIVE, BOX 4047, STAMFORD, CT, U.S.A. 06907-0047
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http://www.omega.com e-mail: info@omega.com

CERTIFICATE OF ACCURACY

This is to certify that meter serial number 4270050003001 is certified to an accuracy of +/- 1 % of 200 slpm of N2 and has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (N.I.S.T.) according to our procedures.

All traceable certifications and related procedures for the equipment used are on file.

Barometer Number:	1667
Vol-U-Meter Number:	613
Type of Gas:	N2
Gas Used for Calibration:	N2
Pressure Gauge Number:	1950
Timer Number:	1876
Thermometer Number:	985
Voltmeter:	NA
Calibrated By:	[redacted]
Date Calibrated:	2-7-13

Uncertainty of measurements: +/- 0.3 % of reading

Calibrations were performed under a controlled Quality System Manual, which incorporates the requirements of ISO Guide 25, ISO 10012-1, ISO 9001 (1994) and ISO 13485. The released ISO 13485 registration (Medical Devices – Quality Management Systems – System Requirements for Regulatory Purposes) includes Design Controls and Metrology Systems.

0122220B FM-1011 REV B

OMEGA ENGINEERING, INC.
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http://www.omega.com e-mail: info@omega.com

MASS FLOWMETER/FLOW CONTROLLER CALIBRATION DATA SHEET

SPECIFICATIONS

MODEL #: FMA-875A-V-NIST

SERIAL #: 4270050003001

FLOW RANGE: 200 SLPM

OPERATING TEMPERATURE: 70 F

NAMEPLATE (PROCESS) GAS: N2

SURROGATE (CALIBRATION) GAS: N2

STANDARD TEMPERATURE: 21.1 C

STANDARD PRESSURE: 101.32 kPa (760 Torr)

P1 (INLET PRESSURE): 20 PSIG

P2 (OUTLET PRESSURE): N/A

CALIBRATION TEMPERATURE: 18.7 C

CALIBRATION ATTITUDE (calibration attitude checked):

- ☒ Horizontal (base down)
- ☐ Horizontal (upside down)
- ☐ Horizontal (front down)
- ☐ Horizontal (back down)
- ☐ Vertical (inlet up)
- ☐ Vertical (inlet down)

CALIBRATION ACCURACY: ± 1 % OF FULL SCALE FLOW

CALIBRATION DATA

% FULL SCALE (Nominal)	FLOW SIGNAL OUTPUT (signal type checked) ☒ Vdc ☐ mAdc	STANDARD VOLUMETRIC FLOW (Units: SLPM)		ERROR * (% Full Scale)
		DEVICE	MEASURED	
100	5.000	200.000	200.079	.5395
75	3.750	150.000	149.317	-.3415
50	2.500	100.000	100.488	.2440
25	1.250	50.000	50.852	.4260
0	0.00	0.000	0.000	------

* % FULL SCALE ERROR = (100) (MEASURED FLOW - DEVICE FLOW) ÷ FULL SCALE FLOW

CALIBRATED BY: [redacted] DATE: 2-7-13

LEAK TEST DATA

INBOARD (EXTERNALLY-PRESSURIZED) HELIUM LEAK RATE: $\leq 1 \times 10^{-8}$ atm cc/sec

VACUUM PRESSURE: ≤5 millitorr

TESTED BY: [redacted] DATE: 2-1-13

FM-355-OE Rev. 0

[redacted] 9/4/13

Calibration
Certificate No. 1750.01

Calibration complies with ISO 9001
ISO/IEC 17025 AND ANSI/NCSL Z540-1

Cert. No.: 1045-5005294

Traceable® Certificate of Calibration for Watr/Shock Res Stpwch

Manufactured for and distributed by: Fisher Scientific, P.O. Box 1768, Pittsburgh, PA 15230

Instrument Identification:

Model: S40799-7 S/N: 130176939 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Non-Contact Frequency Counter	26.66879	7/02/13	1000320243

Certificate Information:

Technician: 150 Procedure: CAL-01 Cal Date: 3/29/13 **Cal Due: 3/29/15**

Test Conditions: 22.5°C 42.0 %RH 1020 mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
Sec/24hr		N.A.		0.000	-0.300	Y	-8.640	8.640	0.130	>4:1

This Instrument was calibrated using Instruments Traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min = Nominal(Rounded) - Tolerance; Max = Nominal(Rounded) + Tolerance; Date=MM/DD/YY

[redacted]

[redacted] Aaron Judice, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Watr/Shock Res Stpwch should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Watr/Shock Res Stpwchs change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

TEST ARTICLE ATTRIBUTE CHECKLIST

PROJECT NO: 6101276459-008 **CLIENT :** AREVA

Project Description PRESSURE #8

		SAT	UNSAT
I.	**ASSEMBLY**		
	Proper materials used	X	
	Material documentation complete	X	
	Configuration/dimensions in accordance w/ approved drawings	X	
	Description of assembly: MOX AREVA PRESSURE 8		
II.	**ELECTRICAL CABLE**		
	Correct material used	N/A	
	Material documentation complete		
	Correct cable lay-in and fill requirements		
	Description of electrical cable:		
III.	**THERMOCOUPLES**		
	Correct thermocouple type, certs received	N/A	
	Thermocouples positioned in accordance with test plan		
	Adequately labeled and secured		
	Quality Assurance verification done		
	Description of thermocouples:		
IV.	**FIRE BARRIER**		
	Name or type of material		
	INTERTEK received material documentation provided by Client	X	
	Materials provided by INTERTEK properly documented	X	
	Materials installed by INTERTEK in accordance with test plan	X	
	INTERTEK Quality Assurance responsibilities determined	X	
	QA responsibilities of Client installation determined	X	
	Moisture check required ..... Yes ___ No X		
	Special requirements		

V. FINAL PREBURN VERIFICATION

Final visual inspection & approval (initials) INTERTEK [redacted] Client [redacted]

CALIBRATION DOCUMENTATION (S/N and calibration due date)

Data Acquisition Equipment: ~~SEE TEST DATA PACKAGE~~

Other Measurement Devices:

Temperature 50 Humidity 48 Date 12/12/13 Time of Test start 10:08 A

INTERTEK pre-burn checklist performed by [redacted]

Client representative present to witness test [redacted]

Note: Verification to be made using initials by INTERTEK Quality Assurance or test personnel.

09-013-12/30/03

Intertek

TEST ACTIVITIES EVENT LOG

Note:
This Log is used to document the date and note the significant events during the completion of Test Project #G101276459SAT-008 for AREVA NP, Inc.

Page 1 of 1

ITEM	DATE	INIT'L
Concrete poured by Alamo Concrete	9/3/13	MD
Concrete conditioned	9/9/13	MD
Critical attributes of test slab verified	9/25/13	MD
Completed seal assemblies verified against the test plan	10/10/13	MD
Test conducted on the top (boot) side	10/18/13	MD
Pressure Test #6 conducted on the bottom (non-boot) side	10/21/13	MD
Seismic Test #4 conducted	10/22/13	MD
Test assembly re-purposed for Pressure Test #8		
Critical attributes of the test slab and applicable penetrations verified	12/4/13	MD
Begin pouring seals	12/4/13	MD
Finish pouring seals	12/5/13	MD
Completed seal assemblies verified against the test plan	12/10/13	MD
Pressure Test #8 conducted	12/12/13	MD

9/12 NQAP-007.7.3

Certificate of Conformance

Client Name: AREVA NP Inc. Date: July31, 2014

Project No: G101276459SAT-008

Intertek Testing Services NA (Intertek) has conducted testing for AREVA NP Inc., on the pressure resistance capabilities of Quantum Silicones QSil 5558MC Silicone Elastomer (QSil 5558MC) and Dow Corning® Sylgard 170 Silicone Elastomer (Sylgard 170) through a 12" thick concrete deck for compliance with the applicable requirements of and in accordance with AREVA NP Inc. Document No. 51-9207462-000, *Detailed Test Plan for Conducting MOX Pressure Test 8 and 8a (If Needed)*. This evaluation took place on December 12, 2013.

The materials, processes), and deliverable(s) in this project were managed under and conform to the test laboratory's 10CFR50 Appendix B Quality Assurance Program.

[redacted]

Michael A Brown
Quality Supervisor

July31, 2014
Date

Intertek Testing Laboratory
16015 Shady Falls Road, Elmendorf TX 78112
210-635-8100

Quality Assurance Statement

Intertek is devoted to engineering, inspection, quality assurance and testing of building materials, products and assemblies. Intertek has developed and implemented a Quality Assurance Program designed to provide its clients with a planned procedure of order and document processing for inspection and testing services it provides to assure conformity to requirements, codes, standards and specifications. The Program is designed to meet the intent of ANSI 45.2 Quality Assurance Program Requirements for Nuclear Power Plants, and complies with the requirements of the ASME Code, SPPE, Military Standards and other less stringent programs. It is the Laboratory's intention to adhere strictly to this Program, to assure that the services offered to its clients remains of the highest quality and accuracy possible.

All QA Surveillance documents remain on file at the Laboratory, and are available for inspection by authorized personnel in the performance of an on-site QA Audit. All materials, services and supplies used herein were obtained with appropriate QA Certifications of Compliance.

APPENDIX G
Supplemental Test Information

The following supplemental information has been included to provide clarity with respect to certain aspects of MOX Pressure Test 8.

Clarification of BOM Listing of DC-732 and DC-790 Materials

The concrete test deck used for Pressure Test 8 was the same concrete test deck previously used in Pressure Test 6 and Seismic Pressure Test 4 (see Intertek Test Report No. 101276459SAT-001B; AREVA document 58-9223133-000 for Pressure Test 6 and Intertek Test Report No. 101276459SAT-005; AREVA document 58-9224039-000 for Seismic Pressure Test 4).

Additionally, the galvanized steel sleeve insert installed in Penetration 1 of Pressure Test 6 was re-used in Pressure Test 8, since the sleeve was intact and undamaged from the previous tests. This sleeve was glued into the concrete opening using DC-790 silicone building sealant and the QC records for this sleeve reside in the final test report for Pressure Test 6. Similarly, the galvanized sleeve extension installed in Penetration 4 of Pressure Test 6 was re-used in Pressure Test 8, since the sleeve extension was intact and undamaged from the previous tests. This sleeve was glued into the cast-in-place carbon steel sleeve using DC-732 multi-purpose sealant and the QC records for this sleeve extension reside in the final test report for Pressure Test 6.

The Pressure Test 8 BOM listed DC-732 and DC-790 in the event that the Pressure Test 8 test assembly had to be completely re-built. Since the sleeve insert in Penetration 1 and the sleeve extension in Penetration 4 were intact and undamaged from Pressure Test 6 and Seismic Pressure Test 4, it was decided that these portions of the test assembly could be re-used for Pressure Test 8. Therefore, no new or additional DC-732 or DC-790 materials were needed for Pressure Test 8. However, the DC-732 and DC-790 materials left in place from Pressure Test 6 and Seismic Pressure Test 4 were considered part of the overall penetration seal assemblies being tested in Pressure Test 8.

The supplemental information contained in this appendix was provided by Scott Groesbeck, the AREVA Test Engineer responsible for the MOX Penetration Seal Test Program.

REVISION SUMMARY

DATE	SUMMARY
July 31, 2014	Original Issue Date