# THIRTY-SECOND EDITION, 2025

## LIST OF LEAK DETECTION EVALUATIONS FOR STORAGE TANK SYSTEMS


**https://neiwpcc.org/nwglde/**

# DISCLAIMER

**GENERAL**

Appearance on this list is not to be construed as an endorsement by any regulatory agency nor is it any guarantee of the performance of the method or equipment. Equipment should be installed and operated in accordance with all applicable laws and regulations.

This list of Leak Detection Evaluations was prepared by a work group consisting of State and EPA members and is limited to evaluations of leak detection equipment and procedures or systems, conducted by an "independent third-party evaluator" (see Appendix "Glossary of Terms") and reviewed by the work group. This list includes evaluations conducted in accordance with either EPA Standard Test Procedures for Evaluating Leak Detection Methods (EPA/530/UST-90/004 through 010) or other test procedures accepted by the NWGLDE as equivalent to the EPA standard test procedures (see Part III "Acceptable Test Protocols").

The National Work Group on Leak Detection Evaluations (NWGLDE) does not guarantee the performance of any leak detection method or equipment appearing on this List, nor does it warrant the results obtained through the use of such methods or equipment.

**SPECIFIC**

- The NWGLDE does not evaluate methods or equipment and appearance on this List does not mean they are automatically acceptable for use in any particular state or local jurisdiction.
- The NWGLDE List is not an EPA List, nor does appearance on this list constitute endorsement or approval by the NWGLDE or EPA. Anyone claiming that a device or method is "EPA approved" because it appears on this list is making a false claim.
- The NWGLDE makes no representations concerning the safe operation of any method or equipment. Users of any method or equipment appearing on this List assume full responsibility for the proper and safe operation of said equipment and assume any and all risks associated with its use.
- On each data sheet, this List reports parameters and data values for methods, equipment, and software that are specific to the most current third-party evaluation submitted to the NWGLDE. Subsequent modifications or changes to the method, equipment, or software may produce parameters and data values that are significantly different than the listed third-party evaluation parameters and data values. It is the responsibility of the local implementing agency to accept or reject those modifications or changes.
- NWGLDE Listings apply to leak detection functionality only and not material compatibility. Since long term material compatibility with the product stored is not addressed in test procedures and evaluations, the NWGLDE makes no representations as to the compatibility of leak detection equipment with the product stored.
- Unless specifically indicated on the individual data sheets, performance with alternative fuels has not been demonstrated **with the following exception:**

  **Biodiesel B6 through B20 meeting ASTM D7467 and biodiesel B100 meeting ASTM D6751** may be used with all equipment listed for diesel whether or not these alternative fuels are included on individual data sheets. This exception DOES NOT APPLY to leak detection test methods using Out-Of Tank Product Detection (Vapor Phase) for B6-B20, and Out-Of Tank Product Detection (Liquid and Vapor Phase) and any tracer-based test methods for B100. For these methods, individual data sheets will have to be referenced to determine applicability.
- Measurements derived for minimum detectable water level and minimum water level change for automatic tank gauge method, continuous automatic tank gauge method, and certain non-volumetric tank tightness test method listings were calculated in 100% hydrocarbon fuels, unless otherwise noted.
- NWGLDE listed leak detection equipment may be applicable for use with additional liquids after consultation with the manufacturer and/or third party evaluator and subject to approval by the implementing agency.

National Work Group On
Leak Detection Evaluations

The National Work Group on Leak Detection Evaluations (NWGLDE) is pleased to publish our 32nd Edition, 2025 of the "List of Leak Detection Evaluations for Storage Tank Systems." Please note, the NWGLDE has significantly changed the format of this List. All of our listings are kept current on our webpage: https://neiwpcc.org/nwglde/. As this webpage has the current listings and most users access our information through the much easier-to-navigate webpage, the NWGLDE will no longer be maintaining a full, printed List of all of the NWGLDE evaluations. Instead, the new "List" will simply be a list of the changes made to the evaluations and methods within the past year. Attached, please find only those listings that are new or updated since the previous publication (31st Edition, January 2024). Please use our webpage to access current information, listings, and methods.

For help with accessing anything on our web site, please contact our webmaster, David Wilson, at djwilson@utah.gov, or give him a call at (385) 251-0893.

If you need to contact members of the work group, information for contacting them may be found on our webpage (https://neiwpcc.org/nwglde/group-members/). The work group team and team leaders are also listed on our webpage to help you determine the appropriate contacts (https://neiwpcc.org/nwglde/team-members/).

Vendors should send new third-party evaluations, which were performed by an "independent third-party evaluator" (see Glossary of Terms on webpage), to be reviewed by the work group to the team leader and all of the members of the team. Please follow all requirements and policies for submittals and include all documentation for a more prompt review (available on our webpage).

Please note, all reviews and listings are conducted and prepared by the NWGLDE, an independent work group consisting of state and EPA members. It is not a work group specifically affiliated with EPA or any specific state. The NWGLDE does not "approve" leak detection equipment or procedures. The "List" includes leak detection equipment/procedures that the work group has reviewed. The review confirms that the leak detection equipment/procedures were third-party evaluated in accordance with an acceptable protocol and in accordance with the EPA performance standards under appropriate test conditions. Implementing agencies must approve leak detection equipment and procedures, ensure appropriate installation, and determine compliance with UST regulations.

Thank you and we look forward to working with you soon.

Don Taylor, Chair
National Work Group on Leak Detection Evaluations (NWGLDE)

# What's New Since the 31st Edition List, 2024 (02/05/2024)

**Most Recent Website Additions/Revisions:**

## PMP Corporation

- PMP Dual-point Hydrostatic Sensor 63303 and Mini-Hydrostatic Sensor 63304 as evaluated with the Veeder-Root TLS-350 (version 336 firmware)
  - *Added to Interstitial Detector (Liquid Phase), March 1, 2024*
- PMP Dual-point Hydrostatic Sensor 63303 and Mini-Hydrostatic Sensor 63304 as evaluated with the Veeder-Root TLS-450 Plus console Series 8600 (version 010.J.233.54 software)
  - *Added to Interstitial Detector (Liquid Phase), March 1, 2024*
- PMP Piping Sump Sensor 63228 and 63229 as evaluated with the Veeder-Root TLS-450 Plus console Series (version 010.J.233.54 software)
  - *Added to Interstitial Detector (Liquid Phase), March 1, 2024*
- PMP Tank Interstitial Sensors 63409, 63420, and 63460 as evaluated with the Veeder-Root TLS-450 Plus console Series (version 010.J.233.54 software)
  - *Added to Interstitial Detector (Liquid Phase), March 1, 2024*

## Veeder Root

- BFX1V, BFX1DV in the Big Flow or Submersible Packer Manifold (for Rigid, Semi-rigid, Flexible and Hybrid Pipelines)
  - *Added to Automatic Mechanical Line Leak Detector, February 13, 2024*

## Leak Detection Technologies

- PHDleak Pipeline Hydrostatic Diagnostic Test Method (Line Leak Detection Method for Airport Hydrant and Field Constructed Systems)
  - *Revised Listing June 20,2024*

**Franklin Fueling Systems**

- FMP-LS500 RS-485 and 4-20mA ELLD sensors with EVO Series consoles ( for Rigid, Flexible or Hybrid Combination of Rigid and Flexible Pipelines)
    - *Added to Automatic Electronic Line Leak Detector, December 12, 2024*

**Issue Date: March 1, 2024**

# PMP Corporation

## PMP Dual-point Hydrostatic Sensor 63303 and Mini-Hydrostatic Sensor 63304 as evaluated with the Veeder-Root TLS-350 (version 336 firmware)

## INTERSTITIAL DETECTOR (LIQUID-PHASE)

### Detector:

Output type: qualitative

Sampling frequency: continuous

Operating principle: float switch

### Test Results:

| | propylene glycol (in water) | ethylene glycol (in water) | calcium chloride (CaCl) (in water) | water |
|---|---|---|---|---|
| **Dual-Point Hydrostatic Sensor 63303** | | | | |
| Detection time (sec) | <1 | <1 | <1 | <1 |
| Fall time (sec) | <1 | <1 | <1 | <1 |
| Precision (in) | 0.00 | 0.00 | 0.00 | 0.01 |
| Detection Threshold | | | | |
| Low level (in) | 1.48 | 1.48 | 1.40 | 1.52 |
| High level (in) | 14.50 | 14.14 | 13.67 | 13.99 |
| **Mini-Hydrostatic Sensor 63304** | | | | |
| Detection time (min) | <1 | <1 | <1 | <1 |
| Fall time (min) | <1 | <1 | <1 | <1 |
| Precision (in) | 0.00 | 0.00 | 0.00 | 0.01 |
| Detection Threshold Level | | | | |
| Low level (in) | 1.18 | 1.18 | 1.18 | 1.18 |

### Comments:

63303 is a tall dual-point sensor that indicates both low-level and high-level conditions.
63304 is a shorter, stainless steel body sensor that only registers low-level liquid conditions.
These sensors were third party evaluated with a Veeder Root TLS-350 console (version 336 firmware).

PMP Corporation claims that these sensors will work with these other consoles: the TLS-450 series, TLS-4 series, TLS-350 series, TLS-300 series, ILS-350, Simplicity, Gilbarco EMC series, EMC Basic series, EMC-PC, Red Jacket ProMax and ProPlus.

PMP Corporation

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Evaluator: Solutions Engineering Group

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Montgomery, IL 60538-1367

Tel: (630) 701-7703

Date of Evaluations: 11/1/2023

**Issue Date: March 1, 2024**

# PMP Corporation

## PMP Dual-point Hydrostatic Sensor 63303 and Mini-Hydrostatic Sensor 63304 as evaluated with the Veeder-Root TLS-450 Plus console Series 8600 (version 010.J.233.54 software)

## INTERSTITIAL DETECTOR (LIQUID-PHASE)

### Detector:

Output Type: qualitative

Sampling Frequency: continuous

Operating principle: float switch

### Test Results:

| | propylene glycol (in water) | ethylene glycol (in water) | calcium chloride (CaCl) (in water) | water |
|---|---|---|---|---|
| **Dual-Point Hydrostatic Sensor 63303** | | | | |
| Detection time (sec) | <1 | <1 | <1 | <1 |
| Fall time (sec) | <1 | <1 | <1 | <1 |
| Precision (in) | | | | |
| Detection Threshold | | | | |
| Low level (in) | 1.39 | 1.43 | 1.19 | 1.45 |
| High level (in) | 14.18 | 14.08 | 13.86 | 14.12 |
| **Mini-Hydrostatic Sensor 63304** | | | | |
| Detection time (min) | <1 | <1 | <1 | <1 |
| Fall time (min) | <1 | <1 | <1 | <1 |
| Precision (in) | | | | |
| Detection Threshold Level | | | | |
| Low level (in) | 1.10 | 1.04 | 1.03 | 1.21 |

### Comments:

63303 is a tall dual-point sensor that indicates both low-level and high-level conditions.
63304 is a shorter, stainless steel body sensor that only registers low-level liquid conditions.
These sensors were third party evaluated with a Veeder Root TLS-450 Plus console Series 8600 (version 010.J.233.54 software).

PMP Corporation claims that these sensors will work with these other consoles: the TLS-450 series, TLS-4 series, TLS-350 series, TLS-300 series, ILS-350, Simplicity, Gilbarco EMC series, EMC Basic series, EMC-PC, Red Jacket ProMax and ProPlus.

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Date of Evaluations: 1/26/2024

**Issue Date: March 1, 2024**

# PMP Corporation

## PMP Piping Sump Sensor 63228 and 63229 as evaluated with the Veeder-Root TLS-450 Plus console Series (version 010.J.233.54 software)

### INTERSTITIAL DETECTOR (LIQUID-PHASE)

**Detector:**

Output type: qualitative
Sampling frequency: continuous
Operating principle: float switch

**Test Results:**

| **Piping Sump Sensor 63228** | premium gasoline | diesel* | water | E10 | E25 | E85 |
|---|---|---|---|---|---|---|
| Lower detection limit (in) | 1.24 | 1.16 | 1.17 | 1.29 | 1.25 | 1.25 |
| Precision (in) | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 |
| Detection time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |
| Recovery time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |
| **Piping Sump Sensor 63229** | | | | | | |
| Lower detection limit (in) | 1.24 | 1.16 | 1.17 | 1.29 | 1.25 | 1.25 |
| Precision (in) | 0.03 | 0.01 | 0.03 | 0.01 | 0.01 | 0.01 |
| Detection time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |
| Recovery time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |

*Evaluations determined these sensors' responses to the liquids shown above. Biodiesel blends B6-B20 meeting ASTM D7467 and biodiesel B100 meeting ASTM D6751 would also produce an alarm if the lower detection limit is exceeded. Responses to these fuels were not determined but would be expected to be very similar to the diesel responses.

**Comments:**

63228 & 63229 are identical except for cable length.

These sensors were third party evaluated with a Veeder Root TLS-450 Plus console Series 8600 (version 010.J.233.54 software).

PMP Corporation claims that these sensors will work with these other consoles: the TLS-450 series, TLS-4 series, TLS-350 series, TLS-300 series, ILS-350, Simplicity, Gilbarco EMC series, EMC Basic series, EMC-PC, Red Jacket ProMax and ProPlus.

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Date of Evaluations: 1/26/2024

**Issue Date: March 1, 2024**

# PMP Corporation

## PMP Tank Interstitial Sensors 63409, 63420, and 63460 as evaluated with the Veeder-Root TLS-450 Plus console Series (version 010.J.233.54 software)

### INTERSTITIAL DETECTOR (LIQUID-PHASE)

**Detector:**

Output type: qualitative
Sampling frequency: continuous
Operating principle: float switch

**Test Results:**

| **Fiberglass Tank Sensor 63409** | premium gasoline | diesel* | water | E10 | E25 | E85 |
|---|---|---|---|---|---|---|
| Lower detection limit (in) | 064 | 0.60 | 0.56 | 0.66 | 0.64 | 0.63 |
| Precision (in) | 0.03 | 0.02 | 0.03 | 0.02 | 0.04 | 0.03 |
| Detection time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |
| Recovery time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |
| | | | | | | |
| **Steel Tank Sensors 63420, 63460** | | | | | | |
| Lower detection limit (in) | 1.37 | 1.31 | 1.14 | 1.33 | 1.38 | 1.39 |
| Precision (in) | 0.01 | 0.01 | 0.01 | 0.03 | 0.03 | 0.01 |
| Detection time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |
| Recovery time (sec) | <1 | <1 | <1 | <1 | <1 | <1 |

*Evaluations determined these sensors' responses to the liquids shown above. Biodiesel blends B6-B20 meeting ASTM D7467 and biodiesel B100 meeting ASTM D6751 would also produce an alarm if the lower detection limit is exceeded. Responses to these fuels were not determined but would be expected to be very similar to the diesel responses.

**Comments:**

63420 & 63460 are identical except for cable length.
These sensors were third party evaluated with a Veeder Root TLS-450 Plus console Series 8600 (version 010.J.233.54 software).

PMP Corporation claims that these sensors will work with these other consoles: the TLS-450 series, TLS-4 series, TLS-350 series, TLS-300 series, ILS-350, Simplicity, Gilbarco EMC series, EMC Basic series, EMC-PC, Red Jacket ProMax and ProPlus.

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Date of Evaluations: 1/26/2024

**Issue Date: January 27, 2011**
**Revision Date: June 20, 2024**

# Leak Detection Technologies

## Pipeline Hydrostatic Diagnostic Test Method (PHDleak Test)

### Line Leak Detection Method for Airport Hydrant and Field Constructed Systems

**Certification**
Leak rate of 0.0017% of pipeline volume in pipeline segment being tested at a pressure of 150 psi with PD = 95% and PFA = 5%.

**Leak Threshold**
0.00085% of line volume in gph.
A pipeline system should not be declared tight if the test results indicate a loss that equals or exceeds the threshold.

**Applicability**
Gasoline, diesel, aviation fuel, fuel oil #4, solvents, waste oil, water.

**Specification**
System tests single or double-walled piping made of fiberglass, steel, and other materials.

**Pipeline Capacity**
The PHDleak Test 3rd party certified minimum detectable leak rate for bulk pipeline and hydrant systems is listed in the table below by maximum test section volume.

| | Leak Detection Rate Per Test Section Volume (EPA maximum allowable/PHDleak Test 3rd party certified) | | |
|---|---|---|---|
| Test Section Volume (Gallons) | EPA Semiannual Test Leak Detection Rate Not to Exceed (Gallons per Hour) | EPA Annual Test Leak Detection Rate Not to Exceed (Gallons per Hour) | PHDleak Test 3rd party certified minimum detectable leak rate (Gallons per Hour) |
| 5,001 to 29,412 | 1 | 0.5 | 0.5 |
| 29,413 to <50,000 | 1 | 0.5 | 1 |
| 50,000 to 58,824 | 1.5 | 0.75 | 1 |
| 58,825 to <75,000 | 1.5 | 0.75 | 1.5 |
| 75,000 to 88,236 | 2 | 1 | 1.5 |
| 88,237 to <100,000 | 2 | 1 | 2 |
| 100,000 to 117,648 | 3 | 1.5 | 2 |
| 117,649 to <125,000 | 3 | 1.5 | 2.5 |
| 125,000 to 147,060 | 3 | 1.5 | 2.5 |
| 147,061 to <150,000 | 3 | 1.5 | 3 |
| 150,000 to <175,000 | 3 | 1.5 | 3 |
| 175,000 to 176,472 | 3 | 1.5 | 3 |

* EPA semi-annual minimum detectable leak rate may be 6.0 gallons per hour until October 13, 2021 for pipe segments greater than 100,000 gallons. After October 13, 2021, the minimum detectable leak rate cannot exceed 3.0 gallons per hour.

**Waiting Time**
None between delivery and testing.
None between dispensing and testing.

**Test Period**
Minimum of 24 minutes after setup for data collection.
Pipeline segment being tested must be completely isolated and blocked during test.

**System Features**
System may be permanently installed on pipeline to perform monitoring or may be transported and set up to perform line tightness testing. Total minimum time for data collection and analysis is 35 minutes. System measures changes in pressure gradients and reports output quantity in gph, while compensating for thermal and pipeline "creeping" effects. Over pressurization is managed by using a backup pressure relief valve.

**Calibration**
System must be calibrated in accordance with manufacturer's instructions.

**Comments**
System may be used on large underground bulk pipelines such as airport hydrant fueling systems. Manufacturer claims system is applicable to any size of underground pressurized piping, typically between 2,000 and 1,128,206 gallons. The third-party evaluation is an update to the January 4, 2011 evaluation to verify the performance of the PHDleak Test system on lower volume lines between 5,001 and 50,000 gallons. An abbreviated set of 8 tests was performed on a pipeline with a volume of 25,438 gallons.

Leak Detection Technologies, Inc.
2765 East Wieding Road
Tucson, AZ 85706

Evaluator: Ken Wilcox Associates
Tel: (816) 443-2494
Date of Evaluation: 01/04/2011, 02/16/2024

]

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URL: www.LeakDetect.net

**Issue Date: January 27, 2011**
**Revision Date: June 20, 2024**

# Leak Detection Technologies

## Pipeline Hydrostatic Diagnostic Test Method (PHDleak Test)

### Line Leak Detection Method for Airport Hydrant and Field Constructed Systems

**Certification**
Leak rate of 0.0017% of pipeline volume in pipeline segment being tested at a pressure of 150 psi with PD = 95% and PFA = 5%.

**Leak Threshold**
0.00085% of line volume in gph.
A pipeline system should not be declared tight if the test results indicate a loss that equals or exceeds the threshold.

**Applicability**
Gasoline, diesel, aviation fuel, fuel oil #4, solvents, waste oil, water.

**Specification**
System tests single or double-walled piping made of fiberglass, steel, and other materials.

**Pipeline Capacity**
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| 5,001 to 29,412 | 1 | 0.5 | 0.5 |
| 29,413 to <50,000 | 1 | 0.5 | 1 |
| 50,000 to 58,824 | 1.5 | 0.75 | 1 |
| 58,825 to <75,000 | 1.5 | 0.75 | 1.5 |
| 75,000 to 88,236 | 2 | 1 | 1.5 |
| 88,237 to <100,000 | 2 | 1 | 2 |
| 100,000 to 117,648 | 3 | 1.5 | 2 |
| 117,649 to <125,000 | 3 | 1.5 | 2.5 |
| 125,000 to 147,060 | 3 | 1.5 | 2.5 |
| 147,061 to <150,000 | 3 | 1.5 | 3 |
| 150,000 to <175,000 | 3 | 1.5 | 3 |
| 175,000 to 176,472 | 3 | 1.5 | 3 |

* EPA semi-annual minimum detectable leak rate may be 6.0 gallons per hour until October 13, 2021 for pipe segments greater than 100,000 gallons. After October 13, 2021, the minimum detectable leak rate cannot exceed 3.0 gallons per hour.

**Waiting Time**
None between delivery and testing.
None between dispensing and testing.

**Test Period**
Minimum of 24 minutes after setup for data collection.
Pipeline segment being tested must be completely isolated and blocked during test.

**System Features**
System may be permanently installed on pipeline to perform monitoring or may be transported and set up to perform line tightness testing. Total minimum time for data collection and analysis is 35 minutes. System measures changes in pressure gradients and reports output quantity in gph, while compensating for thermal and pipeline "creeping" effects. Over pressurization is managed by using a backup pressure relief valve.

**Calibration**
System must be calibrated in accordance with manufacturer's instructions.

**Comments**
System may be used on large underground bulk pipelines such as airport hydrant fueling systems. Manufacturer claims system is applicable to any size of underground pressurized piping, typically between 2,000 and 1,128,206 gallons. The third-party evaluation is an update to the January 4, 2011 evaluation to verify the performance of the PHDleak Test system on lower volume lines between 5,001 and 50,000 gallons. An abbreviated set of 8 tests was performed on a pipeline with a volume of 25,438 gallons.

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Tel: (855) 255-5325 Ext 700 or 740
E-mail: info@LeakDetect.com
URL: www.LeakDetect.net

**Issue Date: December 12, 2024**

# Franklin Fueling Systems

## FMP-LS500 RS-485 and 4-20mA ELLD sensors with EVO Series consoles (for Rigid, Flexible or Hybrid Combination of Rigid and Flexible Pipelines)

### AUTOMATIC ELECTRONIC LINE LEAK DETECTOR

**Certification**

Leak rate of 3.0 gph at 10 psi* with PD = 100% and PFA = 0%.
Leak rate of 0.2 gph at operating pressure with PD = 100% and PFA = 0%.
Leak rate of 0.1 gph at 1.5 times operating pressure* with PD = 100% and PFA = 0%.
*Since leak rate varies as a function of pressure, this leak rate and pressure were certified using an equivalent leak rate and pressure, in accordance with an acceptable protocol.

**Leak Threshold**

1.5 gph for leak rate of 3.0 gph.
0.1 gph for leak rate of 0.2 gph.
0.05 gph for leak rate of 0.1 gph.
A pipeline system should not be declared tight if the test result indicates a loss that equals or exceeds this threshold.

**Applicability**

Gasoline, diesel, aviation fuels, fuel oil #4, waste oil, kerosene, biodiesel B6-B20 meeting ASTM D7467, biodiesel B100 meeting ASTM D6751.

**Specification**

On pressurized rigid, flexible, or combination rigid and flexible pipelines, system can perform 3.0 gph, 0.2 gph, and 0.1 gph tests.
Tests are conducted at operating pressure.

**Pipeline Capacity**

Maximum line capacity for **Hourly** testing using bulk modulus limits:

| Example Pipeline | Evaluated Volume (gallons) | Evaluated Bulk Modulus (PSI) | Example Bulk Modulus (PSI) | Multiplier to Convert Evaluated Volume to Equivalent Example Pipeline Volume (multiplier) | Pressure Drop per ML on Evaluated Line (PSI) | Line Volume Equivalent to Evaluated Line Volume Based on Bulk Modulus (gallons) | Maximum Pipeline Volume Allowed for Specific Bulk Modulus (gallons) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Evaluated Pipeline | 601.01 | 19288 | - | 1.000 | 0.0085 | - | 1202.02 |
| 1 | - | - | 5000 | 0.259 | - | 155.80 | 311.60 |
| 2 (APT pipeline) | - | - | 5025.24 | 0.261 | - | 156.59 | 313.17 |
| 3 | - | - | 7500 | 0.389 | - | 233.70 | 467.40 |
| 4 (UPP pipeline) | - | - | 10000 | 0.518 | - | 311.60 | 623.20 |
| 5 | - | - | 12500 | 0.648 | - | 389.50 | 778.99 |
| 6 | - | - | 15000 | 0.778 | - | 467.40 | 934.79 |
| 7 | - | - | 17500 | 0.907 | - | 545.30 | 1090.59 |
| 8 | - | - | 20000 | 1.000 | - | 601.01 | 1202.02* |
| 9 | - | - | 25000 | 1.000 | - | 601.01 | 1202.02* |
| 10 | - | - | 30000 | 1.000 | - | 601.01 | 1202.02* |
| 11 | - | - | 35000 | 1.000 | - | 601.01 | 1202.02* |
| 12 | - | - | 40000 | 1.000 | - | 601.01 | 1202.02* |
| 13 | - | - | 50000 | 1.000 | - | 601.01 | 1202.02* |
| 14 | - | - | 60000 | 1.000 | - | 601.01 | 1202.02* |
| 15 | - | - | 70000 | 1.000 | - | 601.01 | 1202.02* |
| 16 | - | - | 80000 | 1.000 | - | 601.01 | 1202.02* |

Maximum line capacity for **Monthly and Annual** testing using bulk modulus limits:

| Example Pipeline | Evaluated Volume (gallons) | Evaluated Bulk Modulus (PSI) | Example Bulk Modulus (PSI) | Multiplier to Convert Evaluated Volume to Equivalent Example Pipeline Volume (multiplier) | Pressure Drop per ML on Evaluated Line (PSI) | Line Volume Equivalent to Evaluated Line Volume Based on Bulk Modulus (gallons) | Maximum Pipeline Volume Allowed for Specific Bulk Modulus (gallons) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Evaluated Pipeline | 279.51 | 34601 | - | 1.000 | 0.0237 | - | 559.02 |
| 1 | - | - | 5000 | 0.145 | - | 40.39 | 80.78 |
| 2 (APT pipeline) | - | - | 5025.24 | 0.145 | - | 40.59 | 81.19 |
| 3 | - | - | 7500 | 0.217 | - | 60.59 | 121.17 |
| 4 (UPP pipeline) | - | - | 10000 | 0.289 | - | 80.78 | 161.56 |
| 5 | - | - | 12500 | 0.361 | - | 100.98 | 201.95 |
| 6 | - | - | 15000 | 0.434 | - | 121.17 | 242.34 |
| 7 | - | - | 17500 | 0.506 | - | 141.37 | 282.73 |
| 8 | - | - | 20000 | 0.578 | - | 161.56 | 323.12 |
| 9 | - | - | 25000 | 0.723 | - | 201.95 | 403.90 |
| 10 | - | - | 30000 | 0.867 | - | 242.34 | 484.69 |
| 11 | - | - | 35000 | 1.000 | - | 279.51 | 559.02* |
| 12 | - | - | 40000 | 1.000 | - | 279.51 | 559.02* |
| 13 | - | - | 50000 | 1.000 | - | 279.51 | 559.02* |
| 14 | - | - | 60000 | 1.000 | - | 279.51 | 559.02* |
| 15 | - | - | 70000 | 1.000 | - | 279.51 | 559.02* |
| 16 | - | - | 80000 | 1.000 | - | 279.51 | 559.02* |

**Waiting Time**

None between delivery and testing.
None between dispensing and testing for leak rate of 3.0 gph.
Depending on temperature stability, 1½ to 10 hours between dispensing and testing for leak rates of 0.2 gph and 0.1 gph.

**Test Period**

Response time is 12 to 19 minutes for leak rate of 3.0 gph.
Minimum of 75 minutes for leak rate of 0.2 gph.
Minimum of 605 minutes for leak rate of 0.1 gph.
Test data are acquired and recorded by a microprocessor.

**System Features**

Permanent installation on pipeline.
Automatic testing of pipeline every 45 minutes for leak rate of 3.0 gph.
Automatic testing of pipeline when pump has been idle for 2 hours for leak rate of 0.2 gph.
Automatic testing of pipeline when pump has been idle for 3½ hours for leak rate of 0.1 gph.
Pump shutdown, indicator light and alarm activation if leak is declared for 3.0 gph and 0.2 gph tests.

**Calibration**

System must be checked annually and, if necessary, calibrated in accordance with manufacturer's instructions.

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Dates of Evaluations: 09/23/2024