STATE OF WISCONSIN
Department of Agriculture,
Trade and Consumer Protection

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Bureau of Weights and Measures
Storage Tank Regulation
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin ATCP 93 Material Approval

Equipment: HCNA LDS V 2.1 & 2.2

Manufacturer: Hansa Consult of North America LLC
200 International Drive, Building 120
Portsmouth, NH 03801

Expiration of Approval: December 31, 2027

SCOPE OF EVALUATION

The HCNA LDS V 2.1 & 2.2 leak detection systems, manufactured by Hansa Consult of North America LLC, have been evaluated in accordance with **s. ATCP 93.130(1)(a), ATCP 93.515(4) and ATCP 93.517** of the current edition of the Wisconsin Administrative Flammable, Combustible and Hazardous Liquids Code for use as a line tightness tester.

This evaluation summary is condensed to provide the specific installation, application and operation parameters necessary to maintain the subject systems in compliance with the Wisconsin Administrative Code – ATCP 93.

DESCRIPTION AND USE

The HCNA Leak Detection system is a dual pressure system that can be applied to lines of any length and diameter and can be used on lines containing any type of liquid. The dual pressure provides the information necessary to correct for temperature effects on the pressure during the test. The physical principles used are based on the fact that leaks are pressure dependent but temperature changes are not.

The HCNA Leak Detection system instrumentation consists of a pressure transmitter together with a data converter connected to a computer loaded with the HCNA LDS software. In addition to this measurement system, a method is needed to pressurize the line to the high-test pressure and to release the pressure to the low-test pressure. For permanent installations, the computer system can control the fuel management system pumps to raise the pressure and can control electrically operated valves to reduce the pressure. The portable unit utilizes a fuel reservoir and high pressure pump to produce the pressure changes.

Prior to conducting tests on a line, the HCNA Leak Detection system must be commissioned to confirm the existing line characteristics. The purpose of the commissioning is to ensure that the line segment is tight. If the commissioning determines that the line is not tight, repairs must be made before further testing is conducted on the line. The data from the commissioning tests and the line size are used to set parameters in the software. Thus, the HCNA Leak Detection system is commissioned to each specific line segment before being used. The HCNA Leak Detection system is a computer-controlled, fully automatic system. All data is acquired and processed electronically.

A HCNA leak detection test is conducted with the fuel in the line. The HCNA Leak Detection system is attached at a single location along the line. Since the line must be isolated from other lines and tanks and then pressurized, all transfer operations must be suspended for the duration of the test. If the valves used to isolate the line do not seal properly, either a double block and bleed valve or blinds must be installed. A test is completed in 15-45 minutes, depending on the time needed to pressurize the line and reduce the pressure. Multiple line segments can be tested concurrently. It can be permanently installed for periodic monitoring, or it can be transported from line to line as a portable means of assessing integrity.

The HCNA Leak Detection system measures pressure over time. Pressure changes are converted to volume changes using the commissioning data for the specific line segment. Temperature compensation is used to remove temperature effects from the

measured data. The test result is a leak rate standardized to the operating pressure of the line {typically 150-160 psi). In addition, the standard report compares the measured leak rate to an allowable error size based on the size of the line. It also prints a conclusion about whether the measured leak rate exceeds an allowable threshold.

The HCNA Leak Detection system compensates for the thermal expansion and contraction of the liquid within the line. This system measures pressure changes in the pipeline over time at two different set pressures (e.g., 160 psi and 60 psi). The system uses four distinct test periods, typically a low pressure to start the test and then high pressure, low pressure, and high pressure again and utilizes these three measurements to generate a direct estimate of the leak rate, if a leak is present. The full test takes about 15- 45 minutes dependent on line size. This approach makes use of the fact that (1) the leak rate changes depending on line pressure and (2) the rate of thermally induced volume change is not affected by line pressure. Because of the system's temperature compensation capability, there are no restrictions on product temperature in order to conduct a test, and no waiting period is required after product transfer, delivery, or dispensing.

Once the line has been isolated, testing is conducted at two pressures, a high pressure test and a low pressure test. The line is pressurized for a test by operating the system pumps. Typically, the high pressure test is done at 150 – 160 psi and the low pressure test is done at 50 - 60 psi. Other pressures could be used, but a difference in pressures of about 100 psi is usually maintained. The pressure is initially reduced to 60 psi at the beginning of each test. The line is then pressurized to the high pressure, allowed to stabilize for about 10 minutes, with the last 2 minutes of data being used for the test. Following the high pressure test, pressure is reduced and the line stabilizes again for about 10 minutes, with the last 2 minutes of data used for the test. Finally, the line is re-pressurized to the high pressure, allowed to stabilize for about 10 minutes and the last 2 minutes of data are used for the test. During each test segment, the HCNA Leak Detection system electronically measures and records the pressure in the line. After conclusion of the four test periods, the HCNA Leak Detection system automatically analyzes the test data and prints a report.

The HCNA system is capable of operation at any test pressure up to the limits of the pressure transmitter. Piping is tested with the contained fluid, typically at the pipeline operating pressure and a lower pressure.

TESTS AND RESULTS

The performance of the HCNA LDS V 2.1 & 2.2 leak detection systems as a line tightness testing method was verified by Ken Wilcox Associates in accordance with the EPA Protocol for pipeline tightness testing systems. The HCNA LDS V 2.1 leak detection systems was found to detect a leak rate of 0.068 gph with a 95 percent probability of detection and 5 percent probability of false alarm.

The HCNA LDS V 2.2 leak detection system was found to detect a variable leak rate of 0.00078 percent of line volume with 95 percent probability of detection and 5 percent probability of false alarm; this meets the ATCP 93.517 leak detection requirement for airport hydrant fueling systems as detailed in the table below.

Leak Detection Rate Per Test Section Volume (EPA maximum allowable/HCNA 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)**	**HCNA 3rd party certified minimum detectable leak rate. (Gallons Per Hour)**
5,000 to 25,000	**1.0**	**0.5**	**0.2**
25,001 to 50,000	**1.0**	**0.5**	**0.4**
50,001 to 75,000	**1.5**	**0.75**	**0.6**
75,001 to 100,000	**2.0**	**1.0**	**0.8**
101,000 to 125,000	**3.0**	**1.5**	**1.0**
125,001 to 150,000	**3.0**	**1.5**	**1.2**
150,001 to 175,000	**3.0**	**1.5**	**1.4**

LIMITATIONS / CONDITIONS OF APPROVAL

- The HCNA LDS V 2.1 & 2.2 leak detection systems are approved for use on pipeline systems for underground storage tank facilities that contain gasoline, diesel, aviation fuel, #4 fuel oil, biodiesel B6-B20 meeting ASTM D7647, biodiesel B100 meeting ASTM D6751, and other liquids with manufacturer approval.
- The HCNA V 2.2 systems are approved for use on single or double wall rigid piping only. The HCNA 2.1 system is approved for use on single or double wall rigid piping and flexible piping.
- Manifolded piping may be tested as long as the total length of piping is within the capacity and configuration limitations.
- The operating instructions and test procedures specified by HCNA shall be used to conduct all tests.
- Line tester operation shall be verified annually, and calibrated in accordance with manufacturer’s instructions if necessary.

- The manufacturer shall submit for a revision to this Wisconsin Material Approval application if any of the functional performance capabilities of this equipment are revised. This would include, but not be limited to changes in software, hardware, or methodology.

Critical performance parameters for the **HCNA 2.1 Pipeline Tightness Test:**

Parameter	Value
Test Line Pressure	**- 30 to 50 psi or 150% of normal operating pressure**
Minimum waiting period between last product dispensing and start of data collection	**None**
Minimum time for test	**45 minutes**
Total maximum allowable volume of product in any rigid or flexible pipeline	**5,000 gallons or less**

Critical performance parameters for the **HCNA 2.2 Pipeline Tightness Test** for large diameter pipeline systems**:**

Parameter	Value
Test Line Pressure	**- 60 to 160 psi or a differential pressure of 100 psi between the 2nd and 3rd test periods**
Minimum waiting period between last product dispensing and start of data collection	**None**
Minimum time for test	**45 minutes**
Total maximum allowable volume of product in any rigid or flexible pipeline	**175,000 gallons or less**

- This approval will be valid through December 31, 2027, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The Wisconsin Material Approval Number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The Department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement unless specified in this document.

Effective Date: November 22, 2023

Reviewed by: _____ Date: 11/22/2023

Erik Otterson
Environmental Engineering Specialist
Bureau of Weights and Measures
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Approved by: _____ Date: 11/22/2023

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