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Environmental & Regulatory Services Division
Bureau of Petroleum Products and Tanks
201 West Washington Avenue
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin COMM 10 Material Approval

Equipment: FlexWorks and FlexWorks Next Generation Nonmetallic Underground Secondary Containment Piping System Including the OPW-FCS "Loop System".

Manufacturer: OPW Fueling Containment Systems
3250 US Highway 70 Business West
Smithfield, NC 27577

Expiration of Approval: December 31, 2012

SCOPE OF EVALUATION

The FlexWorks and FlexWorks Next Generation underground piping system as manufactured by OPW Fueling Components, were evaluated for use as petroleum product piping for underground storage tank systems in accordance with **Comm 10.130(1)(b), 10.500(2), and 10.500(5)**, of the Wisconsin Administrative Code for Flammable and Combustible Liquids. The OPW-FCS "Loop System" also meets the requirements of the Wisconsin Administrative Code since the primary component of the system is the either the FlexWorks or FlexWorks Next Generation piping.

This evaluation summary is condensed to provide the specific installation, application and operational parameters necessary to maintain the subject systems in compliance with the Wisconsin Administrative Code – Comm 10.

DESCRIPTION AND USE

The FlexWorks primary flexible piping system (designated as 'Cxx') is available in 0.75-in, 1-in., 1.5-in., 2-in., and 3-in. sizes with or without integral secondary containment (double-wall). The FlexWorks Next Generation flexible piping system (designated as "CxxA") with integral secondary containment is available in 0.75-in, 1-in., 1.5-in., 2-in., and 3-in. sizes. For both the FlexWorks and FlexWorks Next Generation secondary containment capability is provided by jacketing the primary pipe with a stand-off layer that is fabricated to produce an interstitial space (double-wall). For the Loop System, an access pipe is provided as part of the overall piping system to allow the FlexWorks product pipe to be retracted for inspections, repairs, or replacement, without excavation. The access pipe is optional for non-Loop System installations as the FlexWorks and FlexWorks Next Generation piping is UL-Listed for direct burial.

TESTS AND RESULTS

FlexWorks flexible piping was found to comply with the current Underwriters Laboratories' requirements for this class of piping and is suitable for use in the distribution of motor vehicle fuels including gasoline, gasoline-ethanol blends up to 30%, 85% ethanol (E85) to 100% ethanol (E100), diesel, and diesel-biodiesel blends up to 20%.

FlexWorks Next Generation flexible piping was found to comply with the current Underwriters Laboratories' requirements for this class of piping and is suitable for use in the distribution of motor vehicle fuels including gasoline, gasoline-ethanol blends up to 100%, 100% ethanol (E100), diesel, and diesel-biodiesel blends up to 20%.

LIMITATIONS / CONDITIONS OF APPROVAL

FlexWorks and FlexWorks Next Generation Flexible Piping

- FlexWorks and FlexWorks Next Generation flexible piping is approved as meeting the design and construction standards for underground flexible piping as specified in **s. Comm 10.500(2)** and **10.520(1)(a)1.**.

- Critical performance parameters for the FlexWorks and FlexWorks Next Generation flexible piping:

Single and Double-Wall Pipe

FlexWorks and FlexWorks Next Gen. Pipe Size (in.)	Minimum Bend Radius (in.)[1]	Maximum Allowable Working Pressure (psi)	Bulk Modulus[2] (psi)
3/4	18	150	Contact Manufacturer
1	18	125	Contact Manufacturer
1 1/2	24	100	15,000
2	36	75	11,000
3	72	75	4,100

[1]: As measured in a horizontal plane into the tank or dispenser sump basin.
[2]: Calculated value assuming 73.4°F, nominal wall thickness, 50-year creep allowance, no contribution from barrier layer.

Access Piping

Flexworks Pipe Size (in.)	Minimum Bend Radius (in.)	Terminating Fitting Bend radius (in.)[1]	Bulk Modulus[2] (psi)
3,4	36	36	N/A

[1]: As measured in a horizontal plane into the tank or dispenser sump basin.
[2]: The Access piping is for not designed for carrying product; a bulk modulus value is not necessary for this application.

- FlexWorks and FlexWorks Next Generation flexible piping is approved for installation without the flex connectors specified in **s. Comm 10.500(2)**. Except for the Loop System, entry angle for flexible pipe into a sump cannot exceed 15 ° off the center line in any direction.

- FlexWorks and FlexWorks Next Generation flexible piping is approved for underground (buried) installations only.

- The FlexWorks secondary containment jacket/double-wall piping and FlexWorks Next Generation double-wall piping, are approved for use as secondary barriers for interstitial monitoring systems in compliance with **s. Comm 10.500(5) and 10.515(8)(c)2.**.

- Installation, use and maintenance of all products shall be in accordance with the manufacturer's recommendations, this approval, and requirements as listed in Comm 10 and adopted standards. In the event of conflicts, the stricter requirement shall govern.

- Leak detection for the piping system shall be provided in accordance with **s. Comm 10.515(8)**. The specific leak detection system must be shown on the plans that are submitted for review in accordance with **s. Comm 10.100**. Automatic line leak detectors and line tightness testing methods must be specifically approved for use with flexible piping in accordance with **s. Comm 10.130(1)(a)**. (Note: Evaluation of these leak detection methods with the standard EPA protocol does not demonstrate acceptability for use with flexible piping.)

Loop System

The OPW-FCS Loop System utilizes the OPW FlexWorks or FlexWorks Next Generation double-wall piping in conjunction with pre-fabricated factory assembled components. The Loop System is designed for use in pressure delivery piping systems that are typically routed in single or dual series. Supply lines are "Looped" from one dispenser to the next by connecting each pipe section directly to the inlet and outlet of specially designed "Angled Shear valves".

The Loop System is also compatible for use with suction piping systems. The major difference is that the supply piping runs are routed in a "direct method" instead of a "series method". Each dispenser is connected to the tank with a dedicated supply line. The geometry of the loop sumps facilitate installation of direct piping runs with the recommended slope back to the tank in Suction Systems. Inside the shallow dispenser sumps the pipe couplings are connected to plumbing assemblies that consists of the Loop System™ male adapter connected to a 45-degree elbow fitting that is connected to a union fitting.

- All Limitations/Conditions of Approval listed above for the FlexWorks or FlexWorks Next Generation piping apply to Loop System installations.
- Each dispenser, submersible, and transition sump shall be individually monitored in accordance with **Comm 10.500(5)**.
- Product piping shall be monitored with the use of either electronic line monitoring equipment that tests for leak rates of 3.0 gph @ 10 psi and 0.2 gph monthly in accordance with **Comm 10.515(8)** or electronic or mechanical line monitoring equipment that tests for leak rates of 3.0 gph @ 10 psi and a pressure or vacuum interstitial monitoring system in accordance with **Comm 10.515(8)(c)2.**.

This approval will be valid through December 31, 2012, 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: July 1, 2011

Reviewed by: Signature on File
Greg Bareta, P. E.
Engineering Consultant
Bureau of Petroleum Products and Tanks

Approved by: Signature on File Date: _____