

## WISCONSIN DEPARTMENT OF NATURAL RESOURCES

### Rehabilitation of Water Main Requirements

Plans and specifications for rehabilitation projects must be submitted to the Department for review and approval prior to construction as per s. NR 811.69(6), Wis. Adm. Code. The plans and specifications must be stamped by a Professional Engineer (PE) registered in the state of Wisconsin as per s. NR 811.08(3), Wis. Adm. Code. The Department's rehabilitation contact person is Jim Witthuhn, [james.witthuhn@wisconsin.gov](mailto:james.witthuhn@wisconsin.gov), (608)225-9283.

1. Rehabilitation materials, design and construction methods must comply with Class IV "Fully Structural" conditions as defined in the AWWA Manual M-28 and for "Fully Deteriorated Host Pipe" conditions as defined in ASTM F-1216. The design needs to include the following:
  - a. Withstand a minimum working pressure of 100 psi without a host pipe, except as approved by the Department. (s. NR 811.69(2), Wis. Adm. Code)
  - b. Have a long-term 50-year internal burst strength, when tested independently of the host pipe, that is greater than the maximum allowable operating pressure (MAOP) of the host pipe service area.
  - c. Ability to survive any dynamic loads.
  - d. Minimum Safety factor = 2.5
  - e. Design submittal should provide source of data used to substantiate the short-term and long-term rehabilitation material tensile strength and flexural modulus used in design calculations.
  - f. Provide a set of calculations, stamped by a Professional Engineer registered in the state of Wisconsin, that determine the minimum required liner thickness(es). Refer to the most current edition of ASTM F-1216 equations X1.1, X1.3, X1.4, X1.7 and X1.2.1.1.
2. All rehabilitation products must be NSF/ANSI certified for use in potable water.
3. Provide documentation to verify the proposed rehabilitation curing requirements are aligned with the manufacturer's installation procedures and the NSF certified rehabilitation curing requirements.
4. Provide completed DNR forms 3300-260 Public Water System Approval Request and 3300-066 Water Main Submittal Checklist along with the plans and specifications.
5. Provide specifications detailing how temporary potable water service will be implemented and maintained for the project. The temporary water system must be disinfected in accordance with AWWA C651 requirements. Hydrant connections should require backflow prevention devices. See s. NR 810.17, Wis. Adm. Code.
6. Provide specifications detailing how any services will be temporarily plugged and then reopened or otherwise addressed.
7. Provide specifications for installing new service taps on rehabilitation lined water mains, if applicable.
8. Provide plans and specifications for the new water main and appurtenances to be installed where the existing water main will be removed at the installation locations.
9. Closed circuit televising (CCTV) must be conducted pre and post installation. Owner shall be provided copies of all CCTV inspections.
10. A post-construction, minimum one-hour duration pressure/leakage test must be performed at a pressure that is a minimum of 25% greater than the normal working pressure in accordance with AWWA Standard C600, unless an alternative procedure is approved.

11. The water mains must be disinfected and coliform negative water samples obtained in accordance with AWWA C651 and s. NR 810.09(4), Wis. Adm. Code requirements.
12. A minimum of two post-construction water samples must be collected at different locations as required by the Department and submitted to a Department approved Safe Drinking Water Act (SDWA) laboratory for volatile organic compound (VOC) analysis. The post-construction water to be sampled must be collected after the water main has been pressure tested, disinfected, flushed and allowed to remain at rest for 24 hours. The laboratory results must be submitted to this office along with a brief report that summarizes the rehabilitation installation project, notes any issues of concern and makes any related recommendations for future rehabilitation projects. The Department may decide to waive future post-construction water sampling for VOC's as well as the submittal of a summary report for any rehabilitation product if successful results are routinely obtained after three or more installation projects.
13. The lining procedures must be compliant with the requirements of the references listed below.

American Society for Testing and Materials (ASTM)

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| ASTM F1216 | Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.   |
| ASTM F1533 | Standard Specification for Deformed Polyethylene (PE) Liner.   |
| ASTM F1743 | Rehabilitation of Existing Pipelines and Conduits by Pulled-In Place installation of Cured-In-Place Thermosetting Resin Pipe (CIPP).   |
| ASTM F3182 | Standard Practice for the Application of Spray Applied Polymeric Liners Inside Pipelines for Potable Water.  |
| ASTM D2837 | Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.  |
| ASTM D2992 | Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass Fiber Reinforced Thermosetting Resin) Pipe and Fittings.  |
| ASTM D3350 | Standard Specification for Polyethylene Plastics Pipe and Fittings Material.   |
| ASTM D5813 | Cured-In-Place Thermosetting Resin Sewer Piping Systems (Section 6.4).   |
| ASTM D7065 | Determination of Nonylphenol, Bisphenol A, p-tert-Octylphenol, Nonylphenol Monoethoxylate and, Nonylphenol Diethoxylate in Environmental Waters by Gas Chromatography Mass Spectrometry. |
| ASTM D7574 | Determination of Bisphenol A in Environmental Waters by Liquid Chromatography/Tandem Mass Spectrometry.  |

American Water Works Association (AWWA)

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| AWWA M28  | Rehabilitation of Water Mains.   |
| AWWA C600 | Installation of Ductile-Iron Water Mains and Their Appurtenances.                      |
| AWWA C602 | Cement Motor Lining of Water Pipelines in Place 4-inches and larger.                   |
| AWWA C651 | Disinfecting Water Mains.  |
| AWWA C906 | Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) through 63 In. (1,600 mm) |

Environmental Protection Agency (EPA)

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| EPA Method 524.2 | Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry. |
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National Science Foundation/American National Standards Institute (NSF/ANSI)

- NSF/ANSI 61 Drinking Water Components

Wisconsin Department of Natural Resources

Chapters NR 810 and NR 811, Wis. Adm. Code, including cover depth requirements per s. NR 811.73(2)(e), separation from sanitary and storm sewer mains per s. NR 811.74, and separation between hydrant drains and sewers per s. NR 811.71(4), Wis. Adm. Code.