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To: MAG Specifications and Details Committee

Subject: Case 12-12, New Section 739: Steel Reinforced Polyethylene Pipe (SRPE)

The Section 739 specification for Steel Reinforced Polyethylene (SRPE) pipe was originally drafted by modifying and editing the existing Section 738 specification for HDPE pipe. The latest 739 revision (attached) incorporates comments and suggestions from various MAG members including Rod Ramos, Jim Badowich, Bob Herz, Bob Draper and others. We have also worked closely with ADS personnel (Dan Currence, Bill Davis and Kelly Kokesh) to assure that, where appropriate, content and format in the new pipe specifications 739 and 740 is consistent. The attached specification has also been updated to reflect recent comments received at the April 23, 2013 Water & Sewer Working Group meeting and is ready to submit to the Main Committee for final review, comment and vote.

Primary revisions to Section 739, since its original draft that was based on specification 738 (HDPE) include the following:

- Incorporated references to the various installation specifications for flexible pipe (Sections 603, 615, & 618) that are being developed and updated.
- Maintained select wording (underlined) within 739 specification that exceeds ASTM minimum requirements including:
 1. Galvanized vs. black steel
 2. 80,000 psi vs. 20,305 psi steel tensile strength
 3. 335464C vs. 335420C polyethylene cell classification
 4. Steel reinforced bell and spigot joints

A general explanation for the areas where 739 requirements exceeded ASTM minimums is as follows: Although the steel is full encapsulated in HDPE material, the galvanized steel vs. black steel provides a second level of corrosion protection in case the exterior HDPE protective coating is ever scuffed due to rough handling. The 80,000 psi vs. 20,305 psi tensile steel is significantly stronger, which means less steel can be used or fewer steel ribs are needed to develop required pipe stiffness. The more efficient 80,000 psi steel results in more economy for the end user. The 335464 cell classification is for pressure rated resin vs. non-pressure rated resin. Pressure rated resins possess higher resistance to environmental stress cracking and other desirable characteristics. DuroMaxx (SRPE) is sold into sanitary sewer and low pressure irrigation applications (not just storm drains); where the higher rated polyethylene cell classification is desirable for more demanding applications. The 335464 cell classification is also commonly available from resin suppliers, which is also important.

DuroMaxx SRPE utilizes steel reinforced polyethylene (HDPE) bell and spigot gasketed joints as a means to provide joints that are rated at 15 psi vs. 10.8 psi, when tested in accordance with ASTM D3212. The ASTM D3212 joint test is a 10 minute test and does not necessarily capture the long-term tightness capabilities of a jointing system. HDPE material can creep over time so purely HDPE joints (without steel reinforcement) could relax and lose gasket compression over time if not designed properly. The steel reinforcement in the joint eliminates the possibility of plastic creep (relaxation) and consequently loss of gasket compression over time. The minimum pressure rating in the 739 specification has been revised from 15 psi to 10.8 psi to reflect the ASTM minimum requirement per committee suggestion.

The minimum requirements included in 739 appropriately cover the SRPE pipe that is currently in production and that has been proven in the field local and nationally. As a result, the manufacturer's pipe certifications and pipe markings will match 739 requirements and wording. This will eliminate confusion in the field with inspectors when comparing certification wording to specification wording.

- Streamlined language used in the Material Specifications for Gaskets and Water Stop to simply reflect ASTM requirements.
- Streamlined language for the Certification subsection to simply reflect ASTM requirements.
- Removed the subsection for Dimensions & Tolerances, since this is completely covered by the ASTM specifications.
- Corrected errors in the Markings subsection to reflect current ASTM requirements.
- Deleted language near the end of the Fitting subsection that attempted to communicate requirements for structural connections, and replaced it with a new subparagraph added to the Joining subsection entitled "Pipe to Concrete Structure Connections". The content of this subparagraph was then edited to allow for pending revisions to the manhole standards.

STEEL REINFORCED POLYETHYLENE PIPE & FITTINGS FOR STORM DRAIN, SANITARY SEWER & IRRIGATION**739.1 GENERAL:**

This specification covers the requirements of Steel Reinforced Polyethylene Pipe (SRPE) pipe manufactured per ASTM F2562 for storm drains, irrigation and sanitary sewer systems. When noted on the plans or in the special provisions, storm drains, irrigation and sanitary sewers may be constructed using SRPE pipe. The SRPE pipe will be of the sizes 24 inch diameter through 120 inch diameter. Trench excavation, backfilling and compaction for this flexible pipe shall be in accordance with Section 603. Construction and installation shall be in accordance with Section 618 for storm drain and irrigation water and Section 615 for sanitary sewers.

The size of the SRPE pipe to be furnished shall be specified by the Engineer and shown on the plans or in the project specifications. The pipe stiffness class shall be Class 1, per Table 1 of ASTM F2562, unless otherwise specified.

739.2 MATERIALS:

739.2.1 Base Steel Materials: Continuous high strength *galvanized* ribs shall be cold rolled steel meeting the requirements of either ASTM A1008 or ASTM A1011 with minimum yield strength of 80,000 psi. Steel ribs shall be completely encased within the HDPE profile.

739.2.2 HDPE Material Composition: SRPE pipe HDPE material and fittings shall, in accordance with ASTM 2562, be made from HDPE plastic compound meeting the minimum requirements of cell classification 335464C or higher cell classification, in accordance with ASTM D3350.

739.2.3 Gaskets: Elastomeric gaskets shall comply with the requirements in ASTM F477 and be as recommended by the pipe manufacturer.

739.2.4 Water Stops: Elastomeric Water stop gaskets shall conform to the requirements of ASTM C923.

739.2.5 Thermal Welding Material: The material used for thermally welding the pipe material shall be compatible with the base material.

739.2.6 Lubricant: The lubricant used for assembly shall comply with manufacturer's recommendations and have no detrimental effect on the gasket or pipe.

739.3 JOINING SYSTEMS:

739.3.1 Gasket Type: *Steel reinforced* bell and spigot joints for the piping system and fittings shall consist of an integrally formed bell and spigot gasketed joint. The joint shall be designed so that when assembled, the elastomeric gasket located on the spigot is compressed radially on the pipe or fitting bell to form a water tight seal. The joint shall be designed so to prevent displacement of the gasket from the joint during assembly and when in service. The elastomeric gasket shall meet the provision of ASTM F477. Gasketed watertight pipe joints shall meet a minimum laboratory test pressure of 10.8 psi when tested in accordance with ASTM D3212.

All pipes shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

The bell and spigot configurations for the fittings shall be compatible to those used for the pipe.

Joints shall provide a seal against exfiltration and infiltration. All surfaces of the joint upon which the gasket may bear, shall be smooth and free of any imperfections, which would adversely affect seal ability. The assembly of the gasketed joints shall be in accordance with the pipe manufacturer's recommendations.

739.3.2 Thermal Weld Type: Thermal weld joints, when specified, shall utilize plain ended pipe welded together by internal pressure testable couplers. The internal couplers shall have a minimum wall thickness equal to or greater than the pipe wall thickness as defined in pipe specification, ASTM F2562. The assembly of the welded joints shall

be in accordance with the manufacturer's recommendations. Thermal welded pipe joints shall meet a minimum laboratory test pressure of 10.8 psi or 1.5 times the allowable pressure rating for the pipe, whichever is greater, when tested in accordance with ASTM D3212.

739.3.3 Pipe To Concrete Structure Connections: An approved flexible connector, mechanical seal or water stop shall be provided at manhole entry or concrete structure connection to reduce infiltration and exfiltration. When grouting is necessary at a water stop connection, non-shrink grout shall be used.

739.4 FITTINGS:

Fittings for SRPE pipe may include tees, elbows, manhole adapter rings, plugs, caps, adapters and increasers. Fittings shall be joined by gasket type or thermal weld type joints in accordance with Subsection [739.3](#).

739.5 CERTIFICATION:

The manufacturer shall furnish a certification that all materials delivered shall comply with the minimum requirements of ASTM F2562. The certification shall also identify the steel as galvanized, with 80,000 psi yield strength and the cell classification of the HDPE material as 335464C minimum.

739.6 MARKINGS:

Markings on pipe and fittings shall be per ASTM F2562. The markings shall be clearly shown on the pipe, at least, at the end of each length of pipe and spaced at intervals of not more than 10 feet. Markings shall include the following information: ASTM F2562, the nominal pipe size in inches, the pipe stiffness class, the manufacturer's name, trade name or trademark, the manufacturer's production code: identifying plant location, machine, and date of manufacture.

739.7 CARE OF PIPE AND MATERIALS:

All pipe and materials shall be manufactured, handled, loaded, shipped and unloaded in such a manner as to be undamaged and in sound condition, in the completed work. Particular effort shall be exercised to protect the ends of the pipe. Repairs on damaged pipe shall be made to the satisfaction of the Engineer otherwise they shall not be used in the work and shall be replaced with an equal pipe or special in an acceptance condition. At all times, rubber gaskets shall be covered in a factory applied protective wrap or stored in a cool, dark place until ready for use.

- End of Section -