

## Product Guide Specification

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) Format, including *MasterFormat* (1995 Edition), *SectionFormat*, and *PageFormat*, contained in the *CSI Manual of Practice*.

The section must be carefully reviewed and edited by the Engineer to meet the requirements of the project and local building code. This section must be coordinated with other specification sections and the drawings.

Delete all "Specifier Notes" when editing this section and save under a new file name.

### SECTION 02955

#### MANHOLE ENCAPSULATION SYSTEM

Specifier Notes: This section covers Canusa "WrapidSeal!" Manhole Encapsulation System.

WrapidSeal is a heat-shrinkable, wraparound sleeve designed for protection of buried and exposed manhole structures. Once installed, the system creates a barrier to water infiltration and effectively protects the manhole support structure and frame from ground moisture, preventing corrosion and freeze-thaw damage. In below grade vaults or concrete lines, the system is used to minimize water infiltration, reducing dewatering costs and loads on wastewater treatment facilities.

Consult Canusa:

1. Where heavy soil stresses are common.
2. Where the installed product will be exposed for extended periods in temperatures greater than 130; F.
3. For assistance in editing this section for the specific application.

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Manhole Encapsulation System.

## **1.2 RELATED SECTIONS**

Specifier Notes: Edit the following list as required for the project. List other sections with work directly related to the manhole encapsulation system.

- A. Section 02080 - Utility Materials.
- B. Section 02315 - Excavation and Fill.
- C. Section 02530 - Sanitary Sewer Manholes, Frames, and Covers.
- D. Section 02580 - Electrical and Communication Underground Ducts and Manholes.
- E. Section 02630 - Storm Drainage Manholes, Frames, and Covers.
- F. Section 02950 - Site Restoration and Rehabilitation.

## **1.3 REFERENCES**

Specifier Notes: List standards referenced in the section, complete with designations and titles. This article does not require compliance with standards, but is merely a listing of those used.

- A. ASTM D 570 - Water Absorption of Plastics.
- B. ASTM D 638 - Tensile Properties of Plastics.
- C. ASTM D 1000 - Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications.
- D. ASTM D 1002 - Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-To-Metal).
- E. ASTM D 1044 - Resistance of Transparent Plastics to Surface Abrasion.
- F. ASTM D 2240 - Rubber Property - Durometer Hardness.
- G. ASTM D 2671 - Heat-Shrinkable Tubing for Electrical Use.
- H. ASTM E 28 - Softening Point by Ring-and-Ball Apparatus.

## **1.4 SYSTEM DESCRIPTION**

- A. Manhole encapsulation system uses a heat-shrinkable, wraparound sleeve to create

a barrier to water infiltration and to protect manhole support structure and frame from ground moisture, preventing corrosion and freeze-thaw damage.

- B. System accommodates ground movement and resists soil stress.

## **1.5 SUBMITTALS**

- A. Comply with Section 01330 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data.
- C. Manufacturer Qualifications: Submit manufacturer's certification indicating heat-shrink sleeves manufactured in an ISO 9002 registered facility.

## **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications:
  - 1. Manufacture heat-shrink sleeves in an ISO 9002 registered facility.
  - 2. Capability of producing irradiated and cross-linked polyethylene coating to allow shrinking of coating material in circumferential direction under influence of heat.
  - 3. Capability of providing manufacturer employed field service personnel for site assistance as required.
- B. Installer Qualifications:
  - 1. Experienced with installation techniques.
  - 2. Attended a minimum of 1 day of training at manufacturer's facility or on-site with manufacturer's representative.

Specifier Notes: Describe requirements for a meeting to coordinate the installation of the manhole encapsulation system and to sequence related work.
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- C. Pre-Installation Meeting: Convene a pre-installation meeting [2] [ \_\_\_\_\_ ] weeks before the start of installation of manhole encapsulation system. Require attendance of parties directly affecting work of this section, including the Contractor, Engineer, installer, and manufacturer's representative. Review surface preparation, installation, field quality control, backfilling, protection, and coordination with other work.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery:
  - 1. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, batch or lot number, and date of manufacture.
  - 2. Protect individual sleeves to prevent adherence to other sleeves, packing material, and containers.
- B. Storage:
  - 1. Store materials in accordance with manufacturer's instructions.
  - 2. Keep containers sealed until ready for use.
  - 3. Do not store at temperatures above 95°F ( 35°C) or below -4°F (-20°C).
  - 4. Protect materials and containers from exposure to direct sunlight, rain, snow, dirt, and dust.
  - 5. Store materials off ground or floor in ventilated area.
- C. Handling: Protect materials during handling and installation to prevent damage or contamination.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURER**

- A. Canusa, Division of Shaw Resource Services Inc., 2408 Timberloch Place, Building C-8  
  
The Woodlands, Texas 77380-1038; Phone: (281) 367-8866. Fax: (281) 367-4304
- B. Canusa-CPS, Division of Shaw Industries Ltd., 25 Bethridge Road, Rexdale, Ontario, Canada M9W 1M7. Phone: (416) 241-0128. Fax: (416) 241-6890.

### **2.2 MANHOLE ENCAPSULATION SYSTEM**

- A. Heat-Shrinkable Sleeves: WrapidSeal!" Manhole Encapsulation System.
  - 1. Material: Irradiated and cross-linked polyethylene impermeable backing, coated with protective heat-activated adhesive.
  - 2. Bonding: Bond to primed concrete, metal, and fiberglass surfaces.

3. Compatibility: Compatible with concrete, steel, iron, and fiberglass.
  4. Closure: Separate closure seal to secure sleeve in place during installation and seal overlap area.
- B. Functional Performance of Heat-Shrinkable Sleeves:
1. Peel Strength, ASTM D 1000: 8.6 pli (15 N/cm).
  2. Lap Shear, ASTM D 1002: 1.5 psi (1.0 N/cm<sup>2</sup>).
  3. Water Absorption, ASTM D 570: 0.05 % maximum.
  4. Low Temperature Flexibility, ASTM D 2671: -40 °F ( -40 °C).
- C. Physical Properties of Heat-Shrinkable Sleeves:
1. System Type: High shrink.
  2. Supplied Thickness: 101 mils (2.5 mm).
  3. Fully Recovered Thickness: 125 mils (3.2 mm).
  4. Shrink Factor: 40%, minimum.
- D. Sleeve Adhesive:
1. Softening Point, ASTM E 28: 212° F (100° C).
- E. Sleeve Backing:
1. Tensile Strength, ASTM D 638: 2900 psi (20 MPa ).
  2. Elongation, ASTM D 638: 600%
  3. Hardness, ASTM D 2240, Shore D: 46.
  4. Abrasion Resistance, ASTM D 1044: 35 mg.
- F. Primer: WrapidSeal!™ G G ? P Primer.
1. Use: Primes steel, concrete, and fiberglass surfaces for installation of sleeve.
  2. Compatibility: Compatible with common substrates and sleeve adhesive.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Examine surfaces to receive manhole encapsulation system. Notify the Engineer if surfaces are not acceptable. Do not begin surface preparation until unacceptable conditions have been corrected.

**3.2 SURFACE PREPARATION**

- A. Prepare surfaces in accordance with manufacturer's instructions.
- B. Ensure surfaces are clean, dry, and free of frost, surface rust, foreign objects, sharp edges, and projections that could damage manhole encapsulation system.

Specifier Notes: Delete inspection by the Engineer if not required. Specify a minimum number of days advance notice of start of installation.
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- C. Inspection by Engineer:
  - 1. Advance Notice: Give the Engineer a minimum of [3] [ \_\_\_\_\_ ] days advance notice of start of installation of manhole encapsulation system.
  - 2. Before installation, surfaces to be encapsulated will be inspected by the Engineer.
  - 3. Do not begin installation until defects or deficiencies identified by the Engineer have been corrected.

**3.3 INSTALLATION**

- A. Install manhole encapsulation system in accordance with manufacturer's instructions.
- B. Install system to create barrier to water infiltration and protect manhole support structure and frame from ground moisture, preventing corrosion and freeze-thaw damage.

**3.4 FIELD QUALITY CONTROL**

- A. Sleeve Inspection: Visually inspect installed sleeve to ensure:
  - 1. Sleeve is in full contact with substrate, including cone section and manhole frame.

2. No cracks or holes in polyethylene backing.
  3. No voids below sleeve.
  4. Adhesive has flowed beyond sleeve edges.
- B. Site Adhesion Testing: Peel tests.
1. Frequency of Test: 1 in every 100 sleeves.
  2. Surface Temperature at Time of Test:  $77 \pm 10$  °F ( $25 \pm 5$ °C), unless environmental conditions will not allow and continuation of test is approved by the Engineer.
  3. Peel Rate: 4 inches /minute (100 mm/min).
  4. Perform testing using hand peel gauge on 1 inch (25 mm) wide strip.
  5. Cut strip and induce initial failure by undercutting and peeling back strip until 2 inch (50 mm) flap is created.
  6. Attach clamp to strip and hand peel gauge to clamp and peel back at a 90° angle to surface at specified peel rate.
  7. Passing Minimum Peel Strength: 8.6 pli (15 N/cm) with cohesive failure of adhesive.

### **3.5 BACKFILLING AND PROTECTION**

- A. Allow sleeve to cool before backfilling manhole. Water quenching is permissible to expedite backfilling.
- B. Prevent damage to sleeve by backfilling with select backfill or material with no sharp stones or large particles, or protect sleeve with extruded polyethylene mesh or other suitable protective shield as approved by the Engineer.
- C. Backfill manhole as specified in Section 02315.