

SECTION 02604

HDPE CONCRETE PROTECTIVE LINER

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish and install all labor, materials, equipment, and incidentals required to supply and install High Density Polyethylene (HDPE) and Polypropylene Copolymer (PP-R) concrete protective liner (CPL) in the lift station/wet wells, receiving manholes, drop manholes, and manholes as required or as shown on the plans.
- B. HDPE concrete protective liner (CPL) shall be designed and installed to protect concrete surfaces from corrosion.

PART 2 PRODUCT

2.1 MATERIALS

- A. Liner shall be AGRU Sure Grip® HDPE (high density polyethylene) with a minimum thickness of 2 mm. All HDPE liner sheets shall be extruded with a large number of anchoring studs, a minimum of 39/ft², manufactured during the extrusion process in one piece with the sheet so there is no welding and no mechanical finishing work to attach the studs to the sheet. The liner shall have a pull out of 112.5 lbs./anchoring stud.
- B. Flat liner sheet, non anchored, used for overlapping joints, shall have a minimum thickness of 3mm. All joints shall be sealed by means of thermal welding performed by Agru certified welders.
- C. The lining shall have good impact resistance, shall be flexible, and shall have an elongation sufficient to bridge up to a 1/4-inch settling crack, without damage to the lining. The liner shall be able to bridge any expansion cracks that may occur.
- D. The lining shall be repairable at any time during the life of the structure.
- E. An AGRU certified fabricator shall custom fit the liner to the form work in order to protect the concrete surfaces from sewer gases. The interior surfaces to be protected shall include the walls, ceiling, and pipe entries.
- F. For all lined manholes the use of HDPE Grade rings shall be used in lieu of brick or precast grade rings. Grade rings shall meet HS-25 load rating. Butyl sealant shall be used between each ring to make a watertight joint. The first grade ring shall be welded to the liner to provide a gas tight seal.

2.2 PHYSICAL PROPERTIES

- A. The AGRU Sure Grip CPL systems and welding rod shall be manufactured from the same resins and meet the following properties:

Property	Testing Method	Unit	HDPE	PP-R
Density	ASTM D792-86.	g/cm ³	.0945	1.78
MFI (Melt Flow Index)	ASTM D1238-88	g/10min	(190/5)	(190/5)
Heat Reversion (Dimensional Stability)	ASTM D1638-83	%	<2	<2
Yield Stress	ASTM D638-89	PSI	≥ 2,320	≥ 2,900
Elongation of Yield	ASTM D638-89	%	≥ 12	≥ 10
Elongation at break	ASTM D638-89	%	≥ 200	≥ 50

Property	Testing Method	Unit	HDPE	PP-R
Fire Classification	UL-94		V2	V2
Maximum Working Temperature		C° F°	60 140	90 194

- B. Upon request, the manufacturer shall provide written certification that the liner used meets or exceeds the requirement of this specification.

PART 3 EXECUTION

3.1 WELDING

- A. All welding shall be performed in accordance with the published directives and procedures of the manufacturer and by welders certified by the manufacturer. Completion of welding will provide a one piece monolithic concrete protective liner system that will provide excellent resistance to hydrogen sulfide attack and will not pull off the wall in the event that infiltration occurs.

The following welding techniques are acceptable:

1. Extrusion Welding
 2. Wedge Welding
 3. Butt Welding
 4. Hot Air Welding
- B. Testing and supervision of the installation and welding shall be performed by qualified staff only and must be checked when completed by visually checking and by Spark Testing all welded joints.
- C. Sample welds shall be taken from each jobsite during the field welding process and submitted to the quality assurance department for testing. The following test are performed: Shear and Peel Test. Shear weld test results shall meet or exceed at least 80% strength of parent material in a destructive test which pulls the sample apart to test the strength and integrity of the extrusion weld. The peel test pulls the weld apart from the backside of the weld using a peeling type motion. The results of this test shall meet or exceed 70% of the value of the parent material.
- D. Provide a five (5) year unlimited warranty on all workmanship and products. The work includes the surface preparation and application of the liner system, shall protect the structure for at least five (5) years from all leaks, and from failure due to corrosion from exposure to corrosive gases such as hydrogen sulfide.

END OF SECTION

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