

Standard Specification
for

Lifespan Frame and Adjustment System

Manufactured from elastomeric materials for sanitary, storm and utility structures.

1. GENERAL

- 1.1 Scope: This specification covers the work, including the furnishing of all labor, tool, equipment and materials in conjunction with the installation of Lifespan or approved equal elastomeric frame, extension ring and grade adjustment risers. Lifespan is intended to be placed between a cast iron or composite material cover and the support structure and is designed to provide a flexible and durable seal between the two. Lifespan will reduce or eliminate vibrations transmitted through the cover to the support structure, the entrance of subsurface water through the chimney area of the structure, and reduce the entry of subsurface fines, which contribute to pavement failure.
- 1.2 Product Handling: Lifespan component parts shall be stored in as cool, clean, and shaded a place as practicable, preferably at 21 deg. C or less.
- 1.3 Submittals: Brochures shall be submitted for all items to be furnished in accordance with the provisions of the General Conditions and shall include information on Lifespan.
- 1.4 Safety: The Contractor shall conform to all work safety requirements of pertinent regulatory agencies and shall secure the site for the working conditions in compliance with it. The Contractor shall erect signs and other devices as are necessary for the safety of the work site and shall perform all work in accordance with the applicable OSHA standards.

2. REFERENCED DOCUMENTS

- 2.1 ASTM Standards:
 - D 395 Test Methods for Rubber Property – Compression Set
 - D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Elastomers – Tension
 - D 573 Test Method for Rubber – Deterioration in an Air Oven
 - D 746 Test Method for Rubber – Low Temperature Brittleness Point
 - D 1149 Test Method for Rubber Deterioration – Surface Ozone Cracking in a Chamber
 - D 2240 Test Method for Rubber Property – Durometer Hardness

3. BASIS OF ACCEPTANCE

- 3.1 The acceptability of the Lifespan component parts shall be determined by the results of the physical tests prescribed in this specification, if and when required, and by inspection to determine whether the Lifespan component parts conform to this specification as to the design and freedom from defects.

4. MATERIALS

- 4.1 Properties of the elastomer: Lifespan component parts shall be molded and cured in such a manner that any cross section will be dense, homogenous, and free of porosity, blisters, pitting, and other imperfections. Lifespan component parts shall be fabricated from a high-grade rubber compound. The basic polymer shall be natural rubber, synthetic rubber, or a blend of both acceptable to the owner and meeting the physical requirements prescribed in Table 1. There shall be no reclaimed material incorporated in the finished product.

4.2 All material tests shall be carried out at 23 +/- 2 deg. C unless otherwise noted.

4.3 For the purpose of determining conformance with this specification, an observed or calculated value shall be rounded off to the nearest 100 kPa for tensile strength, to the nearest 10 percent of elongation, and to the nearest 1 percent for change in aged tensile and aged elongation.

Table 1: Elastomer Properties

| Material Property | ASTM Standard | Test Requirements | Natural Rubber 85 Durometer | Synthetic Rubber 85 Durometer | Units |
|---------------------------------|-------------------------------------|--|--------------------------------|----------------------------------|------------------|
| Physical Properties | D 2240 | Hardness | 85 +/- 5 | 85 +/-5 | Shore "A" points |
| | D 412 | Min. tensile strength | 1500 | 1500 | psi |
| | | Min. ultimate elongation | 300 | 300 | percent |
| Heat Resistance | D 573 at Specified temp. | Specified temp. of the test | 70 | 100 | deg. C |
| | | Aging time | 168 | 70 | hours |
| | | Max. change in durometer | +10 | +15 | Shore "A" points |
| | | Max. change in tensile | -25 | -15 | percent |
| | | Max. change in elongation | -25 | -40 | percent |
| Compression Set | D395 Method B at Specified temp. | Specified temp. of test | 70 | 100 | deg. C |
| | | Max. permissible change(after 22 hours) | -25 | -35 | percent |
| Low Temp Brittleness | D 746 Procedure B | Tested at -40 deg. C | passes | passes | |
| Ozone Resistance | D 1149 | Concentration of ozone | 25 | 100 | mPa |
| | | Duration of test | 48 | 100 | hours |
| | | | No cracks | No cracks | |

5. DESIGN

5.1 Each component part of the system shall have, as part of its construction, the ability to limit lateral movement after installation. The lateral movement shall be limited by the integration of an interlocking of the frame and adjustment risers, as well as between the adjustment risers on their opposing surfaces by a matching rib and groove system. The interlocking rib and groove system shall also be self-sealing, providing a barrier and limiting the inflow of subsurface water and backfill fine material into the manhole through the chimney area.

6. INSTALLATION

6.1 New Construction

- 6.1.1 For new construction, the contractor shall prepare the top surface of the precast concrete structure prior to the installation of the Lifespan System. The contractor shall ensure the concrete structure is in good order; otherwise the contractor shall reconstruct the precast concrete structure. The contractor shall wire brush those surfaces in order to remove scale or loose impediments before installation.
- 6.1.2 An accurate measurement of the distance between the precast concrete structure and the surface grade should be taken. A pre-installation of the Lifespan System component parts should be done to ensure the Lifespan System is measured to within 0.25" below surface grade.
- 6.1.3 A continuous bead of construction grade flexible butyl resin sealant shall be placed on the concrete surface prior to the setting of the Lifespan System to facilitate a complete seal between the bottom component of the Lifespan System and the precast concrete surface. The sealing bead shall be not less than 7/16 of an inch in diameter.
- 6.1.4 The Lifespan Rubber Adjustment Risers will be placed, with the groove up, and stacked in combination to meet the final grade. In all cases, a flat-bottomed Lifespan Rubber Adjustment Riser will be used first. The Lifespan Rubber Adjustment Riser stack shall not exceed 6 inches, when located in the roadway, and be properly sized to the dimensions of the precast concrete structure. The matching Lifespan Frame should then be placed on top. A cast iron or equivalent cover, which has been approved to work with the Lifespan System, shall then be placed in the Lifespan Frame or Lifespan Extension Ring.
- 6.1.5 The area surrounding the structure, including the Lifespan System shall be filled and compacted with specified backfill material up to the base of the Lifespan Frame. The appropriate depth of specified asphalt or concrete shall then be added to bring the surrounding area to surface grade. If asphalt is used, care shall be taken to ensure that it is well compacted.
- 6.1.6 Once paving or concrete work has been completed, the cover shall be removed and any loose debris or extraneous material shall be removed, leaving a clean surface on all contact points.
- 6.1.7 For Sanitary Sewers, and if specified by the engineer, a continuous bead of butyl sealant shall be placed into each of the Lifespan Adjustment Riser grooves prior to the installation of the next Lifespan Adjustment Riser onto the stack or Lifespan Frame if it is the top Lifespan Adjustment Riser on the stack. This sealant will improve the sealing ability of the system.

6.2 Rehabilitation and Resurfacing

- 6.2.1 For the rehabilitation of as well as the raising of manholes relating to road construction/paving of precast concrete structures, the previous instructions defined in Section 6.1 shall be followed.
- 6.2.2 For the rehabilitation of brick/block structures, the contractor shall remove and excavate all roadway materials to a depth of 12 inches. The opening shall not be less than 18 inches greater than the diameter of the Lifespan System. Remove all loose or broken concrete blocks, bricks, temporary spacers or other objects that may have been used in the original construction and would create an improper seal between the precast concrete structure and system. A precast concrete transition collar of no less than 4 inches shall then be placed on top of the structure in order to ensure the system has a sound foundation and resides entirely on a precast concrete base.
- 6.2.3 The contractor shall, if required, re-mortar the top surface using a construction grade mortar mix in order to provide a level and smooth top surface to accept the first component of the Lifespan System. After the patching material has sufficiently cured as directed by the engineer, the instructions for new construction shall be followed.
- 6.2.4 For both Storm and Sanitary sewers and as directed by the engineer, the instructions defined in Section 6.1 shall be followed.