

NPC – FlexRib Frame-Chimney Seals

Technical Specifications

1. Purpose of the Product – NPC - FlexRib Frame-Chimney Seals are installed in new manholes to prevent eventual infiltration and to eliminate the infiltration into existing structures, which occurs during wet weather, between the manhole frame and cone through the “grade adjustment” area.

2. Scope – This technical specification describes the function of the NPC - FlexRib Frame-Chimney Seal, principle of operation, component materials and physical properties.

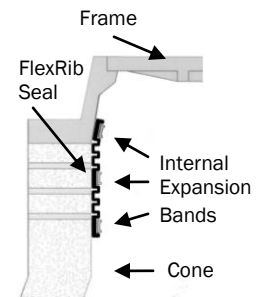
3. Background – Manholes are the principal means of access to the sanitary and stormwater collection system. These structures are typically constructed with a narrow vertical chimney section that extends from the top of the manhole cone to the frame. To bring the frame casting to grade and provide the necessary structural support, courses of bricks, blocks or riser rings are positioned on top of the manhole cone before the frame is set. This is referred to as the “grade adjustment” or “chimney” area of the manhole.

Over time, ground movement, thermal expansion and contraction of the surrounding pavement, freeze-thaw lift, and traffic loading can cause the “grade adjustment” bricks, blocks, and riser rings and their associated adhesive or mortar to deteriorate allowing subsurface water to enter the manhole. Depending on soil conditions and initial backfill methods this water infiltration causes settlement, cave-ins, sink holes and street collapse as the surrounding soils and subgrade materials flow with the water into the manhole.

4. Principle of Operation – NPC - FlexRib Seals prevent infiltration of water and subgrade material by forming a permanent, monolithic, watertight and flexible seal that connects the manhole frame to the cone, effectively blocking all infiltration through the grade adjustment area.

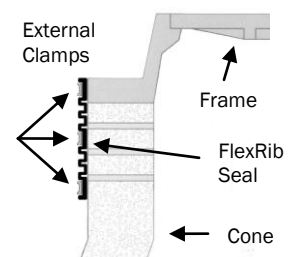
There are two types of FlexRib Seals:

Internal FlexRib Seal – Installation of the internal seal involves positioning the high quality rubber seal as illustrated. The top band track is positioned completely inside the manhole frame and the bottom band track is positioned over the cone. A specially designed tool is used to



expand a high-strength stainless steel band radially outward at the top and bottom of the seal. As the bands expand, the rubber seal is compressed against the surface of the frame and cone; once the required pressure is achieved the band is permanently held in the expanded position with an integrated latching mechanism.

External FlexRib Seal – Installation of the external seal involves positioning the rubber seal around the outside top of the cone and the outside bottom of the frame as illustrated. Once the seal has been positioned, high-strength stainless steel clamps are tightened using a simple torque wrench, compressing the rubber against the outside of the cone and manhole frame.



5. Materials – The FlexRib seal is manufactured in compliance with the material requirements of ASTM C-923, consisting of a high-quality flexible rubber seal and either stainless steel Expansion Bands or stainless steel External Clamps. As presented in the table below.

Flexible Rubber Seal - The FlexRib is extruded from a high-grade rubber compound and the ends are joined using a hot vulcanized splice.

Internal Expansion Bands - The Expansion Bands are manufactured from 300 Series, non-magnetic stainless steel, which conforms to the material requirements of ASTM C 923.

External Clamps - The External Clamps are manufactured from 300 Series, non-magnetic stainless steel, which conforms to the material requirements of ASTM C 923.

ASTM C-923 Material Properties

Physical Property	ASTM Specification	Test Requirement
Chemical Resistance 1 N Sulfuric Acid 1 N Hydrochloric Acid	D543, at 22°C for 48 hours	No Weight Loss No Weight Loss
Tensile Strength	D412	1200 psi
Elongation at Break	N/A	35% minimum
Hardness	D2240 (shore A durometer)	5% +/- from manufacturer's specified hardness
Accelerated Aging	D573 70°C for 7 days	Maximum Decrease 15% tensile 20% elongation
Water Absorption	D471, immerse 0.75 by 2 inch specimen in distilled water at 70°C for 48 hours	10% weight increase maximum
Ozone Resistance	D1149	Rating 0
Low Temp. Brittle Point	D746	No fracture at -40°C
Tear Resistance	D624, method B	200 lbf/in.

