MILLER PIPELINE
AN MVERGE COMPANY

WEKO-SEAL® EPDM Material Specifications

(Water/Waste Water Applications)

Manufactured in compliance with ASTM D3900 and D3568 and shall have designation of M3BA710A13B13C12Z1Z2Z3 in accordance with ASTM D2000, where ZI, Z2, and Z3 are defined as follows:

Suffix Z1: The material shall be an EPDM polymer where all ingredients are listed in FDA Title 21 Code of Federal Regulations Section 177.2600 Rubber Articles Intended for Repeated Use with the final material not supporting microbiological growth when used in potable water or sea water or in humid aerobic conditions.

Suffix Z2: The volume change of the rubber shall not exceed 3% after immersion in fresh or seawater at 100°C for 70 hours.

Suffix Z3: The stress relaxation shall not exceed 12% when tested form the time of 30 minutes to 24 hours in accordance with British Standard Method of Testing Vulcanized Rubber Part A42 determination of stress relaxation.

R-H Compound: 206 (EPDM) "WEKO-SEAL" material:

Physical Properties	Specification	Typical Results
Durometer (pts) ASTM D-2240	70 ± 5	72
Tensile (psi) ASTM D-412	1,450 min.	1,700
Elongation (%) ASTM D-412	250 min.	400
Suffix A13 ASTM D-573		
Heat Aged 70h 70°C		
Durometer (pts)	± 15	± 6
Tensile change, (%)	± 30	± 4
Elongation change, (%)	- 50 max.	- 22

Physical Properties	Specification	Typical Results
Suffix B13 ASTM D-395B		
Compression Set, 22h 70°C		
(%) Permanent set	25 max.	13
Suffix C12 ASTM D-1171		
(%) Ozone resistance	85 min.	100
Suffix Z1		
EPDM/FED REG. 177.26	Listed	Listed
Suffix Z2 FLUID AGING D471		
70 hrs. @ 100°C (%) Volume swell in water	3 max.	1
Suffix Z3		
Stress relaxation, 100% Elong. 10-min., 10 min. Rest, (%)		+4

The WEKO-SEAL shall be classified ANSI/NSF Standard 61 "Drinking Water System Components Health Effects."

Manufacturing Process:

a. Extrusion process used for belt material.
b. All joints to be transfer molded.
c. Vulcanization shall occur at 330°F with 2000-psi pressure.
d. Manufactured to Miller Pipeline drawing numbers, 3600 0000 0149, 3600 0000 0248, and 3600 0000 0347.
e. All material specifications must be certified.
f. Material Safety Data Sheet (MSDS) must be provided.

Stainless Steel Retaining Bands:

1. This specification references Amercian Society of Testing and Materials (ASTM) standards and American Welding Society (AWS) standards, which are made part thereof by such reference shall be the latest edition, and revised.

2. All bands, wedges, shims, and set screws for securing rubber membrane across piping joints shall be UNS S30400 (Type 304), UNS S31600 (Type 316), UNS S31603 (Type 316L), or UNS N08367 (AL-6XN) and shall conform to ASTM A240 Standard Specifications for heat-resisting chromium and chromium-nickel stainless steel plate, sheet, and strip for pressure vessels. The weld wire ER316, ER316L shall conform to AWS A5.22 and Alloy 625 (ERNiCrMo-3) shall conform to AWS A5.14.

3. All material such as push tabs, shims, and wedges shall be made compatible with the base metal selected.

4. Welding wire used for selected base metal:

Retaining Band	Weld Wire
UNS S30400 (Type 304)	ER316
UNS S31600 (Type 316)	ER316
UNS S31603 (Type 316L)	ER316L
UNS N08367 (AL-6XN)	ERNiCrMo-3

5. The retaining band shall be rolled to the radius of the pipe that being repaired. The radius shall be obtained from measurement data acquired from the inspection report. Each band to be checked on a fixed radius gauge.

6. The cleated ends shall be manufactured from the same lot number as the band. Certified welders shall make all shop and field welds with a minimum of 2 years experience on this alloy (T-304). The welds shall be made with a stick or wire of T-316 alloy, as mentioned in the above table.

6. Welding shall be accomplished in using either gas metal arc welding or shielded metal arc welding.

7. All material specifications shall be certified.

8. All material sourcing and manufacturing is performed in the U.S.A.

9. All shims to be manufactured to the radius of the pipe and shall be 16-22 gauge x 2" x 6" composed of the same alloy selection as band material. All edges shall be deburred.

10. All retaining bands to be manufactured from stainless steel materials with the following minimum physical properties:

Physical Properties	Type 304	Type 316	Type 316L	Type AL-6XN
UNS Designation	S30400	S31600	S31603	N08367
Tensile Strength (min.)	75,000 psi	75,000 psi	70,000 psi	100,000 psi
Yield Strength (min.)	30,000 psi	30,000 psi	25,000 psi	45,000 psi
Elongation in 2in (min.)	40%	40%	40%	30%
Brinell Hardness (max.)	202	217	217	233
Weld Wire Tensile Strength (min.)	80,000 psi	70,000 psi	70,000 psi	110,000 psi

11. The retaining bands shall be made from the material selection above or designed from a material that will meet the customer's requirement. Typical selection is Type 304 for potable water, Type 316/316L for wastewater conditions, and AL-6XN for seawater environments. These materials have been selected for their exceptional physical properties as well as their ability to resist corrosion when subject to said environment.

Cement Mortar:

Cement Mortar for pipe joint sealing and preparation shall be the fast setting type suitable for sea water, wet/dry conditions. Cement mortar shall be as specified in ASTM-C150.

Liquid Joint Lubrication:

Liquid joint lubricant to assist in installation of the WEKO-SEAL and retaining bands shall be a non-toxic vegetable based lubricating gel with the following required properties:

1. Will not deteriorate or decompose while in storage for a minimum of two years.
2. A soft pasty consistency suitable for use intended from 0°F to 120°F.
3. Does not have any deteriorating effect on natural or synthetic rubber gaskets.
4. Will not impart taste or odor to water.
5. Has no objectionable odor.
6. Is non-toxic and does not support the growth of bacteria.
7. PH – 9.6 minimum – 11 maximum (pH Meter)
8. Method of test, Modified ASTM-D562-55
9. Does not contain any petroleum based oils or grease.
10. Does not contain any material considered toxic.

Thread Sealing Compound:

Thread sealing compound shall be a non-toxic Paste Type with "Teflon"
Teflon Components Required Properties:

Physical Data	
Flash Point	410 degrees F closed cup
Density	1.4 – 1.42
Viscosity	200,000 – 275,000 centipoises
Temperature Range	-50 degrees F to 500 degrees F
Pressure Application	Maximum 10,000 psi