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1.0 **SCOPE**

This specification covers the minimum requirements for supply and installation of Low Preheat Heat Shrinkable Joint Coating Sleeves for pipes. (Type Raychem HTLP 80 or equivalent).

2.0 **TEST STANDARDS APPLICABLE**

ASTM D-1002	Test Method for Strength Properties of Adhesives in Shear by Tension Loading (Metal-to-Metal).
ASTM D-1963	Test Method for Specific Gravity of Drying Oils, Varnishes, Resins, and Related Materials at 25 °C.
ASTM D-2240	Test Method for rubber Property -- Durometer - Hardness.
ASTM D-149	Dielectric breakdown test
ASTM D-2671	Standard Methods of Testing Heat-Shrinkable Tubing for Electrical Use.
ASTM E-28	Standard Test Method for Softening Point by Ring and Ball Apparatus.
ASTM E-398	Standard Test Method for Water Vapor Transmission Rate of Sheet Materials Using a Rapid Technique for Dynamic Measurement.
ASTM G-14	Standard Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test).
ASTM G-17	Standard Test Method for Penetration Resistance of Pipeline Coatings (Blunt Rod).
ASTM G-42	Standard Test Methods for Cathodic Disbonding for Pipeline Coatings Subjected to Elevated Temperatures.
ASTM D-1000	Peel strength to steel test.
TP - 206	Alyeska Test - Tape Shear Test.
ASTM D-882	Toughness Test.

2.1 **Procedures**

The specific procedures to be followed for preparation and testing of products described in this document, using the above general test methods.

3.0 REQUIREMENTS

The pipe sleeves furnished under this specification shall be tested and will meet the following:

Property	Condition	Unit	Requirements	Method of Test *	Typical Value
A. HTLP 80 SLEEVE BACKING					
Tensile Strength	23°C (73°F)	psi **	2200 min.	ASTM D-638	3000
Elongation to Break	23°C (73°F)	percent	400 min.	ASTM D-638	580
Toughness (2% secant modulus) 0.4 in./min.	23°C (73°F)	psi	30,000 min.	ASTM D-882	38,000
Hardness Shore D	23°C (73°F)		50	ASTM D-2240	55
Shrink Force (Modulus @ 100% Elongation@2 in/min)	150°C (302°F)	psi	35 min.	ASTM D-638	40
Heat Aging: Followed by Elongation to break	150°C (302°F) 21 days 23°C (73°F)	 percent	 200 min.	 ASTM D-638	 450
Volume Resistivity	23°C (73°F)	ohm-cm	1 x 10 ¹⁵ min.	ASTM D-257	5X10 ¹⁵
B. HTLP 80 SLEEVE ADHESIVE					
Ring & Ball Softening Point		°C	120 ± 10	ASTM E-28	120
Lap Shear	80°C (176°F) CHS 2"/min. ****		50 min.	ASTM D-1002	65
C. HTLP 80 SLEEVE					
Dimensions	23°C (73°F)	inches	Table - III	ASTM D-2671	Pass
Moisture Vapor Transmission	38°C (100°F) 90% RH	g/24 hrs/ 100 in ²	0.08	ASTM E-398	0.04
Low Temperature Flexibility	1 inch mandrel	°C	-10 max.	ASTM D-2671 Procedure C	-25
D. S-1301 EPOXY PRIMER (Note 1)					
Specific Gravity Part A Part B	25°C (77°F)		1.41 ± 0.10 1.73 ± 0.10	ASTM D-1963 ASTM D-1963	1.40 1.73
Lap Shear of Cured Primer	80°C (176°F)	psi	1000 min	ASTM D-1000	2700
E. PROPERTIES OF INSTALLED HTLP 80 SYSTEM					

Property	Condition	Unit	Requirements	Method of Test *	Typical Value
Impact Resistance	23°C (73°F)	in-lbs	70 min.	ASTM G-14	95
Penetration Resistance	80°C (176°F) 24 hrs.		no. holiday with 10 KV detector	ASTM G-17	Pass
Cathodic Disbondment	80°C (176°F) 30 days	mm	25 mm max. disbondment radius	ASTM G-42	12
Peel	23°C (73°F) CHS 2"/min. ****	pli	15 min.	ASTM D-1000	21 (Note 2)
Soil Stress Creep Resistance	80°C (176°F) 24 hrs.	inches	0.10 max.	TP-206	(0.003mm) 0.0001
Dielectric Breakdown Voltage	23°C (73°F)	KV	30	ASTM D-149	41
Hot Water Immersion	80°C (176°F) 120 days	No delamination, blisters, or water under sleeves		ASTM D-870	Pass

* Additional details of test procedures are given in Raychem RT-1599, (latest issue).

** Ponds per square inch.

*** Pounds per linear inch.

**** Cross-head pulling speed, inches per minute.

Note 1: HTLP 80 may also be used with S-1142/1 epoxy primer.

Note 2: This is the value measured between the adhesive and the backing; the peel strength between the adhesive and a steel pipe exceeds the breaking strength of the backing (more than 50 pli).

4.0 **STANDARD SLEEVE WIDTHS**

11, 17, 24 & 34 inches (280, 432, 610 & 864 mm)

– tolerances on sleeve width: - 0 + 0.5 inches

5.0 **APPLICATION**

5.1 **Overlap**

Use sleeve width that will overlap pipe coating two inches minimum on each side of joint.

5.2 **Cleaning of Steel**

Cleaning and surface preparation of steel shall be according to section 6.0 of Spec. No. 123-6-SPM-006.

5.3 **Preheat of Steel**

Steel shall be heated to a temperature of 60 °C - 80 °C prior to the application of sleeve.

6.0 **INSPECTION**

All sleeves shall be holiday detailed at 15 KV. One sleeve per days production shall be peel tested.