

PTI M10.2-17 Specification for Unbonded Single Strand Tendons Addendum #1 November-2019

[Update your specification by changing the items identified]

1.6.2.3 — Shipping

- (a) Use non-metallic tiedowns to secure tendon bundles to the bed of the transport vehicle. Metal strapping or chains shall not be used.
- (b) ~~When material is transported farther than 500 miles from the point of fabrication, provide protection between the bed of the transport vehicle and bundles to protect sheathing during transportation.~~
- (c) ~~When material is transported farther than 500 miles from the point of fabrication or during inclement weather, protect material during transportation by being shipped inside enclosed trailers, being covered by tarps, and shrink wrapping the tendon bundles or alternate method approved by the LDP. Protect material from deicing salts and other corrosive elements during transportation.~~

PT supplier shall provide protection to ensure that materials will not get damaged during transport.

2.1.4 — Testing

Mechanical Properties:

~~Perform breaking strength, yield strength, elongation, and dimensional testing by the strand manufacturer is required to be performed on each heat of finished product(s) to confirm the requirements of Section 2.1.1. Mechanical properties; dimensional and relaxation tests shall be performed or observed and certified by an independent testing laboratory accredited under ASTM G1077. Testing facility used, whether in house or otherwise, must be identified completely, including physical address and contact information.~~

Relaxation Properties:

Test the finished strand for relaxation at least annually, and if there is any change in the type of raw material or manufacturing process. Perform the relaxation test according to the requirements of ASTM A416/A416M and ASTM A1061/A1061M.

Perform the relaxation test as a full 1000-hour test at initial production and every third year thereafter. Interim annual relaxation tests may be performed as 200-hour tests with results extrapolated to 1000 hours, provided that the previous full 1000-hour test exhibits satisfactory results.

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Reporting:

Report mechanical property, dimensional, and relaxation testing showing appropriate heat/coil identification, steel area, and test results. Units shall be in.-lb units and language shall be English.

Identify testing facility used, whether in-house or otherwise, must be identified completely, including physical address and contact information.

2.1.5 — Strand producer records

The manufacturer shall produce and maintain for a period of at least 5 years the following records related to material production:

- (a) Purchasing records showing the purchase of appropriate base materials used in production
- (b) Product traceability through production and shipping
- (c) Testing results for tests required under Section 2.1.4, conformities (or nonconformities), and resultant actions
- (~~e~~) Calibration records for testing devices indicating calibration to known standards at intervals not exceeding 1 year
- (~~e~~) Records of quality performance evidencing the occasion, frequency, and percentage of accepted and rejected final product. Records shall include internal and external occurrences, such as on-site lab results and customer responses;
- (~~f~~) Suitability and testing of raw materials including quality reports from wire or rod suppliers; and
- (~~g~~) Procedure for the quarantine and disposal of noncompliant product and records of same

2.2.2 — Tests

Provide PT coating compound that complies with the tests and associated acceptance criteria specified in Table 2.2.2.1. Conduct qualification tests 1 through 10 from Table 2.2.2.1 Test all PT coating types every 5 years 30 months or whenever any change is made to their chemical composition.

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In addition, conduct and report the results of tests 1, 9, and 10 specified in Table 2.2.2.1 for every batch of PT coating supplied.

2.2.4 — Shipping and Handling

Transport bulk shipments of PT Coating in a manner that ensures it is not mixed with any PT Coating not certified according to Section 2.2.2. All shipping containers/tanks hoses and pumps being utilized for the transport/transfer of PT Coating shall be dedicated for the transport/transfer of PT Coating or be cleaned and free from any other contaminates that could have a deleterious impact on the PT Coating. In the event that non-dedicated equipment is used for the transport/transfer of PT Coating, verification of cleaning shall be required.

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Table 2.2.2.1—Performance specification for PT coating

No.	Test description	Test method	Acceptance criteria
1	Dropping point	ASTM D566 or ASTM D2265	Minimum 300°F (149°C)
2	Oil separation at 160°F (71°C) <ul style="list-style-type: none"> All weight/mass measurements shall be recorded to 4 significant digits in grams. Run three (3) separate samples from the same batch. The bleed shall be calculated for each sample and the result reported as the average/mean of the three recorded samples. Final result shall be reported to the nearest 2 significant digits (0.xx%). 	ASTM D6184 (modified)	0.5% max by mass
3	Water content	ASTM D95	0.1% maximum
4	Flash point (refers to oil component)	ASTM D92	Minimum 300°F (149°C)
5	Corrosion test <ul style="list-style-type: none"> 5% salt fog at 100°F [38°C] 5 mils [0.127 mm], Q Panel Type S 	ASTM B117	Rust Grade 7 or better after 1000 hours of exposure according to ASTM D610 <u>The acceptance criteria of Grade 7 or better after 1000 hours of exposure requires that only 0.3% of the area exposed can have indications of corrosion. (Refer to Fig. 2.2.2.1).</u>
6	Water-soluble ions <ul style="list-style-type: none"> Chlorides Nitrates Sulfides <p><u>Procedure: The inside (bottom and sides) of a 1.06 qt (1 L) glass beaker (approximate outside diameter 4.13 in. [105 mm], height 5.71 in. [145 mm]) is thoroughly coated with 3.53 ± 0.35 oz (100 ± 10g) of corrosion-inhibiting coating material. The coated beaker is filled with approximately 30 oz (900 cc) of distilled water and heated in an oven at a controlled temperature of 100°F (38°C ± 1°C) for 4 hours. The water extraction is tested by the noted test procedures for the appropriate water-soluble ions. Results are reported as ppm in the extracted water.</u></p>	ASTM D512 ASTM D3867 ASTM D4658	10 ppm maximum 10 ppm maximum 10 ppm maximum
7	Soak test <ul style="list-style-type: none"> 5% salt fog at 100°F [38°C] 5 mils [0.127 mm] coating, Q Panel Type S. Immerse panels 50% in a 5% salt solution and expose to salt fog 	ASTM B117 (modified)	No emulsification of the coating after 720 hours of exposure.
8	Compatibility with sheathing <ul style="list-style-type: none"> Hardness and volume change of polymer after exposure to grease, 40 days at 150°F (66°C) Tensile strength change of polymer after exposure to grease, 40 days at 150°F (66°C) 	ASTM D4289 (ASTM D792 for density) ASTM D638	Permissible change in hardness 15%, volume 10%. Permissible change in tensile strength 30%.
9	Cone penetration	ASTM D217	265 – 295 (NLGI 2) worked penetration.

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No.	Test description	Test method	Acceptance criteria
10	<u>Kinematic viscosity of base oil</u> • <u>Report measurement at 40° C in ISO Viscosity Grade numbers (Appendix A)</u>	<u>ASTM D445-17a</u>	<u>The base oil for each batch shall be within the same ISO Viscosity Grade as the PT Coating that was submitted for tests at the 30 months intervals.</u>

Notes:

^aProcedure: The inside (bottom and sides) of a 1.06 qt (1 L) glass beaker (approximate outside diameter 4.13 in. [105 mm], height 5.71 in. [145 mm]) is thoroughly coated with 3.53 ± 0.35 oz (100 ± 10g) of corrosion-inhibiting coating material. The coated beaker is filled with approximately 30 oz (900 cc) of distilled water and heated in an oven at a controlled temperature of 100°F (38°C ± 1°C) for 4 hours. The water extraction is tested by the noted test procedures for the appropriate water soluble ions. Results are reported as ppm in the extracted water.

^bASTM International.

^cThe acceptance criteria of Grade 7 or better after 1000 hours of exposure requires that only 0.3% of the area exposed can have indications of corrosion. (Refer to Fig. 2.2.2.1).

APPENDIX A — ISO VISCOSITY GRADES FOR INDUSTRIAL OILS

<u>ISO Viscosity Grades for Industrial Oils</u>			
<u>ISO Viscosity Grade</u>	<u>Kinematic Viscosity at 40°C, Min cSt</u>	<u>Kinematic Viscosity at 40°C, Mid cSt</u>	<u>Kinematic Viscosity at 40°C, Max cSt</u>
<u>2</u>	<u>1.98</u>	<u>2.2</u>	<u>2.42</u>
<u>3</u>	<u>2.88</u>	<u>3.2</u>	<u>3.52</u>
<u>5</u>	<u>4.14</u>	<u>4.6</u>	<u>5.06</u>
<u>7</u>	<u>6.12</u>	<u>6.8</u>	<u>7.48</u>
<u>10</u>	<u>9</u>	<u>10</u>	<u>11</u>
<u>15</u>	<u>13.5</u>	<u>15</u>	<u>16.5</u>
<u>22</u>	<u>19.8</u>	<u>22</u>	<u>24.2</u>
<u>32</u>	<u>28.8</u>	<u>32</u>	<u>35.2</u>
<u>46</u>	<u>41.4</u>	<u>46</u>	<u>50.6</u>
<u>68</u>	<u>61.2</u>	<u>68</u>	<u>74.8</u>
<u>100</u>	<u>90</u>	<u>100</u>	<u>110</u>
<u>150</u>	<u>135</u>	<u>150</u>	<u>165</u>
<u>220</u>	<u>198</u>	<u>220</u>	<u>242</u>
<u>320</u>	<u>288</u>	<u>320</u>	<u>352</u>
<u>460</u>	<u>414</u>	<u>460</u>	<u>506</u>
<u>680</u>	<u>612</u>	<u>680</u>	<u>748</u>
<u>1000</u>	<u>900</u>	<u>1000</u>	<u>1100</u>
<u>1500</u>	<u>1350</u>	<u>1500</u>	<u>1650</u>
<u>2200</u>	<u>1980</u>	<u>2200</u>	<u>2420</u>
<u>3200</u>	<u>2880</u>	<u>3200</u>	<u>3520</u>