TR 2018-15 – GM – Coatings Used for Pipelines

2020 – July 16 – Editorial Section

Approved additions and revisions to guide material under §192.461. **Ready for LB.**

PRIMARY: 192.461
SECONDARY: G-192-1
PURPOSE: To request a review and amend as appropriate GM to address coatings.
ORIGIN/RATIONALE: 2018 – March 13 – IMP/Corrosion Task Group Minutes
After IMP/CORR TG review and discussion to approve TR 18-06, a request was made by Lee Reynolds to review existing GM 192.461 and amend GM where appropriate to enhance guidance on coatings used for pipelines.
RESPONSIBLE GROUP: IMP/Corrosion Task Group

Section 192.461

~~1 REFERENCES~~
~~References are contained in Table 192.461i.~~

[Editorial Note: Remove entire Table 192.461.i – deleted text from table shown below.]

~~REFERENCES~~

~~Federal Regulation~~	~~NACE Document [1]~~
~~§192.461(a)~~	~~SP0169, Section 5~~
~~§192.461(b)~~	~~SP0169, Section 5~~
~~§192.461(c)~~	~~SP0274~~
~~§192.461(d)~~	~~SP0169, Section 5~~
	~~RP0375, Section 5~~

~~[1] For document titles, see Guide Material Appendix G-192-1, Section 1.9.~~

~~TABLE 192.461i~~

1 GENERAL

Each operator should specify protective coatings for factory-applied and field-applied coatings to meet the requirements stated in §192.461. Materials purchased with factory-applied coatings should include references to the appropriate industry standard for the coating selected with options such as platings and overlays clearly indicated. Field-applied coating requirements should state the expectation to follow manufacturer application instructions including appropriate surface preparation.

2 FACTORY-APPLIED COATINGS

When purchasing materials with factory-applied coatings, operators should ensure coating materials selected and the application processes will be appropriate for the service conditions (e.g., below ground, above ground) and method of installation. For horizontal directional drilling (HDD) installations, see Guide Material Appendix G-192-15A, Section 5.3. Designation of the coating requirements could be an operator-developed material purchase specification for certain items (example 1) or just review and acceptance of manufacturer coating processes (example 2).

(a) Example 1:
A steel line pipe coating specification for fusion bonded epoxy may refer to NACE SP0394 (see 7 below) and add requirements such as the following.
(1) Approved coating type and manufacturer of the Fusion Bonded Epoxy and Abrasion Resistant Overlay.
(2) Frequency of soluble salt testing.
(3) Coating thickness (i.e., minimum, maximum, average).
(4) Allowance of recycled materials.
(5) Production inspection above and beyond industry specification.
(6) Allowable holiday repairs.

(b) Example 2:
Manufacturers of risers, transition fittings, valves, and meter assemblies typically have standard coating materials and application processes for their product. Operators should review the manufacturer coating information, determine the appropriateness for the intended application, and document the acceptance. Considerations in the review process might include the following.
(1) ASTM B117 salt spray test results.
(2) Ensuring product free of water, dust, dirt, oil, or grease prior to coating.
(3) Surface preparation procedures.
(4) Coating material accommodating of all surfaces without cracking, disbonding, or flaking.
(5) Coating options such as:
(i) 2-part epoxy primer and enamel overlay,
(ii) 2-part epoxy primer and 2-part urethane overlay, or
(iii) Zinc plating, 2-part epoxy primer, and 2-part urethane overlay.

3 FIELD-APPLIED COATINGS

(a) There are numerous situations where field application of coatings is required during new pipeline installation, maintenance, and repair activities. Examples include weld joints, service tees, buried valves, thermowelds, and meter assembly maintenance. Compatibility of field-applied coatings with the associated factory-applied coatings should be a consideration in the selection. Due to the variables in the field compared to factory conditions, minimizing the amount of field applications is generally preferred.

(b) Typical field-applied coatings for the applications stated above include liquid epoxy, cold applied tape, hot applied tape, mastic, wax wrap, and shrink sleeves. Operators should specify the appropriate field applied coating for the conditions anticipated and provide manufacturer instructions for application.

(c) Surface preparation of the metallic surface is critical to achieve proper bonding with the coating material. Operators should specify expectations for surface preparation for the various situations that will typically be encountered.
(1) Bare steel should be free of water, dust, dirt, grease, oil, and other foreign matter.
(2) Welds should be free of slag, splatter, and scale.
(3) Sharp edges or burrs should be removed by filing or grinding.
(4) Blast cleaning, if required, should be to a NACE No. 2/SSPC-SP10 finish.
(5) Repair area should be dry and at a temperature at least 5 degrees above the dew point.
(6) Surfaces with oil, grease, pipe thread sealant, or other soluble surface contamination may be cleaned with an approved solvent provided it does not have a detrimental effect on the coating material.
(7) If primer is required, application details should be provided.

4 COATING INSPECTION

(a) The inspection of coatings is an important precautionary measure to ensure defects are identified prior to placing a facility in service. Operators should consider viable opportunities to validate coating integrity during coating application processes, following transportation and other logistical steps, during construction, and post-construction. Methods of inspection might include visual checks, thickness measurements where appropriate, electrical inspection for pipe (typically referred to as jeeping or holiday detection), and for significant facilities, post-construction indirect electrical measurement techniques (e.g., current drain tests, DCVG, close interval surveys).

(b) Operators should review manufacturer inspection requirements in the factory application processes. After delivery to warehouses or construction sites, inspect materials for visible damage.

(c) Inspect pipe coatings while pipe is being lowered into a trench by jeeping or holiday detection (see 4(d) below), and during backfill operations (see 3 of the guide material under §192.319). Pipe handling equipment such as rollers, slings, and chains should be selected and maintained to avoid potential coating damage during use. Backfilling operations should include procedures to

ensure that materials contacting the pipe do not cause coating damage. Use of supplemental protection such as rockshield may also be considered.

(d) The holiday detection test is intended to detect voids, cracks, or contaminants in the coating that may lower the electrical resistance or dielectric strength of the coating. Operators should consider procedures specific to holiday detection that include the appropriate equipment to perform the test, voltage settings per coating type and thickness, requirements by pipe size, length and coating material, and pipe cleanliness expectations. The holiday detection test should be performed prior to lowering the pipe into the trench in order to identify any damage that may occur in the installation process. See NACE documents related to holiday detection in 7 below.

(e) Electrical measurements that can provide indications of coating integrity can be implemented as a further method of inspection. These techniques might require special resources so the operator should consider use of these for facilities deemed at special risk or for significant projects. Examples of these methods include current drain tests, DCVG, and close interval surveys.

5 ADVERSE DITCH CONDITIONS AND SUPPORT BLOCKS (§192.461(d))

(a) During pipe installation in ditch conditions that could cause coating damage or electrical shielding, preventative measures should be taken to protect the pipe and coating. Measures to consider include the following.
(1) Grading ditch bottom to remove rocks or other foreign matter.
(2) Use of bedding sand.
(3) Screening of backfill to remove rocks or other detrimental debris.
(4) Additional coating protection such as rockshield.

(b) Pipe supported over a trench should be placed on padded skids of sufficient size to safely support the pipe weight. If blocking is used to support valves or other assemblies, protective material that will not cause electrical shielding should be considered.

~~2~~6 BORING OR DRIVING (§192.461(e))

See 2 of the guide material under §192.361.

7 REFERENCES

(a) ASTM B117, “Standard Practice for Operating Salt Spray (Fog) Apparatus” - (§192.461(a)(1)-(4)).
(b) NACE No. 2/SSPC-SP 10, “Near-White Metal Blast Cleaning” - (§192.461(a)(1)).
(c) Section 5 of NACE SP0169, "Control of External Corrosion on Underground or Submerged Metallic Piping Systems” – (§192.461(a), (b), and (d)).
(d) NACE SP0188, “Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates” - (§192.461(c)).
(e) NACE SP0274, “High Voltage Inspection of Pipeline Coatings” - (§192.461(c)).
(f) Section 5 of NACE SP0375, “Field-Applied Underground Wax Coating Systems for Underground Metallic Pipes: Application, Performance, and Quality Control” - (§192.461(d)).
(g) NACE SP0394, “Application, Performance, and Quality Control of Plant-Applied Single Layer Fusion-Bonded Epoxy External Pipe Coating.”
(h) NACE SP0490, “Holiday Detection of Fusion-Bonded Epoxy External Pipeline Coating of 250 to 760 µm (10 to 30 mil)” - (§192.461(c)).

GMA G-192-1

1.9 CORROSION RELATED *[Editorial note: insert in list in alphanumeric order.]*

ASTM B117	Standard Practice for Operating Salt Spray (Fog) Apparatus	§192.461
NACE No. 2/SSPC-SP 10	Near-White Metal Blast Cleaning	§192.461
~~NACE RP0375~~	~~Field-Applied Underground Wax Coating Systems for Underground Pipelines: Application, Performance, and Quality Control~~	~~§192.461~~
NACE SP0188	Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates	§192.461
NACE SP0375	Field-Applied Underground Wax Coating Systems for Underground Pipelines: Application, Performance, and Quality Control	§192.461
NACE SP0394	Application, Performance, and Quality Control of Plant-Applied Single Layer Fusion-Bonded Epoxy External Pipe Coating	§192.461
NACE SP0490	Holiday Detection of Fusion-Bonded Epoxy External Pipeline Coating of 250 to 760 µm (10 to 30 mil)	§192.461

Commented [KJ1]: Check titles