Plastic Pipe Rule Update

PHMSA Office of Pipeline Safety
Applicability

- The amended regulations apply to **new**, **repaired** and **replaced** plastic pipe used in the transportation of natural gas.

- **Effective Date:**
  - January 22, 2019, except for some marking aspects (December 31, 2019)
  - Some dates adjusted based on AGA Petition for Reconsideration
AGA Petition for Reconsideration

• On March 1, 2019 PHMSA responded to AGA’s petition to reconsider

• Granted operators additional time to implement training and operator qualification programs for the new requirements
  – an additional 90 days to work with equipment suppliers, and
  – an additional six months to comply with certain provisions that require the development of new programs.

• PHMSA also delayed the compliance deadline for category 1 requirements in § 192.281(e)(4), for joints between metallic and plastic with nominal pipe size (NPS) of 4 or greater.

• Petition and response on public docket (https://www.regulations.gov/docket?D=PHMSA-2014-0098). An official notice in the federal register addressing the petition along with other errors found in the rule will be forthcoming.
Petition for Reconsideration

<table>
<thead>
<tr>
<th>Topic</th>
<th>Sections</th>
<th>New compliance deadline</th>
</tr>
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<tbody>
<tr>
<td>Joining plastic pipe with mechanical couplings.</td>
<td>§§ 192.281(e)(3), 192.281(e)(4), 192.283, and 192.285</td>
<td>April 22, 2019 (90 days)</td>
</tr>
<tr>
<td>Installing service lines with compression couplings.</td>
<td>§ 192.367</td>
<td>April 22, 2019 (90 days)</td>
</tr>
<tr>
<td>Implementing corrosion control for electrically isolated metallic fittings.</td>
<td>§ 192.455</td>
<td>April 22, 2019 (90 days)</td>
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<tr>
<td>Maintaining equipment used to join plastic pipe.</td>
<td>§ 192.756</td>
<td>April 22, 2019 (90 days)</td>
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<tr>
<td>Requirement for devices and components to withstand anticipated loads and meet listed specifications.</td>
<td>§§ 192.143, 192.313, 192.145, 192.149, 192.375, 192.281(e)(3), 192.283, 192.285, 192.376</td>
<td>April 22, 2019 (90 days)</td>
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<tr>
<td>Cathodic protection design for isolated metallic fittings.</td>
<td>§ 192.455</td>
<td>April 22, 2019 (90 days)</td>
</tr>
<tr>
<td>Develop and implement programs for using weak links.</td>
<td>§ 192.329</td>
<td>July 22, 2019 (six months)</td>
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<tr>
<td>Develop and implement programs for storing and handling plastic pipe.</td>
<td>§ 192.67</td>
<td>July 22, 2019 (six months)</td>
</tr>
<tr>
<td>Develop programs for maintaining joining equipment.</td>
<td>§ 192.756</td>
<td>July 22, 2019 (six months)</td>
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Request to Limit Applicability of Category 1 Fittings

In its Petition, AGA raises specific concerns about the category 1 requirements for larger-diameter mechanical joints between plastic and metallic pipe and the applicability of § 192.281(e)(4). While PHMSA appreciates AGA's concerns, it has determined that limiting applicability of category 1 requirements to joints on plastic pipe below 4 inches in nominal pipe size is beyond the issue of plastic to metallic connections raised by AGA and therefore, not appropriate. To better accommodate compliance with this requirement, for joints between metallic and plastic pipe with a nominal pipe size of 4 inches or greater, PHMSA will delay the compliance deadline for category 1 requirements in § 192.281(e)(4) until January 22, 2020. This provides additional time to develop and test larger mechanical joints that can meet the category 1 performance standard.
New or Updated Standards

• § 192.7 (Documents Incorporated by Reference)

• Item I, Appendix B (Listed Pipe Specifications and Other Listed Specifications for Components (new))

• 16 new or updated standards
  – ASTM D2513-12ae1 for PE (includes some aspects of Tracking and Traceability – new 16 digit code)
  – New suite of standards for PA-11 and PA-12 pipe and fittings (replace ASTM D2513-99 and ASTM D2513 that previously applied to thermoplastic pipe other than PE)
  – Several new IBR standards for components (fittings)
<table>
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<tbody>
<tr>
<td>ASTMD2513–12ae1 “Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings” (incorporated by reference, see §192.7).</td>
</tr>
<tr>
<td>ASTM F2817–10 “Standard Specification for Poly(Vinyl Chloride) (PVC) Gas Pressure Pipe and Fittings for Maintenance or Repair” (incorporated by reference, see §192.7).</td>
</tr>
<tr>
<td>ASTM F1924–12 “Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Thermoplastic Gas Distribution Pipe and Tubing” (incorporated by reference, see §192.7).</td>
</tr>
</tbody>
</table>

**B. Other Listed Specifications for Components**

| (2) PPI TR–4, HDB/HDS/SDB/MRS, Listed Materials, “PPI Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Rating For Thermoplastic Pipelines and MRS, Bridge Trestles, Piping and Pressure Vessels,” updated March 2011, (PPI TR–4/2012), IBR approved for §192.121.
Standards generating most questions/concerns

- ASTM F2620 – Heat Fusion Joining of PE
- ASTM F1924 – Plastic Mechanical Fittings for use on PE
- ASTM F1948 – Metallic Fittings for use on Thermoplastic Pipe
- Transitions for multiple material types – where do they fit?
  - Does ASTM F1973 (Factory Assembled Anodeless Risers and Transition Fittings in PE, PA11 and PA12) truly cover all?
Example PA-11 Saddle on PVC Main to PE Service

• Does it fall under
  – F2817 (Maintenance and Repair of PVC)
  – F1924 (Plastic Mechanical Fittings)
  – F2145 (PA11 and PA 12 fittings)
Example Cont’d

• F2817
  – generic language in spots that just talks about fittings on PVC pipe
  – based on the title and other performance requirements in that standard, seems to be talking about PVC pipe and PVC fittings
  – No rotational requirements for mechanical saddles.
Example Cont’d

• F1924 is for plastic mechanical fittings, but says for use on PE Pipe.
• Might work for the PE service line outlet, but not quite on the PVC main.
• Does contain rotational requirements
Example Cont’d

• F2145 is for PA11 and PA12 Fittings, but says for use on PA11 and PA12 pipe. That doesn’t quite work for the material of the main or service outlet.

• Does contain rotational requirements (Similar to F1924)
ASTM F1948

- Title says Metallic Mechanical Fittings for use on Thermoplastic
- Scope says for use of pipe as specified in D2513
- Non-Mandatory Appendix X2 includes some information on material transitions
  - Steel to PE
  - PVC to PE
- Metallic Mechanical on PA 11/12 – F1973?
Traceability and Tracking

• PHMSA delayed adopting the proposed definitions of “traceability information” and “tracking information” in §192.3.

• PHMSA delayed tracking and traceability recordkeeping requirements proposed for §192.63, §192.321 and §192.375

• Distribution operators still expected to collect some form of tracking and traceability information under DIMP §192.1007(a)(5)... location where new pipeline installed and material of which it is constructed
Traceability and Tracking

• The incorporated 2012 editions of material standards for polyethylene (PE) and polyamide (PA-11 and PA-12) pipe require operators to mark plastic pipe with the 16 character ASTM F2897-11a markings.

• This will promote standardization in how component attributes are marked.
Marking of Materials (§192.63)

• Plastic pipe and components manufactured after December 31, 2019 must be marked in accordance with listed specification
  – Intended to give manufacturers time to figure out application of 16 character code based on durability requirements

• All physical markings on plastic pipelines must be legible until time of installation (originally proposed as permanent)

Image source: https://napipelines.com/checking-ids/
Design and Limitations

• 49 CFR §§ 192.121 and 192.123 have been merged (192.123 removed)

• §192.121 reformatted slightly with general requirements first, then any additional requirements by material type
  – (a) design formula for plastic pipe
  – (b) general requirements for plastic pipe
  – (c) PE pipe requirements
  – (d) PA-11 pipe requirements
  – (e) PA-12 pipe requirements
  – (f) Reinforced thermosetting plastic pipe requirements
Increased Design Factor (PE)

• The allowable design factor for new and replaced PE pipe is increased from 0.32 to 0.40 in §192.121 under certain limitations.

• Minimum wall thickness provided for various diameters.

• The higher design factor also applies to pipe sizes less than one-inch Iron Pipe Size (IPS) and Copper Tubing Size (CTS).
Expanded Use of Polyamide-11 Pipe

- The design factor for PA-11 pipe remains at 0.40 in §192.121.

- Maximum operating pressure is increased from 200 psig to 250 psig if using PA32316.

- Maximum pipe diameter is increased to six inches (previously 4 inches).
Expanded Use of Polyamide-11 Pipe

- The increased design factor also applies to small diameter pipe.

- ASTM F2945-12a, an Industry Standard for PA-11 pipe, is incorporated by reference.

Permitted Use of Polyamide-12 Pipe

- PA-12 pipe is permitted for use with a design factor of 0.40 in §192.121.

- Maximum operating pressure is 250 psig for pipe up to six inches in diameter.

- ASTM F2785-12, an Industry Standard for PA-12 pipe, is incorporated by reference (IBR).
Wall thickness table with error

PE PIPE—MINIMUM WALL THICKNESS AND SDR VALUES

<table>
<thead>
<tr>
<th>Pipe size (inches)</th>
<th>Minimum wall thickness (inches)</th>
<th>Corresponding SDR (values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” CTS ........</td>
<td>0.090</td>
<td>7</td>
</tr>
<tr>
<td>¾” CTS ........</td>
<td>0.090</td>
<td>9.7</td>
</tr>
<tr>
<td>1” CTS ........</td>
<td>0.119</td>
<td>11</td>
</tr>
<tr>
<td>1” IPS ........</td>
<td>0.119</td>
<td>11</td>
</tr>
<tr>
<td>1¼” IPS .........</td>
<td>0.151</td>
<td>11</td>
</tr>
<tr>
<td>1½” IPS .........</td>
<td>0.173</td>
<td>11</td>
</tr>
<tr>
<td>2” ...............</td>
<td>0.216</td>
<td>11</td>
</tr>
<tr>
<td>3” ...............</td>
<td>0.259</td>
<td>13.5</td>
</tr>
<tr>
<td>4” ...............</td>
<td>0.265</td>
<td>17</td>
</tr>
<tr>
<td>6” ...............</td>
<td>0.315</td>
<td>21</td>
</tr>
<tr>
<td>8” ...............</td>
<td>0.411</td>
<td>21</td>
</tr>
<tr>
<td>10” ..............</td>
<td>0.512</td>
<td>21</td>
</tr>
<tr>
<td>12” ..............</td>
<td>0.607</td>
<td>21</td>
</tr>
</tbody>
</table>

1” CTS minimum wall should be 0.101 (same error in tables for PA-11 and PA-12)
Design and Construction of Risers

- New § 192.204 added for risers installed after effective date
- Must be tested to ensure safe performance under anticipated loads
- Factory assembled anodeless must be designed and tested in accordance with ASTM F1973-13

Risers Cont’d

- All risers used to connect regulator stations to mains must be rigid and designed to provide adequate support and resist lateral movement.
- Anodeless risers must have rigid casing
- Operators may install field-assembled anodeless risers
Joining Plastic Pipe

- PHMSA has removed the diameter restrictions for socket-fusion joints from §192.281(c)(2).

- Such fittings must still comply with the listed specification, which may have their own diameter restrictions.
Qualifications of procedures and individuals to make joints

• § 192.281 (Plastic Pipe)
  – Heat fusion joints on a PE pipe or component (except electrofusion joints) must comply with ASTM F2620-12

• § 192.285 (Plastic Pipe: Qualifying persons to make joints)
  – PE Heat fusion joints (except electrofusion joints) visually inspected and tested in accordance with ASTM F2620-12
Concerns raised – fusion qualifications

• Some concerns raised on timing needed to update procedures and train/qualify individuals

• What if operator is using something other than F2620?
Fittings (§192.281(e) and 192.283 (b))

- Mechanical fittings must meet listed specification
- Must be Category 1 as defined by listed specification for application material
  - Seal plus resistance to a force such that pipe fails outside joint area

Image source: [https://www.elster-perfection.com/](https://www.elster-perfection.com/)
Concerns raised - Fittings

• Some concerns identified related to
  – availability of fittings 4” or larger, particularly for transitions between plastic and other materials (like cast iron)
  – Time needed to test and validate to new IBR standards
§ 192.283 Plastic pipe: Qualifying joining procedures.
(a)(3) For procedures intended for non-lateral pipe connections, perform testing in accordance with a listed specification. If the test specimen elongates **no more than 25%** or failure initiates outside the joint area, the procedure qualifies for use

Should be “no less than...” similar to as written in § 192.367 and § 192.281 (e)(4)
Installation by Trenchless Excavation

- §192.329(a) and §192.379(a) have been revised to specify that operators take steps to provide sufficient clearance from other underground utilities and/or structures at the time of installation.

- The definition of “weak link” in §192.3 has been revised to include a “device or method”.
External Corrosion Control for Fittings – 192.455 (g)

- Newly installed electrically isolated metal fittings must be cathodically protected and maintained in accordance with operator’s integrity management plan.
- This is not required for existing fittings.
Corrosion – don’t forget about §192.455 (f)

(f) This section does not apply to electrically isolated, metal alloy fittings in plastic pipelines, if:

1. For the size fitting to be used, an operator can show by test, investigation, or experience in the area of application that adequate corrosion control is provided by the alloy composition; and

2. The fitting is designed to prevent leakage caused by localized corrosion pitting.
Does something like a MetFit fall under 192.455 (f) or (g)?

Source: http://www.jmeagle.com/sites/default/files/MetFit_pricelist.pdf
Repair of Plastic Pipe

• §192.720 has been added to specify mechanical leak repair clamps cannot be used as a permanent repair on plastic pipe.
Equipment Maintenance and Calibration

§192.756  Joining plastic pipe by heat fusion; equipment maintenance and calibration.

Each operator must maintain equipment used in joining plastic pipe in accordance with the manufacturer's recommended practices or with written procedures that have been proven by test and experience to produce acceptable joints.
Other Amendments

- PVC pipe is permitted for use (NPRM proposed to prohibit for new installations)
  - ASTM F 2817-10 incorporated for maintenance or repair
  - ASTM D2564-12 (Spec for solvent cements for PVC) IBR for
- Type B regulated onshore gathering lines constructed with plastic pipe must comply with the plastic pipe regulations.
Next Steps

• Issues to resolved
  – Address errors and typos that have been identified
  – Other questions for clarification
  – Standards questions? (ASTM Process)

• Additional Implementation Plans
  – Requests for webinars/workshops to address questions raised to date (ongoing)
  – Slide decks for State Seminars (ongoing)
  – Updated Training for Fed and State inspectors (ongoing)
Questions from Industry

§192.59 Plastic pipe.
New plastic pipe is qualified for use under this part if:
(1) It is manufactured in accordance with a listed specification;
(2) It is resistant to chemicals with which contact may be anticipated; and
(3) It is free of visible defects.

Clarification:
Clarify what is meant by “visible defects”. During construction, new plastic pipe gets nicked up, and may not be “free of visible defects”. So as a clarification, maybe say “defects greater than 10% of the pipe wall”.

To protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives.
§192.121 Design of plastic pipe.
(b) General requirements for plastic pipe and components.
(2) Plastic pipe may not be used where operating temperatures of the pipe will be:
(ii) Above the temperature at which the HDB used in the design formula under this section is determined.

Clarification:
There are concerns that some regulators may interpret this section to mean that the that a section of pipe cannot be used when the temperature of the pipe exceeds the temperature selected for the hydrostatic design basis (HDB) of the pipe.

Ex. A field crew finds a leak in the middle of the summer on a sunny day where the ambient temperature is 90°F. Once the crew exposes the pipe to inspect the pipe and the source of the leakage, the pipe will be operating at a temperature greater than or equal to 90°F and above the 73°F at which the HDB was established.
Questions

§192.204 Risers installed after January 22, 2019.
(a) Riser designs must be tested to ensure safe performance under anticipated external and internal loads acting on the assembly.

Clarification:
1. Does 192.204(a) apply only to manufacturers or to steel riser made in-house as well? If so what type of testing is needed to show that it performs safety under anticipated external and internal loads?
2. Need to better understand regulator station riser design requirements. Is this for plastic risers or metallic risers connecting to plastic main some point downstream?
Questions

§192.281 Plastic Pipe

Clarification:
1. Are operators still required to qualify heat fusion joint procedures as stated in 192.283 now that 192.281(c) requires all heat fusion joining to comply with ASTM F2620-12? If all utilities are required to follow F2620-12 it would seem unusual that everyone would then set up testing to qualify a mandatory joining process.
2. If a PA12 fitting intended for use on existing PVC gas pipe meets F2785, does this satisfy 192.281 (e), (3)?
3. If so, what are the performance requirements/applicable testing methods for such fittings? We currently feel that any requirements and test methods listed in F2785 minus the pipe specific portions would apply.
4. F2785 does not have a Category 1 criteria to satisfy the requirements of 192.281 (e), (4), what would be the appropriate way to test/meet a Category 1 status for these types of fittings?
5. Previously, these fittings were designed and stamped to ASTM D2513, however, the version of D2513 (12ae1) that is now IBR has stipulations (see below) that now make any fitting not made from PE to be non-applicable to this standard.
§192.283  Plastic pipe: Qualifying joining procedures.

(a)(3) For procedures intended for non-lateral pipe connections, perform testing in accordance with a listed specification. If the test specimen elongates no more than 25% or failure initiates outside the joint area, the procedure qualifies for use.

Clarification:
1. Clarify that “no more than 25%” is an error.
2. It is not clear to use how a piping joining procedure for making mechanical plastic pipe joints must be qualified with a listed specification based upon the pipe material. This new addition requires clarification. It is not clear what is desired by referring the operator to the pipe specification for PE, PA-11, PA-12, or any other plastic material being utilized for mechanical fittings.
Questions

§192.329  Installation of plastic pipelines by trenchless excavation and
§192.376  Installation of plastic service lines by trenchless excavation.

Clarification:
1. What does “pulled through the ground” mean? Typically, a hydraulic mole or rod pusher to make a penetrating hole under the street and then pull the plastic service line pipe back through the ground. This is typically done by hand, so would we need to use a weak link here? Consider using the term “Horizontal Directional Drill (HDD)” to reference anywhere we would use a weak link.
2. Weak Link on small diameter pipe. If this is still a requirement, can we at least limit it to mechanically pulled in pipe? Service tubing is often fed in by hand. Should service tubing installed using missile/mole should be exempted from weak link requirement?
3. What constitutes a weak link? Is there a widely accepted industry standard for a “method” to prove elongation hasn’t occurred.
Questions

Subpart I – Requirements for Corrosion Control

1. 2” and smaller mechanical couplings are factory coated and we have no history of coupling failure of this size due to corrosion. Does this meet 192.455(f) so that we won’t need to protect isolated coupling of this size?

2. For a particular size coupling is there a recommended anode size to use and what’s the prefer method to connect to the anode? Some couplings do not have lead for anode connection

3. Are test stations required to monitor isolated couplings or can it be protected with anode and monitor through leak survey?

4. “Ensure all electrically isolated metal alloy fittings are protected and maintained.” Does this mean tracking each metallic fitting on plastic pipe, ie, mechanical couplings, tee connections (or conversion to steel fittings), plastic main tees transitioning to steel, etc. and if so what are the maintenance requirements (1 year, 5 year, etc.)

...
Thank you for Your Participation in Pipeline Safety

For Additional Information on the Plastic Pipe Rule, Contact:

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