DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR Part 192

[Docket No. PHMSA–2014–0098: Amdt. No. 192–124]

RIN 2137–AE93

Pipeline Safety: Plastic Pipe Rule

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: PHMSA is amending the Federal Pipeline Safety Regulations that govern the use of plastic piping systems in the transportation of natural and other gas. These amendments are necessary to enhance pipeline safety, adopt innovative technologies and best practices, and respond to petitions from stakeholders. The changes include increasing the design factor of polyethylene pipe; increasing the maximum pressure and diameter for Polyamide-11 pipe and components; allowing the use of Polyamide-12 pipe and components; new standards for risers, more stringent standards for plastic fittings and joints; stronger mechanical fitting requirements; the incorporation by reference of certain new or updated consensus standards for pipe, fittings, and other components; the qualification of procedures and personnel for joining plastic pipe; the installation of plastic pipe; and a number of general provisions.

DATES: The effective date of these amendments is January 22, 2019. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of January 22, 2019.

FOR FURTHER INFORMATION CONTACT:

General Information: Sayler Palabrica, Transportation Specialist, by telephone at 202–366–0559 or by email at *sayler.palabrica@dot.gov*.

Technical Questions: Max Kieba, General Engineer, by telephone at 202–493–0595 or by email at *max.kieba@dot.gov*.

SUPPLEMENTARY INFORMATION:

I. Executive Summary

A. Purpose of Regulatory Action

PHMSA is amending the Federal Pipeline Safety Regulations that govern the use of plastic piping systems in the transportation of natural and other gas. This final rule is comprised of amendments that will improve safety, allow for expanded use of plastic pipe products, and allow or require the use of certain materials and practices. The use and availability of plastic pipe have changed over the years with technological innovations in the products and best practices used in plastic pipe installations. Progress in the design and manufacture of plastic pipe and components has resulted in materials with higher strength characteristics. Manufacturers are instituting new practices related to traceability, and operators are incorporating these practices. Together, these measures have the potential to improve pipeline safety and integrity. The pipeline safety regulations have not stayed current with some of these developments. Many of PHMSA's stakeholders have petitioned PHMSA to codify measures from the progress the industry has made; these petitions are detailed below. This final rule amends the Federal Pipeline Safety Regulations (PSR) to incorporate these changes to enhance pipeline safety, respond to petitions for rulemaking, and accommodate innovations in plastic pipe materials and designs.

PHMSA received several petitions for rulemaking under 49 CFR 190.331 regarding plastic pipe. Copies of these petitions are available in the docket for this rulemaking (PHMSA–2014–0098) in addition to the dockets initially established for the petitions. The amendments in this rulemaking will address the following petitions:

- American Gas Association (AGA)—(Docket No. PHMSA 2010–0011)—Petition to increase design factor of PE pipe 0.32 to 0.4 and incorporate updated ASTM International (ASTM) D2513 (standard for polyethylene (PE) pipe and fittings).
- Evonik Industries (Evonik) and UBE Industries (UBE)—(Docket No. PHMSA 2010–0009)—Petition to allow use of Polyamide-12 (PA–12) pipe.
- Arkema—(Docket No. PHMSA 2013–0227)—Petition to allow use of Polyamide-11 (PA–11) pipe at higher pressures.
- Gas Piping Technology Committee (GPTC)—Petition to allow above-ground, encased plastic pipe for regulator and metering stations.

Federal and State inspectors have noticed issues related to plastic pipe installation that should be addressed in the pipeline safety regulations. For example, the National Association of Pipeline Safety Representatives (NAPSR), an association of State pipeline safety regulators, petitioned PHMSA to establish permanency requirements for pipe markings in Resolution SR 2–01. Approved on September 27, 2001, Resolution SR2–01 encouraged PHMSA OPS to amend 49 CFR 192.63 ''to require marking of all pipe, fittings, and components in such a manner that the markings last for a period of 50 years or the life of the pipe, fittings, and components.''

B. Summary of Regulatory Provisions

To address these issues and petitions, PHMSA is amending the PSR in 49 CFR part 192 to update the plastic pipe regulations. This rulemaking limits these changes to new, repaired, and replaced pipelines. The changes include increasing the design factor of PE pipe; increasing the maximum pressure and diameter for PA–11 pipe and components; allowing the use of PA–12 pipe and components; new standards for risers; more stringent standards for plastic fittings and joints; stronger mechanical fitting requirements; new and expanded standards for the installation of plastic pipe; the incorporation by reference of certain the qualification of procedures and personnel for joining plastic pipe; the installation of plastic pipe; new or updated consensus standards for pipe, fittings, and other components; the qualification of procedures and personnel for joining plastic pipe; the installation of plastic pipe; and a number of general provisions. These amendments are described in Part III of this document and in further detail in the Notice of Proposed Rulemaking (NPRM) published May 21, 2015. *See* 80 FR 29263.

C. Costs and Benefits

In accordance with 49 U.S.C. 60102, Executive Orders 12866 and 13563, and U.S. DOT policy, PHMSA has prepared an assessment of the benefits and costs of the rule as well as reasonable alternatives. PHMSA released the initial Regulatory Impact Analysis (RIA) concurrent with the NPRM for public review and comment. PHMSA developed the final RIA by incorporating further internal review and input from public comments. PHMSA has published the final RIA concurrent with this final rule, and it is

available in the docket. PHMSA quantified positive net benefits of $32.7 million, mostly from cost savings due to the change in the PE design factor. Other changes enhance pipeline safety, expand flexibility in pipe material choice, and incorporate more modern technical consensus standards.

PHMSA quantified approximately $391,000 in annualized safety benefits from the revisions to plastic pipe installation requirements. This estimate is based on the historical frequency and consequences of incidents on plastic pipe systems that could have been prevented by the changes in the final rule. PHMSA also determined unquantified safety benefits from enhanced standards for fittings and risers, prohibiting the permanent use of temporary leak repair clamps, and other general provisions. PHMSA estimated that the revised design factor for PE, relaxed restrictions on PA–11, incorporation of PA–12, and updated standards for all three materials would have negligible impacts on pipeline safety. Overall, the rule improves the safety of plastic pipe systems.

On the cost side, PHMSA quantified $32 million in cost savings for the revision to the design factor of PE pipe from 0.32 to 0.40. The change in design factor leads to pipe material cost savings as it permits pipe to operate at higher pressures for a given pipe size and wall thickness. PHMSA also determined that the provisions for expanded use of PA–11 and incorporation of PA–12 materials would lead to unquantified cost savings to operators from greater flexibility in pipeline material choice. The other provisions have unquantified costs, however PHMSA expects these to be minimal as they generally incorporate existing industry best practices by incorporating by reference technical consensus standards.

II. Background

A. Notice of Proposed Rulemaking

On May 21, 2015, PHMSA published the Plastic Pipe NPRM and requested feedback and public comments on the proposed changes to the natural gas pipeline safety regulations in accordance with the Administrative Procedure Act, 5 U.S.C. 551 *et seq.* The comment period closed on July 31, 2015. These comments and all other related rulemaking materials are available in the electronic docket via *www.regulations.gov* under Docket ID PHMSA–2014–0098. In section III of this document, PHMSA has summarized the regulatory changes proposed in the NPRM and the public's comments regarding those changes. PHMSA has included a detailed response to the public's feedback and comments.

B. Gas Pipeline Advisory Committee

Under 49 U.S.C. 60115, the Gas Pipeline Advisory Committee (GPAC) is a statutorily mandated advisory committee that advises PHMSA on proposed safety standards, risk assessments, and safety policies for natural gas pipelines. The Pipeline Advisory Committees were established under the Federal Advisory Committee Act, Public Law 92–463, 5 U.S.C. App. 1–16, and the Federal Pipeline Safety Statutes, 49 U.S.C. ch. 601. The GPAC consists of 15 members, with membership equally divided among Federal and State agencies, the regulated industry, and the public. The GPAC advises PHMSA on the technical feasibility, practicability, and cost-effectiveness of each proposed pipeline safety regulation.

On June 1–3, 2016, the GPAC met in Arlington County, VA. Seven members of the GPAC were in attendance: One representing government, three representing the public, and five representing industry. One member representing the public, one representing industry, and one representing government were absent; additionally, there were 3 vacancies for government representatives and one vacancy for a public representative. During the meeting, the GPAC considered the regulatory proposals of the NPRM, discussed the comments on the NPRM from the public and the pipeline industry, and recommended changes to the NPRM. The record of this meeting, including full transcripts, is filed under Docket Number PHMSA–2016–0032, available at both *regulations.gov* and on the PHMSA meeting page at *https://primis.phmsa.dot.gov/meetings/MtgHome.mtg?mtg=113*.

The GPAC, in a unanimous vote, found the NPRM, as published in the **Federal Register**, and the Draft Regulatory Evaluation technically feasible, reasonable, cost-effective, and practicable provided PHMSA incorporated recommended amendments agreed upon by the committee. PHMSA staff has reviewed and incorporated the GPAC's recommendations into this final rule to the extent practicable. Part III of this document summarizes these discussions and recommendations in greater detail under the respective individual topics.

III. Analysis of Comments and PHMSA Response

In the NPRM published on May 21, 2015, PHMSA solicited public comment on whether the potential amendments put forward in the NPRM would enhance the safety of plastic pipe in gas transmission, distribution, and gathering systems, and on the costs and benefits associated with these proposals. PHMSA received comments on the NPRM from 39 entities, including:

- Fifteen pipeline operators;
- Eight pipeline or manufacturer trade associations;
- Six manufacturers;
- Five private citizens;
- Three consultants;
- Two government entities, including an association of State pipeline regulators;
- One citizen group; and
- One pipeline services company.

The following subsections summarize PHMSA's proposals, each of the relevant issues raised by commenters concerning those proposals, and PHMSA's response to those comments. Comments and corresponding rulemaking materials received may be viewed at *www.regulations.gov* under docket ID PHMSA–2014–0098.

A. Tracking and Traceability

(1) PHMSA's Proposal

In the NPRM, PHMSA proposed to amend § 192.3 to define ''traceability information'' and ''tracking information'' and to amend §§ 192.321 and 192.375 to establish standards requiring operators to properly and consistently track and trace pipe and components within their system. The proposed tracking information included the location of each section of pipe, the individual who joined the pipe, and components within the pipeline. The proposed traceability information included the location of pipe and components; manufacturer; production; lot information; size; material; pressure rating; temperature rating; and as appropriate, other information such as type, grade, and model. PHMSA proposed to amend § 192.63 to require operators to adopt the tracking and traceability requirements in ASTM F2897–11a, ''Standard Specification for Tracking and Traceability Encoding System of Natural Gas Distribution Components (Pipe, Tubing, Fittings, Valves, and Appurtenances),'' issued in November 2011, (ASTM F2897–11a), and proposed that operators must record the tracking and traceability data and retain it for the life of the pipe.

(2) Comment Summary

PHMSA received comments supporting the proposed revisions from NAPSR and Dr. Gene Palermo of Palermo Plastics Pipe (P3) Consulting

(Palermo). Palermo praised the tracking and traceability standards in ASTM F2897–11a and noted that it would bring American operators more in line with International Standards Organization (ISO) tracking and traceability standards. Though the American Public Gas Association (APGA) had specific concerns about technology and costs, it described the collection of tracking and traceability information as ''a laudable goal'' and further noted that ''operators no doubt wish this capability existed when PHMSA issued advisory bulletins about brittle-like cracking problems with Century Pipe, DuPont Adyl A piping manufactured before 1973 and polyethylene gas pipe designated PE 3306.''

AGA, APGA, the Texas Pipeline Association (TPA), the Northeast Gas Association, National Grid, AGL Resources, Atmos Energy Corporation, CPs Energy, Questar Gas Company, National Fuel Gas Distribution Corporation, SoCal Gas and San Diego Gas and Electric (SDG&E), NiSource Incorporated, and Norton McMurray Manufacturing Company (NORMAC) submitted comments suggesting that the plastic pipe tracking and traceability provisions should be dropped entirely from the rulemaking. Many operators echoed AGAs concern that a tracking and traceability program would be economically significant, and that full consideration of the costs, benefits, and alternatives that program would slow the adoption and implementation of other portions of the rule.

Additionally, those commenters maintained that tracking and traceability requirements should be considered in a separate rulemaking for all material and system types, rather than piecemeal and only for plastic pipe in this rulemaking. The commenters suggested that consistent regulation of all system types would avoid regulatory uncertainty. AGA, APGA, National Fuel, NiSource, SoCal Gas and SDG&E, and Southwest Gas (SW Gas) all proposed convening a working group to discuss options for moving forward with a separate, comprehensive tracking and traceability rule. National Grid estimated a compliance cost of $8.1 million a year for 14,968 plastic pipe miles, and SW Gas estimated $10 million to $20 million in startup costs and $1 million to $2 million in annual costs. APGA, the Plastics Pipe Institute (PPI), NORMAC, R.W. Lyall and Company (Lyall), Thomas M. Lael, National Fuel Gas, City Utilities, and TPA submitted comments, indicating that markings should only have to be permanent up to the time of installation. Commenters argued that truly ''permanent'' markings are not currently technically feasible, stating that the information is only needed at the time of installation; after the information has been recorded into a recordkeeping system, the physical markings are no longer necessary. PPI notes that with current technology and practice, markings are designed to last only three years in an underground environment

APGA commented that the proposal would be significantly burdensome to small public operators and that it would be reasonable to expect markings to remain intact 20 years after the pipe was made. Lyall requested clarification about what was expected by the term ''permanent markings'' and whether an operator's records were sufficient to meet those requirements.

APGA suggested that if PHMSA did move forward with a tracking and traceability program, it should only collect the data required by the six fields prescribed under ASTM F2897–11a: Component manufacturer, manufacturer's lot code, production date, material, type and size. Both Lyall and Continental Industries concurred. PPI noted that deviating from ASTM F2897–11a would require manufacturers to revamp their marking systems away from the standard and would potentially require new barcoding systems. SW Gas suggested that a tracking and traceability working group could potentially revise ASTM F2897 to incorporate any additionally-needed data fields in the future.

AGA, Northeast Gas Association (NGA), National Fuel Gas Distribution Corporation (NFGDC), PPI, Lyall, and City Utilities recommended that, regardless of the specific tracking and traceability provision in the final rule, PHMSA should use a ''phased-in'' approach for implementation. City Utilities commented that it was not opposed to the recordkeeping of material data but requested an extended timeframe to create an implementation plan that considered budget costs. Commenters suggested three to five-year phase-in periods for tracking and traceability recordkeeping requirements.

The GPAC discussed this topic at length and ultimately recommended that PHMSA phase-in the tracking and traceability provisions by establishing a compliance deadline of one year for ASTM F2897–11a-compliant markings and a deadline of five years for recordkeeping requirements. The GPAC further recommended that PHMSA limit the marking and traceability requirements to the categories in ASTM F2897–11a and revise the permanent marking standard to a requirement that markings on plastic pipe and components be legible at the time of installation.

(3) PHMSA Response

In response to comments on the tracking and traceability recordkeeping requirements proposed for §§ 192.63, 192.321(j) and 192.375(c), PHMSA is delaying final action on these proposals until a later date. PHMSA expects to consider all the comments and the recommendations of the GPAC related to tracking and traceability recordkeeping after further evaluation of the costs and benefits of this issue. These issues may be revisited in either a subsequent final action or a new rulemaking project.

Plastic pipe must still be marked with the 16-character ASTM F2897–11a markings, which are included in the 2012 editions of the material standards for PE and PA–12 pipe. Incorporating the 2012 editions of the material standards help narrow the gap between the regulations and the latest consensus standards, and adopting the 16-character ASTM F2897–11a markings within those materials standards will help to phase in standardization to how component attributes are marked and eventually captured in asset management systems. The final rule does not include most of the additional marking performance regulations previously proposed in § 192.63(e), such as permanence requirements and instead defers to the language in the material standards. PHMSA notes that some of the standards incorporated by reference in this final rule contain their own durability requirements which also vary on whether the marking is on pipe, fitting or another component. For example, section 7 for respective material specific standards (*i.e.* ASTM D2513–12ae1 for PE, ASTM F2785–12 for PA–12 and ASTM F2945–12a for PA–11) states that for pipe all required markings shall be legible, visible, and permanent. The standards go on to say to ensure permanence, markings shall be applied so it can only be removed by physically removing part of the pipe wall, shall not reduce the wall thickness to less than the minimum value of the pipe, not have any effect on the long-term strength of the pipe, and not provide leakage channels when elastomeric gasket compression fittings are used to make joints. The marking section for fittings on the other hand does not have such explicit requirements on durability or mention permanence. The standard for plastic valves, ASME B16.40–2008, states that only certain markings on valves must be

permanently affixed, while others can be made by any means.

PHMSA is including language in § 192.63(e) that markings must be legible until time of installation based on public comments and GPAC recommendations. The language is intended to provide clarity given the confusion with how the marking portions of the material specific standards (such as ASTM D2513–12ae1 for PE, ASTM F2785–12 for PA–12 and ASTM F2945–12a for PA–11) are written and what the ultimate requirements are. For example, it is not entirely clear in section 7.1 of ASTM D2513–12ae1, ''Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings,'' issued on April 1, 2012, (ASTM D2513–12ae1), whether all required markings (including the 16-character ASTM F2897–11a markings in section 7.6) be ''legible, visible, and permanent'' per the standards or if the permanence requirements only apply to the more conventional print line information in place prior to the 2012 version and the 16-character marking is an additional requirement with different durability requirements. While manufacturers also commented that it was not feasible to make ASTM D2897 markings permanent and readable for several years after installation without additional costs, it is certainly feasible to print markings legible until the time of installation. This new regulatory language addresses issues raised in public comments and by the GPAC concerning confirming the durability of markings, and help ease any potential regulatory burdens as a result of confusion with permanency and durability requirements. Furthermore, PHMSA is still including a one-year implementation period based on public comments and GPAC recommendations to allow manufacturers additional time to incorporate the new requirements, particularly for the 16-character marking. PHMSA understands many manufacturers are already implementing the 16-character marking but some have not yet, with many manufacturers on both sides waiting to get clarity of expectations on durability.

In the interim, PHMSA expects all distribution operators to already be collecting some form of tracking and traceability information, since the Distribution Integrity Management Program (DIMP) regulations in § 192.1007(a)(5) require that operators capture and retain data on the location where new pipeline is installed and the material of which it is constructed.

B. Design Factor for PE

(1) PHMSA's Proposal

PHMSA proposed to amend the design pressure equation in § 192.121 to increase the design factor (DF) for PE pipe from 0.32 to 0.40.

The design pressure for PE pipe and other thermoplastics are based first on a Hydrostatic Design Basis (HDB) rating, which refers to the categorized long term hydrostatic strength for a given material. The HDB value is sometimes also considered a measure of the ultimate long term strength of the material. Industries then apply an additional design factor multiplier to the HDB rating to account for potential long term effects based on engineering considerations of how the HDB of the material was derived in conjunction with the behavioral properties of the material, and the specific product they are transporting. The allowable design pressure for plastic in § 192.121 is based on a number of factors, including the HDB rating, wall thickness and diameter or standard dimension ratio (SDR), and design factor. An increase in design factor allows for the use of slightly thinner wall to achieve the same design pressure.

To illustrate how the design factor affects the design of plastic pipe, examples using the design pressure calculation are shown below. The design pressure formula in § 192.121 is expressed in one of two ways:

$$P = 2 \times S \times (t/(D-t)) \times DF$$

or

$$P = 2 \times (S/(SDR-1)) \times DF$$

Where S = the HDB rating; t = specified minimum wall thickness; D = specified outside diameter; DF is the design factor; and SDR the standard dimension ratio (ratio of average specified outside diameter to minimum specified wall thickness.)

A common pipe material is PE4710 which has an HDB rating of 1600 at 73 °F. A common pipe size is 4-inch PE SDR 11 which has an average specified outside diameter of 4.5 inches and specified minimum wall thickness of 0.409 inches. If these values are applied to the first equation above, the design pressure would be:

$$P = 2 \times 1600 \times (0.409/(4.5-0.409)) \times 0.32 = 102.4$$

Applying them to the second equation above, design pressure would be:

$$P = 2 \times (1600/(11-1)) \times 0.32 = 102.4 \text{ psi}$$

If the design factor is changed from 0.32 to 0.40, it also changes the result of the calculation in the design pressure formula. If an operator wants to maintain an operating pressure of around 102.4 psi with the new design factor, they could do so using a slightly thinner wall pipe of SDR 13.5, or minimum specific wall of 0.333 inches. The formulas below illustrate how the new design factor allows an operator to use the same design pressure with thinner wall pipe.

$$P = 2 \times 1600 \times (0.333/(4.5-0.333)) \times 0.4 = 102.3 \text{ psi}$$

or

$$P = 2 \times (1600/(13.5-1)) \times 0.4 = 102.4 \text{psi}$$

Alternatively, an increase of design factor with use of slightly thinner wall pipe allows an operator to increase throughput and design pressure if all other variables remain the same, as long as the design pressure doesn't exceed the limitations called out in the regulations (such as 125 psi and minimum wall thickness.)

The current design factors for thermoplastic pipe were established decades ago based on general experience with materials at the time and attempts at standardization. As an example, water used a 0.5 design factor for decades. For gas pipe, additional safety factors (sometimes also called strength reduction or derating factors) were applied to the water DF: an additional 0.8 multiplier covers long term effects from constituents in fuel gas, and another 0.8 multiplier compensates for use at increased temperatures above 73 °F. If those two multipliers are applied on top of 0.5 DF for water (or $0.5 \times 0.8 \times 0.8$) the resulting DF is 0.32 for gas.

On August 14, 2009, PHMSA received a petition from AGA to allow for a 0.40 design factor for PE pipe based on research and technical justifications performed by the Gas Technology Institute (GTI; July 16, 2007) and to include certain limitations by type of material and wall thickness.[1] A primary justification for considering raising the design factor is consideration of newer, better performing materials of today and changes in other industries like water, but still applying the same safety factors in place for gas. The water industry has changed their safety factor from 0.5 to 0.63 in standards such as ANSI/AWWA C901–08, Polyethylene (PE) Pressure Pipe and Tubing, ½ in. (13 mm) through 3 in. (76mm), for Water Service (October 1, 2008.) The 2017 edition of PPI TR–4 allows a design factor of 0.63 for plastic water pipe made of certain PE 4710 materials. Applying the same two derating factor multipliers for gas to the newer DF for water (or $0.63 \times 0.8 \times 0.8$) results in a DF of 0.4 for gas. There are

[1] Docket No. PHMSA–2011–0011, August 14, 2009.

additional safety measures applied if operators want to use the 0.4 DF, including the use of newer materials in place today, the application of a minimum wall thicknesses by pipe size, and a maximum pressure of 125psi.

Since design pressure for plastic pipe is based on a number of variables, including design factor and wall thickness, an increase in design factor would allow for the use of PE pipe with thinner pipe walls manufactured in accordance with ASTM D2513–12ae1 as long as it doesn't go below the minimum wall thickness for a specific pipe size.

(2) Summary of Comments

The majority of commenters, including AGA, APGA, PPI, NGA, NAPSR, NFGDC, TPA, Palermo, and SW Gas, supported this proposal, with several suggesting that a higher design factor would incentivize the use of plastic pipe and provide safety and economic benefits due to its low cost and resistance to traditional corrosion risks. Palermo supported the design factor increase to 0.40 and noted the safe operating history of PE pipe operated to that specification in Canada. Palermo further noted that increasing the design factor would make the material more attractive for operators which it claims would have positive impacts on pipeline safety, stating that going to a 0.4 design factor encourages distribution operators to ''extend the use of plastic pipe systems and displace the lower safety related performance of metal pipe with the higher safety related performance of plastic piping system.'' Palermo noted specifically that plastic pipe systems do not face corrosion risks like metallic pipe systems do.

AGA, PPI, NGA, Evonik Industries, and the MidAmerican Energy Company (MidAmerican) supported the proposal in general but were opposed to restricting the diameter of PE pipe beyond the limitations in ASTM D2513–14e1. The commenters suggested permitting pipe up to 24 inches as provided in the standard. Evonik Industries, a plastic pipe manufacturer and one of the original petitioners, also requested that PHMSA expand the PE, PA–11 and PA–12 minimum wall thickness tables in § 192.121 to include pipe sizes less-than-or-equal-to one-inch Iron Pipe Size (IPS).[2] MidAmerican further requested the inclusion of one-inch Copper Tubing Size (CTS) (another size standard) as a pipe size.

AGA and TPA requested that the proposal for an increased design factor for PE pipe should be applied retroactively to existing pipe made of PE2708 and PE4710. ASTM introduced those compounds in 2008 in ASTM D2513–08b ''Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.''

The Iowa Utilities Board (IAUB) stated that the wall-thickness tables in the rule should use Standard Dimension Ratio (SDR) rather than Dimension Ratio (DR) in the column heading to be consistent with the design formula for plastic pipe in § 192.121. Additionally, for ease of use, IAUB recommended including a header on the PE and PA tables in § 192.121 indicating to what materials they apply.

DTE Energy (DTE) opposed the proposed 0.090-inch minimum wall thickness for plastic pipe and suggested that PHMSA should retain the current 0.062-inch minimum for PE pipe that they have used in Michigan since 1967. DTE further commented that operators should be allowed to apply the design formula in § 192.121(a), based on the intended use and operating pressure of the pipe, to dictate the minimum required wall thickness.

The PVC Pipe Association, a trade group representing PVC pipe manufacturers, submitted comments broadly opposing PHMSA's proposal to modify the allowed design factor of PE Pipe. The Association opposed the less-conservative design factor of 0.40 until operators could gain more field experience with PE pipe operating at the higher factor. In supporting documentation, the PVC Pipe Association hypothesizes that certain high-density polyethylene (HDPE) pipe grade compounds can be susceptible to microscopic crack propagation in high-pressure water service, though it acknowledged that newer compounds may be more crack-resistant.

The GPAC recommended minor changes to the minimum wall thickness tables to add additional items, and that PHMSA research the procedural possibility of incorporating the more recent ASTM D2513–14e1, which allows PE pipe with a larger maximum diameter. The Committee further requested that PHMSA research the possibility of applying the new design factor retroactively to existing pipe with the same material characteristics specified in the rule. Members of the Committee and representatives of PPI and AGA commented that, except for the diameters allowed currently, ASTM D2513–12ae1 is not significantly different from either the editions issued before or after it. Therefore, allowing previously installed pipe to operate at the increased design factor or allowing the higher diameters permitted in the 2014 standard should be acceptable.

(3) PHMSA Response

In consideration of the comments, PHMSA is revising the final rule to include pipe sizes smaller than one-inch IPS and certain one-inch CTS pipe sizes on the tables for each of the materials modified in the final rule. Specifically, in this final rule, PHMSA has revised the proposed PE wall thickness and the SDR table in § 192.121(c)(iv) for clarity and to include ½′ and ¾′ IPS and CTS sizes. The omission of these smaller-diameter specifications was an oversight; PHMSA did not intend to restrict the use of small-diameter plastic pipe. PHMSA will also revise the PE, PA–11, and PA–12 tables per the recommendations of the IUB for consistency and ease of use.

In response to comments from DTE, PHMSA notes that the 0.090-inch minimum wall thickness applies to pipes operating at the new 0.40 design factor. At 0.32, operators may still use the design formula in § 192.121 in accordance with the applicable standard. PHMSA is not lowering the minimum wall thickness for 0.40 design factor pipe, as the more conservative wall thickness is necessary to mitigate sidewall fusion and tapping risks, among others, that exist at the higher design factor.

PHMSA notes that while AGA and TPA are correct in their assessment that the design requirements for PE2708 and PE4710 pipe under ASTM D2513–08b are the same as the newly incorporated ASTM D2513–12ae1 edition, this subpart is non-retroactive, therefore, the previous maximum design factor would still apply to existing pipelines.

PHMSA disagrees with comments from the PVC Pipe Association; the supporting data provided in the AGA petition provides proper safety justification for the revised maximum design factor. As described further in the petition, a battery of tests was performed on pipe to evaluate the combined influence of increased internal pressures and other add-on stresses including effects of squeeze-off, rock impingement, surface scratches, earth loading, and bending stresses on the pipe wall. Various types of joints (butt heat fusion, saddle fusion, electrofusion and mechanical joining) were also subjected to long term sustained pressure testing at elevated temperatures. No failures were observed. Both the petition and the final rule do provide minimum wall thickness requirements for an added safety measure. The Vinyl Institute's comments studying the history of legacy

[2] Iron pipe size (IPS) is a pipe size standard still used for polymer pipe.

plastic pipe materials in high-pressure water service is not directly applicable to evaluating the operation of modern PE compounds in gas service.

PHMSA has considered, as requested by the GPAC, the possibility of incorporating a more recent edition of ASTM D2513 and permitting retroactive applicability of the 0.40 design factor. PHMSA is not in the position to adopt the more recent ASTM D2513–14e1, which includes the increased maximum diameter, since this is beyond the scope of the NPRM and PHMSA has not solicited comment on such a proposal. PHMSA will evaluate the new standard and diameter revision for inclusion in future rulemakings.

C. Expanded use of PA–11 Pipe

(1) PHMSA's Proposal

In the NPRM, PHMSA proposed to amend part 192 to allow pipelines made of certain modern PA–11 compounds to operate at pressures up to 250 pounds per square inch gauge (psig) and permit installation of PA–11 pipe with a diameter up to six inches. This would expand the allowable uses of PA–11 from the current regulations which restrict the use of PA–11 pipe to pressures up to 200 psig and nominal pipe sizes of 4 inches or less.

Arkema, the plastics manufacturer that petitioned for this change, cited the growing history of safe operation of PA–11 pipe since 1999 either under special permit or the current restrictions. PHMSA is also permitting arithmetic interpolation of the allowable pressure equation for PA–11. This would allow consistency with how hydrostatic design basis (HDB) [3] is already determined for other thermoplastic pipe materials in § 192.121.

Finally, PHMSA proposed incorporating two PA–11 specific standards by reference. Currently, plastic pipe and fittings made of PA–11 must be manufactured in accordance with the much older editions of ASTM D2513 (1987 and 1999) that are referenced for thermoplastic materials other than PE. Adopting ASTM F2945–12a incorporates over a decade of PA–11 material and design advancements. The standard includes requirements for material composition, design, manufacturing tolerances, strength, crack resistance, and quality control for PA–11 pipe and fittings.

The final rule also incorporates ASTM F2600–09 as a listed specification for electrofusion fittings on PA–11 pipe. An electrofusion fitting is one with a built-in electric heating element. Passing a current through the fitting bonds the pipe. With new material specific standards being added for PA–11 and other standards being added for components in this rule, there is a need to add F2600–09 for Electrofusion PA–11 fittings, similar to how ASTM F1055 is currently referenced for PE Electrofusion Fittings. Like the PE standard, ASTM F2600–09 sets material and performance requirements for PA–11 electrofusion fittings. In order to meet this standard, a manufacturer must demonstrate test a specimen for minimum hydraulic burst pressure, sustained pressure, tensile strength, impact resistance, and joint integrity.

(2) Summary of Comments

Nearly all commenters supported this proposal, including AGA, APGA, PPI, NGA, TPA, TPA, NAPSR, Palermo, and Arkema. Arkema highlighted the operating history of PA–11 pipe in offshore oil and gas use and in gas systems in Australia.

A number of commenters requested additional entries on the minimum wall thickness table for PA–11. AGA, NGA, and Arkema proposed including ¾-inch pipe, and MidAmerican requested the inclusion of one-inch CTS sized pipe in the PE, PA–11, and PA–12 tables. IAUB noted that the rule references CTS pipe, but it is not present on the table.

The Board further stated that CTS values should be included in the minimum wall-thickness table; if not, then references to CTS should be removed from the final rule. The GPAC voted unanimously for these additions to be added to the minimum wall-thickness table.

Palermo and Volgstadt and Associates recommended allowing the use of PA32312 at higher pressures in addition to PA32316 under PA–11. Volgstadt and Associates further noted that since the HDB of PA–11 is 180 °F in PPI TR4, § 192.121 should be revised to allow the installation of pipe using the higher temperature rating. Volgstadt noted that PA32312 could then be safely used in lower-pressure applications where temperatures higher than 140 °F are expected.

(3) PHMSA Response

As noted in the previous discussion on the new design factor for PE Pipe, PHMSA agrees with commenters to revise the tables to include additional sizes, including IPS smaller than one-inch diameter and one-inch CTS. Specifically, PHMSA amended the table in the proposed § 192.121 (d)(2)(iv) to add ½″ and ¾″ IPS and CTS sizes, which match those in the standard and those listed for PE pipe. PHMSA is not including an HDB rating at 180 °F, as not all compounds are rated at that temperature, and inclusion could wrongly imply that operators are permitted to operate any plastic pipe at that temperature. Operators may still interpolate the design formula down from 180 °F. PHMSA is not allowing the use of PA32312 at the higher pressures permitted for PA32316. As explained in the NPRM, PHMSA found it appropriate that operators use PA32316 for such higher-pressure applications due to material characteristics, more specifically, an HDB rating of 3150 psi at 73 °F that can result in a design pressure of 250 psi using SDR 11 and 0.4 DF. The PA32312 material HDB rating of 2500 psi would correlate to a design pressure of 200 psi using the same SDR and DF. Operators may install and use PA32312, but not at the higher pressures permitted for PA32316.

D. Incorporation of PA–12

(1) PHMSA's Proposal

In the NPRM, PHMSA proposed to amend § 192.121 to allow the use of PA–12 pipe in response to a petition for rulemaking from Evonik and UBE (Docket No. PHMSA–2010–0009) at pressures up to 250 psig and for pipe sizes up to 6 inches in diameter, subject to wall thickness limitations described in the petition. These restrictions are consistent with the proposed requirements for PA–11, another polyamide material. The petitioners stated that material testing and experience in pipeline service under special permit have ''amply validated'' the strength and durability of PA–12 against known threats and failure mechanisms.

PHMSA also proposed to incorporate by reference a number of standards applicable to PA–12 pipe. PA–12 pipe and fittings used under part 192 must be manufactured in accordance with ASTM F2785–12, ''Standard Specification for Polyamide 12 Gas Pressure Pipe, Tubing, and Fittings.'' The standard defines: Material properties; manufacturing tolerances; test methods and requirements, marking requirements; and minimum quality control program requirements. Manufacturers must comply with these requirements in order to sell pipe as ASTM F2785–12 compliant.

ASTM F2767–12 establishes specifications for electrofusion fittings on PA12 systems. An electrofusion fitting is one with a built-in electric heating element. Passing a current through the fitting bonds the pipe. With new material specific standards being added for PA–12 and other standards

[3] The HDB is a reflection of a plastic pipe's ability to resist internal pressure over long periods of time.

being added for components in this rule, there is a need to add F2767 for Electrofusion PA–12 fittings, similar to how ASTM F1055 is currently referenced for PE Electrofusion Fittings.

(2) Summary of Comments

NAPSR, AGA, APGA, Evonik, NGA, PPI, TPA, and Palermo all expressed support for the proposal. Palermo commented that ''PA–12 is very similar to PA–11 and both materials are being used very successfully for gas operations internationally.'' Palermo further noted that the material has been successful in limited trial use in oil and gas operations in the United States. A number of commenters requested the addition of sizes smaller than one-inch IPS and one-inch CTS for PA–12 similar to those requests made for PE and PA–11.

Evonik commented that the language in the preamble of Section D references to ''allow a minimum wall thickness of at least 0.90 inches.'' The commenter stated that this is a typographical error. A value of 0.090 inches would be consistent with the original petition and the proposed wall thickness tables in § 192.121 for all of the proposed materials. Correcting this error would significantly reduce the required wall thickness for PA–12 pipe. Continental Industries recommended that the material designation code ''PA 42316'' be included in the PA–12 design requirements in § 192.121(e). The GPAC concurred with this comment.

(3) PHMSA Response

As for PA–11 and PE, PHMSA agrees with the commenters and has revised § 192.121(e)(4) in the final rule to clarify the table by adding ½′ and ¾′ IPS and CTS sizes. In response to comments from Evonik Industries and Continental Industries regarding the typographical error, PHMSA has corrected the minimum wall thickness to 0.090 inches, to conform to the initial petition and includes the material designation code in § 192.121(e).

E. Risers

(1) PHMSA's Proposal

In the NPRM, PHMSA proposed to add a new § 192.204 to part 192, to establish specific requirements for the design and construction of risers for plastic pipe. PHMSA also proposed to incorporate by reference ASTM F1973, ''Standard Specification for Factory Assembled Anodeless Risers and Transition Fittings in Polyethylene (PE) and Polyamide 11 (PA11) and Polyamide 12 (PA12) Fuel Gas Distribution Systems'' ASTM F1973, which prescribes design requirements for factory-assembled anodeless risers.[4] This specification covers requirements and test methods for the qualification of factory assembled anodeless risers and transition fittings for use in PE pipe sizes through Nominal Pipe Size (NPS) 8, and for PA–11 and PA–12 sizes through NPS 6. No version of this standard is currently in the CFR. The final rule uses this standard to establish the specifications for the design and specimen testing of factory assembled anodeless risers. The standard also provides a definition for Category 1 fittings on plastic pipe. This item will be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components.

(2) Summary of Comments

AGA, APGA, NAPSR, NGA and P3 Consulting supported GPTC's petition to allow the use of anodeless plastic risers above ground to meter and regulator stations. A number of commenters opposed the structural support requirements for risers in the NPRM as being too prescriptive. Specifically, those commenters opposed the requirement for a three-foot horizontal base leg on risers. AGA, PPI, NGA, TPA, NORMAC, Lyall, Volgstadt and Associates, and Avista Utilities all suggested either deleting the requirement altogether or applying some type of performance standard. AGA, PPI, TPA, NORMAC, and Lyall & Co. proposed language requiring operators to ensure that risers do not bear external loads and are secured against lateral movement. Volgstadt and DTE supported deleting all references to the horizontal base leg. Other commenters supported performance standards in general. The GPAC unanimously voted to recommend removing the requirement for a three-foot horizontal base leg.

A number of commenters representing manufacturers and third party consultants expressed concerns that the exclusive reference to ASTM F1973, which exclusively applies to factory-assembled risers, would effectively prohibit the use of field-assembled risers that are constructed in accordance with ASTM F2509, ''Standard Specification for Field-assembled Anodeless Riser Kits for Use on Outside Diameter Controlled Polyethylene and Polyamide-11 (PA11) Gas Distribution Pipe and Tubing'' (ASTM F2509). PPI, Lyall, Volgstadt, and Continental Industries therefore recommended incorporating ASTM F2509 into the final rule. NORMAC also recommended incorporating ASTM F1948–15, ''Standard Specification for Metallic Mechanical Fittings for Use on Outside Diameter Controlled Thermoplastic Gas Distribution Pipe and Tubing'' (ASTM F1948–15) since, as in many cases, ASTM F2509 riser fittings may have identical requirements to standard fittings under ASTM F1948–15. The IAUB, the Gas Processors Association (GPA), and TPA commented that, as written, the proposed revision could be interpreted to require that all risers be plastic anodeless risers. These commenters suggested the NPRM should either address other types of risers or the title of the section should be written as to explicitly only apply to anodeless risers.

AGA noted that this requirement should not be applicable to risers installed before the effective date.

IAUB requested clarification on whether anodeless risers will be allowed on structures other than metering and regulating stations, such as pressure recording stations or other installations. IAUB further commented that this scenario might be addressed if the riser is considered a main. NORMAC recommended deleting § 192.204(b), arguing that it is duplicative of the proposed § 192.281(e)(4). If not, it suggested ASTM F2509 be incorporated to allow for field-assembled risers.

NiSource commented that the use of the word ''rigid'' in § 192.204 is unclear and that, specifically, ''rigid'' typically refers to an ''anodeless riser rigid riser casing'' as defined in ASTM F1973. The company argued that if this was PHMSA's intent, then § 192.204(c) should be revised to require anodeless risers to have a rigid riser casing. Additionally, NiSource suggested PHMSA revise § 192.375(a)(2) to permit the use of anodeless flex riser casings.

The GPAC voted unanimously to incorporate this provision if the requirement for a three-foot base leg is removed and PHMSA clarifies that the standards do not apply retroactively.

(3) PHMSA Response

PHMSA concurs with the comments and GPAC recommendations requesting the removal of the requirement for a three-foot horizontal base leg in § 192.204(c) and has therefore removed this requirement from § 192.204(c). PHMSA is retaining, however, the requirement that risers be rigid. As noted by one commenter, PHMSA's intent is to require a rigid riser casing for anodeless risers used to attach plastic mains to regulator stations, and so paragraph (c) has been revised to

[4] An anodeless riser is metal-encased plastic pipe carrying gas to a gas meter.

reflect that intent. PHMSA subject matter experts believe that risers to regulator and metering stations must be rigid and secure to ensure safety, noting that unsecured risers are already prohibited per § 192.321. Finally, these requirements are not retroactive and the final rule has been revised to make that clear.

PHMSA has also resolved a number of other issues regarding anodeless risers. The intent of the proposed revision is neither to prohibit field-assembled risers nor to imply that all risers must be anodeless risers. Therefore, in this final rule, PHMSA has revised § 192.204(b) to specify that it applies only to factory assembled anodeless risers. For reasons described in the incorporation by reference portion of the final rule, PHMSA has not added a field-assembled riser standard in this final rule. Operators may still install field-assembled anodeless risers, but PHMSA will consider incorporating relevant standards in future rulemaking efforts. Regardless of riser type, § 192.204(a) still applies.

In response to the IAUB, the revised amendments permit anodeless risers for use outside of metering and regulating stations provided they meet the minimum general requirements of § 192.204(a) and (b). In response to NORMAC, the riser design requirements in § 192.204(b) are broader than the joint standards specified in § 192.281(e)(4).

F. Fittings

(1) PHMSA's Proposal

In the NPRM, PHMSA proposed to amend § 192.281(e) to require operators to use only mechanical fittings or joints that are designed and tested to provide a ''seal plus resistance'' to lateral forces so that a large force on the connection would cause the pipe to yield before the joint does. PHMSA proposed that such joints, fittings, and connections must meet the requirements of a ''Category 1'' joint as defined in ASTM F1924–12, ''Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing'' (ASTM F1924–12), ASTM F1948–12, ASTM F1973–13, or ASTM D2513–12ae1 as appropriate.

PHMSA also proposed adding a new paragraph (g) to § 192.455 to clarify that operators must cathodically protect and monitor electrically isolated metal alloy fittings in plastic pipelines that do not meet any of the exemptions in paragraph (f) of that section. Applying cathodic protection to metal fittings on plastic pipe systems helps to control corrosion on those components and therefore reduces the risk of incidents caused by corrosion.

(2) Summary of Comments

NAPSR and Palermo approved of the revisions proposed for this section. Palermo noted that there is ''no reason for a gas operator to use anything but a Category 1 mechanical fitting.'' APGA submitted comments supportive of the requirements to use specified fittings and the cathodic protection requirements, further noting that, ''in fact, some fitting manufacturers ship their fittings already pre-coated, with a sacrificial anode attached.'' On the other hand, though APGA submitted comments supporting cathodic protection requirements in general, it opposed the cathodic protection monitoring requirements for isolated metal fittings. APGA noted that it would require a test station for each fitting, and operators would incur significant costs. APGA further stated that isolated metal fittings do not face the same corrosion risks since they are isolated by the plastic pipe and don't have significant variances in soil conditions that a long metal pipe system does, therefore burdensome monitoring requirements are often not justified.

TPA, GPA, Norton McMurray, Continental Industries, and GE Dresser Pipeline Solutions (GE) submitted comments encouraging the installation of Category 1 fittings but noted that they are not available in the large diameters frequently found in transmission line service.

TPA and GPA suggested revising the requirement to use Category 1 joints to distribution lines only. Norton McMurray and Continental Industries commented that the justification for requiring Category 1 fittings on higher-diameter lines is unsupported and that Category 2 and 3 joints under ASTM D2513, F1924, F1948, or F1973 should be permitted.

AGA, NGA, and TPA argued that the requirement for Category 1 fittings and cathodic protection should only be for newly installed fittings or those uncovered during maintenance. All three commented that a search and replace program would be very costly, with little corresponding safety benefit.

AGA and NFGDC recommended revising § 192.455 to require monitoring every 10 years rather than the proposed requirement to survey 10 percent of the system each year.

After a lengthy discussion, the GPAC recommended replacing the cathodic protection monitoring requirement for certain electrically isolated metal fittings. Instead, the committee recommended that PHMSA mandate a maintenance requirement consistent with operators' integrity management plans. This means that instead of imposing explicit prescriptive monitoring requirements, PHMSA would expect operators to maintain electrically isolated fittings based upon the on a risk posed by the fitting.

(3) PHMSA Response

In this final rule, PHMSA amends the PSR to require Category 1 joints on all regulated plastic gas pipelines as originally proposed. PHMSA and State inspectors, and the incident history described in PHMSA Advisory Bulletin ADB–08–02, issued in March 2008, titled ''Pipeline Safety: Issues Related to Mechanical Couplings Used in Natural Gas Distribution Systems'' have shown that inadequate joints are a safety risk on plastic pipelines. Requiring the use of Category 1 joints significantly reduces the risk of mechanical joints or fittings loosening over time or getting pulled out. Large-diameter lines are not exempt from this requirement. The fact that Category 1 mechanical joints are not available is not sufficient justification to use weaker Category 2 or 3 mechanical joints since other effective joining methods that don't require mechanical fittings are available, such as heat fusion.

PHMSA acknowledges that there may be issues with only mentioning the three specifications in § 192.281(e)(4), specifically ASTM F1924–12, ASTM F1948–12, or ASTM F1973–13. There are other fittings standards also included in this rule and listed in § 192.7 and Appendix B that would be applicable for other material types. For example, ASTM F2145 ''Standard Specification for Polyamide 11 (PA 11) and Polyamide 12 (PA12) Mechanical Fittings for Use on Outside Diameter Controlled Polyamide 11 and Polyamide 12 Pipe and Tubing'' is applicable for PA–11 and PA–12 mechanical fittings. Rather than adding more standards into the regulatory language § 192.281(e)(4) and potentially missing others, PHMSA is instead revising the language in the final rule to say ''. . . must be Category 1 as defined by a listed specification for the applicable material . . .'' PHMSA has also clarified the final rule to state explicitly that this provision does not apply retroactively. While all new fittings must be cathodically protected, and meet Category 1 requirements, operators do not have to search for and remove existing mechanical fittings that are non-compliant with the new requirements. Therefore, PHMSA has amended §§ 192.281(e) and 192.367 to state in the headings for those sections that they only apply to plastic pipe

fittings installed after the effective date of the rule. This change should alleviate any concerns raised in comments related to the cost and complexity of replacing or cathodically protecting existing fittings.

In response to comments and the recommendations of the GPAC, PHMSA is revising the cathodic protection requirements to reference paragraph § 192.455(g) in paragraph (a) of the same section and is modifying the monitoring requirement in § 192.455(g). PHMSA amended the proposed § 192.455(g) to require that all newly installed electrically isolated metal fittings be cathodically protected, and maintained in accordance with the operator's integrity management plan, rather than comply with a prescriptive monitoring requirement. PHMSA notes that the existing § 192.455(a)(2) still applies unless an isolated metal fitting meets any of the conditions in paragraphs (b), (c), or (f) of that section.

G. Plastic Pipe Installation

The NPRM proposed several revisions to part 192 regarding the installation of plastic pipe. A summary of each of these topics is presented below along with a summary of public comments and PHMSA's response.

(1) Installation by Trenchless Excavation

(a) PHMSA's Proposal

The NPRM proposed adding new §§ 192.329 and 192.376 to the PSR to include new minimum requirements for trenchless excavation. PHMSA and the States are aware of a number of incidents related to cross-boring, where plastic pipe installed via trenchless excavation has come in contact with or been installed right through another underground utility, such as a sewer line. These conflicts can damage both the pipeline and the other underground structure. PHMSA therefore proposed that operators must ensure that the excavation path for installation and maintenance activities will provide sufficient clearance from other underground utilities and structures. Additionally, PHMSA proposed that operators be required to use a ''weak link'' device for plastic pipe through the ground during installation to prevent unnecessary, excessive stresses on the pipeline.

(b) Summary of Comments

Nearly all commenters broadly supported the proposed revisions to the trenchless excavation requirements. DTE and PPI supported the proposal, as did NAPSR, AGA, APGA, TPA, Avista Utilities, and SW Gas with reservations about specific provisions or with suggestions for modifications. Avista recommended ''a Weak Link to be used on trenchless installations on mains and services'' though it suggested that the type of weak link would be up to the discretion of the operator to define based on sound engineering practices. Like other commenters, Avista specifically referenced using a segment of smaller diameter pipe as a weak link method. PPI supported PHMSA's requirement for a weak link and noted that ''a properly selected breakaway swivel provides added assurance against damaged pipe and is good engineering practice.'' NAPSR recommended requiring operators to pull through an additional 10 feet beyond the exit of the ground during trenchless excavation. If that segment of pipe shows any damage exceeding 10 percent of wall thickness, NAPSR suggested that the operator should be required have to replace the installed segment. Additionally, NAPSR recommended requiring the use of a tracer wire, though it may be installed on an existing steel pipe if its use on the plastic pipe is not feasible.

A member of the public associated with trenchless technology associations suggested alternative language in the trenchless excavation requirements at § 192.329 to require positive identification of other underground structures prior to trenchless installation. Specifically, he suggested requiring operators to ensure that the excavation path ''has provided'' sufficient clearance rather than ''will provide.'' He noted that modern best practices and technologies, such as closed-circuit television (CCTV) and robotic CCTV could assure positive identification of other underground infrastructure.

AGA, APGA, TPA, PPI, GPA, Avista, DTE, and SW Gas were all supportive of the use of a ''weak link'' in trenchless excavation but expressed concern that the use of the word ''device'' could limit operators to commercially available discrete devices. Some operators commented that they use a piece of weaker pipe or an internal lab-designed device as a weak link. The commenters proposed that PHMSA clarify the language so as not to inadvertently prohibit alternative technologies. The GPAC voted unanimously to support these comments. City Utilities suggested that requiring operators to have written procedures for mitigating and preventing cross-bore incidents would be sufficient to ensure safety.

AGA suggested that these requirements should not apply to service lines below 1.25-inch IPS if an analysis of incidents shows that no relevant incidents have occurred.

NGA noted that there are other tools available to operators to avoid damage to pipelines installed by trenchless excavation, and that requiring weak link technologies is shortsighted. NGA recommended that PHMSA host a workshop of operators and industry experts to explore trenchless excavation best practices.

A number of operators had concerns about the proposed requirement that operators ensure that the excavation area is clear of other underground structures. AGA, TPA, and NFGDC proposed that operators only be responsible for providing sufficient clearance from underground-structures known at the time of installation. TPA suggested that if an underground-structure owner does not respond to a one-call notification, the plastic pipe operator has no means to ensure appropriate clearance. GPA recommended that PHMSA either drops the requirement or provide operators with a list of specific steps to achieve compliance. The GPAC voted unanimously in favor of revising the language of this section to require operators to take ''practicable steps'' to maintain adequate clearance from other underground structures in accordance with ''best practice'' documents.

(c) PHMSA Response

In this final rule, PHMSA has made a number of changes recommended by commenters and the GPAC. PHMSA has revised §§ 192.329(a) and 192.376(a) to specify that operators must take practicable steps to provide sufficient clearance for installation and maintenance activities from other underground utilities and/or structures at the time of installation. Additionally, PHMSA revised the definition of ''weak link'' in § 192.3 to include ''a device or method,'' which should provide operators more flexibility. These changes address the concerns raised by commenters regarding the flexibility of weak-link options and the need for clarity of an operator's responsibilities. PHMSA has not provided an exception, however, for small-diameter service lines, since small-diameter lines face many of the same risks as larger mains. Additionally, any hazard reduction due to a smaller-diameter pipe is offset by the fact that service lines are typically closer to dwellings and other inhabited structures. PHMSA notes that CCTV technologies may be useful for positive identification of other underground-structures, but the specific recommendations involving CCTV technology have not been subject to

notice and comment or cost-benefit analysis. PHMSA may analyze this issue in a future rulemaking after considering the benefits and limitations of CCTV technologies.

Similarly, PHMSA has not implemented the enhanced requirements recommended by NAPSR, but is open to enhancing these requirements in future rulemakings and possibly hosting a public workshop on weak links and trenchless excavation. More information on this topic is available in a white paper titled ''Meta-Analysis: Cross Bore Practices'' issued by the PHMSA/NAPSR Plastic Pipe Ad Hoc Committee on July 10, 2014.[5]

(2) Joining Plastic Pipe

(a) PHMSA's Proposal

In the NPRM, PHMSA proposed amending § 192.281 to clarify language related to joining plastic pipe. The proposed revisions included clarifying that solvent cement requirements in ASTM D2564–12, ''Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems'' (ASTM D2564–12), apply only to PVC pipe, clarifying that the joining requirements in § 192.281(c) apply to both the pipe and components, requiring heat fusion joints to comply with ASTM F2620–12, ''Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings,'' issued on August 1, 2012, (ASTM F2620–12), and adding a new paragraphy (e)(3) to require that each fitting used to make a mechanical joint meets a listed specification in Appendix B of part 192.

(b) Summary of Comments

AGA and NFGDC opposed requiring all types of heat fusion joints to comply with ASTM F2620–12. AGA commented that ASTM F2620–12 is primarily intended for saddle-fusion joints on live pipes. AGA also stated that compliance with ASTM F2620–12 would require operators to re-qualify a number of proven joining procedures and eliminating those that differ from the standard. Those two commenters were specifically concerned about the prohibition of methods differing from the standard, particularly with respect to the use of different heater temperatures. TPA requested that PHMSA allow the continued use of existing qualified joining procedures.

APGA supported PHMSA's proposal to require heat-fusion joints to comply with ASTM F2620–12 and the proposed revisions to § 192.281(d), which require all mechanical joints and fittings to be classified as Category 1 as defined in ASTM F1924–12, ASTM F1948–12, or ASTM F1973–13.

Arkema commented that since ASTM F2620–12 is specific to PE only, the regulatory language should refer to this standard for only PE heat-fusion joints. Volgstadt and Associates' comments echoed the concerns of Arkema. Volgstadt also noted electrofusion is not covered under ASTM F2620–12 and suggested that §§ 192.281(c) and 192.285(b) be corrected so ASTM F2620–12 only applies to PE hot plate fusion and not to either electrofusion or PA–11. Volgstadt further recommended either revising § 192.281(c) to replace ''plastic pipe'' with ''PE pipe'' to avoid requiring an incompatible standard, or revising future editions of ASTM F2620 to include electrofusion methods and PA–11 materials. APGA, TPA, PPI, NAPSR, PPI, and City Utilities opposed the prohibition of socket-fusion joints above a certain diameter. APGA noted that PHMSA has not provided a rationale for prohibiting socket-fusion on any size of plastic pipe and that the cost of butt-fusion or electrofusion equipment is prohibitive for small operators. APGA further proposed allowing socket-fusion for plastic pipe of four-inch diameter or less. PPI, TPA, NAPSR, and City Utilities concurred. The GPAC voted unanimously to recommend adoption of the comments requesting removal of the socket-fusion diameter restriction.

NORMAC requested clarification as to whether the proposed § 192.281(e) requires manufacturers of factory-assembled anodeless risers to meet a listed specification as § 192.271(b) states that the requirements do not apply to joints made during the manufacture of a product.

NORMAC also proposed that the requirement for qualifying joining procedures by operators must be separate from the qualification of designs for manufacturers' joint and fitting specifications. ASTM D2513 should not be applied to mechanical joint manufacturing regulations as it is a standard specification rather than a testing performance criterion. NORMAC further suggested deleting § 192.281(e)(1) as it is not written in performance language and is unnecessary as there is no evidence of material incompatibility of plastic materials. It further commented that §§ 192.281(e)(2) and 192.281(e)(3) are duplicative. NORMAC also strongly opposed implying that elastomers in mechanical fittings and joints can loosen or degrade over time. NORMAC stated that PHMSA must provide publicly cited evidence that elastomer degradation has been a systemic problem or retract unsupported statements on mechanical joints from the docket and elsewhere.

(c) PHMSA Response

PHMSA disagrees with AGA's proposal to restrict ASTM F2620–12 to saddle-fusion joint procedures only. The standard includes procedures for other types of joints.

Regarding concerns on whether operator joining procedures that may differ from ASTM F2620–12 may not be acceptable and would have to be requalified, it would depend on how exactly they differ. PHMSA would expect that if an operator can demonstrate the differences are sound and provide an equivalent or better level of safety compared to ASTM F2620–12 it could be found acceptable. However, if operator procedures are found to be lacking in any way, such as a heating temperatures used, fusion pressures or cooling times, they may not be acceptable.

PHMSA agrees with commenters that noted ASTM F2620–12 is a PE only standard and does not cover electrofusion. PHMSA has made revisions for clarification. For electrofusion, it is not explicitly listed in the code language in §§ 192.281 or 192.285, but electrofusion fittings and joints would ultimately need to comply with requirements of ASTM F1055, a listed specification for electrofusion.

PHMSA supports Volgstadt's suggestion to consider revising ASTM F2620–12 to include electrofusion and other thermoplastic material types (including PA–11), but defers to the ASTM process on how best it should be handled and ultimately vetted.

PHMSA's intent regarding socket-fusion joints was not to prevent the common use of safe components. Therefore, 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.

In response to comments from NORMAC, PHMSA notes all parts of factory assembled risers must comply with the appropriate listed specifications. PHMSA disagrees that § 192.281(e)(2) is duplicative with § 192.281(e)(3) that is incorporated by this final rule; § 192.281(e)(3) requires that newly installed mechanical fittings must meet a listed specification, while § 192.281(e)(2) is a general requirement that applies to all mechanical joints on plastic pipe regardless of the applicable material. Further comments regarding

[5] *http://primis.phmsa.dot.gov/dimp/docs/MetaAnalysis_Cross_bore_practices_07102014%20final%20R3.pdf.*

the appropriateness of existing code language regarding gasket material compatibility or comments on past advisory bulletins related to observed wear of elastomers are not within the scope of the rulemaking.

(3) Qualifying Joining Procedures

(a) PHMSA's Proposal

In the NPRM, PHMSA proposed to amend § 192.283(a)(1)(i) to incorporate an updated version of ASTM D2513–12ae1 for PE pipe and the new joining standards applicable to PA–11 and PA–12 pipe in ASTM F2945–12a and ASTM F2785–12 respectively when determining the sustained pressured test or minimum hydrostatic burst test. PHMSA also proposed to remove § 192.283(d), which permitted operators to use pipe or fittings manufactured prior to July 1, 1980, if they are joined in accordance with procedures that the manufacturer certifies will produce a joint as strong as the pipe. Together these changes will codify modern joining procedures for PE, PA–11, and PA–12 pipeline systems.

(b) Summary of Comments

NAPSR supported PHMSA's proposal.

NORMAC commented that the three listed specifications in § 192.281(e)(4) do not contain language for qualifying operator joining procedures, unlike the existing provisions in § 192.283. NORMAC further recommended revision of § 192.283 to separate the specification and testing requirements for manufacturers from the regulatory performance standards for operator procedures currently in the PSR.

(c) PHMSA Response

PHMSA believes NORMAC may have incorrectly interpreted the NPRM proposed language in § 192.281(e)(4) and § 192.283(b) related to mechanical joints and applicable pipe standards for qualifying joining procedures. However, PHMSA can see reasoning for the confusion and believes there is the possibility that others could misinterpret as well. The three specifications that were named in § 192.281(e)(4), specifically ASTM F1924–12, ASTM F1948–12, or ASTM F1973–13, were included only to help provide references for the definition for Category 1 depending on the specific type/material of fitting involved, since PHMSA doesn't have an explicit definition for Category 1. The language in § 192.283 (b) that talks about being ''qualified in accordance with a listed specification based upon the pipe material'' is referring to a listed specification in Appendix B for pipe depending on the material (for instance ASTM D2513–12ae1 for PE, ASTM F2785–12 for PA–12, or ASTM F2945–12a for PA–11.) PHMSA believes each of those material specific standards or the standards they reference for mechanical fittings (for instance the PA–11 and PA–12 material standards require mechanical fittings to conform to ASTM F2145) provide suitable language related to testing that can help qualify joining procedures. Since each of the standards is written slightly differently and in some cases have additional material specific considerations compared to what was written in § 192.283 previously, PHMSA believes it is appropriate to defer to the listed specification. As mentioned in the PHMSA response in § 192.281(e)(4) and given the confusion between the language in § 192.283 (b), the three listed specifications in § 192.281(e)(4), and considering there are additional listed specifications in Appendix B that also contain material specific considerations and can help with definition for Category 1, PHMSA is editing § 192.281(e)(4) to more generically point to a listed specification. This would also make §§ 192.281(e)(4) and § 192.283 (b) more consistent with how the language is written related to listed specifications.

(4) Qualifying Persons To Make Joints

(a) PHMSA's Proposal

The NPRM proposed amending § 192.285 by modifying the requirements for qualifying persons to make joints. PHMSA proposed to add reference to ASTM F2620–12 to the joiner qualification requirements in § 192.285 (b)(i) as an option for PE pipe. ASTM F2620 provides information on what constitutes a visual acceptable or unacceptable joint.

(b) Summary of Comments

NAPSR supported PHMSA's proposal. The PPI supported the incorporation of ASTM F2620–12 but noted that certain standards it had developed, including PPI TR–33 and TR–41, were equally sound procedures and should also be incorporated. Arkema opposed deleting the joint-testing details from § 192.285. Arkema commented that ASTM F2620–12 is limited only to PE and that § 192.285 should instead refer to ASTM F2620–12 for only PE heat-fusion joints while other joining qualification tests could be regulated under the existing § 192.285 language. Volgstadt and Associates' comments echoed these concerns. Volgstadt also suggested that §§ 192.281(c) and 192.285(b) be corrected as ASTM F2620–12 only applies to PE hot plate fusion and applies to neither electrofusion nor PA–11. Volgstadt recommended either revising § 192.281(c) to replace ''plastic pipe'' with ''PE pipe'' to avoid requiring an incompatible standard, or revising a future ASTM F2620 edition to include electrofusion methods and PA–11 materials.

SoCal Gas and SDG&E jointly commented that ASTM F2620–12 does not address a number of safety concerns that have been incorporated into qualified heat-fusion procedures. They proposed that PHMSA continue to allow the use of procedures qualified under the testing performance standard in § 192.283. They argued that the existing testing standards under § 192.283 are more stringent than the proposed ASTM F2620–12 and should not be eliminated. The commenters proposed that § 192.285 should use more general language that allows the option of relying on sound engineering requirements developed by an operator's own lab testing.

(c) PHMSA Response

The NPRM did not propose to delete any of the testing requirements in the existing § 192.285. ASTM F2620–12 is being incorporated as an additional minimum standardized practice for PE materials to address many gaps and inconsistencies seen through the years with the joining procedures. Regarding concerns on whether operator joining procedures that may differ from ASTM F2620–12 may not be acceptable, it would depend on how they differ. PHMSA would expect that if an operator can demonstrate through an inspection of the procedures that the differences are sound and provide an equivalent or better level of safety compared to ASTM F2620–12 it could be found acceptable. However, if operator procedures are found to be lacking in any way when comparing the operator procedures to ASTM F2620–12, and reviewing results of testing results used to qualify the procedures, they may not be acceptable.

PHMSA agrees with commenters that noted ASTM F2620–12 is a PE only standard and does not cover electrofusion; PHMSA has made revisions for clarification. For electrofusion, it is not explicitly listed in the code language in §§ 192.281 or 192.285 but electrofusion fittings and joints would ultimately need to comply with requirements of ASTM F1055, a listed specification for electrofusion.

PHMSA supports Volgstadt's suggestion to consider revising ASTM F2620–12 to include electrofusion and other thermoplastic material types (including PA–11) but defers to the

ASTM process on how best it should be handled and ultimately vetted.

(5) Bends

(a) PHMSA's Proposal

In the NPRM, PHMSA proposed to revise § 192.313 to prohibit bends in plastic pipe less than the minimum radius specified by the manufacturer. While plastic pipe is somewhat elastic, a bend radius that is too small may compromise the structural integrity of the pipe.

(b) Summary of Comments

AGA and NAPSR supported PHMSA's bend-specification proposal. PPI and GPA noted a typographical error in the proposed § 192.311(d), stating that PHMSA most likely intended to prohibit bends less than the minimum radius specified by the manufacturer rather than the maximum.

(c) PHMSA Response

PHMSA agrees with the commenters about the typographical error and has corrected § 192.313 to prohibit bends smaller than the minimum radius specified by the manufacturer.

(6) Installation of Plastic Pipe

(a) PHMSA's Proposal

In the NPRM, PHMSA proposed to amend § 192.321 to increase the minimum wall thickness of all plastic pipe to 0.090 inches (2.29 millimeters), to require that operators protect plastic pipe from damage when installing it within a casing, to establish backfill requirements during excavation, and to allow operators to terminate plastic mains aboveground under certain conditions.

(b) Summary of Comments

APGA supported the proposals to require protecting encased plastic pipe from damage at casing entrance and exit points in § 192.321(f), and to allow certain plastic mains to terminate above ground in § 192.321(i).

NAPSR, AGA, APGA, PPI, SW Gas, TPA, and NFGDC submitted the following comments critical of the proposed backfill requirements in this section:

- The commenters generally concurred with AGA's critique that the phrase ''properly compacted'' inadvertently added a prescriptive requirement that required further clarification. AGA commented that including the phrase ''properly compacted'' requires operators to quantify soil compaction, but does not define what is an acceptable level of quantification.
- SW Gas commented that PHMSA must clearly specify compaction and documentation requirements.
- AGA recommended simply requiring that lines be properly supported.
- NAPSR proposed removing the phrase ''such as rocks of a size exceeding those established through sound engineering practices'' from § 192.321(i)(1).
- SW Gas argued that backfill requirements are typically prescribed and enforced by the construction permitting agency and therefore, a PHMSA specification was unnecessary.
- PPI recommended that PHMSA clarify the requirements through the incorporation of ''PPI Handbook for PE Pipe, Chapter 7—Underground Installation of PE Pipe.''

As for the proposed change in the minimum wall thickness requirement for new and replaced pipe, three entities submitted comments:

- APGA noted that the proposed requirement for a minimum wall thickness of 0.090 inches for plastic pipe might be inconsistent with the proposed § 192.121(b)(3), which established a minimum plastic pipe thickness of 0.062 inches.
- APGA did not have a strong opinion either way but recommended that the rule be revised to remain consistent.
- DTE strongly opposed any change from the current minimum wall thickness of 0.062 inches.

The GPAC recommended approval of all the proposed changes in the NPRM, provided that PHMSA removed the enhanced backfill requirements.

(c) PHMSA Response

PHMSA concurs with the comments and the recommendations of the GPAC, and has therefore removed the proposed enhanced backfill requirements from the final rule. PHMSA notes that operators must still avoid issues with backfill under the more general requirements in §§ 192.319(b) and 192.361(b). The existing § 192.319(b)(1) already requires that backfill for transmission lines provide adequate support for the pipeline, while § 192.361 has similar requirements for service lines. Section 192.319(b)(2) further requires that operators must backfill transmission lines with materials that prevents damage.

For clarity, PHMSA has revised § 192.321 to refer to § 192.121 rather than repeat the minimum wall thickness requirement.

(7) Service Lines; General Requirements for Connections to Main Piping

(a) PHMSA's Proposal

In the NPRM, PHMSA proposed to add a new paragraph (b)(3) to § 192.367 that required operators use Category 1 joints for service line connections to gas mains. Category 1 joints are defined in ASTM F1924–12, ASTM F1948–12, or ASTM F1973–13 for the applicable material and must provide a seal plus resistance to a force on the pipe joint equal to or greater than that which will cause no less than 25 percent elongation of the pipe or would cause the pipe to fail outside of the joint area during the tensile strength test prescribed by the applicable standard. In other words, the fitting must be designed such that the pipe will fail before the joint does.

(b) Summary of Comments

NAPSR supported PHMSA's proposal.

NORMAC submitted comments arguing that, in the context of § 192.367(b), the word ''connection'' is synonymous with ''joint.'' Therefore, NORMAC suggested that the proposed § 192.367(b)(3) and the existing § 192.367(b)(1) should be deleted, as these regulations repeat §§ 192.281(e)(3) and 192.283(b), which specify compression fittings. NORMAC further commented that gaskets are used beyond just connections to mains. Therefore, the performance standards for gaskets should be included in the general requirements in § 192.273 while § 192.367 should only address issues unique to main connections.

(c) PHMSA Response

PHMSA recognizes that § 192.367(b) and the existing language in §§ 192.81(e)(3) and 192.283(b) may be redundant; however, § 192.367 applies to more than just plastic pipe materials and therefore has not been removed because referencing these standards in both sections is prudent. The gasket requirements proposed in § 192.367 are specific to service line connections to mains. PHMSA may consider standards for gaskets in the future if PHMSA identifies a safety need for such standards.

PHMSA acknowledges that there may be issues with only mentioning the three specifications in § 192.367(b) specifically ASTM F1924–12, ASTM F1948–12, or ASTM F1973–13. There are other fittings standards also included in this rule and listed in Appendix B that would be applicable for other material types. For example, ASTM F2145 ''Standard Specification for Polyamide 11 (PA 11) and Polyamide 12 (PA12) Mechanical

Fittings for Use on Outside Diameter Controlled Polyamide 11 and Polyamide 12 Pipe and Tubing'' is applicable for PA–11 and PA–12 mechanical fittings and also has a definition for Category 1. Rather than adding more standards into the regulatory language § 192.367(b) and potentially missing others, PHMSA is instead revising the language in the final rule to say ''. . . must be Category 1 as defined by a listed specification for the applicable material . . .'' As described above, the mechanical fitting standards all define a category 1 fitting as one in which the surrounding pipe fails before the joint during tensile strength testing.

(8) Equipment Maintenance; Plastic Pipe Joining

(a) PHMSA's Proposal

In the NPRM, PHMSA proposed adding a new § 192.756 to establish minimum maintenance, calibration and testing, and recordkeeping provisions for plastic pipe joining equipment. Proper calibration and maintenance of plastic pipe joining equipment is important due to the difficulty in assessing the quality of field joints.

(b) Summary of Comments

NAPSR and Lael supported the proposed recordkeeping requirements. Lael suggested strengthening the requirements under this part and suggested adding a requirement for operators to have written procedures for equipment calibration and maintenance. Specifically, Lael commented that daily or periodic adjustment records are also important, and therefore recommended eliminating the recordkeeping exception for those records. AGA, APGA, GPA, TPA, Avista Utilities, DTE, and SW Gas submitted comments that agreed with the importance of proper equipment maintenance and calibration but critical of prescriptive recordkeeping requirements. The commenters viewed the proposed § 192.756 as excessively prescriptive, limiting, and burdensome. The commenters claim that, as proposed, the NPRM was not sensitive to varying maintenance and recordkeeping requirements recommended by equipment manufacturers. The GPAC recommended that PHMSA withdraw the proposed changes in paragraphs (b) through (d) of § 192.756.

GPA suggested alternative language clarifying that equipment maintenance and calibration must be appropriate for the equipment being evaluated

(c) PHMSA's Response

In consideration of the comments and the recommendations of the GPAC, PHMSA has removed the additional calibration and recordkeeping requirements in paragraphs (b) through (d). Therefore, the retention of records of daily equipment calibrations and adjustments suggested by Lael has not been implemented. Commenters suggested that the proposed requirements were overly prescriptive and burdensome. PHMSA may revisit this issue if problems are identified in the future. The final rule retains the requirement that operators must maintain joining equipment in accordance with the manufacturer's recommended practices or with written procedures that have been proven by test and experience to produce acceptable joints.

H. Repair of Plastic Pipe

(1) PHMSA's Proposal

In the NPRM, PHMSA proposed to amend the plastic pipe repair criteria in § 192.311 to require operators to replace plastic pipe or components if they have a scratch or gouge exceeding 10 percent of the wall thickness. The purpose of the proposed amendment was to add a clearer standard of what constitutes the type of defect that necessitates repair. The current § 192.311 merely states that an operator must repair or remove ''[E]ach imperfection or damage that would impair the serviceability'' of plastic pipe.

PHMSA further proposed adding a new § 192.720 to prohibit the use of leak repair clamps as a permanent repair on plastic gas pipelines. PHMSA and States have observed issues where some operators have used stainless steel band clamps, intended and designed for temporary repairs on plastic pipe used in gas distribution, as a permanent repair solution. While clamps can be an effective temporary solution in certain situations, such as during an incident to stop the release of gas, PHMSA believes that these clamps should be used only as a temporary repair measure until the pipe can be replaced. PHMSA is also aware of at least one manufacturer that has issued a letter saying its repair clamps are intended for temporary repairs only and should be replaced with a more permanent solution.

(2) Summary of Comments

NAPSR supported both the repair standard for plastic pipe and prohibiting the permanent use of leak repair clamps. Regarding the 10-percent-gouge-depth repair criteria, PPI ''supports this proposal as a reasonable and conservative maximum scratch or gouge depth.'' However, PPI stated that wider tolerances were acceptable since their research showed that 30 percent gouges were found to not have significant long-term performance impacts. PPI commented that less-precise methods such as visual inspections were sufficient for determining gouge depth and should be allowed.

AGA, APGA, and TPA were critical of the 10-percent-gouge-depth threshold for requiring repair or replacement. AGA noted that the 10-percent threshold is an industry rule of thumb that is too stringent for a regulatory requirement and instead proposed a 20-percent threshold as a reasonable repair standard.

AGA and NGA had concerns that the proposed § 192.311(a) as written could prevent the use of electrofusion sleeves for plastic pipe repair.

The GPAC voted unanimously to recommend approval of these provisions, conditioned on the removal of the 10-percent threshold for repair criteria and the clarification that the prohibition on mechanical leak-repair clamps would not require operators to remove existing clamps. Members of the GPAC likewise considered the 10-percent gouge depth criteria to be an industry rule of thumb that was too stringent for a regulatory requirement. While the GPAC did not recommend implementing the 10-percent threshold for repair criteria, members did agree that some sort of repair criteria for plastic pipe was necessary. The GPAC recommended that PHMSA and the Committee support research to develop technically acceptable plastic pipe repair criteria in the near future.

(3) PHMSA's Response

Based on the recommendations of the GPAC, PHMSA has removed the proposed repair criteria from the final rule and therefore did not incorporate the alternative 20-percent-gouge-depth repair criteria proposed by AGA and APGA. PHMSA believes it is appropriate to seek additional technical data and public comment on any proposed repair criteria for plastic pipe. PHMSA intends to revisit this issue and will consider proposing plastic pipe repair criteria in future rulemaking.

PHMSA inspectors have identified the permanent use of leak repair clamps on plastic pipe as an inadequate and risky practice. Furthermore, the lack of clear language in the code has led to enforcement uncertainty. While PHMSA is aware of guidance applicable to repair clamps, such as ASTM F1025, PHMSA is not aware of technical standards for permanent repair clamps on plastic pipe. Section 192.311 does not preclude the use of electrofusion repair sleeves, but for the sake of clarity, PHMSA has revised § 192.720 to specify that a

''mechanical leak repair clamp'' may not be used as a permanent repair. PHMSA may revisit this issue if an acceptable standard for permanent mechanical repair clamps on plastic pipe is developed. In general, if a repair device such as an electrofusion sleeve can provide a Category 1 joint, it is effectively permanent. Like other provisions of this final rule, the prohibition of the permanent use of leak repair clamps is not retroactive.

I. General Provisions

In the NPRM, PHMSA proposed several general revisions to the PSR as follows:

(1) Incorporation by Reference

(a) PHMSA's Proposal

PHMSA proposed to incorporate by reference several new or revised standards for plastic pipe and components. Summaries of each of the standards incorporated by reference in this final rule, and a discussion of the availability of those standards during the rulemaking process, are available in Part IV, *Standards Incorporated by Reference,* in the preamble to this document. Additionally, the effects of these standards are discussed under the topic area to which they are applicable. Section II, *Availability of Standards Incorporated by Reference,* of the NPRM preamble provided information on the reasonable availability of these standards.

(b) Summary of Comments

NAPSR supported PHMSA's proposal to incorporate by reference new standards and currently referenced consensus standards. Several commenters suggested incorporating more recent editions of certain standards that this rule incorporates by reference. Aaron Adamcyzk provided a list of standards proposed in the NPRM that have since been updated by the respective standards development organization. Volgstadt and Associates and Arkema also noted that there were upcoming revisions to certain standards that could impact the NPRM.

GPA and TPA submitted comments arguing that the standards incorporated by reference in the NPRM are intended for distribution systems and that applying them to gas transmission and gathering lines would be improper. The commenters suggested that PHMSA restrict the scope of these standards to distribution lines and pursue a separate rulemaking to incorporate applicable standards for transmission and gathering lines.

PublicResource.org submitted a comment claiming that PHMSA had acted improperly at the NPRM stage by not making the standards proposed for incorporation by reference into the PSR available to the public for free, on the internet, on an unrestricted and permanent basis, as required by law.

(c) PHMSA's Response

As for the recommendation that PHMSA incorporate by reference more recent versions of the consensus standards, PHMSA can only incorporate by reference versions of standards that have been proposed at the NPRM stage of the rulemaking process. For this rulemaking, PHMSA contacted the applicable Standards Development Organizations (SDO), requesting that each SDO provides access to the standards proposed for incorporation by reference during the comment period. During this period, all standards proposed for incorporation by reference were made available to the public for free.

PHMSA does not propose new editions or versions of standards at the final rule stage without an opportunity for public comment. However, PHMSA may consider more recent versions for incorporation by reference in future rulemaking actions if the newer editions of these standards are technically acceptable and consistent with applicable law.

PHMSA does not agree with the comments that suggested limiting the applicability of certain materials standards to distribution facilities. While the scope of some of the plastic pipe standards incorporated by reference in this final rule may have been developed primarily for gas mains and service lines, there is nothing that precludes their use in gathering and transmission systems, as long as all appropriate testing and other considerations are met (*e.g.,* chemical compatibility testing.) In fact, PHMSA is aware of many gathering and transmission systems that are already using ASTM D2513 pipe. To avoid confusion, several SDOs are in the process of expanding the scope of these standards. PHMSA is also aware of other standards, either recently published or still under development, specific to transmission or gathering systems; however, for the time being, pipeline facilities must be constructed in accordance with standards incorporated by reference. PHMSA may, if appropriate, update standards with those clarifications or incorporate by reference transmission and gathering-specific standards in future rulemakings.

PHMSA also disagrees with the comment that incorporating only parts of consensus standards by reference is inconsistent with the intent of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law 104–113. Section 12(d) of NTTAA directs Federal agencies to use standards developed by voluntary consensus standards bodies in lieu of government standards whenever it is practical and consistent with law. The Office of Management and Budget (OMB) issued OMB Circular A–119 to serve as guidance to Federal agencies on the use of such standards. Specifically, OMB Circular A–119 explains the term ''use'' to mean ''incorporation of a standard in whole, in part, or by reference in regulation(s).'' OMB Circular A–119, at p. 20. OMB Circular A–119 also provides a list of factors that an agency should consider when evaluating whether to use a standard, which includes the level of protection a standard provides, the costs and benefits of implementing a standard, and the ability of the agency to use and enforce compliance with a standard in the regulatory process. *Id.,* at p. 17–18.

Neither NTAA nor OMB Circular A–119 establishes a requirement for Federal agencies to incorporate such standards in whole or to adopt the most recent edition of standards. Further, pursuant to 49 U.S.C. 60102(b)(1), standards adopted by PHMSA must be practicable and designed to meet the need for gas pipeline safety and protecting the environment. Accordingly, PHMSA may not adopt standards and portions of standards that fail either to serve its safety-program needs or it deems to be impracticable.

PHMSA also disagrees with comments from *Public Resource.Org* suggesting that PHMSA has failed to make standards incorporated by reference ''reasonably available'' and that it acted illegally and arbitrarily by proposing the incorporation of standards that were not neither reprinted verbatim in the **Federal Register** nor made available to the public for free, on the internet, on a permanent and unrestricted basis.

PHMSA supports the broad dissemination and public availability of consensus standards that have been incorporated by reference into federal regulations and that govern pipeline safety in this country. First, it complies with the procedures set by the Office of the Federal Register to ensure the reasonable availability of standards proposed for incorporation by reference in the rulemaking process. As *Public Resource.Org* noted in its comment, PHMSA worked with SDOs to provide free, read-only access to all standards proposed for incorporation by reference

during the comment period. Providing free, read-only access to standards proposed for incorporation by reference during the comment period is listed under section 5(f) of OMB Circular A–119 (revised, 2016) as a measure that Federal agencies can take to ensure that such standards are made ''reasonably available.'' Additionally, PHMSA has worked to make these materials reasonably available to interested parties. Section IV, ''Standards Incorporation by Reference'', of this final rule provides information on how interested parties can view the standards to be incorporated by reference online or via hardcopy at U.S. DOT headquarters and the Office of the Federal Register. This free online availability, which PHMSA also provided during the comment period, meets PHMSA's statutory requirements at 49 U.S.C. 60102(p), requiring that such standards incorporated by reference be made available to the public, free of charge.

Public Resource.Org has not provided sufficient evidence to support its interpretation that ''reasonably available'' requires Federal agencies, such as PHMSA, to provide internet access to copyrighted standards on a permanent and unrestricted basis free of charge. PHMSA therefore defers to the interpretation set forth in OMB Circular A–119. Broader questions raised by *Public Resource.Org* regarding the applicability of copyright law to standards, what constitutes fair use of standards incorporated by reference, and the economics of copyright protection are all beyond the scope of this rulemaking.

(2) Plastic Pipe Material

(a) PHMSA's Proposal

The NPRM proposed several revisions regarding material requirements for plastic pipe. PHMSA proposed to revise § 192.59 to require that new plastic pipe be free from visible defects and permit the installation of plastic pipe that had been previously used in ''gas'' service, as defined in § 192.3, rather than the current language, which is restricted to ''natural gas.'' PHMSA also proposed to prohibit the installation of PVC pipe and components for new installations after the effective date of the rule and proposed to incorporate ASTM F2817–10, ''Standard Specification for Poly (Vinyl Chloride) (PVC) Gas Pressure Pipe and Fittings for Maintenance or Repair,'' issued on February 1, 2010 (ASTM F2817–10), ''Standard Specification for Poly (Vinyl Chloride) (PVC) Gas Pressure Pipe and Fittings for Maintenance or Repair'' (PVC components only) 02/01/2010 (ASTM F2817–10), to reestablish standards for PVC components that are still permitted on existing PVC pipe segments.

(b) Summary of Comments

APGA and NAPSR supported PHMSA's proposal to prohibit the installation of new PVC gas piping. NAPSR stated that it ''feels the exclusion of PVC pipe for new installations will increase safety.''

The PVC Pipe Association, a trade group representing PVC pipe manufacturers, submitted comments opposed to PHMSA's proposal to prohibit new installation of PVC pipe in gas service. The PVC Pipe Association argued that prohibiting PVC pipe would restrict competition in the plastic piping sector with negative impacts on price and innovation. The PVC Pipe Association proposed permitting PVC pipe in low-diameter, SDR–11 applications. NiSource noted that PVC pipe could be effectively used as regulator and vent piping, arguing that prohibiting new PVC gas piping in these applications would increase pipeline risk by leading to increased use of metal pipe, which carries a corrosion risk. NiSource proposed adopting ANSI/UL 651, ''Standard for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings, for rigid PVC conduits and fittings as permitted in NFPA 54, ''National Fuel Gas Code.'' The GPAC recommended removing the PVC restrictions.

(c) PHMSA's Response

PHMSA has removed the restrictions on PVC pipe after considering the public comments and the recommendations of the GPAC. PHMSA notes that the use of PVC pipe has decreased since the mid-1980s without regulatory intervention due, in large part, to operator preferences. Gas distribution annual reports also show operators are phasing-out this material in the absence of a regulatory restriction.

(3) Plastic Pipe Storage and Handling

(a) PHMSA's Proposal

The NPRM proposed adding a new § 192.67 that would require operators to have written procedures for the storage and handling of plastic pipe that met applicable listed specifications.

(b) Summary of Comments

NAPSR and APGA supported the proposed amendments. APGA agreed ''that proper storage and handling of plastic pipe and components is important to ensure that these pipe and components are not damaged during storage and handling.'' However, APGA sought clarification as to whether a simple, generic storage and handling procedure provided by the pipe and component manufacturer, trade association or another central source would satisfy the requirement.

AGA requested background information on PHMSA's addition of § 192.67, which AGA stated may be due to the adoption of ASTM D2513–09a.

(c) PHMSA's Response

Most commenters supported the addition of this section. In the final rule, PHMSA is issuing these provisions as proposed. In response to AGA's comment, PHMSA developed this requirement due to unsafe handling practices observed by PHMSA inspectors in the field. For example, PHMSA has observed operators dragging plastic pipe with backhoes and other heavy machinery, carrying pipe suspended from chains, and carrying large-diameter pipes with thin straps. In response to APGA's comment, PHMSA notes that operators may use procedures provided by a trade association, the pipe manufacturer, or another central source, provided that those procedures meet the minimum requirements specified in the code and applicable listed specifications and are included in the operator's operations and maintenance manual.

(4) Gathering Lines

(a) PHMSA's Proposal

The NPRM proposed adding language in paragraph § 192.9(d) to specify that Type B regulated onshore gas gathering pipelines made of plastic must comply with all the requirements of part 192 applicable to plastic pipe.

(b) Summary of Comments

NAPSR and DTE submitted comments supporting PHMSA's proposal. However, DTE commented that PHMSA may have inadvertently omitted the leakage survey requirements for Type B gathering lines already in § 192.9(d)(7). DTE suggested placing the new requirements for plastic pipe and components in a more logical order in § 192.9(d).

(c) PHMSA's Response

As commenters noted, PHMSA's intent was not to repeal the recently promulgated leakage survey requirements in what was previously § 192.9(d)(7). In this final rule, PHMSA has therefore reorganized this section as recommended by the commenters and re-designated the leakage survey requirement as § 192.9(d)(8).

(5) Merger of Sections 192.121 and 192.123

(a) PHMSA's Proposal

The NPRM proposed merging the design limitations for plastic pipe in § 192.123 with the calculations for design pressure at § 192.121 so the design pressure and limitations were in one section and more clearly broken out by material type. PHMSA also proposed to revise the PSR to raise the maximum permitted design factor for PE pipe, increase the design pressure limitations of PA–11 pipe, and add design factor and pressure limitations for the use of PA–12 plastic pipe. These requirements would apply to materials produced after the effective date of the rule.

(b) Summary of Comments

Arkema and Palermo recommended that PHMSA allow the installation of plastic pipe designed with a hydrostatic design basis (HDB) at 180 °F, in addition to 73 °F, 100 °F, 120 °F and 140 °F currently in the regulations. The commenters noted that PA–11 and other materials (including PA–12) have an HDB with a rating of 180 °F, so it should be listed along with the other standard temperatures. As described in the sections for PE, PA–11, and PA–12 provision, a number of commenters suggested expansions and revisions to the minimum wall thickness tables in § 192.121 for each material to include entries for pipe with nominal pipe sizes of one-inch CTS and below one-inch IPS.

(c) PHMSA's Response

The comments filed under this subsection primarily concern revisions to the PE, PA–11, and PA–12 tables and HDB temperature ratings for PA–11 and PA–12. As described in the discussions of those topics, PHMSA is revising the minimum wall thickness tables for clarity and to include additional sizes but is not permitting the installation or operation of pipe at temperatures higher than 140 °F. As noted in the discussions for PE, PA–11, and PA–12, not all compounds are rated at that temperature, and inclusion could wrongly imply that operators are permitted to operate any plastic pipe at that temperature. This doesn't preclude an operator from using a pipe with an HDB rating at 180 °F, however, that rating would need to be interpolated back to one of the temperatures listed in § 192.121. See the discussions of the PE, PA–11, and PA–12 provisions in sections III.B, III.C, and III.D of the preamble of this final rule for more detailed information on these subjects. PHMSA also notes this particular consideration for pipe rated at higher temperatures is already in § 192.121, which allows an operator to use an HDB of a higher temperature when using arithmetic interpolation using procedures called out in Part D.2 of PPI TR–3, (incorporated by reference, *see* § 192.7).

(6) General Design Requirements for Components

(a) PHMSA's Proposal

The NPRM proposed adding a new paragraph (c) to § 192.143 to specify that components used for plastic pipe must be able to withstand the operating pressures and anticipated loads in accordance with a listed specification. This revision makes § 192.191 redundant as the requirements for fittings to meet listed specifications are detailed in other parts of the code; therefore, PHMSA proposed to eliminate § 192.191.

(b) Summary of Comments

NAPSR supported the proposal but suggested revising § 192.143 to include the language, ''in accordance with the listed specification for the plastic component being installed.'' NAPSR commented that this wording would provide additional clarification.

NiSource and R.W. Lyall expressed concern that, as written, the proposal would require excess flow valves (EFVs) to meet a listed specification. However an EFV specification has not yet been incorporated. The commenters suggested that PHMSA either exempt EFVs from the specification requirement or incorporate by reference an EFV specification such as ASTM F2138, ''Standard Specification for Excess Flow Valves for Natural Gas Service'' (ASTM F2138).

(c) PHMSA's Response

PHMSA appreciates NAPSR's desire to clarify the applicability of certain standards, but, after careful consideration, PHMSA believes the existing language and the referenced standards are sufficiently clear for operators to know to use the standard for the appropriate component type and material. Therefore, PHMSA is not making further changes to this requirement in this final rule.

Regarding EFVs, PHMSA did not intend to create conflict with EFV requirements. PHMSA has therefore revised the final rule to exempt EFVs from the requirement to meet a listed specification since there is not one specifically listed in Appendix B to part 192. PHMSA will consider incorporating appropriate standards, such as ASTM F2138, in the future.

(7) General Design Requirements for Valves

(a) PHMSA's Proposal

PHMSA proposed adding a new § 192.145(f) to specify that valves on plastic pipe must meet a ''listed specification'' as defined in § 192.3. In other words, valves must be manufactured in accordance with the appropriate consensus standard incorporated by reference into § 192.7. PHMSA also proposed that plastic valves must not be used under operating conditions that exceed the applicable temperature or temperature ratings detailed in the listed specification and consistent with § 192.145(a).

(b) Summary of Comments

AGA and TPA requested that the language in § 192.145(f) be revised to clarify that the requirements for new valves do not apply retroactively.

NAPSR suggested revising the specification requirement to require that valves meet the listed specification for the particular valve being installed.

(c) PHMSA's Response

PHMSA notes that the requirements in § 192.145 do not apply retroactively. PHMSA appreciates NAPSR's desire to clarify the applicability of certain standards; however, the agency believes the existing language and the referenced standards are sufficiently clear for operators to know to use the appropriate standard for the valve type and material being installed. Therefore, PHMSA is not making further changes to this requirement in this final rule.

(8) General Design Requirements for Standard Fittings

(a) PHMSA's Proposal

PHMSA proposed adding § 192.149(c) to clarify that a plastic pipe fitting may only be used if it meets a listed specification. This ensures that standard fittings meet minimum technical standards detailed in industry consensus standards.

(b) Summary of Comments

NAPSR supported the proposal but suggested revising the language to require components to meet the listed specification for the specific part being installed.

Volgstadt and Associates suggested incorporating ASTM D3261 for PE butt-fusion fittings and ASTM D2683 for PE socket-fusion fittings.

(c) PHMSA's Response

In this final rule, PHMSA is issuing this section as originally proposed. As with the previous section, PHMSA has

determined that the language of this requirement is sufficiently clear with the existing wording. Regarding the additional standards proposed, PHMSA cannot incorporate additional standards in the final rule stage that were not proposed and commented on in the NPRM stage. However, PHMSA will consider incorporating applicable standards in future rulemakings.

(9) Test Requirements for Plastic Pipelines

(a) PHMSA's Proposal

The NPRM proposed revising § 192.513(c) to reduce the maximum test-pressure limit for plastic pipe to from 3.0 to 2.5 times the pressure determined under § 192.121. Given the other design limitations in the current § 192.123 for PE and PA–11, and the revisions being proposed in this rule for PE, PA–11, and PA–12, PHMSA believes that plastic pipe will potentially be overstressed if tested to 3 times the pressure determined under § 192.121.

(b) Summary of Comments

NAPSR and Arkema submitted comments supporting the proposed changes.

(c) PHMSA's Response

PHMSA did not receive comments critical of this proposal. Therefore, the final rule incorporates this requirement as originally proposed.

IV. Standards Incorporated by Reference

A. Summary of New and Revised Standards

Consistent with the amendments in this document, PHMSA is incorporating by reference several standards as described in more detail below. Some of these standards are simply updates to existing standards that are already incorporated by reference, while others provide a technical basis for corresponding regulatory changes in the Final Rule, notably the provisions related to PA–11 and PA–12 piping systems.

- ASTM D2513–12ael ''Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings,'' 4/12/2012. This specification covers requirements and test methods for material dimensions and tolerances; hydrostatic burst strength; chemical resistance; and rapid crack resistance of polyethylene pipe, tubing, and fittings for use in fuel gas mains and services for direct burial and reliner applications. The pipe and fittings covered by this specification are for use in the distribution of natural gas. Requirements for the qualifying of polyethylene systems for use with liquefied petroleum gas are also covered.

This standard is an update to standard ASTM D2513–09a (12/1/2009), which is currently incorporated by reference in the CFR. The updated version of this standard adds ASTM F2897 ''Specification for Tracking and Traceability Encoding System of Natural Gas Distribution Components (Pipe, Tubing, Fittings, Valves, and Appurtenances)'' to its referenced document list in Section 2. There is also a new Section 7.6 to address additional marking requirements for incorporating the 16-character code onto PE Pipe and Fittings. The standard also now limits pipe material designation codes to PE 2708 and PE4710 to be consistent with PHMSA DOT Part 192.

- ASTM F2785–12 ''Standard Specification for Polyamide 12 Gas Pressure Pipe, Tubing, and Fittings,'' 8/1/2012. This specification covers requirements and test methods for the characterization of PA–12 pipe, tubing, and fittings for use in fuel gas mains and services for direct burial and reliner applications. The pipe and fittings covered by this specification are for use in the distribution of natural gas. No version of this specification is currently in the CFR.

The final rule will permit the use of PA–12 plastic pipe, which is not permitted under existing regulations. In order to facilitate this change, PA–12 pipe and fittings will need to follow a listed specification, and reference to commonly used industry standards (ASTM F2785) is a preferred approach. Adding dedicated and material specific standards for both PA–11 and PA–12 will also allow PHMSA to remove two much older versions of ASTM D2513 (ASTM D2513–87 and ASTM D2513–99) that are currently referenced for thermoplastic materials other than PE. Overall, this change gives operators additional flexibility in choice of material.

- ASTM F2945–12a ''Standard Specification for Polyamide 11 Gas Pressure Pipe, Tubing, and Fittings,'' 11/27/2012. This specification covers requirements and test methods for the characterization of PA–11 pipe, tubing, and fittings for use in fuel gas piping. No version of this specification is currently in the CFR.

The final rule will expand operators' ability to use PA–11 plastic pipe. PA–11 is currently allowed but with certain limitations on pressure and dimensions. The rule will also update regulations to align with more current industry standards for PA–11 (*i.e.* the ASTM F2945 standard). Adding dedicated and newer material specific standards for both PA–11 and PA–12 will also allow PHMSA to remove two much older versions of ASTM D2513 (ASTM D2513–87 and ASTM D2513–99) that are currently referenced for thermoplastic materials other than PE. Overall, these changes give operators additional flexibility in choice of material.

- ASTM F2620–12 ''Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings,'' 8/01/2013. This practice describes procedures for making joints with PE pipe and fittings by means of heat-fusion joining in, but not limited to, a field environment. The parameters and procedures are applicable only to joining PE pipe and fittings of related polymer chemistry. No version of this standard is currently in the CFR.

The final rule includes a new provision related to heat fusion joints for PE pipe, stating that these must comply with the relevant standard (ASTM F2620–12). Although some comments were received objecting to this change, these were either based on a misunderstanding of the proposal or of the standard itself, as discussed in the comment summary above. PHMSA believes that this will help address gaps and inconsistencies in joining procedures.

- ASTM D2564–12 ''Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems'' 08/01/2012. This specification covers requirements for solvent cements used in joining PVC piping systems.

The final rule includes a minor correction updating and providing a more direct reference to the technical standard for solvent cements and noting that the requirements in this standard apply only to PVC pipe. ASTM D2564 had been a referenced document in the previous versions of ASTM D2513 that applied to all thermoplastics, which in turn was incorporated by reference into PHMSA regulation. With the removal of ASTM D2513–99 and ASTM D2513–99 that is currently referenced for all thermoplastics other than PE, standards need to be included to apply to PVC piping systems that are still in use today (although typically for maintenance or repair only). In addition to referencing ASTM F2817–10 for Maintenance and Repair of PVC, PHMSA believes it is important to reference this standard for the specific solvent to be used. Even with it being included as a referenced document within the standard previously, PHMSA and States have

found cases occasionally where non-listed solvents were used contributing to improper joints.

• ASTM F1924–12, ''Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing,'' 4/01/2012. This specification describes test methods and material requirements for plastic mechanical fittings for use with outside diameter-controlled PE gas distribution pipe smaller than 2-inch IPS. No version of this specification is currently in the CFR.

The final rule revises the regulations for mechanical joints and fittings by adding requirements for seal plus pullout resistance and citing the relevant industry standard(s). The allowable fittings are already widely in use and have little to no cost difference from other fittings for either labor or materials. This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components.

• ASTM F2817–10 ''Standard Specification for Poly (Vinyl Chloride) (PVC) Gas Pressure Pipe and Fittings for Maintenance or Repair,'' (PVC components only) 02/01/2010. This specification covers requirements for PVC pipe and tubing for use only to maintain or repair existing PVC gas piping. No version of this specification is currently in the CFR.

This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components. With the removal of ASTM D2513–99 and ASTM D2513–99 that is currently referenced for all thermoplastics other than PE, standards need to be included to apply to PVC piping systems that are still in use today (although typically for maintenance or repair only).

• ASTM F 2600–09 ''Standard Specification for Electrofusion Type Polyamide-11 Fittings for Outside Diameter Controlled Polyamide-11 Pipe and Tubing,'' 4/1/2009. This specification covers PA–11 electrofusion fittings for use with outside-diameter controlled PA–11 pipe covered by Specification D2513. Requirements for materials, workmanship, and testing performance are included. No version of this specification is currently in the CFR.

This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components. With new material specific standards being added for PA–11 and other standards being added for components in this rule, there is a need to add F2600 for Electrofusion PA–11 fittings, similar to how ASTM F1055 is currently referenced for PE Electrofusion Fittings.

• ASTM F2767–12 ''Specification for Electrofusion Type Polyamide-12 Fittings for Outside Diameter Controlled Polyamide-12 Pipe and Tubing for Gas Distribution'' 10/15/2012.—This specification applies to PA–12 electrofusion fittings for use with outside diameter-controlled PA–12 pipes addressed by Specification F2785. No version of this specification is currently in the CFR.

This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components. With new material, specific standards being added for PA–12 and other standards being added for components in this rule, there is a need to add F2767 for Electrofusion PA–12 fittings, similar to how ASTM F1055 is currently referenced for PE Electrofusion Fittings.

• ASTM F2145–13 ''Standard Specification for Polyamide 11 (PA 11) and Polyamide 12 (PA12) Mechanical Fittings for Use on Outside Diameter Controlled Polyamide 11 and Polyamide 12 Pipe and Tubing,'' 05/01/2013. This specification describes requirements and test methods for the qualification of PA–11 and PA–12 bodied mechanical fittings for use with outside diameter-controlled PA–11 and PA–12, with 2-inch-and-smaller IPS complying with Specification D2513 and F2785. In addition, it specifies general requirements of the material from which these fittings are made. No version of this specification is currently in the CFR.

This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components. With new material specific standards being added for PA–11 and PA–12 and other standards being added for components in this rule, there is a need to add F2145 for PA–11 and PA–12 mechanical fittings.

• ASTM F1948–12 ''Standard Specification for Metallic Mechanical Fittings for Use on Outside Diameter Controlled Thermoplastic Gas Distribution Pipe and Tubing,'' 04/01/2012. This specification covers requirements and test methods for the qualification of metallic mechanical fittings for use with outside diameter-controlled thermoplastic gas distribution pipe and tubing as specified in Specification D2513. No version of this specification is currently in the CFR.

The final rule revises the regulations for mechanical joints and fittings by adding requirements for seal plus pullout resistance and citing the relevant industry standard(s). The allowable fittings are already widely in use.

This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components. With new material specific standards being added and other standards being added for components in this rule, there is a need to add F1948 for metallic mechanical fittings on thermoplastic pipe. This standard would apply to metallic fittings used on multiple types of thermoplastic pipe (*i.e.* PE, PA–11 and PA–12).

• ASTM F1973–13 ''Standard Specification for Factory Assembled Anodeless Risers and Transition Fittings in Polyethylene (PE) and Polyamide 11 (PA11) and Polyamide 12 (PA12) Fuel Gas Distribution Systems,'' 05/01/2013. This specification covers requirements and test methods for the qualification of factory assembled anodeless risers and transition fittings for use in PE pipe sizes through Nominal Pipe Size (NPS) 8, and for PA–11 and PA–12 sizes through NPS 6. No version of this standard is currently in the CFR.

The final rule uses this standard to establish the procedures for designing and testing factory assembled anodeless risers. The standard also provides a definition for Category 1 fittings on plastic pipe. This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components.

• ASME B16.40–08 ''Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems,'' 03/18/2008. This standard defines design qualification requirements for manually operated thermoplastic valves in nominal valve sized from ½- through 12 inches that are intended for use below ground in thermoplastic fuel gas distribution mains and service lines. No version of this standard is currently in the CFR.

This item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components. This standard is included based on a petition to include thermoplastic valves.

• 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 Piping Materials or Pipe,'' updated March, 2011. This report lists thermoplastic piping materials with a PPI recommended HDB, Strength Design Basis (SDB), Pressure Design Basis (PDB), or Minimum Required Strength (MRS) rating for thermoplastic piping materials or pipe. These listings

have been established in accordance with PPI TR–3. No version of this listing is currently in the CFR directly, although PPI TR–4 has been incorporated indirectly through PPI TR–3 and other requirements for determining design pressure for pipe.

The final rule requires that all plastic pipe, when designed, must have a listed Hydrostatic Design Basis (HDB) rating in accordance with this standard.

PHMSA also updated the following standards, which are summarized below:

• ASTM F1055–98 (reapproved 2006) ''Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing,'' 3/1/2006. This specification covers electrofusion polyethylene fittings for use with outside diameter-controlled polyethylene pipe covered by Specifications D2447, D 2513, D2737, D3035, and F714. This specification is a 2006 reaffirmed version of the 1998 version, meaning the technical content of the standard hasn't changed, but the ASTM technical committee procedurally reviewed it to keep it active.

With the changes being made to the regulations and other component specifications for other materials such as PA–11 and PA–12 being added, the language in 192.283(a) that previously only mentioned F1055 for PE is being revised. Along with the applicable component specifications for other material types, this item would be added as a Listed Specification in Appendix B to Part 192-Qualification of Pipe and Components.

• PPI TR–3/2012, HDB/HDS/PDB/SDB/MRS/CRS, Policies, ''Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Hydrostatic Design Stresses (HDS), Pressure Design Basis (PDB), Strength Design Basis (SDB), Minimum Required Strength (MRS) Ratings, and Categorized Required Strength (CRS) for Thermoplastic Piping Materials or Pipe,'' updated November 2012. This report presents the policies and procedures used by the HSB (Hydrostatic Stress Board) of PPI to develop recommendations of long-term strength ratings for commercial thermoplastic piping materials or pipe. This version is an update to the 2008 version currently incorporated by reference. A more detailed summary of updates to the 2010 version (successor to the 2008 version) is available in the 2012 document itself. Recommendations are published in PPI TR–4. Both documents are freely available on the internet as of the date of publication of this final rule.

The final rule describes the standard as a procedure that can be used to determine a design pressure rating. This is an updated version of the standard currently referenced in the regulations.

B. Availability of Standards Incorporated by Reference

PHMSA currently incorporates by reference into 49 CFR parts 192, 193, and 195 all or parts of more than 60 standards and specifications developed and published by SDOs. In general, SDOs update and revise their published standards every two to five years to reflect modern technology and best technical practices. ASTM often updates some of its more widely used standards every year. Sometimes multiple editions are published in a given year.

In accordance with the NTTAA, PHMSA has the responsibility for determining, via petitions or otherwise, which currently referenced standards should be updated, revised, or removed, and which standards should be added to 49 CFR parts 192, 193, and 195. Revisions to incorporated by reference materials in parts 192, 193, and 195 are handled via the rulemaking process, which allows for the public and regulated entities to provide input. During the rulemaking process, PHMSA must also obtain approval from the Office of the Federal Register to incorporate by reference any new materials.

On January 3, 2012, President Obama signed the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, Public Law 112–90. Section 24 of that law states: ''Beginning 1 year after the date of enactment of this subsection, the Secretary may not issue guidance or a regulation pursuant to this chapter that incorporates by reference any documents or portions thereof unless the documents or portions thereof are made available to the public, free of charge, on an internet website.'' 49 U.S.C. 60102(p).

On August 9, 2013, Public Law 113–30 revised 49 U.S.C. 60102(p) to replace ''1 year'' with ''3 years'' and remove the phrases ''guidance or'' and, ''on an internet website.'' This resulted in the current language in 49 U.S.C. 60102(p), which now reads as follows:

> Beginning 3 years after the date of enactment of this subsection, the Secretary may not issue a regulation pursuant to this chapter that incorporates by reference any documents or portions thereof unless the documents or portions thereof are made available to the public, free of charge.

On November 7, 2014, the Office of the Federal Register issued a final rule that revised 1 CFR 51.5 to require that Federal agencies include a discussion in the preamble of the final rule ''the ways the materials it incorporates by reference are reasonably available to interested parties and how interested parties can obtain the materials.'' 79 FR 66278. To meet its statutory obligation for this final rule, PHMSA negotiated an agreement with ASTM to provide viewable copies of standards incorporated by reference in the PSR available to the public at no cost. The Plastics Pipe Institute provides free electronic copies of their standards on their website (*http://plasticpipe.org/publications/technical-reports.html*). Each organization's mailing address and the website are listed in § 192.7.

In addition, PHMSA will provide individual members of the public temporary access to any standard that is incorporated by reference that is not otherwise available for free. This includes the one ASME standard described in the previous paragraph. Requests for access can be sent to the following email address: *PHMSAPHPStandards@dot.gov*

V. Regulatory Analysis and Notices

Summary/Legal Authority for This Rulemaking

This final rule is published under the authority of the Federal pipeline safety statutes. 49 U.S.C. 60101 *et seq.* Section 60102 authorizes the Secretary of Transportation to issue regulations governing the design, installation, inspection, emergency plans and procedures, testing, construction, extension, operation, replacement, and maintenance of pipeline facilities. Further, section 60102(l) of the Federal pipeline safety statutes states that the Secretary shall, to the extent appropriate and practicable, update incorporated industry standards that have been adopted as a part of the PSR. This final rule will modify the PSR applicable to plastic pipe used in the transportation of gas.

Executive Order 12866, Executive Order 13563, Executive Order 13771, and DOT Regulatory Policies and Procedures

This final rule is a significant regulatory action under Executive Order 12866, 58 FR 51735, and the Regulatory Policies and Procedures of the Department of Transportation. The rule was therefore reviewed by the Office of Management and Budget. A Regulatory Impact Analysis with estimates of the costs and benefits of the final rule is available in the docket. Executive Order 12866, as supplemented by Executive Order 13563, 76 FR 3821, requires agencies to regulate in the ''most cost-effective manner,'' to make a ''reasoned

determination that the benefits of the intended regulation justify its costs,'' and to develop regulations that ''impose the least burden on society.'' PHMSA is amending the PSR with regard to plastic pipe to improve compliance with these regulations by updating and adding references to technical standards and providing clarification. PHMSA anticipates that the amendments contained in this final rule will have net economic benefits to the public. The final rule enhances safety, reduces costs for the regulated community, improves regulatory clarity, increases ease of compliance, and provides additional flexibility in gas pipeline material choices. A copy of the regulatory evaluation is available for review in the docket.

This final rule is considered an E.O. 13771 deregulatory action. Details on the estimated cost savings of this rule can be found in the rule's economic analysis.

Regulatory Flexibility Act

The Regulatory Flexibility Act requires an agency to review regulations to assess their impact on small entities unless the agency determines that a rule is not expected to have a significant impact on a substantial number of small entities. 5 U.S.C. 601 *et seq.* This final rule has been developed in accordance with Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking,'' 67 FR 53461, and DOT's procedures and policies to promote compliance with the Regulatory Flexibility Act to ensure that potential impacts of rules on small entities are properly considered.

While PHMSA does not collect information on the number of employees or revenues of pipeline operators, it does continuously seek information on the number of small pipeline operators to more fully determine any impacts PHMSA's proposed regulations may have on small entities. This final rule proposes to require small and large operators to comply with these requirements. Based on the results of PHMSA's Final Regulatory Flexibility Analysis, PHMSA has determined that the final rule will not have a significant economic impact on a substantial number of small entities. The final Regulatory Flexibility Act Analysis is included in the Regulatory Impact Analysis, available via *regulations.gov*.

Executive Order 13175

PHMSA has analyzed this final rule according to the principles and criteria in Executive Order 13175, ''Consultation and Coordination with Indian Tribal Governments,'' 65 FR 67249. Because this final rule does not significantly or uniquely affect the communities of the Indian tribal governments or impose substantial direct compliance costs, the funding and consultation requirements of Executive Order 13175 do not apply.

Paperwork Reduction Act

PHMSA has analyzed this final rule in accordance with the Paperwork Reduction Act of 1995 (PRA). Public Law 96–511. The PRA requires federal agencies to minimize paperwork burden imposed on the American public by ensuring maximum utility and quality of Federal information, ensuring the use of information technology to improve Government performance and improving the Federal government's accountability for managing information collection activities. This final rule does not impose any new information collection requirements.

Unfunded Mandates Reform Act of 1995

This final rule does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. Public Law 104–4. It would not result in costs of $100 million, adjusted for inflation, or more in any one year to either State, local, or tribal governments, in the aggregate, or to the private sector, and is the least burdensome alternative that achieves the objective of the final rule.

National Environmental Policy Act

PHMSA analyzed this final rule in accordance with section 102(2)(c) of the National Environmental Policy Act, 42 U.S.C. 4332, the Council on Environmental Quality regulations, 40 CFR parts 1500–1508, and U.S. DOT Order 5610.1C, and has determined that this action will not significantly affect the quality of the human environment. An environmental assessment of this rulemaking is available in the docket.

Privacy Act Statement

Anyone can search the electronic form of written communications and comments received into our dockets by the name of the individual submitting the document (or signing the document, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement, published on April 11, 2000 (65 FR 19476), in the **Federal Register** at: *https://www.gpo.gov/fdsys/pkg/FR-2000-04-11/pdf/00-8505.pdf*.

Executive Order 13132

PHMSA has analyzed this final rule according to Executive Order 13132, ''Federalism,'' 64 FR 43255. The final rule does not have a substantial direct effect on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. This final rule does not impose substantial direct compliance costs on State and local governments. This final rule does not preempt State law for intrastate pipelines. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply *Executive Order 13211*.

This final rule is not a ''significant energy action'' under Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,'' 66 FR 28355. It is not likely to have a significant adverse effect on energy supply, distribution, or use. Further, the Office of Information and Regulatory Affairs has not designated this final rule as a significant energy action.

Regulation Identifier Number

A regulation identifier number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in the spring and fall of each year. The RIN contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

VI. Section-by-Section Analysis

Section 192.3 Definitions

Section 192.3 provides definitions for various terms used throughout part 192. In support of other provisions in this final rule, PHMSA has added a definition for ''weak link'' that outlines methods used to avoid overstressing plastic pipe during trenchless excavation.

Section 192.7 What documents are incorporated by reference partly or wholly in this part?

Section 192.7 contains a list of all standards incorporated by reference in part 192. This final rule adds or updates a number of standards related to plastic pipe, fittings, and other components made of PE, PA–11, and PA–12. PHMSA is also adding a standard for maintenance or repair of PVC segments.

Section 192.9 What requirements apply to gathering lines?

Section 192.9 identifies those portions of part 192 that apply to regulated gas gathering lines. PHMSA amended this section by adding a new paragraph (d)(3) to specify that newly constructed

Type B regulated gas gathering pipelines made of plastic must comply with all requirements of part 192 applicable to plastic pipe. The previously existing language in paragraphs (d)(3)–(d)(7) have remained the same, but have been reordered to paragraphs (d)(4)–(d)(8) in this final rule.

Section 192.59 Plastic Pipe

Section 192.59 specifies requirements for plastic pipe materials. This final rule amends this section by requiring operators to verify that all pipe is free of visible defects prior to installation and permit the use of pipe that had been previously used in gas service other than natural gas.

Section 192.63 Marking of Materials

Section 192.63 currently specifies requirements for the type and content of markings of pipe segments, valves, and fittings. In this final rule, PHMSA revises paragraph (a) to delete paragraphs (a)(1) and (a)(2). The revised paragraph (a) requires that materials be marked in accordance with the appropriate listed specification.

Section 192.67 Storage and Handling of Plastic Pipelines

The newly added § 192.67 establishes storage and handling standards for plastic pipeline components.

Section 192.121 Design of Plastic Pipe

Section 192.121 has been amended to specify the design requirements for newly installed plastic tubing made of PE, PA–11, and PA–12. In response to petitions, PHMSA has revised the maximum specifications for PE pipe and permitted the use of PA–12 in gas service. New and replaced PE pipe may now operate with a design factor of 0.40 (previously 0.32), though it is limited to a minimum wall thickness of 0.090 inches. New and replaced PA–11 pipe may now be operated with a design factor of 0.40, a maximum pressure up to 250 psig (previously 200) and a maximum diameter of 6 inches (previously 4). Operators are now permitted to install PA–12 with a design factor of 0.40, a maximum pressure up to 250 psig, and a maximum diameter of 6 inches. Finally, the design limitations which were previously located in § 192.123 have been merged into this section.

Section 192.123 [Removed and Reserved]

Section 192.123 previously contained design limitations for plastic pipe; however, this content has been merged into § 192.121.

Section 192.143 General Requirements

Section 192.143 contains general design provisions for pipeline components. For clarity, PHMSA added a new paragraph (c) to specify that components used for plastic pipe must be able to withstand operating pressures and anticipated loads in accordance with a listed specification, as defined in § 192.3.

Section 192.145 Valves

Section 192.143 contains general design provisions for pipeline valves. For clarity, PHMSA has added a new paragraph (f) to specify that plastic valves must be designed to meet a ''listed specification'' as defined in § 192.3 and not operated in conditions that exceed the applicable pressure or temperature ratings detailed in the applicable listed specification.

Section 192.149 Standard Fittings

Section 192.149 contains general design provisions for pipeline fittings. For clarity, PHMSA added a new paragraph (c) to specify that a plastic fitting may only be installed if it meets a listed specification, as defined in § 192.3.

Section 192.191 Design Pressure of Plastic Fittings [Removed and Reserved]

Section 192.191 is now redundant with the addition of § 192.143(c) and has been removed and reserved.

Section 192.204 Risers

Section 192.204 is new and establishes requirements for the design and construction of risers. PHMSA now requires all riser designs to be tested to ensure safe performance under anticipated external and internal loads. This section also requires factory assembled anodeless risers to be designed and tested in accordance with ASTM F1973 and allows the use of plastic risers from plastic mains to regulator stations with certain expectations and limitations.

Section 192.281 Plastic Pipe

Section 192.281 details the requirements for joining plastic pipe. To reduce confusion and promote safety, PHMSA is making several revisions to § 192.281. Paragraphs (b)(2) and (3) are revised to clarify that solvent cements may only be used to join PVC components and may not be heated or cooled to accelerate setting. Paragraph (c) is revised to specify that the joining requirements apply to both the pipe and components that are joined to the pipe, and for PE joints except for electrofusion must comply with ASTM F2620–12. Paragraphs (e)(3) and (4) are added to require that newly installed mechanical fittings must meet a listed specification and provide Category 1 seal and resistance.

Section 192.283 Plastic Pipe: Qualifying Joining Procedures

Section 192.283 details the requirements for qualifying plastic pipe joining procedures. PHMSA is incorporating requirements for mechanical joints or fittings to be Category 1. Since PHMSA is also incorporating new standards applicable to PE, PA–11 and PA–12 materials as part of this rule, this section is revised to remove references to two versions of ASTM D2513 (depending on whether it's PE or plastic materials other than PE) and instead require operators test procedures in accordance with the appropriate listed specification. PHMSA is also repealing the obsolete § 192.283(d), which allowed operators to install used pipe or fittings manufactured before July 1, 1980, if they are joined in accordance with procedures that the manufacturer certifies will produce a joint strong as the pipe.

Section 192.285 Plastic Pipe: Qualifying Persons To Make Joints

Section 192.285 details the requirements for qualifying persons to make joints. This final rule amends § 192.285 to incorporate several revisions. Section 192.285(a)(2) previously specified that a person must make a specimen joint that is subjected to the testing detailed in § 192.285(b). PHMSA referenced ASTM F2620–12 (Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings) applicable to PE pipe and fittings (except for electrofusion).

Section 192.313 Bends and Elbows

Section 192.313 details standards for bends and elbows in pipe, however, it did not previously address plastic pipe. This final rule adds a new paragraph (d) requiring that operators may only make bends in plastic pipe with a bend radius greater than the minimum bend radius specified by the manufacturer.

Section 192.321 Installation of Plastic Pipelines

Section 192.321 details requirements for the installation of plastic pipe transmission lines and mains. This final rule makes several amendments to this section. Paragraph (d) is revised to require newly installed plastic pipe have a wall thickness consistent with § 192.121. PHMSA has also revised paragraph (f) to specify that the plastic

pipe must be protected from damage at both the entrance and exit of the casing during the installation process. Due to the merger of §§ 192.121 and 192.123, PHMSA has corrected § 192.321(h)(3) to refer to § 192.121. Finally, a new paragraph (i) has been added to allow for the aboveground termination of plastic mains under certain conditions.

Section 192.329 Installation of Plastic Pipelines by Trenchless Excavation

The newly added § 192.329 establishes requirements for the installation of plastic pipe by trenchless excavation. During trenchless installation of plastic pipe, operators must now use a weak link as defined in § 192.3 and take practicable steps to avoid striking other underground structures.

Section 192.367 Service Lines: General Requirements for Connections to Main Piping

Section 192.367 specifies requirements for service line connections to mains. Paragraph (b) specifies requirements for compression-type fittings for service-line main connections. Similar to the new requirements for other fittings, paragraph (b) is amended to require that operators must use Category 1 compression-type fittings.

Section 192.375 Service Lines: Plastic

Section 192.375 requires that plastic service lines be installed underground with limited exceptions. The final rule amends this section to apply the riser standards in § 192.204 to aboveground service lines.

Section 192.376 Installation of Plastic Service Lines by Trenchless Excavation

Section 192.376 is a new section that establishes new requirements for trenchless excavation installation of plastic service lines. Similar to § 192.329, during trenchless installation of service lines, operators must now take steps to avoid other underground structures and use a weak link device during the pull through process to avoid overstressing the pipeline.

Section 192.455 External Corrosion Control: Buried or Submerged Pipelines Installed After July 31, 1971

Section 192.455 details the external corrosion control requirements for all buried or submerged pipe. PHMSA has added a new paragraph (g) to require cathodic protection on electrically isolated metal fittings on plastic pipelines not meeting the exceptions in paragraph (f) installed after the effective date of the rule. Such fittings must also be maintained in accordance with the operator's integrity management plans.

Section 192.513 Test Requirements for Plastic Pipelines

Section 192.513 details the minimum initial testing requirements for plastic pipelines. The final rule amends paragraph (c) to reduce the maximum limit for testing pressure from 3 times the pressure determined under § 192.121 to 2.5 times the maximum pressure to avoid overstressing the line during testing.

Section 192.720 Distribution Systems: Leak Repair

The final rule adds a new § 192.720 prohibiting the use of temporary mechanical leak repair clamps as a permanent repair of plastic pipe used in distribution service.

Section 192.756 Joining Plastic Pipe by Heat Fusion; Equipment Maintenance

The final rule adds a new § 192.756 that establishes minimum requirements for equipment maintenance for equipment used in the heat fusion of plastic pipe.

List of Subjects in 49 CFR Part 192

Incorporation by reference, Pipeline safety, Plastic pipe, Security measures.

In consideration of the foregoing, PHMSA is amending 49 CFR part 192 as follows:

PART 192—TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS

■ 1. The authority citation for part 192 is revised to read as follows:

Authority: 49 U.S.C. 5103, 60102, 60104, 60108, 60109, 60110, 60113, 60116, 60118, 60137, and 60141; and 49 CFR 1.97.

■ 2. In § 192.3, add a definition of ''weak link'' in alphabetical order to read as follows:

§ 192.3 Definitions.

* * * * *

Weak link means a device or method used when pulling polyethylene pipe, typically through methods such as horizontal directional drilling, to ensure that damage will not occur to the pipeline by exceeding the maximum tensile stresses allowed.

* * * * *

■ 3. Amend § 192.7 as follows:
■ a. Redesignate paragraphs (c)(3) through (c)(9) as paragraphs (c)(4) through (c)(10);
■ b. Add new paragraph (c)(3);
■ c. Revise paragraphs (d)(11) through (d)(15);
■ d. Add paragraphs (d)(16) through (d)(24); and
■ e. Revise paragraph (j)(1) and add paragraph (j)(2).

The additions and revisions read as follows:

§ 192.7 What documents are incorporated by reference partly or wholly in this part?

* * * * *

(c) * * *

(3) ASME B16.40–2008, ''Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems,'' March 18, 2008, approved by ANSI, (ASME B16.40–2008), IBR approved for Item I, Appendix B to Part 192.

* * * * *

(d) * * *

(11) ASTM D2513–12ae1, ''Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings,'' April 1, 2012, (ASTM D2513–12ae1), IBR approved for Item I, Appendix B to Part 192.

(12) ASTM D2517–00, ''Standard Specification for Reinforced Epoxy Resin Gas Pressure Pipe and Fittings,'' (ASTM D 2517), IBR approved for §§ 192.191(a); 192.281(d); 192.283(a); and Item I, Appendix B to Part 192.

(13) ASTM D2564–12, ''Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems,'' Aug. 1, 2012, (ASTM D2564–12), IBR approved for § 192.281(b)(2).

(14) ASTM F1055–98 (Reapproved 2006), ''Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing,'' March 1, 2006, (ASTM F1055–98 (2006)), IBR approved for § 192.283(a), Item I, Appendix B to Part 192.

(15) ASTM F1924–12, ''Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing,'' April 1, 2012, (ASTM F1924–12), IBR approved for Item I, Appendix B to Part 192.

(16) ASTM F1948–12, ''Standard Specification for Metallic Mechanical Fittings for Use on Outside Diameter Controlled Thermoplastic Gas Distribution Pipe and Tubing,'' April 1, 2012, (ASTM F1948–12), IBR approved for Item I, Appendix B to Part 192.

(17) ASTM F1973–13, ''Standard Specification for Factory Assembled Anodeless Risers and Transition Fittings in Polyethylene (PE) and Polyamide 11 (PA11) and Polyamide 12 (PA12) Fuel Gas Distribution Systems,'' May 1, 2013, (ASTM F1973–13), IBR approved for § 192.204(b); and Item I, Appendix B to Part 192.

(18) ASTM F2145–13, ''Standard Specification for Polyamide 11 (PA 11) and Polyamide 12 (PA12) Mechanical Fittings for Use on Outside Diameter Controlled Polyamide 11 and Polyamide 12 Pipe and Tubing,'' May 1, 2013, (ASTM F2145–13), IBR approved for Item I, Appendix B to Part 192.

(19) ASTM F 2600–09, ''Standard Specification for Electrofusion Type Polyamide-11 Fittings for Outside Diameter Controlled Polyamide–11 Pipe and Tubing,'' April 1, 2009, (ASTM F 2600–09), IBR approved for Item I, Appendix B to Part 192.

(20) ASTM F2620–12, ''Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings,'' Aug. 1, 2012, (ASTM F2620–12), IBR approved for §§ 192.281(c) and 192.285(b)(2)(i).

(21) ASTM F2767–12, ''Specification for Electrofusion Type Polyamide-12 Fittings for Outside Diameter Controlled Polyamide–12 Pipe and Tubing for Gas Distribution,'' Oct. 15, 2012, (ASTM F2767–12), IBR approved for Item I, Appendix B to Part 192.

(22) ASTM F2785–12, ''Standard Specification for Polyamide 12 Gas Pressure Pipe, Tubing, and Fittings,'' Aug. 1, 2012, (ASTM F2785–12), IBR approved for Item I, Appendix B to Part 192.

(23) ASTM F2817–10, ''Standard Specification for Poly (Vinyl Chloride) (PVC) Gas Pressure Pipe and Fittings for Maintenance or Repair,'' Feb. 1, 2010, (ASTM F2817–10), IBR approved for Item I, Appendix B to Part 192.

(24) ASTM F2945–12a ''Standard Specification for Polyamide 11 Gas Pressure Pipe, Tubing, and Fittings,'' Nov. 27, 2012, (ASTM F2945–12a), IBR approved for Item I, Appendix B to Part 192.

* * * * *

(j) * * *

(1) PPI TR–3/2012, HDB/HDS/PDB/SDB/MRS/CRS, Policies, ''Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Hydrostatic Design Stresses (HDS), Pressure Design Basis (PDB), Strength Design Basis (SDB), Minimum Required Strength (MRS) Ratings, and Categorized Required Strength (CRS) for Thermoplastic Piping Materials or Pipe,'' updated November 2012, (PPI TR–3/2012), IBR approved for § 192.121.

(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 Piping Materials or Pipe,'' updated March, 2011, (PPI TR–4/2012), IBR approved for § 192.121.

■ 4. In § 192.9 revise paragraph (d) to read as follows:

§ 192.9 What requirements apply to gathering lines?

* * * * *

(d) *Type B lines.* An operator of a Type B regulated onshore gathering line must comply with the following requirements:

(1) If a line is new, replaced, relocated, or otherwise changed, the design, installation, construction, initial inspection, and initial testing must be in accordance with requirements of this part applicable to transmission lines;

(2) If the pipeline is metallic, control corrosion according to requirements of subpart I of this part applicable to transmission lines;

(3) If the pipeline contains plastic pipe or components, the operator must comply with all applicable requirements of this part for plastic pipe components;

(4) Carry out a damage prevention program under § 192.614;

(5) Establish a public education program under § 192.616;

(6) Establish the MAOP of the line under § 192.619;

(7) Install and maintain line markers according to the requirements for transmission lines in § 192.707; and

(8) Conduct leakage surveys in accordance with the requirements for transmission lines in § 192.706, using leak-detection equipment, and promptly repair hazardous leaks in accordance with § 192.703(c).

* * * * *

■ 5. Amend § 192.59 as follows:
■ a. Revise paragraphs (a)(1) and (a)(2);
■ b. Add paragraph (a)(3): and
■ c. Revise paragraph (b)(3).

The revisions and addition read as follows:

§ 192.59 Plastic pipe.

(a) * * *

(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.

(b) * * *

(3) It has been used only in gas service;

* * * * *

■ 6. Amend § 192.63 by revising paragraph (a) and adding paragraph (e) to read as follows:

§ 192.63 Marking of materials.

(a) Except as provided in paragraph (d) and (e) of this section, each valve, fitting, length of pipe, and other component must be marked as prescribed in the specification or standard to which it was manufactured.

* * * * *

(e) All plastic pipe and components must also meet the following requirements:

(1) All markings on plastic pipe prescribed in the listed specification and the requirements of paragraph (e)(2) of this section must be repeated at intervals not exceeding two feet.

(2) Plastic pipe and components manufactured after December 31, 2019 must be marked in accordance with the listed specification.

(3) All physical markings on plastic pipelines prescribed in the listed specification and paragraph (e)(2) of this section must be legible until the time of installation.

■ 7. Add § 192.67 to subpart B to read as follows:

§ 192.67 Storage and handling of plastic pipe and associated components.

Each operator must have and follow written procedures for the storage and handling of plastic pipe and associated components that meet the applicable listed specifications.

■ 8. Revise § 192.121 to read as follows:

§ 192.121 Design of plastic pipe.

(a) *Design formula.* Design formulas for plastic pipe are determined in accordance with either of the following formulas:

$$P = 2S\frac{t}{(D-t)}(DF)$$

$$P = \frac{2S}{(SDR-1)}(DF)$$

P = Design pressure, gage, psi (kPa).

S = For thermoplastic pipe, the hydrostatic design basis (HDB) is determined in accordance with the listed specification at a temperature equal to 73 °F (23 °C), 100 °F (38 °C), 120 °F (49 °C), or 140 °F (60 °C). In the absence of an HDB established at the specified temperature, the HDB of a higher temperature may be used in determining a design pressure rating at the specified temperature by arithmetic interpolation using the procedure in Part D.2 of PPI TR–3/2012, (incorporated by reference, *see* § 192.7). For reinforced thermosetting plastic pipe, 11,000 psig (75,842 kPa).

t = Specified wall thickness, inches (mm).

D = Specified outside diameter, inches (mm).

SDR = Standard dimension ratio, the ratio of the average specified outside diameter to the minimum specified wall thickness, corresponding to a value from a common numbering system that was derived from the American National Standards Institute (ANSI) preferred number series 10.

DF = Design Factor, a maximum of 0.32 unless otherwise specified for a particular material in this section

(b) *General requirements for plastic pipe and components.* (1) Except as provided in paragraphs (c) through (f) of this section, the design pressure for plastic pipe may not exceed a gauge pressure of 100 psig (689 kPa) for pipe used in:

(i) Distribution systems; or

(ii) Transmission lines in Class 3 and 4 locations.

(2) Plastic pipe may not be used where operating temperatures of the pipe will be:

(i) Below −20 °F (−29 °C), or below −40 °F (−40 °C) if all pipe and pipeline components whose operating temperature will be below −20 °F (−29 °C) have a temperature rating by the manufacturer consistent with that operating temperature; or

(ii) Above the temperature at which the HDB used in the design formula under this section is determined.

(3) Unless specified for a particular material in this section, the wall thickness of plastic pipe may not be less than 0.062 inches (1.57 millimeters).

(4) All plastic pipe must have a listed HDB in accordance with PPI TR–4/2012 (incorporated by reference, *see* § 192.7).

(c) *Polyethylene (PE) pipe requirements.* (1) For PE pipe produced after July 14, 2004, but before January 22, 2019, a design pressure of up to 125 psig may be used, provided:

(i) The material designation code is PE2406 or PE3408.

(ii) The pipe has a nominal size (Iron Pipe Size (IPS) or Copper Tubing Size (CTS)) of 12 inches or less (above nominal pipe size of 12 inches, the design pressure is limited to 100 psig); and

(iii) The wall thickness is not less than 0.062 inches (1.57 millimeters).

(2) For PE pipe produced after January 22, 2019, a DF of 0.40 may be used in the design formula, provided:

(i) The design pressure does not exceed 125 psig;

(ii) The material designation code is PE2708 or PE4710;

(iii) The pipe has a nominal size (IPS or CTS) of 12 inches or less; and

(iv) The wall thickness for a given outside diameter is not less than that listed in the following table:

PE Pipe—Minimum Wall Thickness and SDR Values

Pipe size (inches)	Minimum wall thickness (inches)	Corresponding SDR (values)
½″ CTS	0.090	7
¾″ CTS	0.090	9.7
½″ IPS	0.090	9.3
¾″ IPS	0.095	11
1″ CTS	0.119	11
1″ IPS	0.119	11
1¼″ IPS	0.151	11
1½″ IPS	0.173	11
2″	0.216	11
3″	0.259	13.5
4″	0.265	17
6″	0.315	21
8″	0.411	21
10″	0.512	21
12″	0.607	21

(d) *Polyamide (PA–11) pipe requirements.* (1) For PA–11 pipe produced after January 23, 2009, but before January 22, 2019, a DF of 0.40 may be used in the design formula, provided:

(i) The design pressure does not exceed 200 psig;

(ii) The material designation code is PA32312 or PA32316;

(iii) The pipe has a nominal size (IPS or CTS) of 4 inches or less; and

(iv) The pipe has a standard dimension ratio of SDR–11 or less (*i.e.,* thicker wall pipe).

(2) For PA–11 pipe produced on or after January 22, 2019, a DF of 0.40 may be used in the design formula, provided:

(i) The design pressure does not exceed 250 psig;

(ii) The material designation code is PA32316;

(iii) The pipe has a nominal size (IPS or CTS) of 6 inches or less; and

(iv) The minimum wall thickness for a given outside diameter is not less than that listed in the following table:

PA–11 Pipe—Minimum Wall Thickness and SDR Values

Pipe size (inches)	Minimum wall thickness (inches)	Corresponding SDR (values)
½″ CTS	0.090	7.0
¾″ CTS	0.090	9.7
½″ IPS	0.090	9.3
¾″ IPS	0.095	11
1″ CTS	0.119	11
1″ IPS	0.119	11
1¼ IPS	0.151	11
1½″ IPS	0.173	11
2″ IPS	0.216	11
3″ IPS	0.259	13.5
4″ IPS	0.333	13.5
6″ IPS	0.491	13.5

(e) *Polyamide (PA–12) pipe requirements.* For PA–12 pipe produced after January 22, 2019, a DF of 0.40 may be used in the design formula, provided:

(1) The design pressure does not exceed 250 psig;

(2) The material designation code is PA42316;

(3) The pipe has a nominal size (IPS or CTS) of 6 inches or less; and

(4) The minimum wall thickness for a given outside diameter is not less than that listed in the following table.

PA–12 Pipe—Minimum Wall Thickness and SDR Values

Pipe size (inches)	Minimum wall thickness (inches)	Corresponding SDR (values)
½″ CTS	0.090	7
¾″ CTS	0.090	9.7
½″ IPS	0.090	9.3
¾″ IPS	0.095	11
1″ CTS	0.119	11
1″ IPS	0.119	11
1¼″ IPS	0.151	11
1½″ IPS	0.173	11
2″ IPS	0.216	11
3″ IPS	0.259	13.5
4″ IPS	0.333	13.5
6″ IPS	0.491	13.5

(f) *Reinforced thermosetting plastic pipe requirements.* (1) Reinforced thermosetting plastic pipe may not be used at operating temperatures above 150 °F (66 °C).

(2) The wall thickness for reinforced thermosetting plastic pipe may not be less than that listed in the following table:

Nominal size in inches (millimeters)	Minimum wall thickness in inches (millimeters)
2 (51)	0.060 (1.52)
3 (76)	0.060 (1.52)
4 (102)	0.070 (1.78)
6 (152)	0.100 (2.54)

§ 192.123 [Removed and Reserved]

■ 9. Remove and reserve § 192.123

■ 10. In § 192.143, add paragraph (c) to read as follows:

§ 192.143 General requirements.

* * * * *

(c) Except for excess flow valves, each plastic pipeline component installed after January 22, 2019 must be able to withstand operating pressures and other anticipated loads in accordance with a listed specification.

■ 11. In § 192.145, add paragraph (f) to read as follows:

§ 192.145 Valves.

* * * * *

(f) Except for excess flow valves, plastic valves installed after January 22,

2019, must meet the minimum requirements of a listed specification. A valve may not be used under operating conditions that exceed the applicable pressure and temperature ratings contained in the listed specification.

■ 12. In § 192.149, add paragraph (c) to read as follows:

§ 192.149 Standard fittings.

* * * * *

(c) Plastic fittings installed after January 22, 2019, must meet a listed specification.

§ 192.191 [Removed and Reserved]

■ 13. Remove and reserve § 192.191.

■ 14. Add § 192.204 to subpart D to read as follows:

§ 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.

(b) Factory assembled anodeless risers must be designed and tested in accordance with ASTM F1973–13 (incorporated by reference, *see* § 192.7).

(c) All risers used to connect regulator stations to plastic mains must be rigid and designed to provide adequate support and resist lateral movement. Anodeless risers used in accordance with this paragraph must have a rigid riser casing.

■ 15. Amend § 192.281 by revising paragraphs (b)(2), (b)(3), and (c) and adding paragraphs (e)(3) and (e)(4) to read as follows:

§ 192.281 Plastic pipe.

* * * * *

(b) * * *

(2) The solvent cement must conform to ASTM D2564–12 for PVC (incorporated by reference, *see* § 192.7).

(3) The joint may not be heated or cooled to accelerate the setting of the cement.

(c) *Heat-fusion joints.* Each heat fusion joint on a PE pipe or component, except for electrofusion joints, must comply with ASTM F2620–12 (incorporated by reference in § 192.7) and the following:

(1) A butt heat-fusion joint must be joined by a device that holds the heater element square to the ends of the pipe or component, compresses the heated ends together, and holds the pipe in proper alignment in accordance with the appropriate procedure qualified under § 192.283.

(2) A socket heat-fusion joint must be joined by a device that heats the mating surfaces of the pipe or component, uniformly and simultaneously, to establish the same temperature. The device used must be the same device specified in the operator's joining procedure for socket fusion.

(3) An electrofusion joint must be made using the equipment and techniques prescribed by the fitting manufacturer, or using equipment and techniques shown, by testing joints to the requirements of § 192.283(a)(1)(iii), to be equivalent to or better than the requirements of the fitting manufacturer.

(4) Heat may not be applied with a torch or other open flame.

* * * * *

(e) * * *

(3) All mechanical fittings must meet a listed specification based upon the applicable material.

(4) All mechanical joints or fittings installed after January 22, 2019, must be Category 1 as defined by a listed specification for the applicable material, providing a seal plus resistance to a force on the pipe joint equal to or greater than that which will cause no less than 25% elongation of pipe, or the pipe fails outside the joint area if tested in accordance with the applicable standard.

■ 16. Revise § 192.283 to read as follows:

§ 192.283 Plastic pipe: Qualifying joining procedures.

(a) *Heat fusion, solvent cement, and adhesive joints.* Before any written procedure established under § 192.273(b) is used for making plastic pipe joints by a heat fusion, solvent cement, or adhesive method, the procedure must be qualified by subjecting specimen joints that are made according to the procedure to the following tests, as applicable:

(1) The test requirements of—

(i) In the case of thermoplastic pipe, based on the pipe material, the Sustained Pressure Test or the Minimum Hydrostatic Burst Test per the listed specification requirements. Additionally, for electrofusion joints, based on the pipe material, the Tensile Strength Test or the Joint Integrity Test per the listed specification.

(ii) In the case of thermosetting plastic pipe, paragraph 8.5 (Minimum Hydrostatic Burst Pressure) or paragraph 8.9 (Sustained Static Pressure Test) of ASTM D2517- 00 (incorporated by reference, *see* § 192.7).

(iii) In the case of electrofusion fittings for polyethylene (PE) pipe and tubing, paragraph 9.1 (Minimum Hydraulic Burst Pressure Test), paragraph 9.2 (Sustained Pressure Test), paragraph 9.3 (Tensile Strength Test), or paragraph 9.4 (Joint Integrity Tests) of ASTM F1055–98(2006) (incorporated by reference, *see* § 192.7).

(2) For procedures intended for lateral pipe connections, subject a specimen joint made from pipe sections joined at right angles according to the procedure to a force on the lateral pipe until failure occurs in the specimen. If failure initiates outside the joint area, the procedure qualifies for use.

(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.

(b) *Mechanical joints.* Before any written procedure established under § 192.273(b) is used for making mechanical plastic pipe joints, the procedure must be qualified in accordance with a listed specification based upon the pipe material.

(c) A copy of each written procedure being used for joining plastic pipe must be available to the persons making and inspecting joints.

■ 17. In § 192.285, revise paragraph (b)(2)(i) to read as follows:

§ 192.285 Plastic pipe: Qualifying persons to make joints.

* * * * *

(b) * * *

(2) * * *

(i) Tested under any one of the test methods listed under § 192.283(a), or for PE heat fusion joints (except for electrofusion joints) visually inspected and tested in accordance with ASTM F2620–12 (incorporated by reference, *see* § 192.7) applicable to the type of joint and material being tested;

* * * * *

■ 18. In § 192.313, add paragraph (d) to read as follows:

§ 192.313 Bends and elbows.

* * * * *

(d) An operator may not install plastic pipe with a bend radius that is less than the minimum bend radius specified by the manufacturer for the diameter of the pipe being installed.

■ 19. Amend § 192.321 by revising paragraphs (a), (d), (f), and (h)(3) and adding paragraph (i) to read as follows:

§ 192.321 Installation of plastic pipelines.

(a) Plastic pipe must be installed below ground level except as provided in paragraphs (g), (h), and (i) of this section.

* * * * *

(d) Plastic pipe must have a minimum wall thickness in accordance with § 192.121.

* * * * *

(f) Plastic pipe that is being encased must be inserted into the casing pipe in a manner that will protect the plastic. Plastic pipe that is being encased must be protected from damage at all entrance and all exit points of the casing. The leading end of the plastic must be closed before insertion.

* * * * *

(h) * * *

(3) Not allowed to exceed the pipe temperature limits specified in § 192.121.

(i) Plastic mains may terminate above ground level provided they comply with the following:

(1) The above-ground level part of the plastic main is protected against deterioration and external damage.

(2) The plastic main is not used to support external loads.

(3) Installations of risers at regulator stations must meet the design requirements of § 192.204.

■ 20. Add § 192.329 to subpart G to read as follows:

§ 192.329 Installation of plastic pipelines by trenchless excavation.

Plastic pipelines installed by trenchless excavation must comply with the following:

(a) Each operator must take practicable steps to provide sufficient clearance for installation and maintenance activities from other underground utilities and/or structures at the time of installation.

(b) For each pipeline section, plastic pipe and components that are pulled through the ground must use a weak link, as defined by § 192.3, to ensure the pipeline will not be damaged by any excessive forces during the pulling process.

■ 21. Amend § 192.367 by revising paragraphs (b)(1) and (b)(2) and adding paragraph (b)(3) to read as follows:

§ 192.367 Service lines: General requirements for connections to main piping.

* * * * *

(b) * * *

(1) Be designed and installed to effectively sustain the longitudinal pull-out or thrust forces caused by contraction or expansion of the piping, or by anticipated external or internal loading;

(2) If gaskets are used in connecting the service line to the main connection fitting, have gaskets that are compatible with the kind of gas in the system; and

(3) If used on pipelines comprised of plastic, be a Category 1 connection as defined by a listed specification for the applicable material, providing a seal plus resistance to a force on the pipe joint equal to or greater than that which will cause no less than 25% elongation of pipe, or the pipe fails outside the joint area if tested in accordance with the applicable standard.

■ 22. In § 192.375, revise paragraph (a)(2) to read as follows:

§ 192.375 Service lines: Plastic.

(a) * * *

(2) It may terminate above ground level and outside the building, if—

(i) The above ground level part of the plastic service line is protected against deterioration and external damage;

(ii) The plastic service line is not used to support external loads; and

(iii) The riser portion of the service line meets the design requirements of § 192.204.

* * * * *

■ 23. Add § 192.376 to read as follows:

§ 192.376 Installation of plastic service lines by trenchless excavation.

Plastic service lines installed by trenchless excavation must comply with the following:

(a) Each operator shall take practicable steps to provide sufficient clearance for installation and maintenance activities from other underground utilities and structures at the time of installation.

(b) For each pipeline section, plastic pipe and components that are pulled through the ground must use a weak link, as defined by § 192.3, to ensure the pipeline will not be damaged by any excessive forces during the pulling process.

■ 24. Amend § 192.455 by revising paragraph (a) introductory text and adding paragraph (g) to read as follows:

§ 192.455 External corrosion control: Buried or submerged pipelines installed after July 31, 1971.

(a) Except as provided in paragraphs (b), (c), (f), and (g) of this section, each buried or submerged pipeline installed after July 31, 1971, must be protected against external corrosion, including the following:

* * * * *

(g) Electrically isolated metal alloy fittings installed after January 22, 2019, that do not meet the requirements of paragraph (f) must be cathodically protected, and must be maintained in accordance with the operator's integrity management plan.

■ 25. In § 192.513, revise paragraph (c) to read as follows:

§ 192.513 Test requirements for plastic pipelines.

* * * * *

(c) The test pressure must be at least 150% of the maximum operating pressure or 50 psi (345 kPa) gauge, whichever is greater. However, the maximum test pressure may not be more than 2.5 times the pressure determined under § 192.121 at a temperature not less than the pipe temperature during the test.

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■ 26. Add § 192.720 to read as follows:

§ 192.720 Distribution systems: Leak repair.

Mechanical leak repair clamps installed after January 22, 2019 may not be used as a permanent repair method for plastic pipe.

■ 27. Add § 192.756 to subpart M to read as follows:

§ 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.

■ 28. In Appendix B to Part 192, revise the appendix heading and the list under ''I.'' to read as follows:

Appendix B to Part 192—Qualification of Pipe and Components

I. List of Specifications

A. Listed Pipe Specifications

API Spec 5L—Steel pipe, ''API Specification for Line Pipe'' (incorporated by reference, *see* § 192.7).

ASTM A53/A53M—Steel pipe, ''Standard Specification for Pipe, Steel Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'' (incorporated by reference, *see* § 192.7).

ASTM A106/A–106M—Steel pipe, ''Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service'' (incorporated by reference, *see* § 192.7).

ASTM A333/A333M—Steel pipe, ''Standard Specification for Seamless and Welded Steel Pipe for Low Temperature Service'' (incorporated by reference, *see* § 192.7).

ASTM A381—Steel pipe, ''Standard Specification for Metal-Arc-Welded Steel Pipe for Use with High-Pressure Transmission Systems'' (incorporated by reference, *see* § 192.7).

ASTM A671/A671M—Steel pipe, ''Standard Specification for Electric-Fusion-Welded Pipe for Atmospheric and Lower Temperatures'' (incorporated by reference, *see* § 192.7).

ASTM A672/A672M–09—Steel pipe, ''Standard Specification for Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures'' (incorporated by reference, *see* § 192.7).

ASTM A691/A691M–09—Steel pipe, ''Standard Specification for Carbon and Alloy Steel Pipe, Electric-Fusion-Welded for High Pressure Service at High Temperatures'' (incorporated by reference, *see* § 192.7).

ASTM D2513–12ae1''Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings'' (incorporated by reference, see § 192.7).

ASTM D 2517–00—Thermosetting plastic pipe and tubing, ''Standard Specification for Reinforced Epoxy Resin Gas Pressure Pipe and Fittings'' (incorporated by reference, *see* § 192.7).

ASTM F2785–12 ''Standard Specification for Polyamide 12 Gas Pressure Pipe, Tubing, and Fittings'' (PA–12) (incorporated by reference, *see* § 192.7).

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).

ASTM F2945–12a ''Standard Specification for Polyamide 11 Gas Pressure Pipe, Tubing, and Fittings'' (PA–11) (incorporated by reference, *see* § 192.7).

B. Other Listed Specifications for Components

ASME B16.40–2008 ''Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems'' (incorporated by reference, *see* § 192.7).

ASTM D2513–12ae1''Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings'' (incorporated by reference, see § 192.7).

ASTM D 2517–00—Thermosetting plastic pipe and tubing, ''Standard Specification for Reinforced Epoxy Resin Gas Pressure Pipe and Fittings'' (incorporated by reference, *see* § 192.7).

ASTM F2785–12 ''Standard Specification for Polyamide 12 Gas Pressure Pipe, Tubing, and Fittings'' (PA–12) (incorporated by reference, *see* § 192.7).

ASTM F2945–12a ''Standard Specification for Polyamide 11 Gas Pressure Pipe, Tubing, and Fittings'' (PA–11) (incorporated by reference, *see* § 192.7).

ASTM F1055–98 (2006) ''Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing'' (incorporated by reference, *see* § 192.7).

ASTM F1924–12 ''Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing'' (incorporated by reference, *see* § 192.7).

ASTM F1948–12 ''Standard Specification for Metallic Mechanical Fittings for Use on Outside Diameter Controlled Thermoplastic Gas Distribution Pipe and Tubing'' (incorporated by reference, *see* § 192.7).

ASTM F1973–13 ''Standard Specification for Factory Assembled Anodeless Risers and Transition Fittings in Polyethylene (PE) and Polyamide 11 (PA 11) and Polyamide 12 (PA 12) Fuel Gas Distribution Systems'' (incorporated by reference, *see* § 192.7).

ASTM F 2600–09 ''Standard Specification for Electrofusion Type Polyamide-11 Fittings for Outside Diameter Controlled Polyamide-11 Pipe and Tubing'' (incorporated by reference, *see* § 192.7).

ASTM F2145–13 ''Standard Specification for Polyamide 11 (PA 11) and Polyamide 12 (PA12) Mechanical Fittings for Use on Outside Diameter Controlled Polyamide 11 and Polyamide 12 Pipe and Tubing'' (incorporated by reference, *see* § 192.7).

ASTM F2767–12 ''Specification for Electrofusion Type Polyamide-12 Fittings for Outside Diameter Controlled Polyamide-12 Pipe and Tubing for Gas Distribution'' (incorporated by reference, *see* § 192.7).

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).

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Issued in Washington, DC, on November 9, 2018, under authority delegated in 49 CFR 1.97.

Howard R. Elliott,

Administrator.

[FR Doc. 2018–24925 Filed 11–19–18; 8:45 am]

BILLING CODE 4910–60–P