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Comment on FR Doc # 2021-00890

Submitter Information

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General Comment

See attached file

Attachments

PPI Response to Regulatory Proposal - Final 04-05-21

Plastics Pipe Institute
The Voice of an Industry.

April 5, 2021

ATTN: Rulemakings and Adjudications Staff
Secretary, U.S. Nuclear Regulatory Commission,
Washington, DC 20555-0001

Re: Draft Regulatory Guides DG-1366 and the Proposed Rule Incorporating the Final Revisions of Regulatory Guides 1.84 into 10 CFR 50.55a, Docket ID NRC–2017–0025

References:

1) Draft Regulatory Guide DG-1366, (Proposed Revision 39 of Regulatory Guide 1.84, dated January 2021), Design, Fabrication, and Materials Code Case Acceptability, ASME Section III (ADAMS Accession No. ML20120A633
2) Proposed Rule, Federal Register, Vol. 86, No. 20, pp. 7820-7838, Tuesday, February 2, 2021, 10 CFR 50, [NRC-2017-0025], RIN 3150-AJ94, Approval of American Society of Mechanical Engineers' Code Cases

Dear Secretary,

The Plastics Pipe Institute appreciates the opportunity to provide comments on the Nuclear Code Case N-886 listed in Draft Regulatory Guides DG-1366 (References 1) and the Proposed Rule to incorporate by reference Regulatory Guides 1.84 into 10 CFR 50.55a (Reference 2).

This comment is in regard to code case N-886 ***Use of Polyethylene Pipe for Class 3, Section III, Division 1*** applicable for the use of polyethylene pipe in Section III, Class 3, Division 1 in above ground applications. The NRC proposes to add conditions requiring fire protection and requiring homogenous carbon black distribution.

This comment specifically addresses the proposed latter condition of requiring homogeneous carbon black distribution "to protect from windows and delamination" with the stated rational of "condition requiring homogeneous carbon black distributiuon [sic] is needed because experiments have shown that inhomogeneous carbon black distribution can lead to windows and delamination".

This additional condition is not warranted for the following reasons:

1) North American HDPE pipe standards for polyethylene pressure pipe already include requirements for workmanship. For example, ASTM F714-21[1] requires that "*The pipe shall be homogeneous throughout and essentially uniform in color, opacity, density, and other properties".* With these types of requirements, pipe manufacturers are already accustomed to this requirement for uniformity and it is well established. These requirements have served the industry well, as evidenced by the hundreds of thousands of miles of installed polyethylene pipe. The addition of this proposed condition is therefore redundant and does not provide additional security to the installation.

[1] ASTM International. F714-21 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter. West Conshohocken, PA; ASTM International, 2021. doi: https://doi.org/10.1520/F0714-21

2) To the knowledge of this commentor, the only reference to delamination in butt fusion of polyethylene pipe is in the work of Devici *et al*.[2] in which 4 levels of windowing in pipe are correlated with the ductile yielding under applied strain of butt fusions. The significance of this observation in terms of performance of butt fusions in service has not be substantiated.
   a) To the knowledge of this commentor, no other observations of this delamination effect has been observed in the decades of related research and actual field fusions of HDPE pipe.
   b) The materials used in this study are not representative of those used in the North American piping products. Specifically, the carbon black concentrate utilized is made up of a higher concentration (40% by weight, the remainder being unspecified polyethylene) of a finer carbon black than utilized in North American production. These are important differences that are known to impact the facility in the incorporation and distribution of the carbon black during pipe production. These differences are also reasonably anticipated to modify the mechanical and rheological behavior of the poorly distributed carbon black concentrate phases in the studied samples. The results of the study in question have not been shown to be relevant to North American piping and fusion practices.

3) EPRI work on the integrity of butt fusion joints has shown that a moderate amount of windows does not impair butt joint performance:
   a) In EPRI Report[3] sample pipes, which had demonstrably different degrees of windowing, were butt fused and tested, including use of the ASTM F2634 High Speed Tensile Impact (HSTI) test[4]. The report concluded "*No windows were present in Product D, some windows were present in Product F and a high degree of windows were observed in Product E.*" and "*The HSTI test results indicated good fusion joint integrity based on the requirements outlined by ASME Code Case N-755-2. The fusion joint specimens also meet all the criteria of a good fusion as defined by the test lab.*"
   b) In EPRI Report[5] the same sample F and D pipes were fused with embedded flaws and evaluated for slow crack growth resistance using a modified ASTM F1473 PENT test[6] on coupons taken across the joint interface, containing the flaws. The report observed "*Product F (light windows) appeared to have performed better than Produce D (no windows). The reason for this difference is not known*" and concluded that "*the presence of a moderate amount of windows in Product F did not seem to have hindered its performance*".

4) The requirements of Mandatory Appendix XXVI of Section III of the ASME Code for buried piping does not include a condition for carbon black distribution. It is the understanding of this commenter

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[2] Deveci, Suleyman, Nisha Antony, Sulistiyanto Nugroho, and Birkan Eryigit. "Effect of Carbon Black Distribution on the Properties of Polyethylene Pipes Part 2: Degradation of Butt Fusion Joint Integrity." Polymer Degradation and Stability 162 (2019): 138–47. https://doi.org/10.1016/j.polymdegradstab.2019.02.015.

[3] Pennsylvania Edge Notched Tensile Resistance of High Density Polyethylene Butt Fusion Joints. EPRI, Palo Alto, CA: 2016. 3002003089.

[4] ASTM International. F2634-15 Standard Test Method for Laboratory Testing of Polyethylene (PE) Butt Fusion Joints using Tensile-Impact Method. West Conshohocken, PA; ASTM International, 2015. doi: https://doi.org/10.1520/F2634-15

[5] Slow crack Growth from Planar Flaws in High Density Polyethylene Coupon Butt Fusion Joints Under Axial Loading. EPRI, Palo Alto, CA: 2020. 3002014505

[6] ASTM International. F1473-18 Standard Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins. West Conshohocken, PA; ASTM International, 2018. doi: https://doi.org/10.1520/F1473-18

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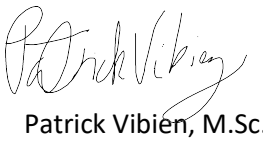
that this was previously considered and extensively discussed and was determined to not be required. N-886 does not provide a technical rational for why this condition should now be applicable to above ground applications.

Additionally, the evaluation method and acceptance criteria for sufficiently homogenized has not been defined or elsewhere in the ASME code so conformance with the proposed condition cannot be demonstrated.

It is of the opinion of this commentor that this condition is not justified and should not be included.

I sincerely appreciate the opportunity to provide comment on this proposal.

Sincerely,



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