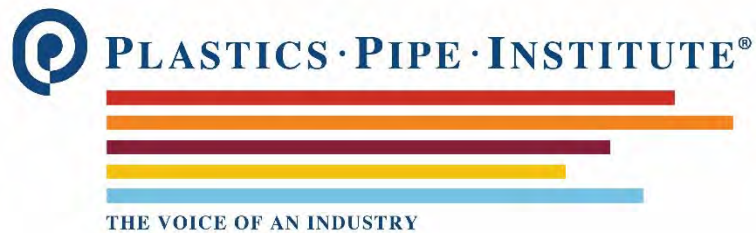


**Project: Policy for Colorant
Changes in PEX
Pipe/Compounds
HSB-N1/2018**



FOREWORD

This technical note was developed and published with the financial support and technical assistance of the members of the PPI (Plastics Pipe Institute, Inc.). The members have shown their interest in quality products by assisting independent standards-making and user organizations in the development of standards, and also by developing notes on an industry-wide basis to help engineers, code officials, specifying groups, and users.

The principal contributors to this technical note were PPI's Hydrostatic Stress Board (the HSB). The HSB is an independent arm of the PPI composed of industry recognized experts knowledgeable in all aspects of hydrostatic testing and performance and the long-term strengths of thermoplastic piping materials. Membership on the HSB represents all facets of the thermoplastics pipe community including polyethylene, polypropylene, PVC, PEX, composite piping products and others as necessitated by current industry practice.

The purpose of this technical note is to provide important information regarding actions and recommendations taken by the Hydrostatic Stress Board in qualifying polyethylene pipe compounds for the application of a 0.63 design factor. Information provided herein includes the final decision of the Hydrostatic Stress Board, a summary and discussion of the research undertaken that resulted in the 0.63 recommendation and a brief history on the origin of the 0.50 design factor and how the 0.63 design factor relates to it.

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The Plastics Pipe Institute

www.plasticpipe.org

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HSB-N1/2018

Review Project: Policy for Colorant Changes in PEX Pipe/Compounds

Purpose

The Polyolefin Committee of the Plastics Pipe Institute Hydrostatic Stress Board (PPI HSB) initiated a project to review and revise, as applicable, PPI TR-3 policy governing colorant changes in PEX pipe and/or compounds with respect to their Long Term Hydrostatic Strength (LTHS) and Hydrostatic Design Basis (HDB).

Background

Current policy regarding colorant changes in PEX pipe/compounds in PPI TR-3 Part G.2.2 refers the reader to Part D.1, which is general policy for colorant changes to all pipes/compounds. This has been the policy for PEX since it was introduced into PPI TR-3 in the late 1990's based on technical rationale as a polyethylene based compound. The suitability of current policy has been discussed and comments considered about PEX materials being less susceptible to changes in LTHS when colorant changes were made. It had also been noted that deviations to PPI TR-3 Part D.1 had been allowed in the past based on technical rationale about what constitutes a change to a colorant. As an example, addition of less than 0.5 phr colorant to a natural (unpigmented) PEX had been accepted without any additional LTHS testing.

As part of its due diligence process to keep PPI TR-3 policy updated with current technology and knowledge, the Polyolefin Committee (POC) of the Hydrostatic Stress Board (HSB) initiated a project and formed a Task Group (TG) to review this. In order to gather data, the TG requested the assistance of the Building & Construction Division (BCD) of PPI, who asked its members to voluntarily submit LTHS data of colored PEX material to the Chairman of the HSB, who would codify it in order to protect confidentiality. The information requested included test temperature, 100,000 hour intercept (LTHS), data set level (i.e. E-16), type of PEX and pigment(s) used.

Observations and Discussion (from TG)

Although a small group of BCD members submitted data, there were 12 data sets for pigmented materials. Lower Confidence Level values were provided by some participants. Data submitted did not include any PEX-a materials. BCD members producing PEX-a pipes do not add any colorants to their base material. If color is required they achieve this by co-extruding an outer colored layer over the natural PEX-a.

The TG agreed there were no alarming trends seen in the data provided. Specifically, none of the colorant changes/substitutions resulted in 100,000 hour intercepts low enough to change the categorized HDB of a material.

One data set showed a significant enough increase in the LTHS by the addition of carbon black to result in a higher categorized HDB at 73°F. It was suggested this could be due to the reinforcing properties of carbon black, however two other data sets using carbon black did not show similar results to support the theory.

Two data sets showed lower intercept values relative to others. These materials contained a blue pigment known for affecting properties of polyethylene based materials. However, the changes did not result in a lower categorized HDB and the statistical significance of the results was low.

Data submitted did include material using organic and inorganic pigments, but it was limited and inconclusive.

Conclusions/Recommendations

The Task Group agreed the provided data does not cause concerns about currently listed products and their determined HDB values. It was also agreed, the limited data did not support changes in the current policy in PPI TR-3 Part G.2.2 which references Part D.1. Making no changes to the current policy may be a conservative position for PEX, but technically correct based on data provided.

From the task group's work, the PPI HSB

1. is working to clarify the zero colorant lower limit in PPI TR-3 Part D.1.
2. is working to clarify the classification of carbon black as an inorganic or organic colorant within the PPI TR-3 policies.
3. is considering adding a note regarding the use of inorganic pigments with residual metals and their potential to accelerate oxidation of the polymers.