

Mechanical Couplings for Joining Polyethylene Pipe TN-45/2012

Foreword

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The purpose of this technical report is to provide important information available to PPI on a particular aspect of polyethylene pipe butt fusion to engineers, users, contractors, code officials, and other interested parties. More detailed information on its purpose and use is provided in the document itself.

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MECHANICAL COUPLINGS FOR JOINING POLYETHYLENE PIPE

1.0 Introduction

The use of polyethylene piping material has steadily increased over the past half century and today it's the material of choice for natural gas piping systems up to 12" size. Mechanical couplings and fittings played a vital part in this evolution, especially in the earlier years, when distribution service line installations were the most common application. Many of these mechanical fittings were metallic and connected to steel or cast iron main piping with a PE outlet connection for the service line. Both plastic and metallic mechanical fittings have provided the industry with fast and easy pipe joining, and repair and transition techniques. Their nearly 50 years of performance history is testimonial to the safe and reliable service these fittings provide.

This document will provide a historical time line to assist material engineers, when assessing older PE systems, and to determine what the governing requirements were for mechanical fittings at the time of their installations. It will also review the specified regulatory requirements for mechanical pipe joints, both in general terms and how they should be interpreted for mechanical joints for PE piping.

An outline of recommended mechanical fitting performance capabilities will be provided to assist material engineers in product selection. It includes any ASTM Test Methods or Standard Specifications available to provide guidance in how to evaluate the performance capability of mechanical fittings.

Some of the most common types of mechanical fittings will generically be described. Some mechanical fitting designs are proprietary to a specific manufacturer. Use recommendations and compliance to regulations should be reviewed with the fitting manufacturer prior to installation. Mechanical fittings do not require highly skilled laborers and typically do not require special equipment to be installed. With each design, it is essential that the manufacturer's installation instructions are followed to obtain optimum performance.

2.0 Definition/Designs

There are primarily five different mechanical coupling designs or technologies for joining PE currently in use in North America. All require the use of an internal stiffener when used with PE pipe to prevent long-term creep of the pipe away from the compression forces. These designs can be classified by the method used for completion. These are:

- Tightening of bolts and nuts
- Tightening of compression nut (also referred to as "nut follower").
- Stab or insertion style
- Hydraulic pressure
- Use of an external compression or "completion" ring