

General Guidelines for Butt, Saddle, and Socket Fusion of Unlike Polyethylene Pipes and Fittings

TN-13/2007



105 Decker Court, Suite 825, Irving, TX 75062 P: 469-499-1044 F: 469-499-1063
www.plasticpipe.org

GENERAL GUIDELINES FOR BUTT, SADDLE AND SOCKET FUSION OF UNLIKE POLYETHYLENE PIPES AND FITTINGS

FOREWORD

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

This technical note has been prepared to provide those responsible for the joining of polyethylene (PE) piping for fuel gas and other applications with suggested general guidelines for the heat fusion of components made from PE's that exhibit unlike (i.e., significantly different) melt flow properties. These guidelines constitute a set of basic operations that have been demonstrated by test and experience to produce satisfactory joints with commercially available materials. Upon this framework may be developed the specific procedures for the joining of a particular combination of unlike PE piping products. Each specific procedure must be acceptable to, and qualified by, the operator having legal responsibility for the performance of the piping system.

These guidelines are intended only for making heat fusion joints with unlike materials under specific conditions. It is recommended that there be no indiscriminate mixing in a PE piping system of components made from unlike materials.

The Plastics Pipe Institute, Inc. has prepared this technical note as a service to the industry. The information in this note is offered in good faith and believed to be accurate at the time of its preparation, but is offered without any warranty, express or implied. Additional information may be needed in some areas, especially with regard to unusual or special applications. Consult the manufacturer or material supplier for more detailed information. A list of member manufacturers is available from PPI. PPI does not endorse the proprietary products or processes of any manufacturer, and assumes no responsibility for compliance with applicable laws and regulations.

PPI intends to revise this report from time to time, in response to comments and suggestions from users of this note. Please send suggestions for improvements to PPI. Information on other publications can be obtained by contacting PPI directly or visiting the web site.

The Plastics Pipe Institute, Inc.
(469) 499-1044
www.plasticpipe.org

This technical note was first issued in January 1981 and was revised in October 1989, June 2001, and June 2007.

GENERAL GUIDELINES FOR BUTT, SADDLE AND SOCKET FUSION OF UNLIKE POLYETHYLENE PIPES AND FITTINGS

1.0 INTRODUCTION

On occasion it may be necessary for an installer of a polyethylene (PE) piping system to heat fuse to each other piping components that are made from unlike PE materials. Recognizing this, the Plastics Pipe Institute first issued in April of 1974 Statement E, "Criteria for Joining Various Polyethylene Materials to One Another by Heat Fusion Techniques", which includes some general guidelines for this operation. Since the publishing of this statement, additional laboratory and field evaluations have been conducted by PPI members and independent testing laboratories, and new information has become available from the literature and other sources.

Upon this background have been developed the general guidelines presented in this technical note. These should be useful in establishing the procedures for the heat fusion joining of specific combinations of unlike PE materials.

In its previously issued Statement E the Plastics Pipe Institute warned that "indiscriminate mixing without consideration of inherent differences between polyethylenes can produce faulty joints subject to failure in service". PPI continues to hold to this position against indiscriminate mixing.

If the application is for butt fusion of gas distribution pipe, refer to TR - 33, "Generic Butt Fusion Joining Procedure for Polyethylene Gas Pipe". In general, if the materials to be butt fused meet ASTM D2513 and have a melt index between 0.05 and 0.25 g/10 min inclusive, the generic procedure defined in TR - 33 apply. This melt index range represents the melt index extremes of the polyethylene materials that were joined and evaluated in the development of TR-33. The procedure defined in TR-33 may apply to materials with melt indices outside of this range, but appropriate testing would be required to determine the applicability of TR-33 to these materials.

A number of PPI member manufacturers made successful fusions between the various manufacturers products using the TR-33 generic procedure then tested the fusions per DOT requirements. The manufacturers then prepared letters of endorsement that identify the combinations of products that were successfully fused using the TR-33 generic procedure, and tested under DOT requirements. The manufacturer's letters of endorsement are published in Appendix B of TR-33 for gas piping applications, and Appendix C for municipal and industrial applications. TR-33 also states, "The results further indicate that there is strong likelihood that the generic fusion procedure used in this testing (see Appendix A) could be qualified by gas pipeline operators under DOT's regulations in Part 192 for use with most of these PE piping products."

Current United States and Canadian PE 2406 and PE 3408 gas pipe materials fall in the 0.05 to 0.25 g/10 min range used in TR-33. Materials no longer commercially available, but which may be encountered in the ground for extension and/or service connections, such as Driscopipe 8000, 8600, and DuPont/Uponor Aldyl A, fall outside of the TR-33