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Standard Practice for Flaring Polyolefin Pipe and Tubing¹

This standard is issued under the fixed designation D 3140; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This practice covers general procedures for flaring polyolefin pipe and tubing for use in flare nut joints and fittings such as AWWA and other standard flare fittings. Pipe producers, fitting and tool manufacturers' instructions and recommendations should be consulted in all applications.

1.2 The techniques covered are applicable only to the flaring of polyolefin pipe and tubing products that are specifically recommended for such flaring by the pipe or tubing manufacturer.

1.3 The values stated in inch-pound units are to be regarded as standard. The values shown in parentheses are for information only.

1.4 *This standard does not purport to address the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Significance and Use

2.1 The techniques described herein can be used in conjunction with the tool manufacturers' specific recommendations to produce properly made flares in polyolefin pipe and tubing which in assembly with an appropriate flare fitting, will make a strong pressure-tight joint, whether made in shop operations or in the field. Some skill and knowledge on the part of the operator is required to make a proper flare and joint. This skill can be obtained by practicing under the guidance of an operator experienced in the techniques or by following the instructions furnished by the manufacturers.

3. Classification

3.1 Two methods of flaring are covered in this practice as follows:

3.1.1 *Cone Flaring*, normally requiring the application of heat from an external source to soften the plastic for forming.

3.1.2 *Spin Flaring*, not requiring an external source of heat since mechanical flexing of the plastic material produces substantial frictional heating.

3.1.2.1 Example: One or more tool projections are rotated and fed into the end of the pipe causing repeated mechanical flexing of the pipe wall and expanding it until the desired flare diameter has been obtained.

3.2 Two types of flare are covered in this practice as follows:

3.2.1 *External Flares*, consisting of the conventional flare made outside the flare nut and later pulled into the flare nut seat prior to assembly and makeup of the flare joint.

3.2.2 *Internal Flares*, characterized by the fact that the flare is formed within the flare nut in such a way that the rim of the flare is captive in a nut recess, preventing axial movement once the flare is completed.

4. End Preparation

4.1 The end of the pipe or tubing to be flared shall be cut off clean and square to the axis, preferably with a pipe or tubing cutter equipped with a sharp-edge wheel specially made for cutting polyolefin pipe or tubing. No cuts, scratches, dirt, or surface damage to either inside diameter or outside diameter are permitted on the pipe end to be flared.

5. Methods

5.1 Cone Flaring:

5.1.1 *External Flare*—After the pipe or tubing end has been prepared for flaring in accordance with section 4, the appropriate flare nut shall be slipped over the end of the pipe or tubing. Heat shall be applied indirectly to the outside of the pipe or tubing from a suitable source of heat, provided that no open flame is allowed to impinge on the plastic material. The plastic shall not be permitted to smoke or ignite. The heat source shall be moved about the circumference with a constant motion to prevent local overheating and promote uniform heating. When the outer end of the pipe begins to curl and the heated surface appears to sweat, the heat source is removed and a flaring tool specifically designed for the purpose is immediately applied to form the flare while the pipe is hot. The finished flare, after cooling and the tool has been removed, shall be of a diameter slightly larger (0.8 to 1.6 mm ($1/32$ to $1/16$ in.)) than the diameter of the flare nut threads, requiring some force to be pulled into the flare nut seat. Since the finished flare diameter is directly dependent upon the amount of tool travel and material allowance, only tools that provide means for controlling the flare diameter shall be used. The force requirement in pulling the flare into the flare nut indicates that the flare diameter is adequate for a tight secure joint.

5.1.2 *Internal Flare*—After the pipe or tubing end has been prepared for flaring, in accordance with Section 4, the appropriate flare nut shall be slipped over the end of the pipe or tubing. Heat shall be applied indirectly to the outside of the pipe or tubing from a suitable source of heat, provided that no open flame is allowed to impinge on the plastic material. The plastic shall not be permitted to smoke or ignite. The heat source shall be moved about the circumference with a constant motion to prevent local overheating and promote uniform heating. When the outer end of the pipe

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