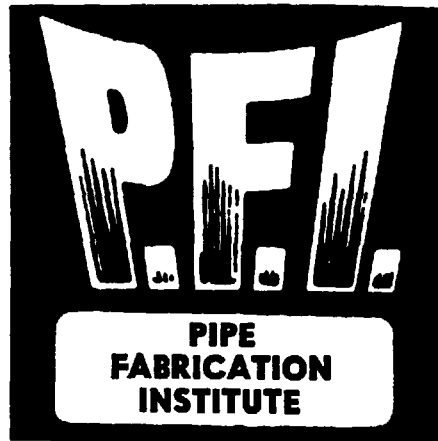


NONSYMMETRICAL BEVELS AND JOINT CONFIGURATIONS FOR BUTT WELDS

Prepared by
Pipe Fabrication Institute Engineering Committee



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METRIC CONVERSIONS

The conversion of quantities between systems of units involves a determination of the number of significant digits to be retained. All conversions depend upon the intended precision of the original quantity and are rounded to the appropriate accuracy.

Pipe sizes together with applicable wall thicknesses are not shown with metric equivalents.

The SI (metric) values were included with the customary U.S. values in this Standard are the rounded equivalents of the U.S. values and are for reference only.

Metric units were derived utilizing the following conversion factor.

Conversion	Factor
inches to millimeter	25.4

1. Scope

- 1.1 This Standard covers the end preparation of non-symmetrical bevels and joint configurations for butt welds in piping systems.

2. Joint Design

- 2.1 In establishing a joint design, the basic aim is to assure accessibility of the welding electrode in the joint so that full penetration in the weld may be achieved. Restricted access results in failure to achieve full penetration and leaves unjoined surfaces. Access greater than that required to achieve full penetration requires more filler metal and creates higher costs because more consumables and labor are required to deposit the extra filler metal.

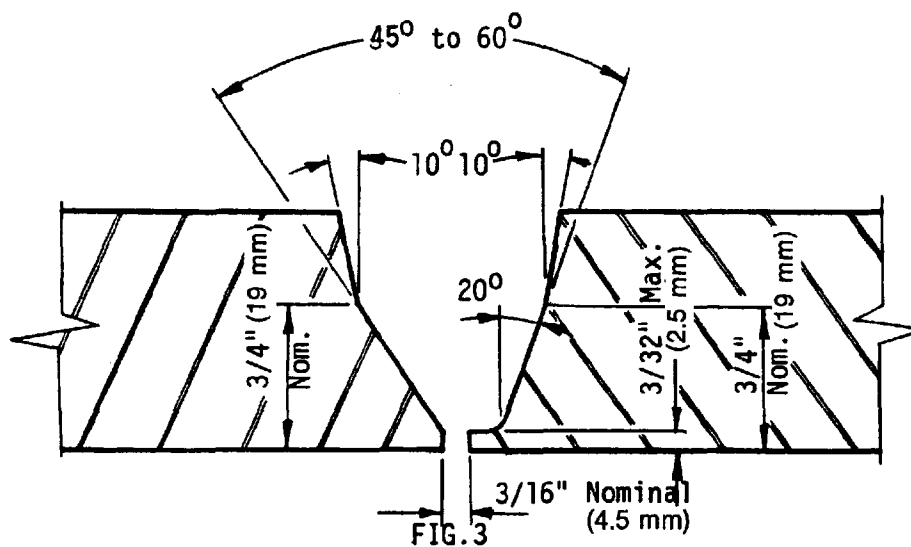
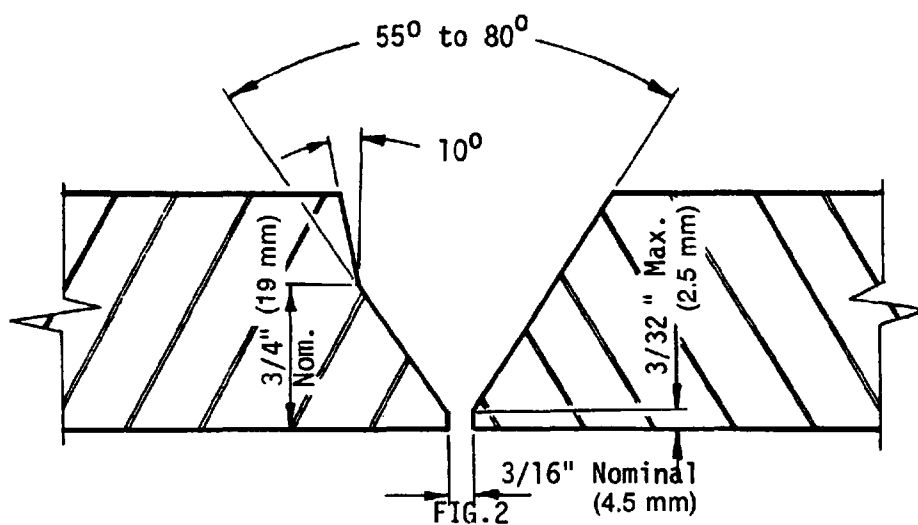
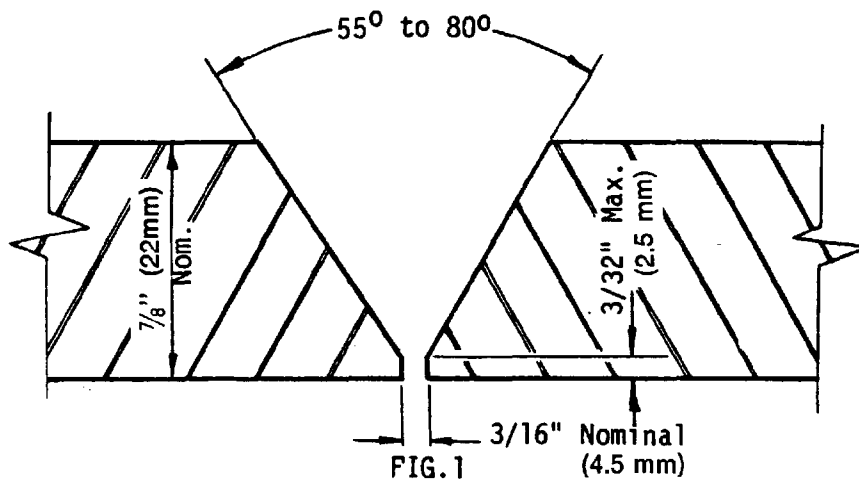
3. Joint Configuration

- 3.1 Piping components, such as fittings and flanges, are normally furnished with a mill bevel of $37\frac{1}{2}$ degrees in wall thickness of $\frac{7}{8}$ " (22mm) or less (see Fig. 1) and a compound bevel of $37\frac{1}{2}$ — 10 degrees in wall thickness greater than $\frac{7}{8}$ " (22mm) (see Fig. 2). However, beveled pipe from the mill is usually furnished with a 30 degree bevel.

- 3.2 The end preparation as shown in the WPS is considered to be a non-essential variable by the ASME Boiler and Pressure Vessel Code, Section IX. Therefore, dimensions shown in Figures 1, 2 and 3 may be modified to suit the joint configuration and the selected welding process. The adjacent weld bevels need not be symmetrical about the joint centerline.

4. General Comments

- 4.1 This Standard is intended to primarily cover the following welding processes, used individually or in combination:
- GMAW — Gas Metal Arc Welding (M.I.G.)
 - FCAW — Flux Core Arc Welding
 - SMAW — Shielded Metal Arc Welding (Stick Rod)
 - SAW — Submerged Arc Welding
 - GTAW — Gas Tungsten Arc Welding (T.I.G.)
- 4.2 For additional information on joints utilizing solid machined backing rings, refer to PFI Standard ES-1.
- 4.3 For additional information on joints prepared for GTAW of the root pass, refer to PFI Standard ES-21.
- 4.4 Asymetric joints shown in this standard may be used in conjunction with PFI standards ES-1 and ES-21.



Notes

1. A flat split backing ring may be used if the Welding Procedure permits.
2. For some Welding Processes the root face may be feather edge.

A current index of the latest revised ES Standards and Technical Bulletins is available from the Pipe Fabrication Institute.

PFI Standards and Technical Bulletins are published to serve proven needs of the pipe fabricating industry at the design level and in actual shop operations. Hence, such needs are continually considered and reviewed by the Engineering Committee of the Pipe Fabrication Institute to provide recommended procedures which have been demonstrated by collective experiences to fulfill requirements in a manner for Code compliance. However, as the PFI Standards are for minimum requirements the designer or fabricator always has the option of specifying supplementary conditions in the form of requirements beyond the scope of the PFI publications.