



Designation: F145 – 72 (Reapproved 2023)

Standard Practice for Evaluating Flat-Faced Gasketed Joint Assemblies¹

This standard is issued under the fixed designation F145; 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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice permits measurement of gasket compression resulting from bolt loading on a flat-face joint assembly at ambient conditions.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E171 Practice for Conditioning and Testing Flexible Barrier Packaging

3. Summary of Practice

3.1 The gasket compression and flange distortion are obtained from compressed-thickness measurements on cylindrically shaped soft-solder plugs (50-50 lead-tin by weight) inserted into holes, drilled or punched through the gasket in the thickness direction. Initial compression is accomplished in the flanged-joint assembly when the bolts are loaded at ambient temperature. Solder, being inelastic, will remain at the compressed thickness of the gasket after the joint is subsequently disassembled.

¹ This practice is under the jurisdiction of ASTM Committee F03 on Gaskets and is the direct responsibility of Subcommittee F03.20 on Mechanical Test Methods.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4. Significance and Use

4.1 Gasket compressions produced by bolt loads in a flanged joint are important in the application engineering of a joint assembly. They are related to the ability of a gasket to seal, to maintain tightness on assembly bolts, and to a variety of other gasket properties that determine the service behavior of a joint assembly. Thus, being able to determine the degree of compression in a gasket under the bolt loading will permit one to make qualitative predictions of the behavior of a joint assembly when it comes in contact with the application or service environment. With the plug test, bending of a flange facing between bolt centers can be measured; however, in a few highly distortable flanges the maximum bending between bolt centers may not be detected.

4.2 The variation in gasket compressions at selected points in a flat-face joint assembly reveals the degree of flange distortion or the ability of the flange to distribute satisfactorily the compressive forces from bolt loads throughout the gasket.

5. Apparatus (see Fig. 1)

5.1 *Test Assembly*, any flat-face flange design.

5.2 *Torque Indicating Device*, for bolt loading.

5.3 *Dial Gage Indicator*, graduated in 0.00254 mm (0.0001 in.) to measure thickness of the solder plugs and the uncompressed gasket.

5.4 *Leather Punch*, for punching holes in the gasket and fabricating the solder plugs.

5.5 *Tweezers*, to conveniently handle the solder plugs.

5.6 *Solder Plugs*—The solder must be made into a flat strip. This can be done by compressing wire in a vise, a pair of flanges, pliers, or passing it between two calender rolls. The solder plugs are punched from the strip by means of the leather punch. Recommended plug diameter is 0.8 mm ($\frac{1}{32}$ in.) and the height need only be such that the plug is compressed by the flanges when the gasket is also compressed. The initial thickness of the plug and gasket before compression need not be equal.

6. Test Specimens

6.1 Three gasket specimens shall be tested. The size and shape of the specimens must be such as to fit the particular flange design.