

GUIDELINES FOR CALCULATING FACTORED WELD DIAMETER INCHES FOR PROJECT REPORTING

Prepared by
Pipe Fabrication Institute Engineering Committee



All PFI Standards are advisory only. There is no agreement to adhere to any PFI Standard and their use by anyone is entirely voluntary.

Copyright by
PIPE FABRICATION INSTITUTE

*Dedicated to Technical Advancements and Standardization in
the Pipe Fabrication Industry
Since 1913*

USA
5901 Coastal Hwy #27
Ocean City MD 21842

CANADA
200-3633 Blvd Des Sources
D.D.O QC Canada H9B-2K4

WEB SITE
www.pfi-institute.org

Denotes revision
April 2021

1. SCOPE

This Technical Bulletin presents a suggested method of determining “Factored Diameter Inches” that can be consistently applied for pipe spool fabrication to measure job progress.

2. PURPOSE

This standard establishes a method for calculating Diameter Inches that considers material type, wall thickness and weld type. Diameter Inches calculated using the factors provided in this standard, result in Factored Diameter Inches, (FDI), that more accurately represent the effort required to complete the fabrication. Factored Dia. Inches will provide a consistent benchmark for determining the progress of pipe fabrication for any project utilizing single or multiple fabrication shops, or when projecting the effort required to complete fabrication for future projects based on past projects. The user is cautioned that these factors are arbitrary. These Factored Diameter Inches are provided as a convenient depiction of relative effort between weld characteristics. The application of this Technical Bulletin is the responsibility of the user and should be agreed upon before the fabrication project starts. The PFI accepts no responsibility for the application of these Factors or consequences of that application.

3. APPLICATION

3.1 The following criteria are not considered in Factored Diameter Inches

- Non Standard weld end preparations.
- Welding Process restrictions.
- Customer specification requirements
- Special processes such as PWHT and painting
- NDE

3.2 REFERENCES

- ASME, Section IX Welding, Brazing and Fusing Qualifications – QW/QB -422.
- ASME B16.25 Buttwelding Ends
- ASME B36.10 Pipe Schedule

- ASME B36.19 Stainless Steel Pipe

3.3 DEFINITION

- IRBC: Integrally Reinforced Branch Connection (MSS SP-97)

4. CALCULATION

4.1 The Factored Diameter Inch formula takes into account four characteristics of a pipe weld.

- Material Type - **REFERENCE TABLE A**
- Pipe Diameter – Nominal Pipe Size “NPS”. –**REFERENCE TABLE B**
- Pipe Diameter – Nominal Pipe Size (SS) ASME B36.19 **REFERENCE TABLE C**
- Pipe wall thickness - –**REFERENCE TABLE D**
- Weld Type – **REFERENCE TABLE E**

4.2 FORMULA FOR FDI CALCULATION

**Nominal Pipe Size (NPS) x
Wall Factor x Material Factor
x Weld Type Factor**

Denotes revision
April 2021

Butt Weld Example #1:



(1)-4" Pipe Standard Wall (.237) weld, Grade
A106 Gr B

NPS –4"

Wall – Factor 1.0

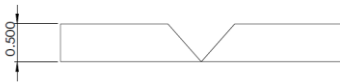
Material Factor – P1 = Factor of 1.0

Weld Type Factor = 1.0

Calculation:

$$4 \times 1 \times 1 \times 1 = \mathbf{4 \text{ Factored Diameter Inches (4 FDI)}}$$

Butt Weld Example #2:



(1)- 12" Pipe XS Wall (.500") weld, Grade A358
(304SS)

NPS –12"

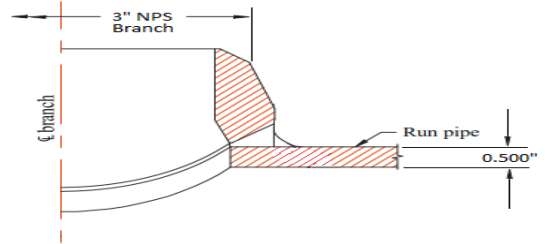
Wall – Factor 1.2

Material Factor – P8 = Factor of 2.0

Weld Type Factor = 1.0

Calculation: $12 \times 1.2 \times 2 \times 1 = 28.8$ **Factored Diameter Inches (28.8 FDI)**

Branch Weld Example #3



(1)- 12" Pipe XS Wall (.500") Header, Grade
A358 (304SS)

NPS –3" IRBC

Wall – Factor 1.2 (header)

Material Factor – P8 = Factor of 2.0

Weld Type Factor – 4.0 (IRBC)

Calculation:

$$3 \times 1.2 \times 2 \times 4 = 28.8 \text{ **Factored Diameter Inches (28.8 FDI)**}$$

5. DOCUMENTATION/TRACKING

Documentation / tracking program must be established prior to starting the project with the client to quantify the overall scope into a FDI metric.

This guideline may already be specified in the contract and may require additional metrics to suit the project deliverables.