



Engineering Specification for Weld Callouts

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1. PURPOSE

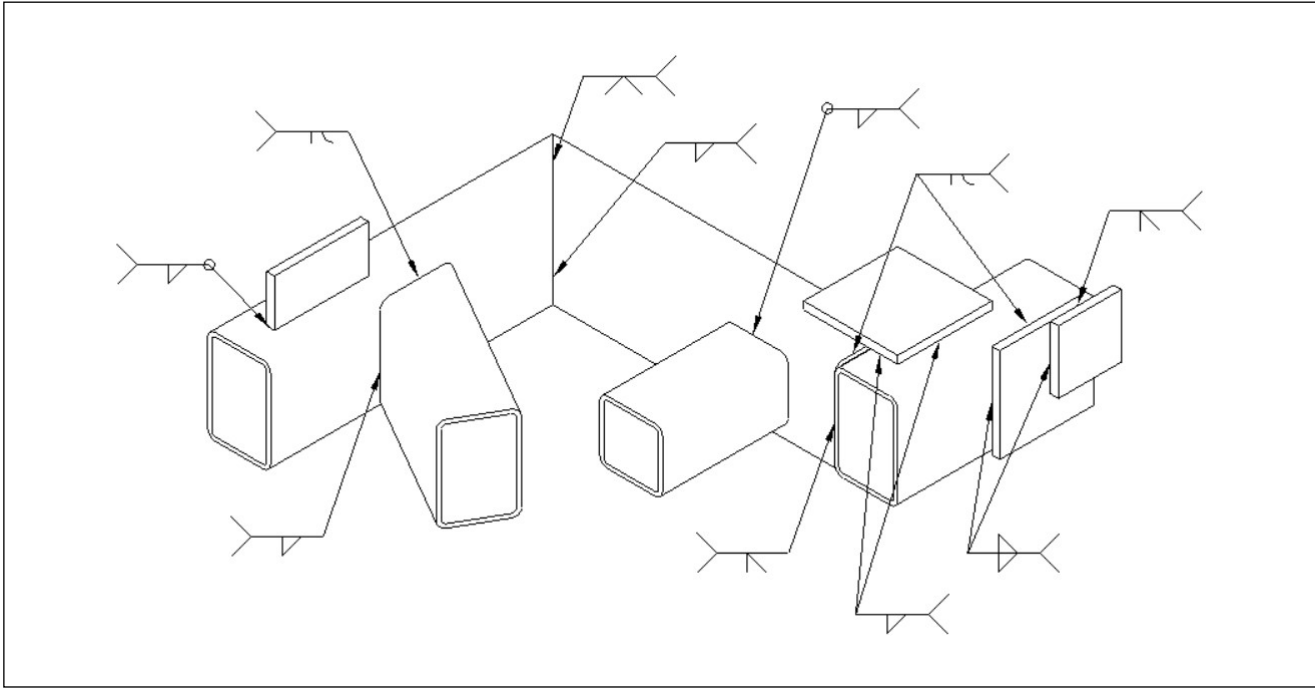
The objective of this specification is to ensure welds of proper quality, and to ensure the safety, quality and serviceability of the product without increasing cost or fabrication time.

This specification is not a quality control standard or intended to replace welding, safety & health regulations, nor does it replace the welding requirements stated on the 'issued for fabrication shop' or 'part' drawings.

2. 2D WELD SYMBOLS

2.1. Drawing Callout for Weld Symbols

2.1.1. General Weld Schematic



Note: Symbols shown above are typical for all welded joints of similar construction unless otherwise specified.

3. GENERAL WELD SIZE REQUIREMENTS AND STRESS RELIEF

3.1. General Welding Steel

- All welds shall be in accordance with AWS D1.1.
- 100% weld required on weldments, where accessible, unless otherwise specified.
- Stress relieve per AWS D1.1 when specified on the drawing or PO.

3.2. General Welding Aluminum

- All welds shall be in accordance with AWS D1.2.
- 100% weld required on weldments, where accessible, unless otherwise specified.
- Stress relieve per AWS D1.2 when specified on the drawing or PO.

3.3. Minimum Weld Sizes for Fillet Welds

Base Metal Thickness (T) in Inches	Minimum Size of Fillet Weld (see Note 1)
$T \leq 0.250$ in	1/8 in (see Note 2)
$0.250 \text{ in} < T \leq 0.500$ in	3/16 in
$0.500 \text{ in} < T \leq 0.750$ in	1/4 in
$0.750 \text{ in} < T$	5/16 in

Data above from AWS D1.1, Table 7.7

Note:

1. Except that the weld size need not exceed the thickness of the thinner part joined.
2. Minimum size for cyclically loaded structures shall be .1875in

3.4. Minimum Weld Sizes for Groove Welds

Groove / Bevel angle (θ): $45^\circ \geq \theta \leq 60^\circ$

Base Metal Thickness (T) in Inches	Minimum Size of Groove/Bevel Weld
$0.250 \text{ in} < T \leq 0.500$ in	3/16 in
$0.500 \text{ in} < T \leq 0.750$ in	1/4 in
$0.750 \text{ in} < T \leq 1.50$ in	5/16 in
$1.50 \text{ in} < T \leq 2.25$ in	3/8 in

3.5. Intermittent Welds

- Intermittent welds are preferred for any welds over 10 inches long.
- All intermittent welds should cover 50% of total weld length unless otherwise noted.
- For decking sheets, the following intermittent welds are preferred:
 - All stitch welds on the top of decks should cover 33% of total weld length unless noted otherwise.
 - All stitch welds on the bottom of decks should cover 25% of total weld length unless noted otherwise.
- Stagger stitch welds when both sides are accessible.

4. REFERENCE WELD REQUIREMENTS

4.1. Minimum Weld Size

- Fillet weld size could not exceed the thickness of the thinner part joined.
- Minimum size for cyclically loaded structures is 3/16 in.

4.2. Intermittent Weld Length

Intermittent Weld Length and Spacing			
Continuous Weld %	Length of Weld and Distance Between Centers		
75		3 - 4	
66			4 - 6
60		3 - 5	
57			4 - 7
50	2 - 4	3 - 6	4 - 8
44			4 - 9
43		3 - 7	
40	2 - 5		4 - 10
37		3 - 8	
33		3 - 9	4 - 12
30		3 - 10	
25	2 - 8	3 - 12	
20	2 - 10		
16	2 - 12		

Table from "Design of Weldments" by Blodgett

4.3. Reference Weld Symbols

Basic Welding Symbols and Their Location Significance								
Location Significance	Fillet	Plug or Slot	Spot or Projection	Stud	Seam	Back or Backing	Surfacing	Edge
Arrow Side								
Other Side				Not Used			Not Used	
Both Sides		Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	
No Arrow Side or Other Side Significance	Not Used	Not Used		Not Used		Not Used	Not Used	Not Used
Location Significance	Groove							Scarf for Brazed Joint
	Square	V	Bevel	U	J	Flare-V	Flare-Bevel	
Arrow Side								
Other Side								
Both Sides								
No Arrow Side or Other Side Significance		Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used

Supplementary Symbols				Location of Elements of a Welding Symbol			
Weld-All-Around	Field Weld	Mel-Thru	Consumable Insert				
Backing/Spacer (Rectangular)		Contour					
		Flush or Flat	Convex				
Basic Joints				<p>Depth of Bevel; Size or Strength for Certain Welds</p> <p>Specification, Process, or Other Reference</p> <p>Weld Symbol</p> <p>Elements in This Area Remain As Shown When Tail and Arrow are Reversed</p> <p>Weld Symbols Shall Be Contained Within the Length of the Reference Line</p> <p>Arrow Connecting Reference Line to Arrow Side Member of Joint or Arrow Side of Joint</p>			
Identification of Arrow Side and Other Side Joint		Letter Designations					
Butt Joint	Corner Joint						
T-Joint	Lap Joint			<p>Where letter designations are to be included in the tail of the welding symbol, reference is made to Table 1, Letter Designations of Welding and Allied Processes and Their Variations, of AWS A2.4-98.</p> <p>American Welding Society 550 N.W. LeJeune Road Miami, Florida 33126</p>			

5. REFERENCES

5.1. Reference Materials

- American Welding Society. AWS D1.1/D1.1M:2020 - Structural Welding Code—Steel, 24th Edition
- American Welding Society. AWS D1.2/D1.2M:2014 - Structural Welding Code—Aluminum, 6th Edition
- Blodgett O.W. - Design of Welded Structures – James Lincoln Welding Foundation 1966
14th printing 1991
- Blodgett O. W. - Design of Weldments - James Lincoln Welding Foundation 1963

REVISION HISTORY

Revision	Date	DCC	Comments	Approved By
08/11/2020	08/11/2020	N/A	Initial release.	Bret Miller
11/13/2020	11/13/2020	N/A	Added section 3.5 and 4.1 outlining intermittent welding. Updated reference material in section 4.	Bret Miller
0	3-6-2024	DCC0000122	General: Changed from date revision to numeric. Section 3.0: updated title to include Stress Relief. Section 3.1 and 3.2: Added requirements for stress relief.	Bret Miller