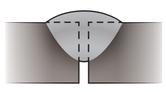
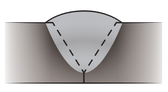
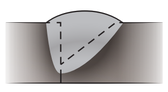
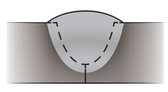
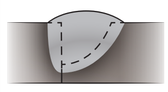
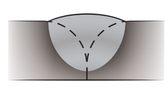
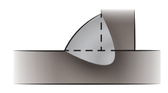
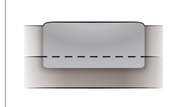
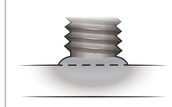
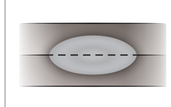
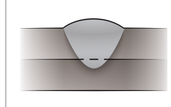
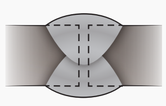
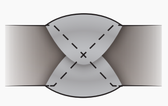
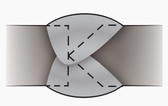
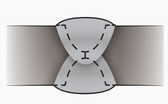
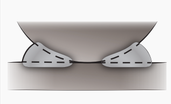
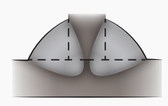
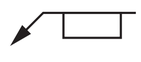
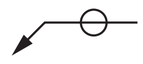
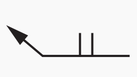
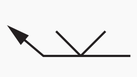
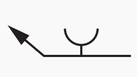
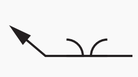
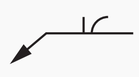
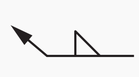
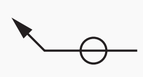
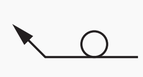
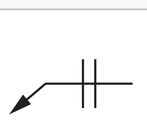
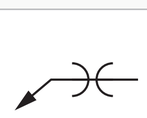
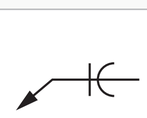
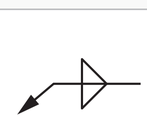
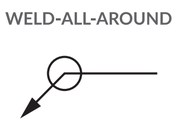
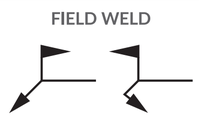
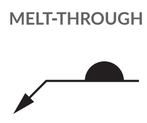
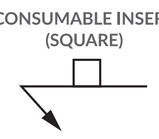
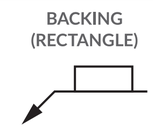
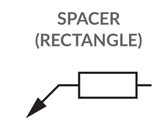
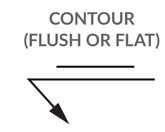
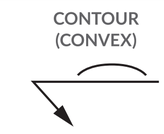
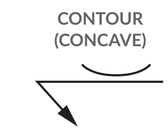
Welded Joints and Symbols

Derived from Joint Design and Symbols Course Content

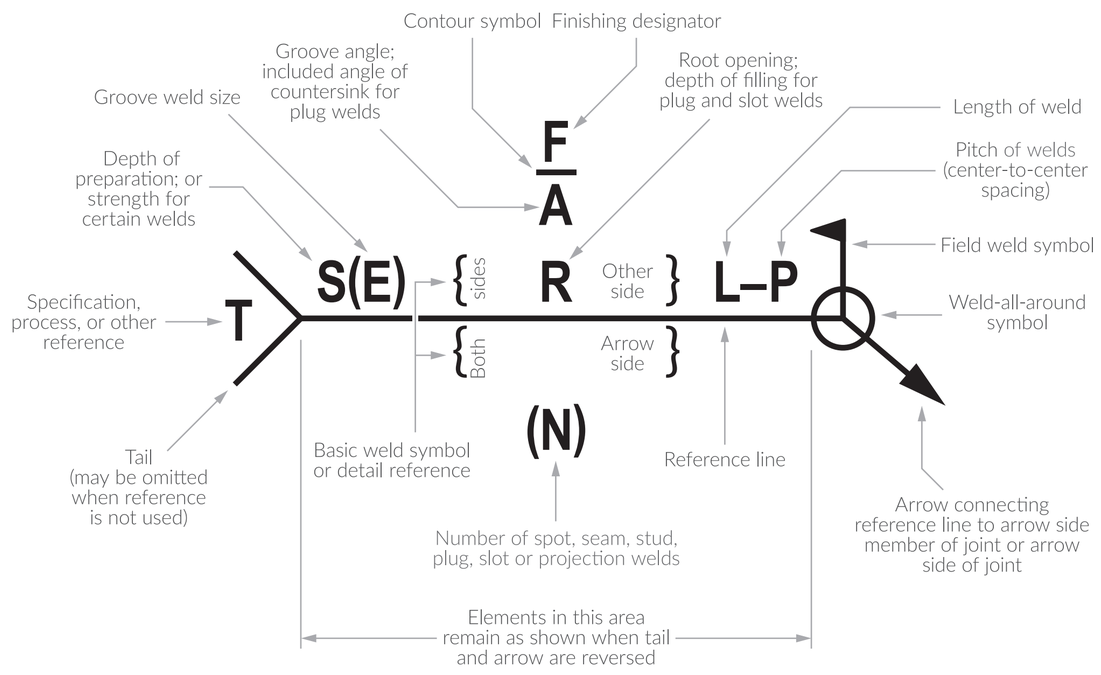
Basic Welding Symbols and Their Location Significance

	SQUARE GROOVE	V-GROOVE	BEVEL GROOVE	U-GROOVE	J-GROOVE	FLARE V-GROOVE	FLARE BEVEL GROOVE	FILLET	PLUG	SLOT	STUD	RESISTANCE SPOT	ARC SPOT
ONE SIDE													
BOTH SIDES									Not used	Not used	Not used	Not used	Not used
ARROW SIDE													
OTHER SIDE											Not used		
BOTH SIDES									Not used	Not used	Not used	Not used	Not used

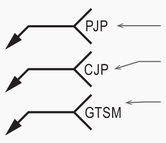
Supplementary Welding Symbols

WELD-ALL-AROUND	FIELD WELD	MELT-THROUGH	CONSUMABLE INSERT (SQUARE)	BACKING (RECTANGLE)	SPACER (RECTANGLE)	CONTOUR (FLUSH OR FLAT)	CONTOUR (CONVEX)	CONTOUR (CONCAVE)
								

Standard Location of the Elements of the Welding Symbol



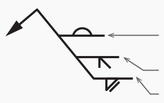
JOINT PENETRATION



- PJP — Indicates partial joint penetration groove weld*
- CJP — Indicates complete joint penetration groove weld regardless of type of weld and joint preparation*
- GTSM — Indicates gouge to sound metal

**To be used on design drawing only*

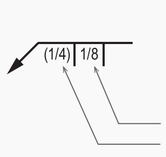
MULTIPLE REFERENCE LINES



- 1st operation shown on reference line nearest arrow
- 2nd operation or supplementary data
- 3rd operation or test information

SQUARE GROOVE WELDING SYMBOLS

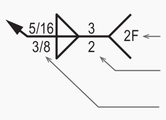
For square groove, the depth of preparation is omitted in the symbol.



Omission of groove weld size without designating the weld as "seal weld" in the tail of the symbol indicates complete joint penetration is required.

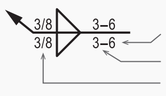
- Root opening
- Groove weld size

DOUBLE FILLET WELDING SYMBOL



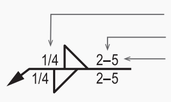
- Specification, process or other reference
- Length: omission indicates that weld extends between abrupt changes in direction or extent of dimensioning
- Fillet weld size

CHAIN INTERMITTENT FILLET WELDING SYMBOL



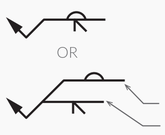
- Pitch: distance between centers of adjacent weld segments
- Length of segments
- Fillet weld size

STAGGERED INTERMITTENT FILLET WELDING SYMBOL



- Fillet weld size
- Length of segments
- Pitch: distance between centers of adjacent weld segments

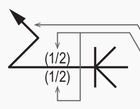
BACK-WELDING SYMBOLS



Any single groove weld with a pass from the other side with no special identification in the tail is considered a complete joint penetration groove weld with a back weld. Back welds are applied after the first side is completely welded out.

- 2nd operation
- 1st operation

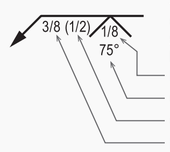
DOUBLE BEVEL GROOVE WELDING SYMBOL



Arrow makes a definite break and points toward member to be prepared

- Groove weld size

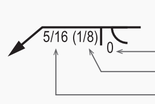
SINGLE V-GROOVE WELDING SYMBOLS



Omission of depth of preparation and groove weld size indicates complete joint penetration is required

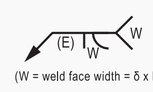
- Root opening
- Groove angle
- Groove weld size
- Depth of preparation

FLARE-BEVEL GROOVE WELDING SYMBOL



- Root opening
- Groove weld size
- Radius or curvature height

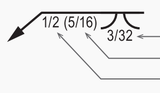
FLARE BEVEL GROOVE IN A T-JOINT FOR R>3/8 in



(E) = groove weld size

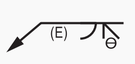
δ = 1.7 (SMAW) or 1.5 (other)

FLARE-V GROOVE WELDING SYMBOL



- Root opening
- Groove weld size
- Radius or curvature height

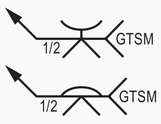
FLARE V-GROOVE IN A BUTT JOINT



(E) = groove weld size

Θ = bevel angle

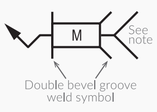
WELDING SYMBOLS FOR GROOVES WELDED FROM BOTH SIDES WITH BACK-GOUGING



Only depth of preparation is required in the welding symbol

GTSM signifies complete joint penetration

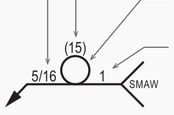
JOINT WITH SPACER



Note:

Material (M) and dimensions of spacer as specified

JOINT WITH BACKING

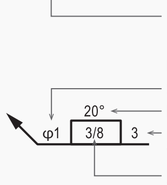


Notes:

1) Material (M) and dimension of backing as specified

2) "R" indicates backing removed after welding

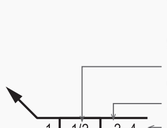
BACKING WELDING SYMBOLS



Any single groove weld with a pass from one side identified in the tail by "backing weld" is considered to be a complete joint penetration groove weld with a backing weld. This weld is to be completed first. Then the other side is to be welded.

- 2nd operation
- 1st operation

FLUSH CONTOUR SYMBOL

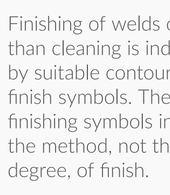


- Flush contour symbol indicates face of weld to be made approximately flush
- Grinding. When surface symbol is omitted, it indicates a weld without subsequent finishing

CONVEX CONTOUR SYMBOL

- Finish symbol (user's) standard indicates method of obtaining specified contour but no degree of finish
- Convex contour symbol indicates face of weld to be finished to convex contour by grinding

ARC SPOT WELDING SYMBOL



- Diameter of spot weld required at faying surface, instead of diameter the required shear strength per spot can be specified
- Number of spot welds
- The spot weld symbol placed above the reference line indicates that the spot weld is to be made on the "other side" and not the "arrow side" member
- **Pitch**

Notes:

1) Arc spot weld symbols can be placed above or below the reference line, depending on whether welding is to be done on the "other side" or the "arrow side" member respectively

2) The location of the first and last arc spot weld in each single line shall be specified on the drawing

STUD WELDING SYMBOL

Notes:

1) Stud weld symbol is always below the reference line

2) The location of the first and last stud weld in each single line shall be specified on the drawing

- Pitch
- Number of studs
- Diameter

PLUG WELDING SYMBOL

- Size: diameter of hole at root
- Included angle of countersink
- Pitch: distance between centers of adjacent weld segments
- Depth of filling (omission indicates filling is complete)

SLOT WELDING SYMBOL

- Depth of filling (omission indicates filling is complete)
- Slot length
- Pitch: distance between centers of adjacent weld segments
- Included angle of countersink
- Slot width

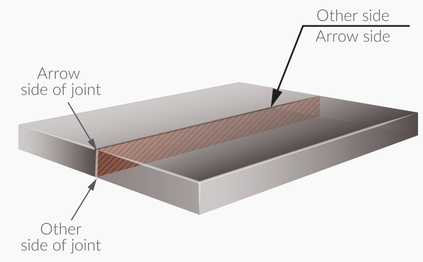
FINISHING OF WELDS

Finishing of welds other than cleaning is indicated by suitable contour and finish symbols. These finishing symbols indicate the method, not the degree, of finish.

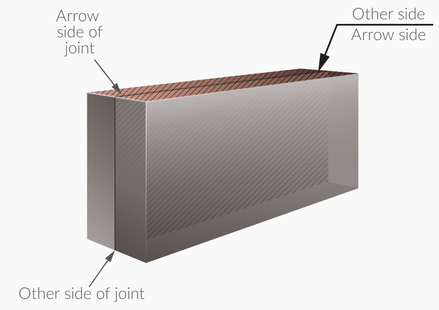
C	Chipping
G	Grinding
M	Machining
R	Rolling
H	Hammering

Basic Types of Welded Joints

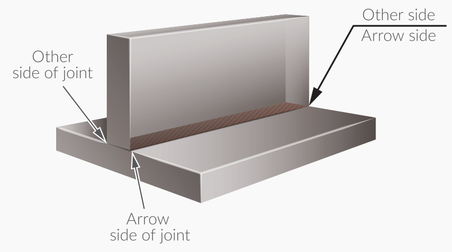
BUTT JOINT



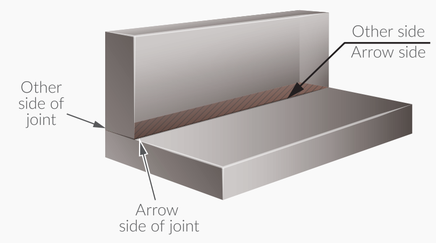
EDGE JOINT



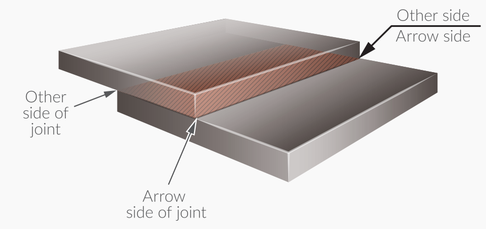
T-JOINT



CORNER JOINT



LAP JOINT



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