WELDING SYMBOLS

Read the Line Before the Symbol

Find the arrow, then identify the reference-line convention on the drawing. The examples both call for an arrow-side fillet.

System A · Solid Line Carries a5



System B · Below the Line



System	Arrow Side	Other Side
ISO 2553:2019 A	Elementary symbol on the continuous reference line.	Elementary symbol on the dashed identification line.
ISO 2553:2019 B	Elementary symbol below the single reference line.	Elementary symbol above the single reference line.
AWS A2.4:2020	Below the single reference line.	Above the line. Read the AWS dimension and supplementary conventions on AWS drawings.

Worked Reading · a5

The arrow points to the joint. In these two ISO examples, a5 specifies a nominal 5mm fillet throat on that arrow side. The arrow itself does not indicate travel direction.

Read the Tail

Where a tail is used, follow the process, procedure or note it identifies. For example, 135 identifies MAG with a solid wire under ISO 4063:2023.

ISO 2553:2019 · Reference lines

TWI · Drawing examples and side rules

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WELDING SYMBOLS

Fillet Size and Weld Extent

Size sits to the left of the elementary symbol. Length and arrangement information sits to the right in the ISO examples.

Example · Single Fillet, 3 × 40 (60)



Example · Both-Sides Fillets



Callout	What to Produce	What to Measure
a5	5mm nominal throat.	On an ideal equal-leg flat-faced fillet, z = a × √2, about 7.07mm.
z7	7mm leg.	The corresponding theoretical throat is about 4.95mm for that ideal profile. These callouts are not automatically interchangeable.
n × l (e)	Number of elements × element length, with spacing e in brackets in the ISO convention.	For a teaching example of 3 × 40 (60), weld 3 lengths of 40mm. With 60mm clear between adjacent welds, first start to final end spans 240mm.
Chain / staggered	Chain runs align on opposite sides. Staggered runs are offset from each other.	Check both sides and dimensioned start points. Do not convert one pattern to the other.

Common Misreading

A 5mm leg does not provide a 5mm theoretical throat. On an ideal 45° equal-leg fillet the theoretical throat is about 3.54mm. Use the symbol letter and correct gauge.

ISO 2553:2019 · Clause 5 dimensions

TWI · Dimensions and intermittent welds

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WELDING SYMBOLS

Chain and Staggered Intermittent Welds

Read the fillet size and intermittent dimensions on both sides of the reference line. These are System B teaching callouts.

Chain · Opposite Runs



Staggered · Z Mark



Pattern	Worked Callout	What to Mark Out
Chain · Clause 5.3.2.2	a5, 3 × 40 (60) on both sides.	Start corresponding 40mm runs at the same stations on either side. Each side has a 100mm repeat.
Staggered · Clause 5.3.2.3	Same dimensions, with Z across the reference line.	With no offset specified, place each run centre opposite a gap centre. This example gives a 50mm offset.
Ends · Clause 5.3.2.4	Read the drawing for unwelded ends.	The staggered set still needs dimensioned start and end positions. Add end welds only when called out separately.

Read the Units and Spacing Convention

For this ISO example, 60mm is the clear space between the 40mm runs. Under AWS A2.4 the pitch for that same spacing is 100mm, measured centre to centre.

ISO 2553:2019 · Clause 5.3.2

AWS A2.4:2020 · Standard and scope

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WELDING SYMBOLS

Recognise the Weld Form

Use the elementary symbol with the joint section and the dimensions. The symbol describes the weld form or preparation.

Single-V · Read the Joint Detail



Prepared Edges · Section View



Symbol Family	Joint Detail	What to Confirm
Square / single V	Square edges or both edges bevelled on one side.	For a 60° symmetrical V, each edge contributes 30°. That arithmetic example is not a default angle.
Single bevel / single J	One edge remains square. The prepared edge is straight or curved.	Read the detail and any arrow convention identifying the member to prepare.
Single U	Both edges curved on the weld side.	Check groove angle, root radius and land.
Plug / slot / spot / seam	Hole fill, elongated slot, individual weld spot or a seam, depending on callout.	Check plan geometry, number, size and weld length.
Flare / steep-flanked	Rounded parent edges can form a flare groove. Steep-flanked preparation uses near-vertical sides.	Do not substitute a simple V. Read the part section and preparation detail.

Depth and Fit-Up

For butt weld dimensions, distinguish the required weld depth from preparation details. A 2mm root face in the joint sketch is not a 2mm penetration instruction.

ISO 2553:2019 · Table 1 and Clause 5

TWI · Weld preparation details

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WELDING SYMBOLS

Supplementary Marks and Drawing Checks

Treat the supplementary mark as another instruction attached to the same joint. Read the joint detail before setting the part up.

Example · Arrow-Side a5 All Round



Example · Arrow-Side a5 on Site



Drawing Mark	What It Adds
Circle at arrow junction	Weld all around the indicated joint, for example around an RHS-to-plate perimeter.
Flag at arrow junction	The weld is to be made on site. Verify access and job controls.
Flat / convex / concave contour	The mark describes the required contour. Read any finish instruction separately.
Backing or backing run	Check the exact backing designation, material, side and whether it stays. A separate back run is a deposited weld, not a backing strip.
Tail and linked drawings	Read the procedure reference, dimensions, notes and any separate joint sketch.

Worked Example · All-Round Fillet

A System B arrow-side a5 fillet with an all-round circle calls for a nominal 5mm throat around the indicated perimeter. The drawing and WPS still govern the fit-up, starts and stops.

Common Drawing Errors

Wrong side, wrong a/z size, treating clear spacing as pitch, missing a tail note and preparing the wrong edge on a bevel or J.

For help identifying the torch or consumable behind a drawing callout, send the symbol, drawing convention and joint detail. Call 023 8033 9443 or email sales@rhdaveywelding.co.uk.

Welding Joint Types
Jasic TIG Range Guide
Parweld XTM
Parweld Filler Wires

ISO 2553:2019 · Supplementary symbols
TWI · All-round and site welds

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