

SIDE 1 • STICK (MMA)

Wear your welding respirator and PPE every time you weld.

Vertical-up 6 mm: one pass, slight triangular weave. **8 mm:** straight root into the corner, then one weave cap. **10 mm:** root + 2 weave layers (3.2 mm rods). Typical layouts: with 4.0 mm rods one layer fewer is common. Always weld upwards. Drawing size = leg z; throat a $\approx$ 0.7 z.

■ Passes and rod size

LEG	FLAT PA	HORIZ. PB	VERT-UP PF	OVERHEAD PD
3 mm	1 run • 2.5	1 run • 2.5	1 run • 2.5	1 run • 2.5
4 mm	1 run • 3.2	1 run • 3.2	1 run • 2.5	1 run • 2.5
5 mm	1 run • 3.2	1 run • 3.2	1 pass, weave • 3.2	1 run • 2.5
6 mm	1 run • 3.2	1 run • 3.2	1 pass, weave • 3.2	1 run • 3.2
8 mm	1 run • 4.0	root + 2 runs • 3.2	root + weave cap • 3.2	root + 2 runs • 3.2
10 mm	root + weave cap • 4.0	root + 2 runs • 4.0	root + 2 weave layers • 3.2	root + 3 runs • 3.2
12 mm	root + 2 runs • 4.0	root + 2 + 3 runs • 4.0	root + 3 weave layers • 3.2	root + 2 + 3 runs • 3.2

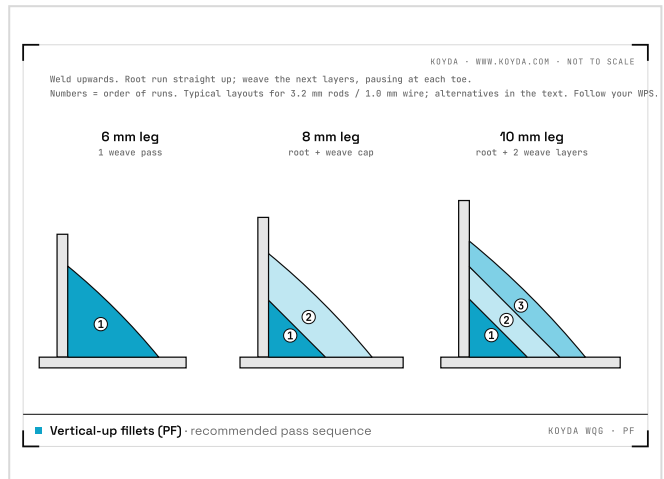
Rod size in mm, 240 V or three-phase. 110 V set: use 3.2 where it says 4.0, and add runs.

■ Amps (typical, Böhler)

ROD	TYPE	FLAT/HORIZ.	VERT./OVERHEAD	POLARITY
2.5 mm	E6013	60–100 A	60–80 A	DC– or AC
3.2 mm	E6013	90–130 A	90–110 A	DC– or AC
4.0 mm	E6013	110–170 A	110–140 A	DC– or AC
2.5 mm	E7018	80–110 A	80–95 A	DC+
3.2 mm	E7018	100–140 A	100–120 A	DC+
4.0 mm	E7018	130–180 A	130–155 A	DC+

■ Leg to throat

LEG Z	3	4	5	6	8	10	12
Throat a	2.1	2.8	3.5	4.2	5.7	7.1	8.5


■ Technique

- Arc length $\approx$ rod core diameter. Shorter with 7018.
- Rod about 45° to both plates; lean back 5–15° (drag). Vertical-up: tilt 0–15° up.
- Vertical-up: root straight up, then weave the full face, pausing at each toe. Flat and horizontal: small weaves only.
- Vertical and overhead: lower half of the amp range.
- 7018: DC+, rods from the oven or quiver (redry FOX EV 50 at 300–350 °C, 2 h). Restart ahead of the crater, move back.
- Clean slag off every run.

■ Machines

SET	MAX OUT	RODS
110 V inverter	120–125 A, 25–35%	2.5; 3.2 lower range
240 V inverter	160–180 A, 20–35%	2.5, 3.2; 4.0 short runs
Three-phase	Rating plate	2.5–4.0+

110 V: right transformer (many need 32 A), short heavy lead, reel fully unrolled.

Questions on a weld or a job? Call the office.

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Typical starting points for mild steel fillet welds, not a welding procedure. Follow the job's WPS, the consumable and machine makers' data and BS EN 1090-2; structural welds by welders qualified to BS EN ISO 9606-1. Weld finder and full tables: Interactive Welding Guide, www.koyda.com/guides/welding-quick-guide/. Koyda Ltd accepts no liability for decisions made using this card. www.koyda.com/guides/welding-quick-guide/ • KOY-WQG-001 • Rev A • © Koyda Ltd, company no. 05632312.

SIDE 2 · MIG

Wear your welding respirator and PPE every time you weld.

Starting settings (typical)

WIRE	AMPS	VOLTS	WIRE SPEED	STICKOUT
0.8 mm	90–140 A	17–21 V	4.5–8 m/min	about 10 mm
1.0 mm	140–200 A	19–23 V	4.5–8 m/min	10–15 mm
1.0 mm	140–185 A	19.5–22.5 V	4.5–7 m/min	10–15 mm

0.8 mm: legs 3–4 mm. 1.0 mm: legs 5 mm and up (second 1.0 row = vertical-up and overhead). G3Si1/ER70S-6 wire, Ar/CO2 mix, dip transfer. Synergic set: start from the program. 1.2 mm: bigger sets, flat and horizontal, use the machine chart.

Passes

LEG	FLAT PA	HORIZ. PB	VERT-UP PF	OVERHEAD PD
3 mm	1 run	1 run	1 run	1 run
4 mm	1 run	1 run	1 run	1 run
5 mm	1 run	1 run	1 pass, weave	1 run
6 mm	1 run	1 run	1 pass, weave	1 run
8 mm	1 run	root + 2 runs	root + weave cap	root + 2 runs
10 mm	root + weave cap	root + 2 runs	root + weave cap	root + 3 runs
12 mm	root + 2 runs	root + 2 + 3 runs	root + 2 weave layers	root + 2 + 3 runs

Technique

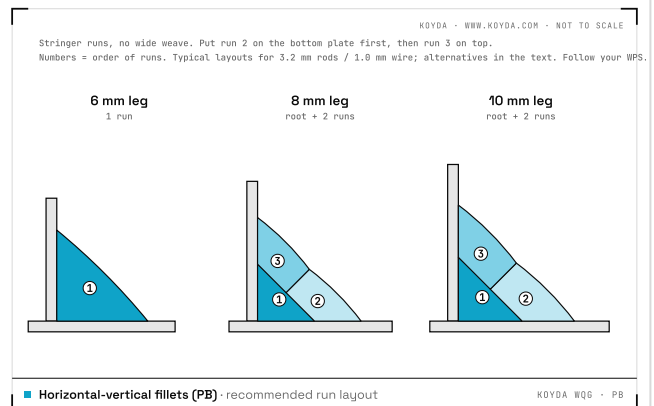
- Gas 12–16 l/min. Shelter from draughts.
- Gun about 45° into the fillet, slight push.
- Vertical: weld upwards, gun pointing slightly up, small weave. Never vertical-down on structural fillets.
- Spray transfer: high current, flat and horizontal only.
- Flux-cored: follow the wire maker's settings and polarity.

Sources: voestalpine Böhler data sheets (FOX OHV, FOX EV 50, EMK 6); Lincoln Electric stick procedure handbook and SuperArc L-56 procedures; Migatron MIG fillet data; ESAB and BOC MIG guides; Miller and ESAB technique guides; TWI Job Knowledge; AWS D1.1; Jasic, R-Tech and ESAB machine specifications. Full list: Interactive Welding Guide, www.koyda.com/guides/welding-quick-guide/#sources

Steelwork to BS EN 1090? Send us your drawings.

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Check your weld

FAULT	FIX
Undercut	Lower the amps, shorter arc, pause at the toes, correct the angle.
Porosity	Dry rods from the oven; check gas and nozzle, shelter the arc; clean to bright metal.
Lack of fusion	More amps, slower, aim into the root, weld uphill.
Overlap (cold lap)	More amps, faster travel, smaller runs.
Slag in the weld (stick)	Chip and brush every run; smaller weaves; grind out deep notches.
Cracks	Stop and report it. Don't weld over a crack.

Before you weld

- Clean to bright metal: scale, rust, paint, oil, zinc.
- Fit tight. Root gap over about 2 mm: ask, the leg must grow.
- Tack both ends. Earth close to the weld on clean metal. Test on scrap.

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