HF welding — defect diagnosis and operation essentials

Seven seam faults, their usual causes and what to change · pre-start checks from the operation guide

The seam is a forge weld, not a fusion weld

High-frequency welding joins the two strip edges by heating them and pressing them together — the edges are brought to welding temperature locally, then the squeeze rolls force them into one another. There is no filler metal. That is why the same three things decide every defect: **how much heat** goes into the edges, **how fast** the strip is travelling, and **how the edges meet** (assembly angle and squeeze). Almost every fault below is one of those three out of balance — which is also why the first three things to check are power, speed and edge alignment, in that order.

Defect diagnosis

What you see	Usual cause	What to change
Weak weld, desoldering, cold weld	Output power, pressure and speed not matched to each other; strip edge damage or other edge defects	Adjust power · change groove shape on heavier wall · adjust squeeze force · adjust speed
Ripples on both sides of the weld	Convergence angle too large	Adjust guide roller position · adjust the solid bending section · increase welding speed
Deep pits and pinholes in the weld	Burn-through	Adjust guide roller position and add assembly angle · adjust power · increase welding speed
Weld burr too high	Heat affected zone too wide	Increase welding speed · adjust power
Slag inclusion	Input power too large while welding speed is too slow	Adjust power · increase welding speed
Outer cracks in the weld	Base metal quality; excessive squeeze force	Guarantee the strip material · adjust squeeze force
Wrong welding / lap welding (edges miss)	Poor forming accuracy	Adjust the forming rolls of the mill

Read the table as a starting point, not a verdict: several faults share symptoms, and the same setting change can cure one and cause another. The published guidance on this site is the source for every row above.

Checks that prevent most of it

Area	What the published operation guide calls for
Before start-up	Confirm every lubrication point is filled with the specified oil
Weld squeeze temperature	If extrusion temperature runs high, use a synthetic composite aluminium grease rated for it (SY1414-80)
Gear box	Gear oil with good fluidity — 230# is the grade given in the guide
Vertical roller / extrusion device	Dismantle and clean periodically according to working conditions
Horizontal roller frames	Monitor the front and rear nuts while running; a slack nut shows up as an unstable seam
Frame adjustment	Adjust the upper and lower nuts of one frame together so the shaft stays parallel; change finished size in small steps, one frame at a time
Electrode reversed	Strip backward distance generally not more than 300 mm
Flying saw	Set the check valve (exhaust throttle) so the carriage behaviour matches the cut cycle

Welder ratings published on this site

The HF welder is sized with the line, not chosen separately: HG32 and HG76 lines are published with a **200 kW** solid-state welder, and the HG165 big-diameter line with a **GGP 400 kW** unit. Because heat input scales with speed and wall, the rating that matters is the one at the wall and speed you intend to run — ask for that, not the nameplate maximum.

What to send when you need help with a seam

A photo of the seam (wet or as-cut), the tube size and wall, the line speed at the time, the welder power setting, and whether the fault is continuous or periodic. Periodic faults usually point at a roll or a drive; continuous ones at power, speed or edge condition.

Technical notes and further reading

- FAQ of high-frequency welding and solutions — steelpipemachines.com/posts/faq-of-high-frequency-welding-and-solustions
- High frequency welding machine operation guide — steelpipemachines.com/posts/high-frequency-welding-machine-operation-guide
- Laser welding vs high-frequency welding in a tube mill — steelpipemachines.com/posts/laser-vs-high-frequency-welding-in-a-steel-tube-mill
- Maintenance of high frequency welded pipe machine — steelpipemachines.com/posts/maintenance-of-high-frequency-welded-pipe-machine