Trouble Chart

Poor Fusion

Causes:

1. Current setting too low.
2. Wrong type electrode.
3. Incorrect electrode manipulation.
4. Too long an arc.
5. Improper preparation of work for welding.

Solutions:

1. Correct current setting.
2. Use proper electrode.
3. Adjust electrode weaving and speed of travel to insure melting of both sides of joint.
4. Hold correct arc gap.
5. Make sure that joint is clean and, if necessary, properly veed or grooved.

Undercutting

Causes:

1. Welding current setting too high.
2. Excessive speed of travel.
3. Excessive arc length.
4. Incorrect electrode-to-work angle.
5. Wrong size electrode.

Solutions:

1. Reduce current setting.
2. Reduce speed of travel.
3. Use proper arc length.
4. Adjust electrode angle so that arc force will “hold” molten metal until undercut fills.
5. Use correct size electrode.

Porosity

Causes:

1. Incorrect current setting.
2. Excessive speed of travel.
3. Impurities in or on base metal.

Solutions:

1. 1. & 2. Correct current setting and speed of travel to prevent gas entrapment.
3. Properly clean and prepare joint for welding – keep penetration at a minimum.

Rough Appearance

Causes:

1. Current setting too high or too low.
2. Incorrect manipulation of electrode.
3. Overheated work.
4. Incorrect speed of travel.
5. Wrong type of electrode.

Solutions:

1. Correct current setting.
2. Adjust electrode-to-work angle, use weaving technique where needed.
3. Allow work to cool between passes.
4. Adjust speed of travel so that the proper bead contour is formed.
5. Use proper type electrode and polarity.

Excessive Spatter

Causes:

1. Current setting too high.
2. Holding too long an arc.
3. Arc blow.
4. Incorrect polarity for electrode being used.

Solutions:

1. Correct current setting.
2. Use proper arc length.
3. Minimize arc blow (See “Arc Blow”).
4. Use proper type electrode and polarity.

Arc Blow

Causes:

1. Magnetic field set up by DC welding current deflects the arc from its proper path.

Solutions:

1. Use AC machine.
2. Use very short arc and point electrode in direction of blow.
3. Relocate ground connection or use two ground cables.
4. Use non-magnetic back up strip or plate as ground.

Slag Inclusions

Causes:

1. Current setting too low.
2. Too short an arc.
3. Incorrect manipulation of electrode.

Solutions:

1. Adjust welding current upward.
2. Use proper arc length.
3. Use correct electrode-to-work angle so that arc force prevents molten metal from overtaking slag.

Arc Hard To Start

Causes:

1. Current setting too low.
2. Flux covered electrode tip.
3. Work not properly cleaned.
4. Work not properly grounded.

Solutions:

1. Correct current setting.
2. Clean electrode tip.
3. Remove paint, heavy oxide, etc.
4. Clamp ground cable securely to bare metal.

Warping or Distortion

Causes:

1. Incorrect placement of pieces to be joined.
2. Poor structural design.
3. Improper jigging.
4. Overheating.
5. Incorrect welding procedure.

Solutions:

1. Adjust pieces, so they “warp into position”.
2. Redesign to allow for warp.
3. Use proper clamping, chill plates, etc.
4. Use short beads, allow cooling between welds.
5. Use proper bead placements and weld sequence. Keep weld deposits at a minimum.

Cracked Welds

Causes:

1. Incorrect size and/or shape of bead.
2. Faulty design and/or pre-weld preparation of joint.
3. Rigidity of structure.
4. Wrong type of electrode.
5. Too rapid chilling of weld deposit.

Solutions:

1. Adjust size of puddle and speed of travel in keeping with the weight of welded section.
2. Prepare joint to insure proper penetration and fusion.
3. Pre heat and post heat – use skip-back or other welding technique to prevent buildup of stresses.
4. “Match” electrode to metal and/or job.
5. Preheat and post-heat – use non-ferrous electrode. On alloy steel, use austenitic rather than air hardening deposit.