Brazing - Problems & Remedies

SYMPTOM	CAUSE	ACTION
Failure of filler metal to wet both surfaces	Surface dirt or contamination Unsatisfactory fluxing	Improve cleaning procedures Apply sufficient flux of correct grade
Failure of filler metal to wet one surface	1.One component contaminated 2.Unsatisfactory heating pattern 3.Preform only in contact with one side of the joint	1.Check cleaning procedure 2.Apply heat to the heavier part 3.Ensure that capillary gap is bridged at melting point by adjusting tolerance to give spring-fit.
Failure of filler metal to flow smoothly (Joint is rough and fillet is uneven)	1.Poor fitting components 2.Uneven heating 3.Poor joint ventilation 4.Bad fluxing 5.Overheating Liquation	1.Check that capillary gaps are consistent throughout the joint area 2.Make sure that whole joint area is brought up to brazing temperature simultaneously 3.Make sure gases generated have escape route 4.Check grade of flux and increase amount used 5.Reduce brazing temperature to 50°C above liquidus Increase heating rate or change to SBA with narrower melting range
Voids (obvious gaps)	Variable or excessive joint clearances; uneven or insufficient heating; poor venting; inadequate fluxing	Correct the applicable faults.
Blowholes (localised holes with rounded and shiny interiors)	Hydrogen pickup by brazing alloy	Adjust burners to give neutral to slightly oxidising flame, check that organic contaminants like oil, grease and paint are not present; check that joint is vented. Pinholes can also be caused by overheating resulting in zinc or cadmium vapourising.
Porosity (shrinkage observed externally in the joint)	Excessive local tolerance, unbalanced heat pattern, overheating, use of alloy with too wide a melting range	Correct the applicable fault
Cracking of filler metal	Thermal stress set up by differential contraction	Redesign joint with higher coefficient of expansion material on outside of joint
Cracking adjacent to one of the parent metals	1.Contamination of the surface concerned 2.Formation of embrittling intermetallic layer.	1.Upgrade preparation techniques 2.Identify possible contaminations, consider trifoil.