

Preforms— An economic way to Silverbrazing

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A preform is any shape of brazing alloy so fabricated that it can be easily and conveniently placed in the assembly prior to the brazing operation. Virtually all high production applications requiring a brazing or soldering alloy, whether it be silver, copper, brass, or lead can be designed, to take advantage of the economies of alloy preplacement. There are different types of preforms, each more adaptable for particular applications.

Development of preformed shape for silver brazing alloy was, of necessity, coincident with the use of automatic methods of heating. It is not practicable to hand-feed the alloy to the stream of parts emerging from a conveyor belt furnace in hydrogen atmosphere or to work inside the induction coil. Preforms help in speedy production, reduce and standardise cost and ensure uniform results.

There are manifold advantages of preforms over hand feeding rods. The correct amount of alloy for complete joint penetration can be determined experimentally, and thereafter, each preform will provide just that measured amount of alloy, minimising and standardising cost. This is in great contrast to hand feeding where operators feed 50 to 100 percent more alloy than the joint requires, just to be sure.

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By using preforms, labour saving is two-fold : (1) instead of heating each assembly upto the brazing temperature by hand torch and then applying the alloy, labour time is reduced to a few seconds to place the preform into the assembly and set the assembly onto the brazing fixture or machine ; (2) relatively unskilled labour replaces highly skilled operators, and also a saving of oxy-acetylene gases by heating jobs on fixture simultaneously.

A brazed joint appears very clean with just a demarcation line. The extra expenses incurred due to grinding or machining can be avoided because of preforms surrounding the joint uniformly. As the preform surrounds the joint, it feeds and fills all of the joint area uniformly. It provides high strength and leak proof tightness, and stops rejection of jobs due to leak rate. A visual inspection is also enough as the penetration of the silver brazing alloy can be arranged from inside to outside of the joint.

In silver brazing process, flux plays a very vital role. No flux is required if the brazing is carried out in hydrogen atmosphere. Silver brazing alloys and the base metals on which they are used, get oxidised when heated in air. Flux is used to remove the oxide as it is formed, to minimise the surface tension on the base metal so as to increase the fluidity of the brazing alloy to cover the base metal and brazing alloy, to stop further oxidation and to act as directive for the molten alloy to enter in the capillary joint.

A brazing alloy must be selected befitting the job requirements, e.g. when the mass of the parts is great, or the base metal is one that oxidises rapidly, or the heating medium is slow or a combination of these, the flux will frequently become spent with higher temperature alloys used. It is generally a greater economy to use the more expensive 45% Ag. or 43/Cd alloy than it is to put up with rejects and costly cleaning methods for scale and flux removal. Since these alloys are the lowest flow point alloys available they will give the flux every opportunity to do its work and at the same time the low temperature will reduce the scaling on the unfluxed areas of the parts.

There is a very wide scope for preforms in various types of industries like air conditioning, refrigeration, automotive, aircraft, electrical appliances, electrical & electronics components, plumbing & heating, ship-

building, motors & generators, space and missiles, silver wares & jewellery, carbide tip tools. Most joints are in ring or washer preforms and some are of special design for carbide tips and other precision joints.

A technical person on the shop floor of a brazing workshop should be on the look out for economic use of costly and precious silver brazing alloys and come out with suggestions of different shapes of preforms of the brazing alloys and insist on the supplier to supply in required preforms instead of conventional rods and foils.

References

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