

**Q:** What should we do when a customer has a critical “hot job” that he wants brazed immediately and cannot wait for us to properly clean the furnace and run the necessary leak checks? How can we make a good braze when the furnace isn’t ready?

**A:** Most brazing shops will occasionally be given rush jobs by their good customers and they do the best they can to comply; however, no brazer wants to risk losing a good customer by delivering a poor-quality product.

Let’s suppose your vacuum brazing furnace has just completed a series of cycles that has left it contaminated. You were preparing to take the furnace out of service for the next day or two for maintenance including hand cleaning, vacuuming, a high-temperature burn-out cycle, etc, then a customer shows up with a hot job that must be done right away.

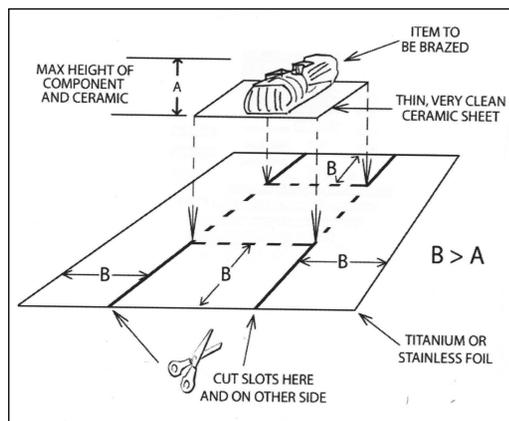
The customer’s assembly consists of some components made from 316L

stainless steel and others from a titanium alloy. These base metals should be brazed in a thoroughly clean and leak-tight furnace. What to do?

Should you attempt to braze the assembly in the dirty furnace and risk an unsatisfactory braze or just tell the customer you cannot do the rush job that day? I propose you enclose the assembly inside of a protective “box” before placing it into the dirty furnace to ensure it will braze well.

Boxing an assembly prior to the brazing run is a simple technique that more shops should use. Here’s how to do it. Prior to brazing, place the parts inside of a foil box that is easily constructed by hand specifically for those parts. The foil box shields the parts so they effectively braze inside their own pristine mini-furnace chamber. The foil box is usually used only once, for a particular assembly for one furnace run.

In my brazing shops, we kept rolls



**Fig. 1** — Making the base of the box to hold components for brazing.

of titanium foil and stainless foil on hand just for this purpose. The titanium foil may be either pure titanium or a titanium alloy — both types work well. Similarly, the stainless steel foil may be made from any one of a number of different alloys. A regular grade stainless steel foil works well. Using a low-carbon L-grade foil is not necessary.

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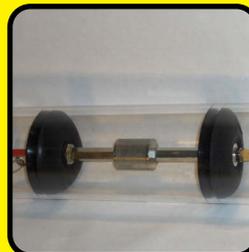


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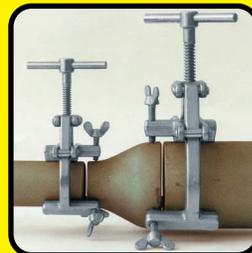
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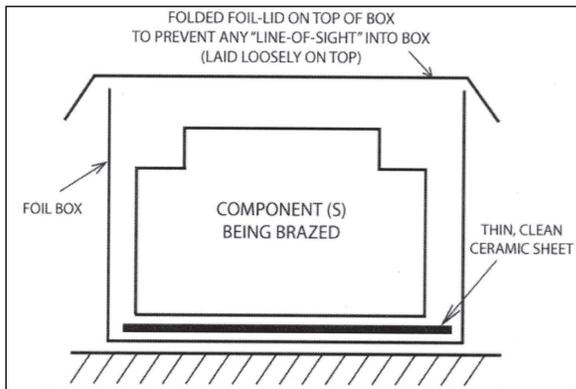


Fig. 2 — Placing the cover onto the box to protect boxed contents.

When a customer gave us a very sensitive part that needed to be brazed right away, we did not delay brazing that component until after the furnace was cleaned. Instead, we placed the component on some thin, clean alumina-ceramic sheet, which we then placed on top of some thin titanium or stainless steel foil. We then cut some short slits in the foil to allow the foil to be folded up to form a box around the component — taking care the component did not touch any of the foil. Fig-

ure 1 illustrates how this is done.

Once two walls are folded up, then the side walls can be folded up into place and the extra foil length folded around the box to ensure there are no open seams to the outside. Everything is merely bent over, crimped, etc., using pliers, metal shears, and other standard tools, so that the box can be made quickly and easily by hand right there in the shop.

The walls of the box formed in this manner should be tall enough so that the sides of the box are higher than the top of the part to be brazed. Then, take another piece of the metal foil to make a loosely fitting cover which is simply laid on top of the box. Fold the edges of the cover down so that there is absolutely no “line-of-sight” into the box. Figure 2 illustrates how this is done. Note: use thinner foils to make these boxes, they are much easier to work with. Keep the foils clean and stored

where they will stay clean and not oxidize. Always handle the foils with clean gloves and use clean tools to construct the box and for placing the components inside it.

During the brazing cycle, the outside of the box serves as a getter. It catches the outgas products in the larger furnace chamber atmosphere that would normally condense onto or coat the parts being brazed. But the foil box can quite effectively prevent those contaminants from reaching the assembly protected inside. When the cycle is over and the box is removed from the furnace, the outside of the box may appear very dark and discolored. However, when the lid is carefully removed, the components inside the box should be pristine clean and nicely brazed. **WJ**

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Post your questions for use in this column on the Brazing Forum section of the BSMC website [www.brazingandsoldering.com](http://www.brazingandsoldering.com).

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