Recollections of Terry Walker:

I recall that in 1962, when I was in junior college in Temple, Texas, I got to tour a small B/W TV CRT rebuilding company in Waco, Texas. I don't know much more about it, but it was active at that time, and you may be able to research it. Given that it was in an old warehouse district in Waco, I wouldn't be surprised if the equipment was still sitting there unused. It might be worth looking for.

They showed us the entire rebuilding process, and they used a horizontal lathe for the actual gun replacement, and vertical bake out ovens. They were getting complete replacement guns from somewhere (there was an old refrigerator sitting there full of them). The guns were mounted on button stems when they got them, but not in neck tubes. They only had a couple of ovens, so processing was almost completely manual. The tip off was done by an electric heater while the CRT was still in the oven.

One comment I remember from then which may matter to you was that they had very poor luck trying to re-gun CRTs with metal cones. They said the glass to metal seal around the faceplate almost invariably cracked, and I saw two of those when I was there. I suspect that the problem was the heating and cooling rate in their ovens was too fast. Their ovens were built vertically so that the top part was a 5 sided cube open at the bottom, which could be raised and lowered over the tube in the processing fixture. The tube processing fixture was about table height off of the floor, and included the vacuum, gun heating, and tip off hardware as well as supports. Their ovens did not seem insulated as well as the one which you are planning on using.

They also showed me how they could run a hand held Tesla coil (the type which made blue sparks, not streamers) around outside edge of the faceplate to cause point electronic emission inside a tube before starting the rebuild procedure. Streaks of electrons would go across the phosphor screen on the inside, and you could see if there were any ion burns on the screen before rebuilding the tube. However, my experience is that this is a hazardous thing to do, as I have had trouble with that type of vacuum tester punching extremely fine holes through glass tubing, causing very small but definite vacuum leaks. A device which had been stressed that way might be found to have lost its vacuum after a few weeks to months, depending on the internal volume. Perhaps on the thick glass of a CRT, this is not a hazard.

Of course, on some tubes, you may be able to test the phosphor activity with suitable ultraviolet light instead.

Anyway, those are my memories, and I thought they might have some usefulness for you.