

The Altec-Peerless[®] 4665 Audio Transformer

Addendum 10/12

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It has been several years since I wrote about the 4665 dissections. A couple weeks ago I received a request from a customer who wanted two sets of core laminations from a K-241-D. I had one set up for sale at an auction site and knew I had another set in storage so a deal was made. In past transformer engineering papers I have written that when reverse engineering a transformer it is important to have multiple examples of the same model in order to extract every possible detail. What follows is a perfect example of why that is.

The K-241-D (blown) that was in storage was located and the disassembly was started. After very carefully removing the laminations and cleaning them there was something visible on these laminations that was not apparent on any of the other five or six K-241-D and 4665's that I have previously dissected. In the 4665 dissection paper (My Audio Transformer Design DVD vol. 2) I wrote that all of the laminations were of the same alloy and they are. What I was not able to see on any of the previous dissections, that could be seen on this lamination set, was a small coloration difference on some of the laminations. See fig. 1.

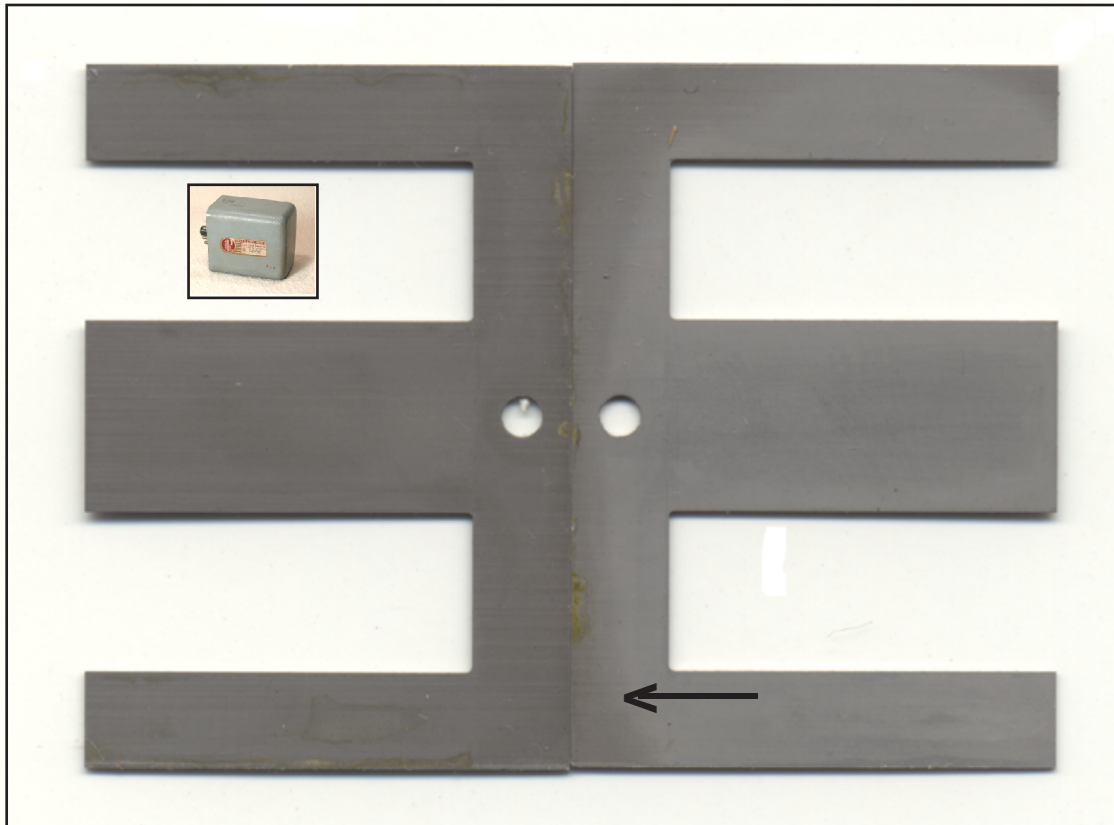


Fig.1 This scan shows the differing K-241-D laminations. The lamination on the left is uniform in color and most of the laminations in the K-241-D/4665 models look like the lamination on the left. The lamination on the right appears to have been mostly covered with some sort of oval shaped object during some or all of the annealing process. The arrow in the photo shows the very minute color difference. The contrast of this photo has been enhanced to make the difference more visible.

This coloration difference appears as though covers that were not quite large enough to cover the entire lamination were placed on some of the laminations during the annealing process. Looking at the photo in fig. 2 the difference can plainly be seen. The outside edges of the lamination on the right have received the full annealing that the entire lamination on the left received. However, the inside surfaces of the lam. on the right were protected from at least some of the heat treatment process. The difference looks obvious on these laminations and I had to wonder how I could have missed this on all of the previous dissections. Making high res. scans of all of the laminations removed is standard procedure during the reverse engineering stage. After blowing up the scans of previous work, and with very close inspection, I found that in fact there are the same variations in a number of laminations from all of 241/4665 units. There was much less color differentiation on all of the two tone laminations from previous dissections and the covers that were placed on the lams from earlier dissections were a little larger which covered almost the entire lamination, making the difference almost impossible to see, especially if you don't know what you're looking for.

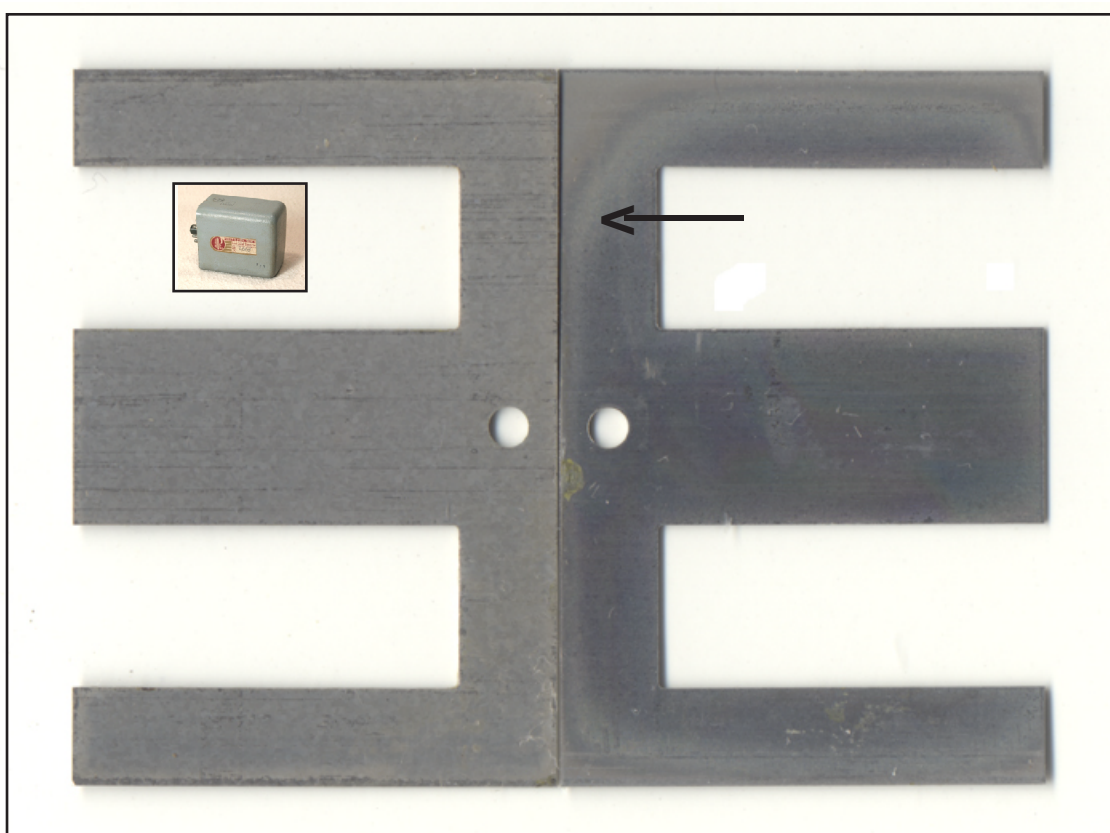


Fig.2 Here is another example. The scanner caught the light from a different direction so the color difference is greatly exaggerated

At this time I can only speculate about what the engineer's line of thought was. I have read many texts regarding magnetic soft metals and many of those contain detailed annealing protocols but this technique of covering the lams during the anneal does not appear in any of them. This technique may be one of those "secrets" that Peerless developed to stay ahead of the competition. The kicker is that the number of two tone laminations is different in all of the units that I have dissected. The number of two tone lams per core ranges from 25% - 35% and on some scans the differences were almost impossible to see so I can't be positive of the exact counts. The next course of action will be to rewind two K-241-D's, one with some two tone lams and one without any, and see what the measured differences are. I'll post the results at VintageWindings.com. CP