

## St. Julian's Creek Annex R-390A's Cracked Brown Tubulars And Other Abusive Damage

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If you are considering buying a rebuilt R-390A, especially a blue striper as they are sometimes called, then it may be to your benefit to read the following before you buy.

Recently the R-390A parking lot of doom (St. Julian's Creek Annex, a.k.a., SJCA) rebuilders and their friends joined me in a war of words about cracked brown tubular capacitors (hereafter referred to as BrT's) in R-390A's. Among other things they denied that their R-390A's with cracked BrT's came from the parking lot. Others claimed that there were also cracked black (in addition to brown) tubulars in R-390A's. However, I have rebuilt between 10 and 20 R-390A's, and my friend has rebuilt 100+ R-390A's, and neither of us has ever seen a black tubular capacitor, cracked or not, in any R-390A, and neither of us has ever seen a cracked BrT in any R-390A. I also stated a disclaimer to the SJCA rebuilders and others similar to the following: *my statement that we have seen no cracked BrT's or black capacitors out of approximately 120 R-390A's (approximately 1200 BrT's) does not apply to SJCA R-390A's and other abused R-390A's*. As a matter of fact, neither of us has ever seen a SJCA R-390A to the best of our knowledge. The laws of statistics say that it is impossible for my friend and I to have seen no cracked BrT's in non-SJCA and otherwise non-abused R-390A's, while the SJCA rebuilders claimed to have seen as high as 70% cracked BrT's in non-SJCA and otherwise non-abused R-390A's. Obviously some people were mistaken. Mud slinging ensued on all sides.

A few days ago, following the war, I sent the following email to a number of people.

| ----- Original Message -----

| **From:** [Dallas Lankford](#)

| **To:** xxxxxx

| **Sent:** Monday, January 17, 2005 6:26 PM

| **Subject:** Brown Beauty Quality Control Experiment

| For the past two days I have been freezing, thawing, heating, cooling, freezing etc. 3 brown beauties from two R-390A IF decks. These 3 brown beauties when removed from the two IF decks had no cracks, microscopic or otherwise. I also tested the 3 for leakage with 200 VDC applied before testing began. Two had 3 microamps leakage; one had 10 microamps leakage. I consider these small amounts of leakage entirely acceptable. If you don't, then replace all capacitors in your R-390A. But don't expect me to. On the 4th cycle of freezing and thawing 2 of the 3 brown beauties in

these tests had developed what might be called microscopic cracks, although the cracks were easily visible to the naked eye under bright light. The freezing and thawing cycles consisted of freezing the capacitors to 0 degrees F, then thawing them in an oven at 165 degrees F, then cooling them in water at room temperature, then freezing them again. The purpose of cooling them in water after the heating cycle was to simulate their being in an outdoor environment where they would have been exposed to rain during some of their cooling cycles. When rain water was present around the ends where the leads exited the cases, cooling by rain would undoubtedly draw water inside the case. There is little doubt that that this experiment provides the definitive answer as to how the cracked brown beauties have come about. They came about from R-390A's sitting in parking lots or other abusive environments.

After circulating the above, someone asked me if the capacitor leakage values continued to increase. Yes, but slowly. One must remember that the SJCA R-390A's went through hundreds, probably well over a thousand, heating and cooling cycles, and an unknown number of acid rain cycles, as well as many freezing cycles. And tap water (from the Sparta aquifer, where I get my tap water) does not provide a reasonable simulation of acid rain. So simulating the acid rain part of the abuse was not feasible even if I were inclined to go through hundreds of simulation cycles.

Most of the SJCA R-390A's could have suffered and surely some did suffer much more extensive damage than just cracked BrT's. The grounding system of an R-390A consists of, among other things, (1) ground lugs held against the chassis with screws, split wing washers, and nuts, (2) tube sockets held against the chassis with screws, split ring washers, and nuts, (3) shields held against the chassis with screws, split ring washers, and nuts, and (4) IF and RF transformer shields grounded via nuts and internal tooth lock washers, and so on.. Rust and/or corrosion in the grounding system can cause and probably has caused degraded performance in rebuilt SJCA R-390A's because it is almost certain that no ground lugs, no tube sockets, no transformer shields, and so on were replaced. There are other capacitors besides BrT's in R-390A's, such as (1) silver micas, and (2) others. It is presently unknown what effect an abusive environment would have on them. But it seems reasonable that there would also be capacitor failures among these other capacitors for R-390A's that were left out in the rain with repeated freezing and thawing cycles for extended periods of time. Have the SJCA rebuilders replaced all of those capacitors? No. A large number of silver micas are in the crystal oscillator module and replacing them, as must sometimes be done even for non-abused R-390A's, is some of the most difficult unsoldering and soldering work you will ever have to do. I know. I have been there and done that. There are also silver micas in the plug-in RF deck transformers, as well as in the IF transformers (both in the IF deck and the RF deck). Have they been replaced? No. Then there are the tube socket receptacles. What did SJCA acid rain do to them? I don't know. And there are other male and female plugs and sockets. What did SJCA acid rain do to them? I don't know. Have the SJCA rebuilders replaced them. No. I asked someone with access to an RF module from a parking lot R-

390A to look inside the plug-in RF transformers and tell me what he saw. He said that the acid rain had compromised the coil windings for some of them, and that the trimmer capacitor contacts appeared to have corrosion. I suppose it is possible that a few SJCA R-390A's may have suffered no damage whatsoever, and you may be lucky enough to find one. But the odds of that are low. And in any case a considerable amount of the acid rain damage probably cannot be seen unless you take the R-390A apart.

Personally I would not have a rebuilt SJCA R-390A or a module from one. So how would I try to identify one? Many (all?) rebuilt SJCA R-390A's had cracked brown tubulars, and many of the SJCA rebuilders used Sprague orange drop radial lead capacitors to rebuild them. So I wouldn't buy any R-390A which had orange radial lead capacitors in it. If it has no orange capacitors in it, look for rust around screw heads, washers, and nuts. If you see rust, don't buy it. The screws, washers, and nuts in an R-390A are stainless steel, and resistant to rust, so you may have to look closely. Exposure to a merely humid environment is probably not sufficient to cause rust. But stainless steel will rust from exposure to water. Look for fine grit in corners and difficult to access places. Look for dried mud. Look for evidence of water damage. Metal surfaces should not be spotted, as if from water spots.