

Preliminary Tube Testing Procedures

The testing of a modern vacuum tube of the type normally found in an industrial RF generator is an extremely detailed procedure that requires specialized and sophisticated equipment. However, there are instances where a very basic testing procedure that can be done at the user facility is extremely helpful. Some examples would be during a repair when the tube is suspected of being at fault or to determine if a particular tube may be a good candidate for rebuilding. The following is a procedure that can be used to determine if the tube experienced a catastrophic failure.

1. Perform a good visual inspection of the tube. Pay particular attention to broken seals, arc marks on the tube surfaces, water inside the tube, a white or yellow powder inside the tube and any discoloration on the inside metal or insulating surfaces.
2. Ohmmeter , check for shorts and continuity between the cathode, grid and anode. There should be continuity between the two filament terminals but connections between all other elements should be open. (infinite resistance).
3. Hi-Pot Tester, connect between the grid and filament (either contact is OK) and it should hold off 6kVdc or 6kVac(peak). If it does, connect the grid-filament together and connect this pair and the anode to the tester. It should withstand 35kVdc or 35kVac(peak).
4. Put the tube in the generator and turn on the filament only. Cooling air or water must be on whenever the filament is on. Measure _____ volts at the filament terminals. The filament current should be between _____ amperes.
5. If still OK, and the high voltage is adjustable, disconnect the grid lead from the tube and connect a jumper wire from the grid to ground. The intent is to prevent the tube from oscillating. Turn up the voltage in 1kV steps to _____ kV, recording the resultant anode current for each interval. The anode current should be between the specified limits.
6. Reconnect the grid and try to run the generator at a low level, recording the grid and anode current at different anode voltage increments.

Each tube type will require different values of grid and anode voltage and current, as well as different filament voltages and currents. This data can be obtained from the tube manufacturers data sheet.