

Instructions

Radiant Technologies High Voltage/High Temperature Test Fixture

Title: Instructions for the use of the High Voltage/High Temperature Test Fixture

Date: September 20, 2007

Author: Joe Evans

Summary:

The Radiant Technologies High Voltage/High Temperature Test Fixture (HTTF) allows the testing of bulk ceramic capacitors at temperatures up to 1000°C and 10,000 Volts in a muffle furnace or tube furnace. The fixture is constructed to allow easy loading of the sample but to also prevent stress cracking in the fixture at high temperatures. The test fixture is constructed of MACOR™, a Dow-Corning machinable glass ceramic. MACOR™ is rated up to 1000°C. The bottom electrode plate and the top electrode gravity contact are constructed from Nickel 200, a high temperature electrical conductor. Nickel 200 has a melting point of 1435°C. The electrical attachment hardware is constructed of 14-4 stainless steel. (The stainless steel will discolor with high temperature.)

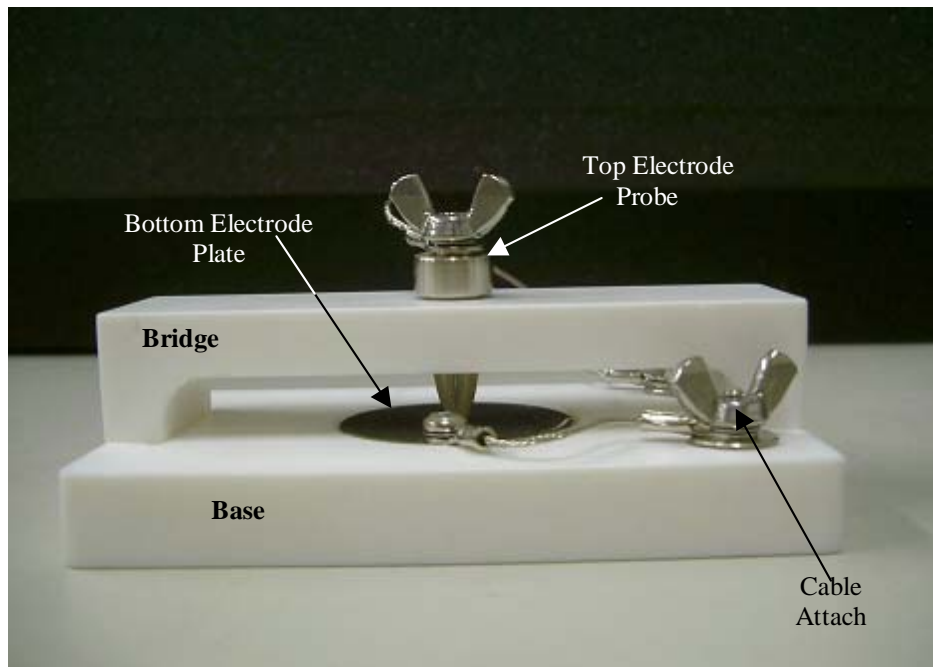
NOTE: Radiant has tested this fixture to 650°C.

The high temperature, high voltage cables delivered with the HTTF are constructed from high temperature nickel wire inside ceramic alumina tubes. The cables with their shields are rated to 10KV. The cables are rated for use in temperatures up to 1000°C. The cable has no asbestos insulation in it.

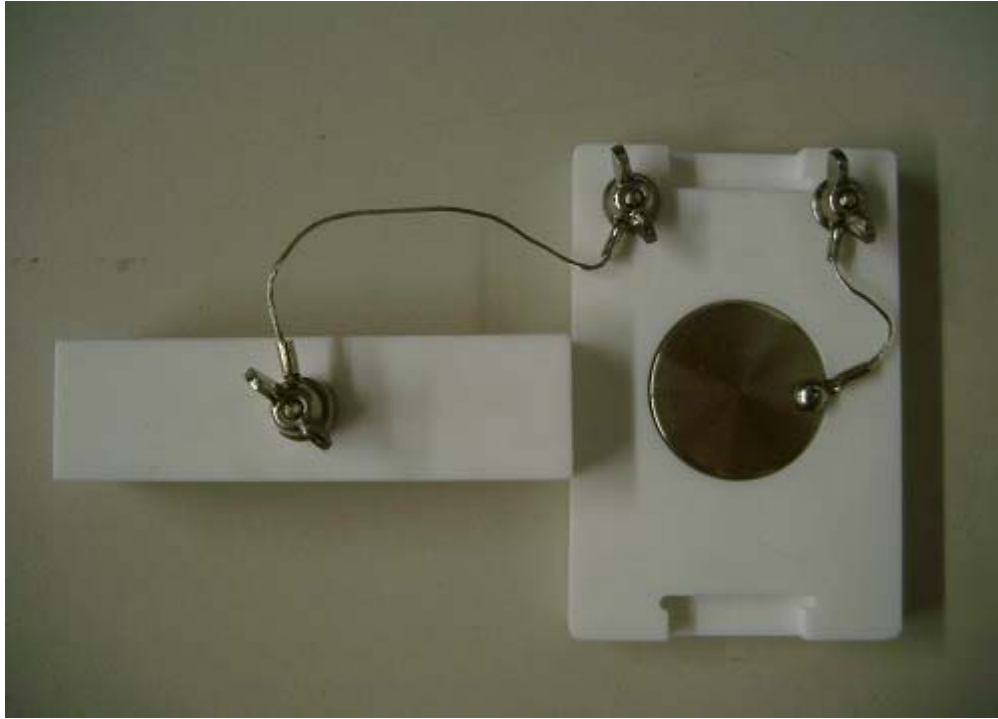
Instructions and Limitations for the High Temperature Test Fixture:

The High Temperature Test Fixture is constructed of a glass ceramic. The fixture consists of five parts:

1. The base.
2. The bottom electrode plate.
3. The top electrode probe.
4. The bridge.
5. Cable attachment points.



The top electrode contact bridge is designed to sit in slots in the fixture base with no mechanical attachment points. This prevents stress build-up due to expansion of the bridge and base during changes in temperature. The bottom electrode plate sits in a well in the fixture base. The sample rests on the plate. The bridge guides the top electrode probe so that it rests directly on the top contact of the sample during testing. The top and bottom electrode contacts are connected to the cable attach points using ring terminals. The cables also end with ring terminals.



To use the sample holder:

1. Place the ring terminals of the high temperature, high voltage cables on the attach points with their associated contacts and tighten the wing nuts.
2. Place the sample on the bottom plate.
3. Fit the legs of the bridge into the slots on the base.
4. Put the top contact probe through the hole in the bridge so that it contacts the top electrode of the sample.
5. If you are using a muffle furnace, place the sample holder in the center of the muffle furnace.
6. If you are using a tube furnace, place the sample holder onto the lip of the tube and let it equalize with the tube furnace. Then, slide the sample holder into the tube.

Limitations for the High Temperature Test Fixture:

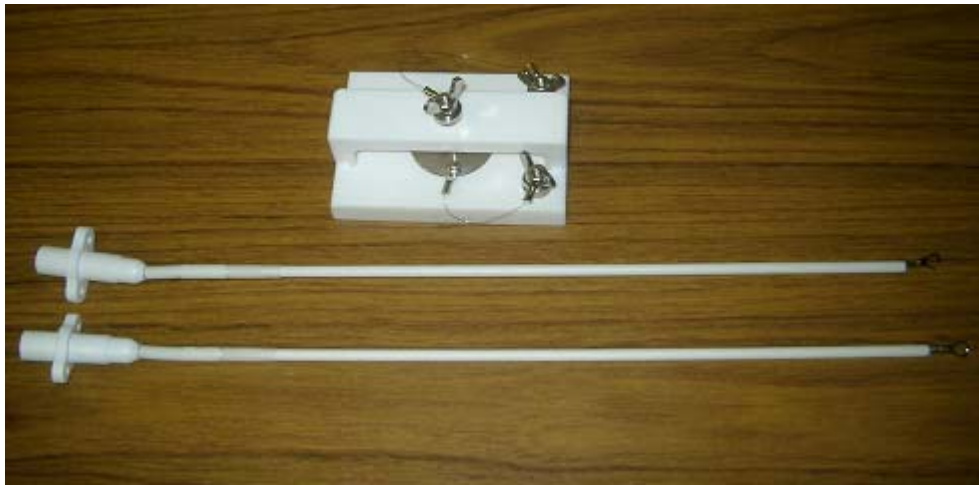
- 1. The HTTF is essentially glass and will fracture if dropped. Handle with care.**
- 2. The sample holder is capable of operating at up to 1000°C in air. However, it is not capable of handling temperature shock. Avoid rapid temperature changes. Limit the temperature ramp rate to 10°C/minute or slower going up or down.**
- 3. Do not place the sample holder directly into a hot oven or furnace. Place the sample holder into the furnace or oven at room temperature and then increase the temperature to the desired test temperature using a 10°C/min or slower ramp rate.**
- 4. The HTTF has a very high heat capacity. Let the sample holder and sample stabilize at the test temperature for at least half an hour prior to testing to ensure both have reached the test temperature. By the same measure, the HTTF will retain heat for hours during cool down. Allow the HTTF to cool completely after a test before handling it.**
- 5. Do not place a hot HTTF on a cool surface or the HTTF will crack.**

Radiant Technologies, Inc. will not be responsible for cracking due to temperature shock or mishandling of the HTTF.

Instructions and Limitations for the High Temperature, High Voltage Cables:

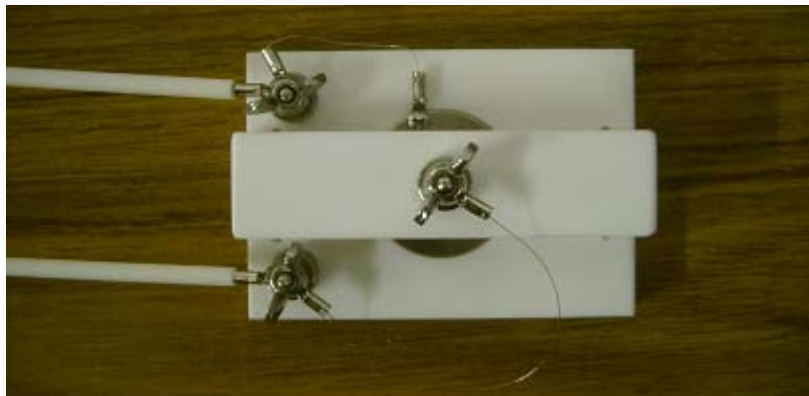
The high temperature, high voltage cables supplied by Radiant for use with the HTTF are constructed from high temperature nickel wire threaded through alumina tubing. The tubing provides high voltage isolation at elevated temperature and should not allow leakage between the DRIVE and RETURN lines during a test.

NOTE The cables may not prevent leakage that might occur through the ambient atmosphere of the furnace at the elevated temperatures of the test. If you experience significant leakage during tests, make the same measurements with no sample in the test fixture to determine if there is a parasitic conduction path. Make sure that, with no sample in the test fixture, the top and bottom electrodes of the test fixture are not in contact during the test.



The High Temperature Alumina Clad High Voltage Cables

If you require longer cables, please specify in your purchase order or contact Radiant for us to make a custom pair.



Alumina Cables Connected to High Temperature Test Fixture