

## Handling of Vacuum Capacitors

### 1. General

Over the past months, we have had several capacitors returned to us that showed some minor mechanical damage which led to non-performance of the component. In most of these cases, rough handling typically indicated by small dents caused important changes in the electrode geometry, sometimes electrodes were even shorted.

Every such case causes a considerable loss of time and money to the user, not even considering possible consequential damage resulting from delayed shipments of the entire system for which the capacitors were ordered. This can be very annoying for our customers and yet, it can be prevented quite easily if a few very simple rules are followed:

### 2. Handling

When installing or removing vacuum capacitors, extreme care must be taken to avoid damage to the body of the capacitor that can easily displace the electrodes. Whereas this was quite visible with the old glass capacitors, it is less so with the modern ceramic types that can take higher mechanical and electrical/thermal loads. Although they look very rugged from the outside, one has to remember that due to the brazing process used to join ceramic and copper, **the copper is in a soft, annealed condition** and is therefore highly susceptible to mechanical deformation.

For this reason, any rough handling like e.g. machining of the flanges must be avoided. Use existing threads and holes for fixation

The ceramic portion of the capacitor should not be touched with bare hands or dirty rags. The film deposited onto the ceramic can be conductive and lead to unwanted arc overs or leakage currents detrimental to the operation of the system.

### 3. Shipping

For shipment, variable capacitors must be set to minimum capacitance. This minimizes the leverage on the variable electrode stack. Whenever possible use original container.