

SÄKAPHEN®-SAEKA-Reinigungspaste für Kunststoffisolatoren 83.750 (3rd party test report)

1. Introduction and objective of the test:

With increasing age, the wear and tear of high voltage insulators (made of cast resin) increases also due to deposits of dust and dirt (impurity layer load).

The aforementioned surface stress may cause unacceptable physical processes such as partial discharges, leaking currents and flashovers leading to failure of equipment as much as to destruction of material in general.

Mainly, cleaning agents for high-voltage insulators are used to thoroughly remove dust and dirt particles from the plastic surface of the high-voltage insulators.

Furthermore, by using more advanced cleaning agents with impregnation characteristics, a surface improvement of the insulator is achieved by applying a microscopic hydrophobic layer on the plastic surface. This increases the self-cleaning effect caused by rain rinsing off the dust and dirt particles.

The objective of this test is to verify the enhanced cleaning effect of **SÄKAPHEN®-SAEKA-Reinigungspaste für Kunststoffisolatoren** (Cleaning paste for plastic insulators) on high-voltage plastic insulators. The product was specially developed and manufactured for plastic insulators to prevent surface contamination more effectively compared to conventional cleaning agents

2. Tested insulators:

The high voltage insulators used as test specimen are insulators for outdoor installations with a cast resin surface (plastic/polymer) with a nominal voltage of $U_N = 12$ kV.



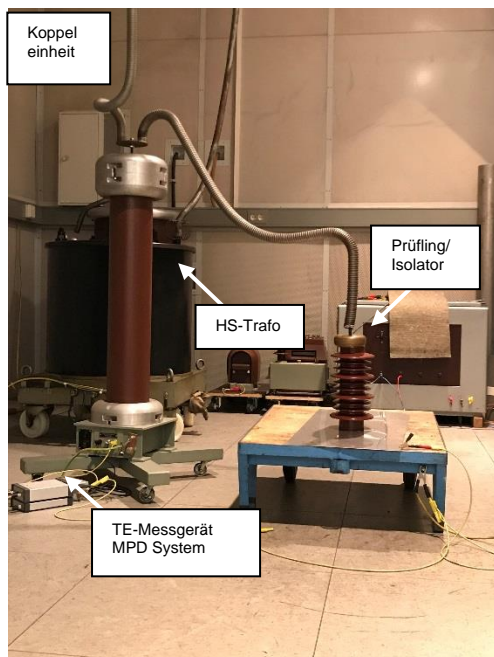
12kV insulator for outdoor installation

As surface preparation, the insulators are being treated with **SÄKAPHEN®-SAEKA-Reinigungspaste für Kunststoffisolatoren** and for comparison purpose with

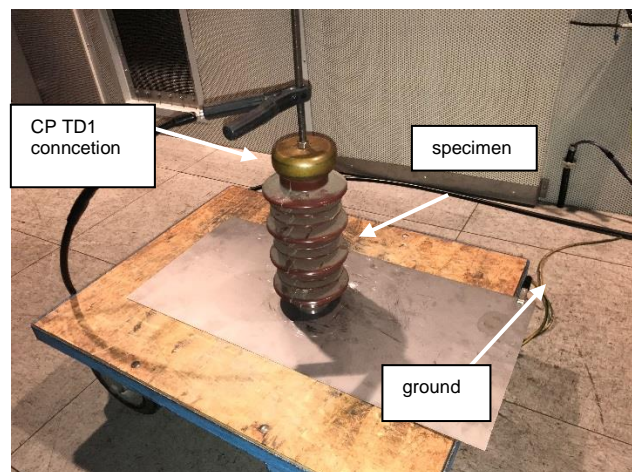
conventional cleaning agents for electrical appliances. These cleaners are distributed by various companies: RIVOLAT, CRC, WEICON etc.

3. Measuring gauge / test procedure:

- To carry out the partial discharge measurements, high voltages of up to 50kV are applied and the **MPD-Messsystem** from **Omicron** is used.
- The loss factor $\tan(\delta)$ is measured with the **CPC-100 + CP-TD1** measuring system from **Omicron**.
- The leakage current is measured with a **Fluke-289 Multimeter**.



Test setup TE measurements with the MPD system



Test setup for loss factor determination

4. Test results:

In general, it can be stated that the partial discharge application point for cleaned high-voltage insulators is significantly higher than that of contaminated components of the same type. In addition, the loss factor of dust and dirt-free surfaces is lower as well.

Test.-Nr.:	Point of partial discharge in kV (Säkaphen)	Loss factor in % (Säkaphen)	Point of partial discharge in kV (conventional cleaners)	Loss factor in % (conventional cleaners)
1-1	35	0,190	32	0,350
1-2	37	0,210	33	0,380
1-3	33	0,200	31	0,320
mean	35	0,200	32	0,350

The point of partial discharge of high voltage insulators treated with **SÄKAPHEN®-SAEKA-Reinigungspaste für Kunststoffisolatoren** is 35vK compared to 32kV of high voltage insulators treated with conventional cleaners. The values thus prove an increased point of partial discharge when the high voltage insulator is treated with **SÄKAPHEN®-SAEKA-Reinigungspaste für Kunststoffisolatoren**.

Furthermore, the cleaning of high voltage insulators with **SÄKAPHEN®-SAEKA-Reinigungspaste für Kunststoffisolatoren** results in a reduced loss factor of $\tan(\delta) = 0.2\%$. This means a reduction of the loss factor by 0,15% compared to the loss factor of insulators being treated with conventional cleaners

The use of **SÄKAPHEN®-SAEKA-Reinigungspaste für Kunststoffisolatoren** is therefore recommended in order to reduce operating costs due to reduced maintenance and reduced risk of failure.