

## Field Experiences of RTV Coated Insulators in Heavy Polluted Areas

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Would the experts from other countries/utilities share their experience in use of RTV coated insulators in heavy polluted areas and ageing over the years?

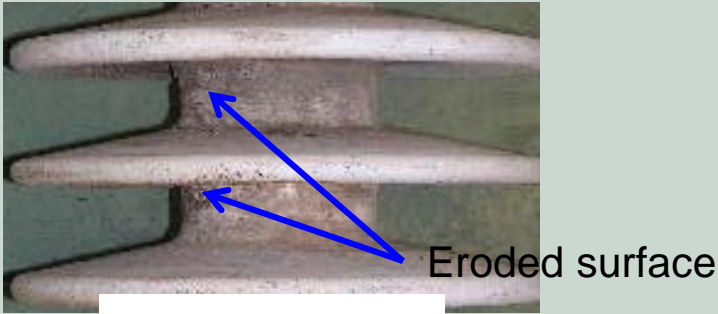
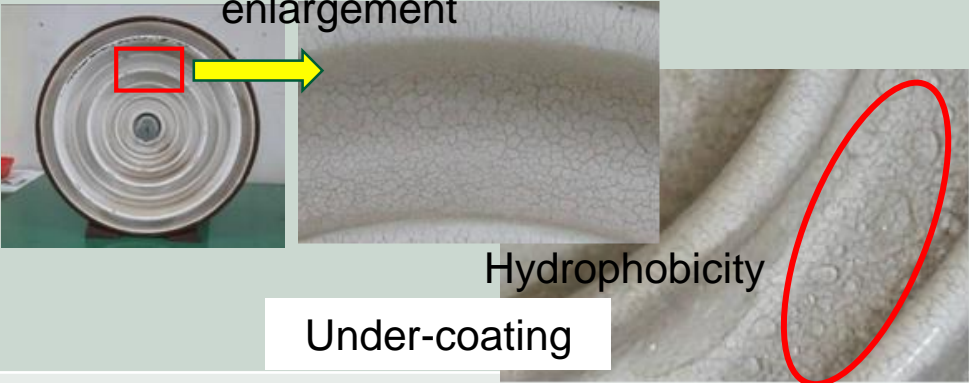
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**NGK INSULATORS**

# 1) Field experience

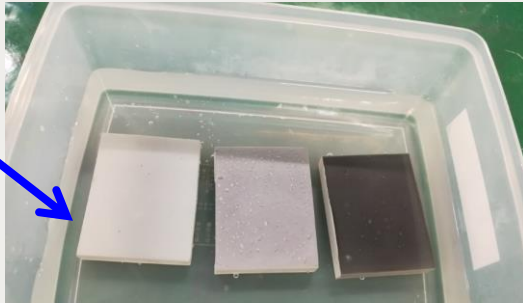
- Satisfactory level of field performance of RTV coated insulators removed from two types of heavy polluted areas in Middle East and Japan was observed.

Area	Middle East	Japan
Voltage	AC 380kV	DC ±250kV (Designed voltage: ±500kV)
Pollution condition	Very Heavy as per IEC 60815-1	Very Heavy (Designed ESDD:0.375mg/cm <sup>2</sup> )
Specimen	Standard long rod (4units per string) Specific creepage distance: 86.5 mm/kV (phase-to-earth)	460mm DC fog disc (52 units per string) Specific creepage distance: 158 mm/kV
Exposure period	5 years (2002-2007)	10 years (2000-2010)
Surface observation	 <p>Eroded surface</p> <p>Whole-coating</p>	 <p>enlargement</p> <p>Hydrophobicity</p> <p>Under-coating</p>
Note	<p>Surface erosion was observed, and <b>nitric acid</b> was detected on trunk portion of the rubber. However significant higher fog flashover voltage than operational voltage can be obtained by laboratory test. On the other hand, the flashover voltage would be decreased with time.</p>	<p>Slight rough surface was observed. However, no erosion and excellent hydrophobicity was appeared. No significant pollution events have been reported even now.</p>

## 2) Proposed verification test (Nitric acid Immersion)

- It is found that the nitric acid generated by partial arc discharges under heavy pollution and high humid conditions causes deterioration of the eroded surface. Therefore, acid resistivity of the rubber (i.e. discharge resistivity) is one of important factors. **Nitric acid immersion test is recommended to discriminate high quality RTV silicone rubbers.**

1 mol/dm<sup>3</sup>



High quality, Poor quality, No-coated  
RTV Coated Test Plate in Nitric Acid (1 mol/dm<sup>3</sup>)

After  
500 hours



High quality  
<No change>



Poor quality  
<Coating peeled>

## 3) Additional discussion

- Accelerated ageing test (ie, the 2000-hour test) for RTV coated insulators is described in CIGRE TB 837. This test procedure seemed not to simulate such specific very heavy pollution areas, also it is very complicated test. In addition, why the energized conditions does not continue for full testing periods. The above proposed test can be carried out in a short time, and also it is very simple and effective.

(end)