

<b>Examination Procedure</b>  <small>Rubrik / Title</small> <b>Temperature and Radiation withstanding of insulated conductors</b>	<small>Beteckning / Document</small> <b>KBE EP-135</b>
	<small>Utgåva / Issue</small> <b>3 (E)</b>
	<small>Datum / Date</small> <b>2013-08-20</b>
	<small>Ersätter / Supersedes</small> <b>2 (E)</b>

## 1 Scope

This Examination Procedure is applicable to all insulated conductors, including optical conductors, where requirement on verification of heat and/or ionizing radiation withstanding is raised.

Verification is normally carried out as type inspection.

## 2 Objective

To check the heat and radiation resistance of insulated conductors and accessories like joints and moulding.

## 3 Method

The test item is to be subjected to thermal ageing, radiation ageing, voltage test and visual inspection.

The test shall be performed on at least three samples of such a length that at least three meters of each sample is exposed to the specified test environment (e.g. wet test)

Product specifications and test conditions are detailed on a separate sheet (page 4).

### Thermal- and radiation ageing

Thermal- and radiation aging must be performed according to KBE EP-154.

### Post-treatment

After irradiation. the conductors are to be straightened out and wound into a coil with an internal diameter of 20 times the external diameter of the conductor, or smaller.

For joints, mouldings, cast sections, cable tails etc, post-treatment is not required.

Following post-treatment the samples must pass the dielectric test specified below. For Fibre Optic conductors an attenuation measurement according to KBE EP-123 is to be performed instead of dielectric tests.

### Voltage test

The stripped ends of the conductor must be secured with metallic contact to a metallic bar. The sample is then immersed in a 5% solution of sodium chloride in water, the solution being kept at

the maximum operating temperature for the sample. The ends of the insulation shall protrude about 50 mm above the surface of the water.

When the test specimen has been immersed for five hours, the test voltage specified in the separate specification sheet is to be applied between the conductor and an electrode in the liquid.

The voltage is to be increased at a uniform rate from zero to the specified voltage level over about 30 seconds, and kept at this value for five minutes and then reduced to zero over a period of 30 seconds.

### **Visual inspection**

After drying the sample is to be visually inspected for cracks, reticulation, discolouring or other damage to the insulation.

## **4 Acceptance Criteria**

If a breakdown of flashover occurs during withstand voltage test, or if the attenuation exceeds the specified value, the sample is to be regarded as having failed.

Any crack, reticulation, large area of discoloration or other fault found by visual inspection (without any optical aids) results in rejection of the test item.

## **5 Documentation**

Type inspection (design verification) carried out is to be documented in a technical report as required in the Inspection Plan. The complete type inspection of the product may be documented in the same report.

The report must as a minimum include the following:

- Product identification

Product type, designations, versions, variations, etc.

- Test specimens

Type, designation, quantity, serial numbers, preparations, etc.

- Identity/Traceability

The identity of the product/test specimens in comparison with the Manufacturers specification and/or in comparison with the Technical Specification must be clearly specified as per KBE EP-180.

- Test procedure

It must be clearly stated if the inspection has been performed according to this Examination Procedure or to any other procedure agreed upon.

- Acceptance criteria

Performance requirements before, during and after specified tests.

- Test set-up

Detailed description of test set-ups, electrical and mechanical interfaces.

- Measurement equipment

Type of equipment, accuracy, identification, etc, and current calibration data for monitoring and recording equipment.

- Results

It must be evident whether or not the items have fulfilled stated requirements and acceptance criteria. Measured and recorded values that are to be documented as per the procedure as well as any deviations from requirements in applicable specifications or test procedures must be reported.

- Approval

Date of inspection and name of responsible inspector shall be included. The report must be reviewed and approved in accordance with the Manufacturers or the laboratory's internal QA/QC routines.

The following data and test conditions must be checked by the person or department responsible for the Supplier's quality assurance before the sample is sent to the test laboratory.

Supplier's workorder no. ....

Product specification .....

Specification .....

Conductor insulation .....

Splice- and moulding materials .....

Drawing no. (splices etc) .....

**Thermal ageing data**

Expected installed life .....years

Long-term material properties, specification no .....

**Radiation data**

Surrounding medium during radiation .....

Temperature of this medium during radiation .....°C

Integrated radiation dose .....Gy

## Voltage testing

Test voltage (AC, 50 Hz)

.....V