

REPORT

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Reference MTz7P07893-R01 Page 1 (7)

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Electrical Type test of a fiberglass ladder

Abstract

The tested fibre glass ladder was subjected to an alternating 50 Hz voltage dielectric test in accordance with SS-EN 131-2:2010+A1:2012 section 5.16.3. Prior the dielectric test the ladder was conditioned in a water bath. The ladder fulfils the type test requirements.

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Identification

Object:	One-piece leaning rung fibre glass ladder, 6 rungs, 280mm distance between rungs, Item no. 211.006,
Test location:	Borås, Sweden
Test date:	21th of November – 22th of November, 2017

Commission

Electrical type test according to SS-EN 131-2:2010+A1:2012 section 5.16.3 was performed on the one-piece leaning rung fibre glass ladder item no 211.006.

A mechanical ageing test according to section 5.16.1.3 was not performed prior the electrical test.

Table 1 Type test sequences

Clause	Test	Reference	Result
5.16.3	Dielectric test	see page 7	Accepted

Measurement conditions

Temperature: $23.0 \pm 2.0 \text{ °C}$

REPORT

Date Reference 2017-12-11 MTz7P07893-R01

Page

3(7)



Test setup

The ladder was immersed in water for 24 hours. The water conductivity was measured before the ladder was immersed in the water bath, se figure 1. The requirement for the water conductivity is $100 + -15 \Omega$.m.



Figure 1. The ladder immersed in a water bath for 24 hours.



After the ladders have been conditioned in the water bath the ladder was drained on water by placing the ladder vertical for 4 hours, se figure 2A. The ladder was wiped dry with a soft cloth and metallic electrodes with a radius of 2.5 mm were applied to two adjacent rungs on the ladder and connected to the stile of the ladder, se figure 2B.

Reference

MTz7P07893-R01

Page

4(7)

Date

2017-12-11



Figure 2A. The ladder removed from the water and placed vertical. 2B. Electrode connected to the rung and the stile.



Reference 2017-12-11 MTz7P07893-R01





An alternating voltage with a amplitude of 933 V RMS 50 Hz was applied between two adjacent rungs for 1 min. The voltage was measured with a high voltage divider connected to a low voltage arm. The voltage was recorded with a precision multimeter. The temperature surface stile was measured with a thermocouple connected to a portable thermometer. The temperature was recorded before and after the voltage test.

Date



Figure 3. Test setup during electrical test.



Traceability

RISE is National Laboratory for electrical quantities and time and frequency by appointment of the Swedish government. RISE realizes fundamental units such as volt, ohm and second from primary standards. Traceability for other units is established from these realizations by means of in-house calibrations and scientific analyses. To ensure international equivalence and acceptance of the established traceability, interlaboratory comparisons are made between national laboratories.

Reference

MTz7P07893-R01

Page

6(7)

Date

2017-12-11

Equipment

BX710086 Conductivity meter Lutron WA-2017SD BX40464, Multimeter HP3458A 603268, Compressed gas capacitor WSTS CP100 900401, Coaxial cable for W.S.T.S. CP 100 503161, Low voltage arm orange 0.37 µF BX71868, Fluke 54 II, Temperature meter





Results

Summary

Electrical type test according to SS-EN 131-2:2010+A1:2012 section 5.16.3.

Identification number	Туре	Distance d between 2 rungs [mm]	Applied Voltage for 1 min* [V]	Stile surface temperature before applied voltage [°C]	Stile surface temperature after applied voltage [°C]
211.006	one-piece leaning rung ladder, 6 rungs	280	933	23.0	23.0

*The applied voltage is defined as Um (Volt) = 1000 x d/300

The tested ladder passed the test without flashover, puncture or temperature rise on the insulation material.

Measurement uncertainty

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty has been determined in accordance with EA Publication EA-4/02.

The high voltage measuring equipment has an uncertainty less than ± 0.15 %. The measuring equipment for water conductivity has an uncertainty less than ± 0.5 %.

Conclusion

The tested ladder fulfils the requirements for dielectric test in accordance with SS-EN 131-2:2010+A1:2012 section 5.16.3.

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