



EGU HV LABORATORY

Accredited testing laboratory No.: 1029
Accredited by Czech Accreditation Institute
according to ČSN EN ISO/IEC 17025:2018

TEST REPORT No.: 11788/I/21

CUSTOMER:

Jiangsu Shemar Electric Co., Ltd.
66 Haiwei Road
226 017 Nantong, Jiangsu
China



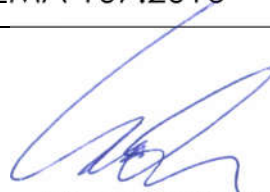
TEST OBJECT: 161 kV Composite insulator

TYPE SPECIFICATION: SML 222 kN

TEST STANDARDS: CSA C411.4-16, CSA C411.1-16,
IEC 60383-1 Ed.4:1993, NEMA 107:2016


Michal Novotný
Test engineer


Marek Brosch
Head of
EGU HV LABORATORY


Jan Lachman, Ph.D.
Director of
EGU - HV Laboratory a. s.

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TEST REPORT**No.: 11788/I/21****TEST OBJECT:** 161 kV Composite insulator**TYPE SPECIFICATION:** SML 222 kN**DRAWING No.:** 21SM510757 Rev. B**MANUFACTURER:** Jiangsu Shemar Electric Co., Ltd.**DATE OF DELIVERY:** 2021-12-09**DATE OF TESTS:** From 2022-02-28 till 2022-03-04**ORDER No.:** Contract 23/21**TESTS WITNESSED BY:** N/A

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1 TEST SUMMARY

| Test title | Test standards | Test result |
|--|---|-------------|
| Corona test | CSA C411.4-16, clause 6.4.4 | Passed |
| Critical impulse flashover test | CSA C411.4-16, clause 6.2 CSA C411.1-16, clause 6.5.1 to 6.5.3 | Passed |
| Wet power frequency voltage flashover test | CSA C411.4-16, clause 6.3 CSA C411.1-16, clause 6.4 | No criteria |

2 TESTS PERFORMED

2.1 Corona test

2.1.1 Test procedure

Date of test: 2022-02-28

The test was carried out according to CSA C411.4-16, clause 6.4.4 and customer requirements. The test was performed on one composite insulator assembly, including grading rings, serial No. 2111161507.

After the test room was thoroughly darkened the voltage above corona point was applied and held for 5 minutes. The voltage was then reduced until corona disappeared from the test object to measure the corona extinction voltage. This procedure was three (3) times repeated. Field glasses were used for the observation of the corona. Measured extinction voltages are shown in Table 2.

The test arrangement was set up according to CSA C411.4-16, clause 6.4.2.2 (see Figure 2). The bundle of double conductors with spacing 457 mm was simulated using an aluminium tube of 14 m length and 30 mm diameter. Both ends of the tubes were terminated with corona shielding spheres (screening electrode) with a diameter of 300 mm. Bundle of conductors was at a height of 4,4 m above the ground.

The exact line configuration (conductor surface voltage gradient E_2) was not known in time of the test. The client specified test voltage (minimum corona extinction voltage) as 120% of maximum design phase-to ground service voltage i.e. $V_T = 1,2 \times 169/\sqrt{3} = 117$ kV.

The test object at the specified test voltage is shown in Figure 4. The corona discharges are shown in Figure 5.

Radio interference voltage RIV was measured according to NEMA 107. RIV (expressed in decibels relative to 1 μ V across 150 Ω) was measured at the frequency of 1,0 MHz in compliance with the circuit diagram in Figure 3-3a of NEMA 107, Section 3.

The circuit RIV factor was 0,42.

Measured RIV values are shown in Table 1.

Testing and measuring equipment:

coupling capacitance, 1 000 pF, 800 kV, serial No. 11100108.10.1
measuring impedance Power Diagnostix, NEMA 150 Ω , type CIT4M/V8 μ 0/RIV, serial No. 12533
test transformer TuR Dresden 5,7/1 200 kV, 1 500 kVA
inductive regulator ČKD Praha 6/ 0 - 3 kV, 50 kVA
capacitive divider TuR Dresden 1 200 kV, 150 pF, type WMC 160/1200, serial No. 884470
universal voltmeter Haefely Trench, type DMI 551, serial No. 150505
RIV meter - measuring receiver Power Diagnostix, type RIV meter, serial No. 035
calibrator Power Diagnostix, type CAL3B, serial No. 3014
measuring system for atmospheric condition COMET, serial No. 10910247
digital stop-watch Kalenji, PM-259
field glasses Nikon Action EX 7x50, serial.No. 320695
measuring telescopic stick 5m, type BMI, serial No. 102

2.1.2 Test results

Table 1 Test results of the RIV test

| | | | |
|---------------------------|-------------------|-------------------|-------------------|
| U_m (kV) | 169 | | |
| Atm. conditions | | | |
| p (kPa) | 100,5 | | |
| t (°C) | 15,6 | | |
| RH (%) | 32,9 | | |
| Test voltage (kV) | RIV ↓ (μV) | RIV ↑ (μV) | RIV ↓ (μV) |
| 213 | 25 119 | 25 119 | 25 119 |
| 201 | 22 387 | 22 387 | 22 387 |
| 189 | 15 849 | 15 849 | 15 849 |
| 177 | 22 | 22 | 22 |
| 165 | 22 | 22 | 22 |
| 153 | 22 | 22 | 22 |
| 141 | 22 | 22 | 22 |
| 129 | 22 | 22 | 22 |
| 117 | 22 | 22 | 22 |
| 105 | 22 | 22 | 22 |
| 93 | 22 | 22 | 22 |
| 81 | 22 | 22 | 22 |
| | | | |
| 0 | 22 | 22 | 22 |

Table 2 Test results of the corona test

| | |
|-----------------------------------|---------------------------|
| U_m (kV) | 169 |
| Atm. conditions | |
| p (kPa) | 100,5 |
| t (°C) | 15,6 |
| RH (%) | 32,9 |
| Measurement No. | U_e (kV) |
| 1 | 186 |
| 2 | 185 |
| 3 | 184 |
| Average value | 185 |
| Location of corona | Corona ring |
| Criteria: U _e > 117 kV | |

Evaluation:

Measured corona extinction voltages U_e were greater than the specified minimum corona extinction voltage of 117 kV.

Statement of conformity:

161 kV Composite insulator, SML 222 kN, drawing No. 21SM510757 Rev. B, passed the test according to requirements given in CSA C411.4-16, clause 6.4.4.

2.2 Critical impulse flashover test

2.2.1 Test procedure

Date of test: 2022-03-01

The test was carried out according to CSA C411.4-16, clause 6.2 and CSA C411.1, clause 6.5.1 to 6.5.3.

The tests were performed on three insulators:

No. 1, serial No. 2111161507,
No. 2, serial No. 2111161501,
No. 3, serial No. 2111161505.

The critical impulse voltages of both polarities were determined by the up and down method with 30 impulses according to CSA C411.1-16, clause 6.5.3.

All measured voltages were corrected to the standard reference atmospheric conditions according to CSA C411.1-16, clause 6.2.5 and 6.2.6.

The representative wave shape of the lightning impulse 1,2/50 μ s is given Graph 1.

The test arrangement was set up in compliance with IEC 60383-1, clause 34 (see Figure 6).

Testing and measuring devices:

impulse generator HighVolt IGL 180/1800G, serial No. IGG2295141
capacitive/resistive divider HighVolt, type MCR 0,4/2000-1000/1000 H391-41, serial No. MCR2295141/103732
measuring system High Volt, type HiRES S4D, serial No. HIGG2295141
tape measure 7,5 m, Assist, PM-242
measuring system for atmospheric condition COMET, serial No. 14900363

2.2.2 Test results

Table 3 Test results of the critical impulse flashover test

| Test sample No. | 1 | | 2 | | 3 | |
|--|-------|-------|-------|-------|-------|-------|
| Impulse polarity | + | – | + | – | + | – |
| Atm. conditions: | | | | | | |
| air pressure (kPa) | 98,9 | 98,9 | 98,9 | 98,9 | 98,9 | 98,9 |
| air temperature (°C) | 16,5 | 16,5 | 16,9 | 16,9 | 16,5 | 16,5 |
| relative humidity (%) | 32,8 | 32,8 | 30,0 | 30,0 | 31,2 | 31,2 |
| Correction factors: | | | | | | |
| air density correction factor k_1 | 0,988 | 0,988 | 0,987 | 0,987 | 0,988 | 0,988 |
| humidity correction factor k_2 | 0,942 | 0,952 | 0,941 | 0,951 | 0,942 | 0,952 |
| atmospheric correction factor K_t | 0,931 | 0,941 | 0,928 | 0,939 | 0,931 | 0,941 |
| Critical impulse flashover voltage (kV) | 841 | 884 | 844 | 888 | 846 | 891 |
| Polarity | + | | | - | | |
| Average critical impulse flashover value of the three insulators (kV) | 844 | | | 888 | | |
| Measured arcing distance: 1 360 mm | | | | | | |
| Drawing specified critical impulse flashover voltage: 780 kV | | | | | | |
| CSA C411.-16, Table 2 specified critical impulse flashover voltage: 780 kV | | | | | | |

Evaluation:

The average critical impulse flashover value of the three insulators was equal to or exceed 95% of the rated critical impulse flashover value specified by CSA C411.4-16, Table 2 and drawing 780 kV, i.e. 741 kV.

Statement of conformity:

161 kV Composite insulator, SML 222 kN, drawing No. 21SM510757 Rev. B, passed the test according to requirements given in CSA C411.4-16, clause 6.2. and client requirements.

2.3 Wet power frequency voltage flashover test

2.3.1 Test procedure

Date of test: 2022-03-04

The test was carried out according to CSA C411.4-16, clause 6.3 and CSA C411.1-16, clause 6.4.

The tests were performed on three insulators:

No. 1, serial No. 2111161507,

No. 2, serial No. 2111161501,

No. 3, serial No. 2111161505.

Characteristics of the artificial rain and precipitation method was in accordance with the CSA C411.1-16, clause 6.4.3.

The wet power-frequency flashover voltage test was performed according to CSA C411.1-16, clause 6.4.4. The flashover voltage was obtained by increasing the voltage continuously from zero up to flashover. The average of five flashovers was calculated.

All measured voltages were corrected to the standard reference atmospheric conditions according to CSA C411.1-16, clause 6.2.5 and 6.2.6.

The test arrangement was set up in compliance with IEC 60383-1, clause 34 (see Figure 7).

Testing and measuring equipment:

synchronous generator BEZ Bratislava 6 kV, 1 300 kVA, 50 Hz

test transformer TuR Dresden 5,7/1200 kV, 1500 kVA, serial No. 884469

capacitive divider TuR Dresden 1200 kV, 150 pF, type WMC 160/1200, serial No. 884470

universal voltmeter Haefely Trench, type DMI 551, serial No. 150505

measuring system for atmospheric conditions Comet, serial No. 10910247

tape measure 5 m, CXS, PM-241

digital stop-watch Kalenji PM-259

conductivity meter WTW Cond 3310, serial No. 10410891

plastic measuring cylinder 50ml, identification No. 1/153/14 & 2/153/14

2.3.2 Test results

Table 4 Test results of the wet power frequency flashover voltage test

| Test sample No. | 1 | 2 | 3 |
|--|---------------|---------------|---------------|
| Atm. conditions: | | | |
| air pressure (kPa) | 98,9 | 98,8 | 98,9 |
| air temperature (°C) | 15,6 | 15,6 | 15,6 |
| relative humidity (%) | 51,4 | 51,4 | 51,4 |
| Rain parameters: | | | |
| vertical (mm/min) | 1,7 | 1,7 | 1,7 |
| horizontal (mm/min) | 1,3 | 1,3 | 1,3 |
| Conductivity (µS/cm) | 99 | 99 | 99 |
| Correction factors: | | | |
| air density correction factor k ₁ | 0,991 | 0,991 | 0,991 |
| humidity correction factor k ₂ | 1,000 | 1,000 | 1,000 |
| atmospheric correction factor K _t | 0,991 | 0,991 | 0,991 |
| Flashover voltage | 471 kV | 473 kV | 476 kV |
| The average wet flashover voltage of the three insulators | 473 kV | | |
| Measured arcing distance: 1 360 mm | | | |
| Drawing specified wet power frequency flashover voltage: 470 kV | | | |

3 LIST OF SYMBOLS

| | |
|----------------------------|---|
| RIV | radio interference voltage (μV) |
| V_t | test voltage specified by client (kV) |
| U_m | maximum design phase-to-phase service voltage |
| U_e | extinction corona voltage (kV), corresponding to actual atmosphere |
| p | air pressure (kPa) |
| t | air temperature ($^{\circ}\text{C}$) |
| RH | relative humidity (%) |
| k₁ | air density correction factor |
| k₂ | humidity correction factor |
| K_t | atmospheric correction factor |
| U_{pk} | maximum voltage of recorded curve (kV) |
| β' | relative overshoot (%) |
| T₁ | front time of recorded curve (μs) |
| T₂ | time to half-value of recorded curve (μs) |
| vertical c. | average value of rainfall intensity – vertical component (mm/min) |
| horizontal c. | average value of rainfall intensity – horizontal component (mm/min) |
| conductivity | water conductivity ($\mu\text{S/cm}$) |

4 UNCERTAINTY OF MEASUREMENTS

| QUANTITY | UNCERTAINTY (k=2) | |
|----------------------------|-------------------|-------|
| Lightning impulse voltage | U_{pk} | 1,7 % |
| | T_1 | 8,0 % |
| | T_2 | 3,1 % |
| Radio interference voltage | 1,0 dB | |
| Power-frequency voltage | 1,7 % | |
| Air pressure | 0,5 % | |
| Temperature | 4,0 % | |
| Relative humidity | 6,3 % | |
| Time | 0,7 % | |
| Telescopic stick | 0,8 % | |
| Length (tape measure) | 1,6 % | |
| Rainfall intensity | 10 % | |
| Conductivity | 5,0 % | |

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 (Gaussian) distribution corresponds to a coverage probability of approximately 95 %. Details related to the statement of conformity when applied are given in a price quotation submitted to a customer before the testing and on the website of the laboratory.

5 PRODUCT DRAWING

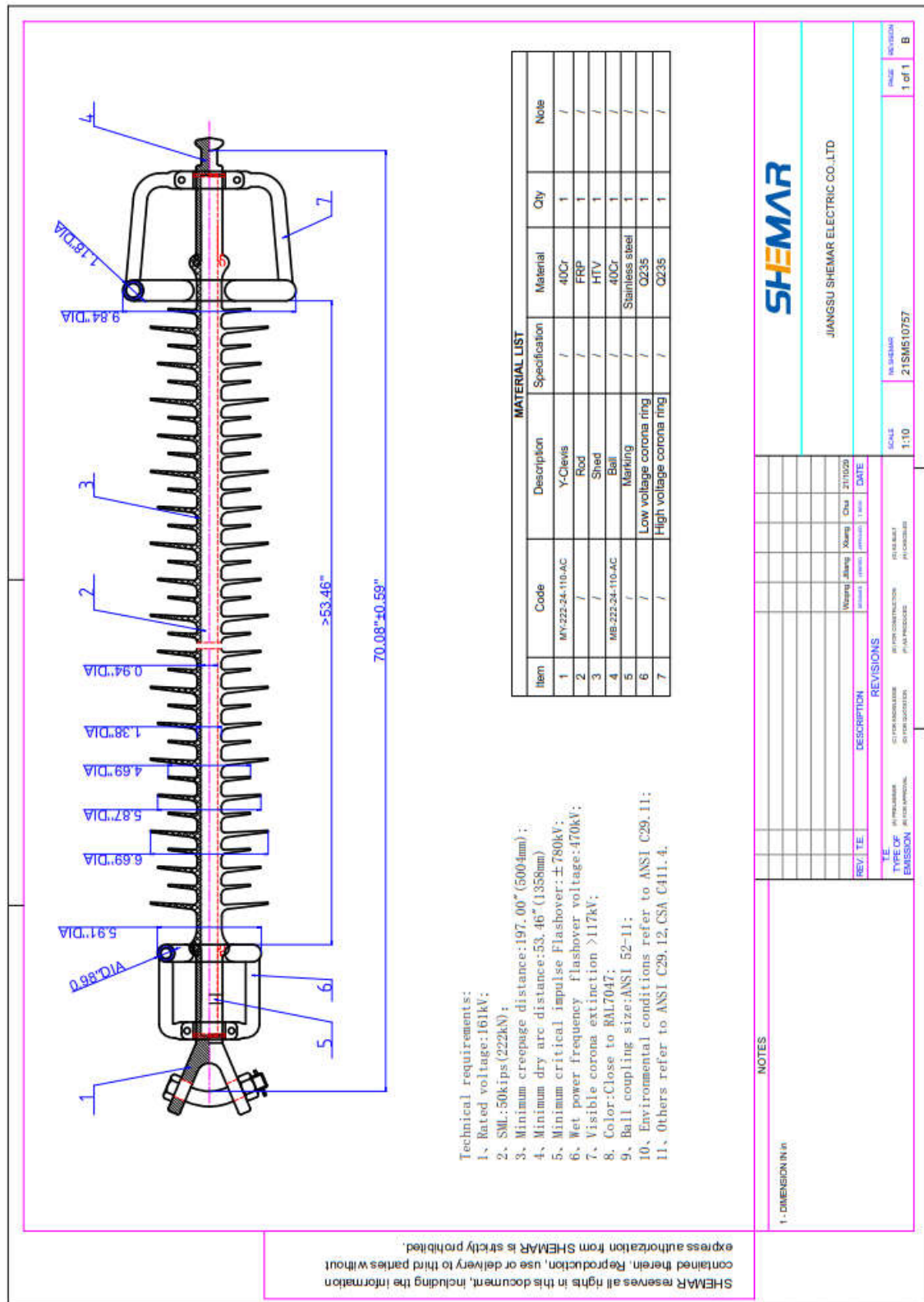


Figure 1
161 kV Composite insulator, SML 222 kN, drawing No. 21SM510757 Rev. B

6 TEST SETUP PHOTOS



Figure 2
Test arrangement for RIV and corona tests

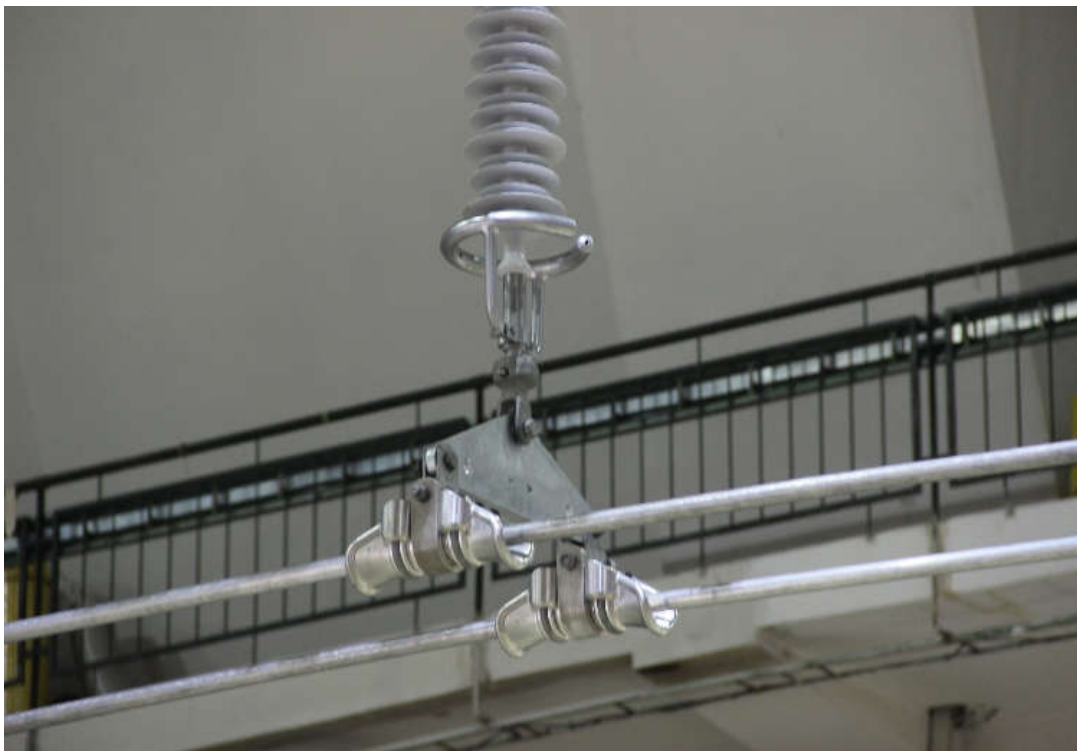


Figure 3
Test arrangement for RIV and corona tests

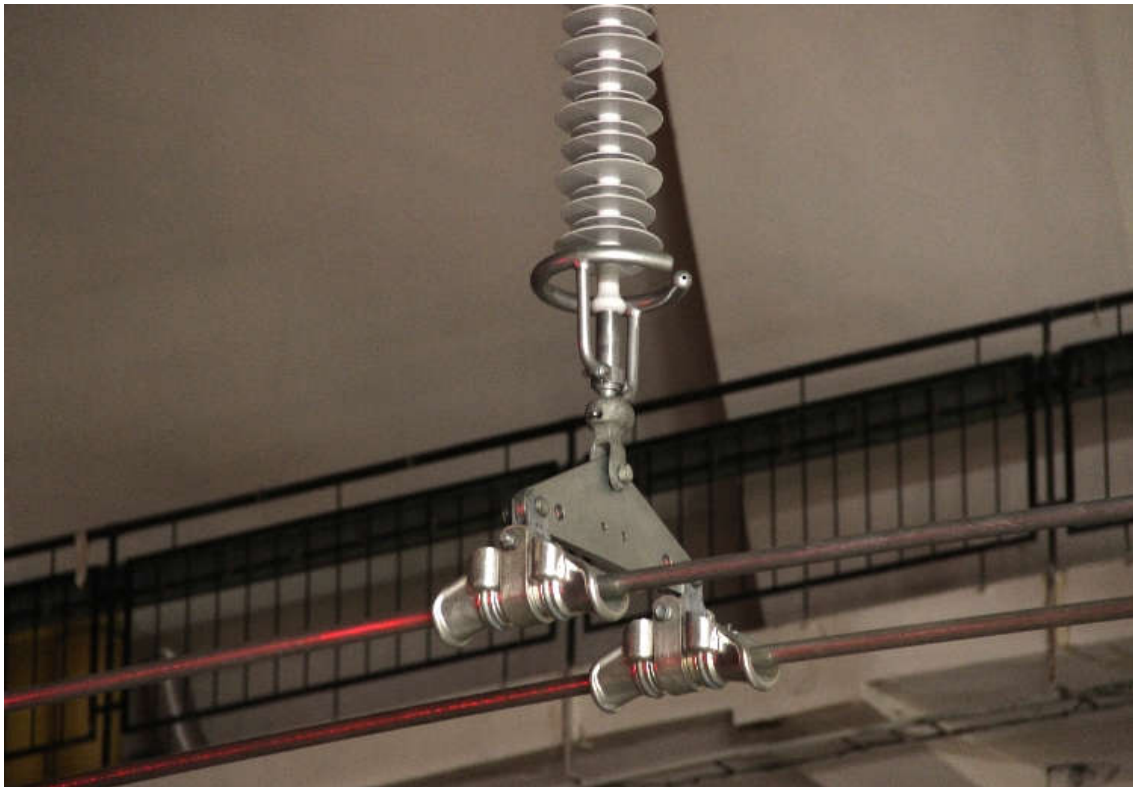


Figure 4
Test object at the test voltage of 117 kV – no positive corona



Figure 5
Test object at the test voltage of 213 kV

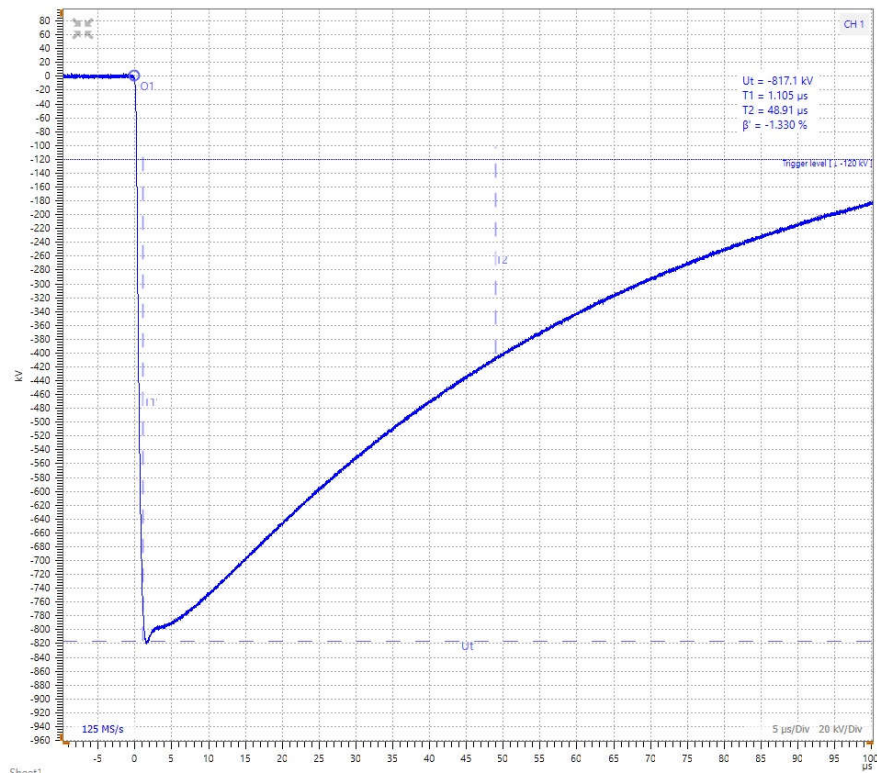
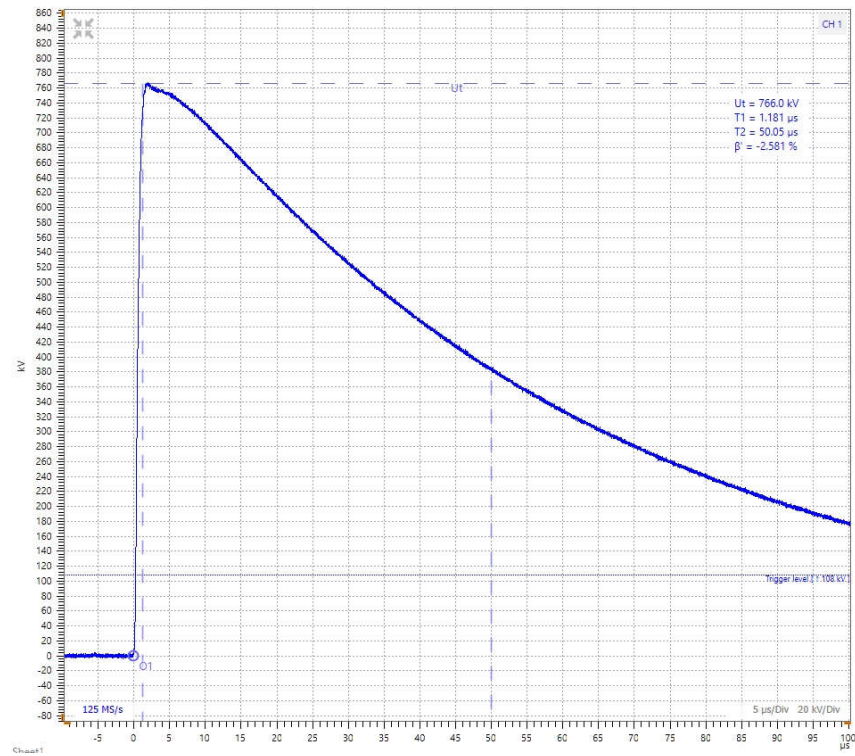


Figure 6
Test arrangement and flashover under the critical impulse flashover test



Figure 7
Test arrangement and flashover under the wet power frequency voltage flashover test

7 GRAPHS



Graph 1
Representative wave shape of the lightning impulse 1,2/50 μs

- end of test report -



Testing laboratory No. 1595
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according to ČSN EN ISO/IEC 17025: 2018



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Test report No. 59/2022/EN

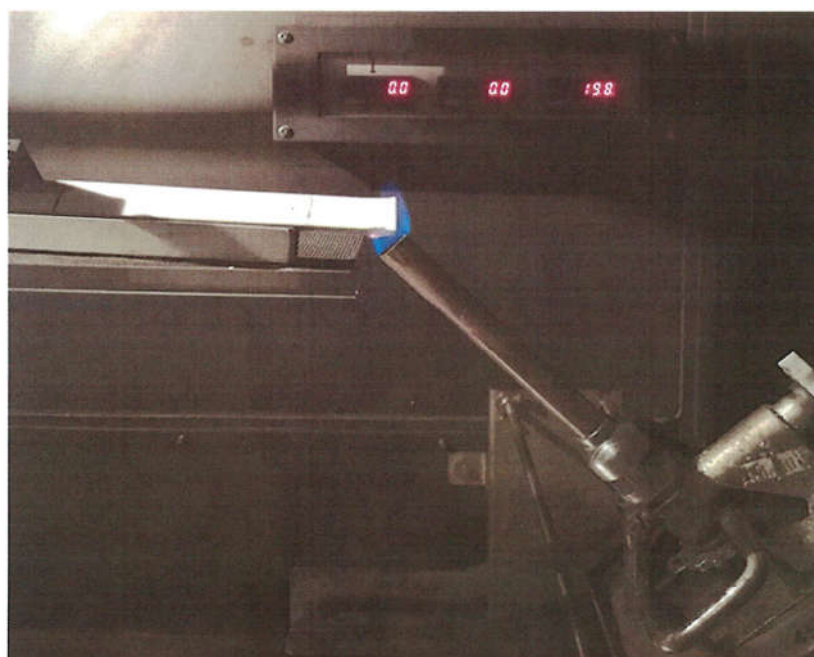
| | |
|--------------------------------|--|
| Customer: | EGU - HV Laboratory a.s., Podnikatelská 267, 190 11 Praha 9, Běchovice |
| | Company ID: 25634330, Tax ID: CZ25634330 |
| Customer's order: | 6/11788/2022 |
| Application form: | 2200223 |
| Tested material: | HTV silicone material |
| Detailed description: | Manufacturer: Jiangsu Shemar Electric Co., Ltd. |
| Form of material: | test specimens - sampled and delivered by customer |
| Preparation of samples: | test specimens supplied by customer |
| Date of receipt of the sample: | 10.1.2022 |

| Tests | Test specifications |
|---|---|
| Fire hazard testing - horizontal and vertical flame tests | UL 94: 2013 revision 05/2021 ČSN EN 60695-11-10 ed.2: 2014 |

These tests were performed in accordance with the standard ČSN EN 62217 ed.2: 2013, article 9.3.4.

| | |
|-------------|--|
| Test No. 15 | Fire hazard testing - Horizontal and vertical flame tests - method A - horizontal burning test |
|-------------|--|

Photo of the position of the test specimen during the test:



Test report No. 59/2022/EN

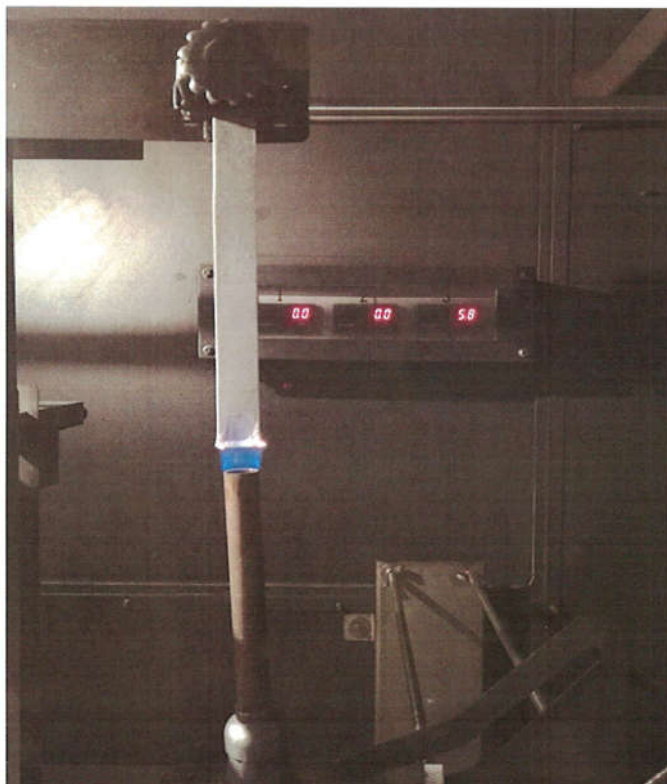
| | | | | | |
|--|--|--------------------|---------------------------|---|------------------------------------|
| Test standard: | ČSN EN 60695-11-10 ed. 2: 2014 | | | | |
| Test equipment: | Chamber Atlas HVUL2 | | | | |
| Ignition source: | Burner with an inner diameter 9.5 mm | | | | |
| | The gas used: Methane 2.5 | | | | |
| Test conditions: | Blue flame height 20 mm, the exposure time 30s | | | | |
| | No forced ventilation was used during the test | | | | |
| | Temperature: | 22,0 - 23,0°C | | | Humidity: |
| Description of the sample (sample type, the color, the location in the product, the number of samples tested): | Test specimens of grey color 125x13x3mm, 3 pieces | | | | |
| Conditioning of samples: | 48 hours at 23±2°C and 50±5% relative humidity | | | | |
| Conditioning of cotton indicator: | 24 hours in desiccator 23±2°C | | | | |
| Deviations from the standard: | no | | | | |
| Test progress: | After removing the ignition flame, the test specimens do not burn. The flame did not exceed the 25 mm mark. A support fixture was used during the test due to the bending of the test specimens. | | | | |
| Test specimen No.1 | burning stopped before 25 mm | | | | |
| Test specimen No.2 | burning stopped before 25 mm | | | | |
| Test specimen No.3 | burning stopped before 25 mm | | | | |
| | | | | | |
| No. of test specimen | Damaged length L (mm) | Burning time t (s) | Linear burn rate (mm/min) | Linear burn rate average value (mm/min) | Sample standard deviation (mm/min) |
| 1 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | | |
| 3 | 0 | 0 | 0 | | |
| | | | | | |
| Statement of conformity to specifications - classification | <p>Measured results (burning rate, damaged length) on tested three samples meet all requirements for classification</p> <p>HB according to article 8.4 ČSN EN 60695-11-10 ed.2</p> <p>This statement of conformity to specifications is given in the sense of the shared risk decision rule; without including measurement uncertainty.</p> | | | | |
| | | | | | |
| Tested and evaluated by: | Ing. Lukáš Navrátil | | | Date: | 13.1.2022 |

Test report No. 59/2022/EN

Test No. 15

Fire hazard testing - horizontal and vertical flame tests - method
B - vertical burning test

Photo of the position of the test specimen during the test:



| | | |
|--|---|------------------------|
| Test standard: | ČSN EN 60695-11-10 ed. 2: 2014 | |
| Test equipment: | Chamber Atlas HVUL2 | |
| Ignition source: | Burner with an inner diameter 9.5 mm | |
| | The gas used: Methane 2.5 | |
| Test conditions: | Blue flame height 20 mm, the exposure time 2 x 10s | |
| | No forced ventilation was used during the test | |
| | Temperature: 22,0 - 23,0°C | Humidity: 48,0 - 49,0% |
| Description of the sample (sample type, the color, the location in the product, the number of samples tested): | Test specimens of grey color 125x13x3mm, 10 pieces | |
| Conditioning of samples: | 5 pieces - 48 hours in the climate chamber at 23±2°C and 50±5% relative humidity; 5 pieces -168 ±2 hours in the hot air oven at 70±2°C and cooled in desiccator min. 4 hours at room temperature | |
| Conditioning of cotton indicator: | 24 hours in desiccator 23±2°C | |
| Deviations from the standard: | Not detected | |
| Test progress: | The test specimens do not burn after the first or after the second application of the flame. The material does not drip or ignite absorbent cotton. | |

Test report No. 59/2022/EN

| No. of test specimen: | Afterflame time after the first flame application t_1 (s) | Afterflame time after the second flame application t_2 (s) | Afterflame plus afterglow time after the second flame application t_2+t_3 (s) | Afterflame up to the holding clamp: YES - NO | Flaming particles or drops: YES - NO | Cotton indicator ignited by flaming particles or drops: YES - NO |
|--|---|--|---|---|---|---|
| Specimens conditioned in climate chamber | | | | | | |
| 1 | 0 | 0 | 0 | NO | NO | NO |
| 2 | 0 | 0 | 0 | NO | NO | NO |
| 3 | 0 | 0 | 0 | NO | NO | NO |
| 4 | 0 | 0 | 0 | NO | NO | NO |
| 5 | 0 | 0 | 0 | NO | NO | NO |
| Specimens conditioned in hot air oven | | | | | | |
| 1 | 0 | 0 | 0 | NO | NO | NO |
| 2 | 0 | 0 | 0 | NO | NO | NO |
| 3 | 0 | 0 | 0 | NO | NO | NO |
| 4 | 0 | 0 | 0 | NO | NO | NO |
| 5 | 0 | 0 | 0 | NO | NO | NO |
| Statement of conformity to specifications - classification | | The measured results (burning and afterglow times and the condition of the cotton indicators) on the ten samples tested meet all the requirements for classification V-0 according to article 9.4 ČSN EN 60695-11-10 ed. 2. | | | | |
| | | This statement of conformity to specifications is given in the sense of the shared risk decision rule; without including measurement uncertainty. | | | | |
| Tested and evaluated by: | | Ing. Lukáš Navrátil | | Date: 13.1.2022, 18.1.2022 | | |

Declaration:

Test results relates only to the test subject and refer to the sample as received
Laboratory is not responsible for sampling and specimen preparations done by customer.
Without the written consent of the Head of Laboratory, the protocol cannot be reproduced other than the entire.
All results are metrologically traceable.

Test report was created by:

Jana Trbušková
Jana Trbušková
Chief laboratory technician

Test report was approved by:

Eva Kovářová
Eva Kovářová
Laboratory manager

In Bohuslavice:

19.1.2022

End of test report



SYNPO, akciová společnost
S. K. Neumanna 1316
532 07 Pardubice - Zelené Předměstí
The Czech Republic

Department of Evaluation and Testing
Testing Laboratory No. 1105.2 accredited by CAI according to ČSN EN ISO/IEC 17025:2018

TEST REPORT T 375/006

| | |
|--|--|
| Name and contact information of the customer | EGU – HV Laboratory a.s. Podnikatelská 267, 190 11 Praha 9 – Běchovice The Czech Republic |
| Test item(s) | Manufacturer: Jiangsu Shemar Electric Co., Ltd. Address : No. 66, Haiwei Road, Sutong Science and Technology Industrial Park, Nantong City, Jiangsu 226017, China Type : HTV |
| Test procedure/method | Test No. 35: Standard Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications ASTM D2565-16 <i>(The test was included in the flexible scope of accreditation)</i> Test No. 1 : Determination of the degree of degradation of coatings APP 1 (ČSN EN ISO 4628 -1, 4, 5) Test No. 33 : Surface roughness measurement (Ra, Rz, Ry, Rq) (ČSN EN ISO 4287, ČSN EN ISO 4288) |
| Date of receipt of item(s) | January 7, 2022 |
| Internal laboratory number | 22 0066 |
| Date of the test | January 7, 2022– February 18, 2022 |
| Tested by | Gabriela Štěpánková |
| The report made by | Gabriela Štěpánková, Ondřej Janča |

This report contains 6 pages and 1 annex.

In Pardubice on March 29, 2022



Digitálně
podepsal Ing.
Vladimír Špaček,
CSc.

Dr. Vladimír Špaček
Head of testing laboratory

The test results relate only to the test item(s) as received.
This test report by itself in no way constitutes or implies product approval by any other body.
The test report shall not be reproduced except in full, without written approval of the laboratory.



TEST REPORT T 375/006

Page/Total pages: 2/6

Annexes: 1

DESCRIPTION OF THE TEST ITEM

| | |
|---|---|
| Test item: | Manufacturer: Jiangsu Shemar Electric Co., Ltd. Address : No. 66, Haiwei Road, Sutong Science and Technology Industrial Park, Nantong City, Jiangsu 226017, China Type : HTV |
| Data delivered by the customer ¹ : | - |
| Internal lab number: | 22 0066 |

¹The laboratory is not responsible for the data delivered by customer.

FURTHER SPECIFICATION OF THE TEST PERFORMANCE

The samples of testing were received from the contractor (3 pieces) and submitted to the test without any treatment of surface protection or heat storage.

Test No. 35: Standard Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications ASTM D2565-16

(The test was included in the flexible scope of accreditation)

Test was performed according to ASTM D2565-16

Testing device: Q-SUN Xe-3HS (Q-Lab Corporation, GB). Cycle number 1^H.

Exposure cycling: regular switching of drying period for 102 minutes at $(63 \pm 2) ^\circ\text{C}$ light followed by 18 minutes of light and front spray.

Light source: Xenon lamps with irradiance energy of $0.35 \text{ W/m}^2/\text{nm}$ at 340 nm. Used UBP placed horizontally at the site of sample exposure was fasten by anticorrosion screw.

The test samples were putted in testing area and the position of samples during the test was not changed – for measurements only.

Test No. 33: Surface roughness measurement

Test was performed according to ČSN EN ISO 4288 - Geometrical product specifications (GPS) - Surface texture: Profile method – Rules and procedures for the assessment of surface texture. Parameters of surface texture were measured according to ČSN EN ISO 4287- Geometrical product specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters.

Testing device: SURFTEST SJ-201 (Mitutoyo, Ltd., Japan).

Ra - arithmetical mean deviation of the assessed profile (roughness)

Rz - maximum height of profile (roughness).

Measurements were performed six times on each sample.

Measurement conditions: basic roughness length 0,8 mm

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DESCRIPTION OF THE TEST ITEM

| | |
|---|---|
| Test item: | Manufacturer: Jiangsu Shemar Electric Co., Ltd. Address : No. 66, Haiwei Road, Sutong Science and Technology Industrial Park, Nantong City, Jiangsu 226017, China Type : HTV |
| Data delivered by the customer ¹ : | - |
| Internal lab number: | 22 0066 |

¹The laboratory is not responsible for the data delivered by customer.

APP 1 - Determination of the degree of degradation of coatings

The evaluation of surface failure (defects) was performed according standard ČSN EN ISO 4628 Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance; Part 1: General introduction and designation system; Part 4: Assessment of degree of cracking; Part 5: Assessment of degree of flaking

Lighting used in the evaluation of defect on the surface finish: the fluorescent tube, standard observation: the observation angle 0° / light incidence of angle 45°.

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VISUAL EVALUATION OF SURFACE DEFECTS ACCORDING TO ČSN EN ISO 4628 DURING THE EXPOSURE AFTER XENON TEST ACCORDING TO ASTM D2565-16

(January 7, 2022 – February 18, 2022)

(The test was included in the flexible scope of accreditation)

| Sample name | Internal Lab Number | Surface failure | Cracking | Flaking |
|-------------|---------------------|-------------------|-------------------|-------------------|
| | | ČSN EN ISO 4628-1 | ČSN EN ISO 4628-4 | ČSN EN ISO 4628-5 |
| | | degree + verbal | degree | degree |

250 hours

| | | | | |
|-----|-----------|----------------------|--------|--------|
| HTV | 22 0066/1 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/2 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/3 | 0, no visual changes | 0 (S0) | 0 (S0) |

500 hours

| | | | | |
|-----|-----------|----------------------|--------|--------|
| HTV | 22 0066/1 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/2 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/3 | 0, no visual changes | 0 (S0) | 0 (S0) |

750 hours

| | | | | |
|-----|-----------|----------------------|--------|--------|
| HTV | 22 0066/1 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/2 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/3 | 0, no visual changes | 0 (S0) | 0 (S0) |

1000 hours

| | | | | |
|-----|-----------|----------------------|--------|--------|
| HTV | 22 0066/1 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/2 | 0, no visual changes | 0 (S0) | 0 (S0) |
| | 22 0066/3 | 0, no visual changes | 0 (S0) | 0 (S0) |

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MEASUREMENT OF SURFACE ROUGHNESS ACCORDING TO ČSN EN ISO 4287, 4288

(January 7, 2022 – February 18, 2022)

| Sample name | Internal Lab Number | Arithmetical mean deviation of the assessed roughness <u>R_a</u> | | | Maximum height of profile (roughness) <u>R_z</u> | | |
|-------------|---------------------|--|------|------|--|------|------|
| | | Measuring range [μm] | | | Measuring range [μm] | | |
| | | Mean | Max. | Min. | Mean | Max. | Min. |

Before exposure

| | | | | | | | |
|------------|-----------|-------------|------|------|-------------|------|------|
| HTV | 22 0066/1 | 0,67 | 0,69 | 0,64 | 4,74 | 4,92 | 4,53 |
| | 22 0066/2 | 0,66 | 0,73 | 0,60 | 4,99 | 5,25 | 4,82 |
| | 22 0066/3 | 0,71 | 0,75 | 0,67 | 5,28 | 5,64 | 4,87 |

250 hours

| | | | | | | | |
|------------|-----------|-------------|------|------|-------------|------|------|
| HTV | 22 0066/1 | 0,67 | 0,70 | 0,63 | 4,84 | 5,11 | 4,56 |
| | 22 0066/2 | 0,69 | 0,75 | 0,65 | 5,06 | 5,47 | 4,52 |
| | 22 0066/3 | 0,72 | 0,76 | 0,65 | 5,24 | 5,78 | 4,25 |

500 hours

| | | | | | | | |
|------------|-----------|-------------|------|------|-------------|------|------|
| HTV | 22 0066/1 | 0,64 | 0,67 | 0,60 | 5,01 | 5,36 | 4,60 |
| | 22 0066/2 | 0,72 | 0,77 | 0,60 | 5,33 | 6,11 | 4,70 |
| | 22 0066/3 | 0,76 | 0,80 | 0,70 | 5,65 | 6,27 | 4,90 |

750 hours

| | | | | | | | |
|------------|-----------|-------------|------|------|-------------|------|------|
| HTV | 22 0066/1 | 0,67 | 0,70 | 0,64 | 5,18 | 5,56 | 4,88 |
| | 22 0066/2 | 0,77 | 0,80 | 0,74 | 5,64 | 5,96 | 5,32 |
| | 22 0066/3 | 0,78 | 0,80 | 0,75 | 5,76 | 6,22 | 5,29 |

1000 hours

| | | | | | | | |
|------------|-----------|-------------|------|------|-------------|------|------|
| HTV | 22 0066/1 | 0,74 | 0,78 | 0,68 | 5,81 | 6,09 | 5,22 |
| | 22 0066/2 | 0,79 | 0,81 | 0,77 | 5,95 | 6,22 | 5,69 |
| | 22 0066/3 | 0,79 | 0,83 | 0,76 | 6,14 | 6,55 | 5,78 |

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| Data delivered by the customer ¹ : | - |
| Internal lab number: | 22 0066 |

¹The laboratory is not responsible for the data delivered by customer.

Statement of conformity

The laboratory uses a binary decision rule according to ILAC-G08: 09/2019, article 4.2.1

| Test items | Prescribed test | Parameter no surface defects such as cracks, crumbling or blisters | Fulfillment of parameters |
|------------|-----------------|---|---------------------------|
| | | result according to CSA C411.4.-16 article 5.4.3 | |
| HTV | ASTM D2565-16 | no cracks, crumbling or blisters | <u>Yes</u> |

-End-

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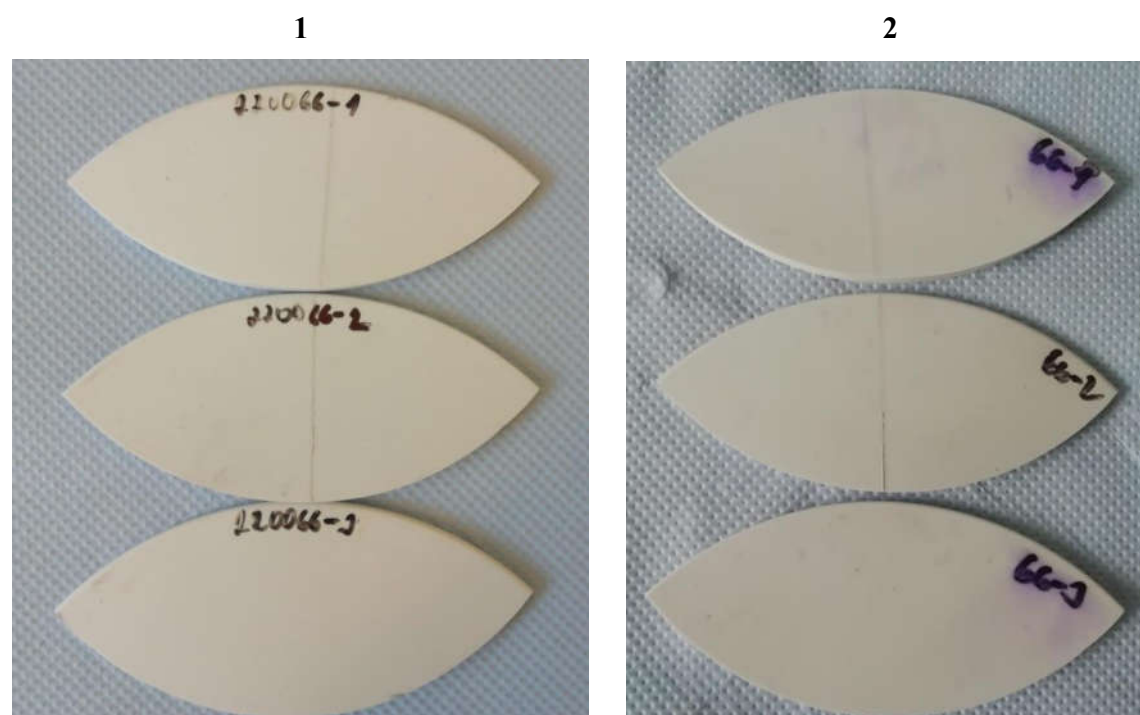
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THE PHOTOS OF TEST SAMPLES AFTER 1000 HOURS OF EXPOSURE UNDER XENON LAMPS ACCORDING TO ASTM D2565-16

(The test was included in the flexible scope of accreditation)



Pic 1 : Exposure after 1000hrs (top face)

Pic 2 : Exposure after 1000hrs (lower face)