



**ELECTROTECHNICAL TESTING INSTITUTE**  
**Pod Lisem 129**  
**171 02 Praha 8 - Troja**

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No. of the Test Report: 802532-08/01

Issued:23.1.2009



## TEST REPORT

**Name of product:** Lightning arrester  
**Type of product:** HZ110, HZ110/400  
**Ratings:** Un:230 V/50 Hz, limp: 110 kA(10/350), In: 110 kA(8/20),  
Up: < 2,5 kV  
Un:400 V/50 Hz, limp: 110 kA(10/350), In: 110 kA(8/20),  
Up: < 1,5 kV  
**Serial number:** ---  
**Manufacturer:** HAKEL spol. s r. o., Bratří Štefanů 980, 500 03  
Hradec Králové, Slezské Předměstí,  
Czech Republic  
**Production site:** HAKEL spol. s r. o., Bratří Štefanů 980, 500 03  
Hradec Králové, Slezské Předměstí,  
Czech Republic  
**EZÚ product coding system:** 020499 – other  
**Ordering firm:** HAKEL spol. s r. o., Bratří Štefanů 980, 500 03  
Hradec Králové, Slezské Předměstí,  
Czech Republic  
**Number of tested samples:** 1  
**Samples submitted on:** 17.6.2008  
**Location of testing:** EZÚ  
**Tested from** 13.1.2009 **through** 23.1.2009  
**Other data:** Test report ŠKODA VÝZKUM s.r.o No.VYZ-0757-0040-  
01A , HAKEL spol.s r.o. No.08-0603,HAKEL spol.s r.o.  
No.07-1101.  
**The product was tested according to:** EN 61643-11:02+A11:07  
(ident.ČSN EN 61643-11:03+A11:07)  
cl.7.2,6.1.2,7.2.2,7.3,7.3.2,7.3.2.1,7.3.2.2,7.4,7.4.1,7.6,7.  
7.7.6.5,7.7.6,7.9.2,7.9.3,7.9.4,7.9.5,7.9.5.2,7.9.5.2.1,  
7.9.6,7.9.7,7.9.8,

The test results contained in this report refer to the tested items only. The values presented in this report were measured with the accuracy specified in the testing regulations. All measuring instruments used are properly traceable.

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Compiled by: Jaroslav Klípa

Approved by: Jan Hlavatý

Testing laboratory  
technical manager

Phone: +420 266104111

Fax: +420 26660070

E-mail: [testing@ezu.cz](mailto:testing@ezu.cz)  
<http://www.ezu.cz>



Tested according to EN 61643-11:02+A11:07 (ident. ČSN EN 61643-11:03+A11:07).

The following tests were carried out:

### **Cl. 7.2 Identification and marking**

Carried out in accordance with requirements in Cl.6.1.1 and 6.1.2.

Manufacturer provided the following information:

a) Manufacturer's name or trade mark, type	*	Hakel, HZ110
b) Location category		inner
c) number of electrodes		2
d) method of assembly		For holder SP50U10 (OEZ )
e) Highest permanent operating voltage U <sub>c</sub> and rated frequency	*	255 V AC/50 Hz
f) SPD type and discharge parameters	*	$\boxed{1}$ , $\boxed{T1}$ ; I <sub>imp</sub> :110 kA (10/350)
g) Rated discharge current I <sub>n</sub>	*	110 kA (8/20)
h) Voltage protection level U <sub>p</sub>	*	< 2,5 kV
i) Rated load current I <sub>L</sub>		----
j) Protection degree IP (if IP > 20)	*	IP 00
k) Short-circuit withstand capability		----
l) Max. recommended level of overcurrent protection	*	----
m) Effect indication of the disconneter		----
n) Position when normally used, if significant		----
o) Marking of leads (if necessary)	*	----
p) Installation instructions		Stated in documentation
q) Type of current *	*	AC
r) Specific energy W/R ( kJ/Ω)		3000
s) Temperature limit*		-40°C to +80°C
t) Interrupt level of the follow-on current		----
u) Any requirements on external SPD disconnecter		----
v) Residual current (optional)		----
w) Temporary overvoltage characteristics		----

**Passed**

### **Cl. 6.1.2 Marking**

\*) marking is compulsory to be stated on the body of SPD or stuck to the body of SPD.

Marking is inefaceable, tested in accordance with Cl. 7.2.2. with the passing result.

**Passed**

### **Cl. 7.2.2 Inefaceability test of the marking**

Tested by manual abrasion for the period of 15 sec with a piece of cotton cloth damped in water and subsequently for 15 sec with a piece of cotton cloth damped in petrol.

Marking remained legible after the test.

**Passed**

### **Cl. 7.3 Terminals and connections**

#### **Cl. 7.3.2 Screw terminals**

##### **Cl. 7.3.2.1 Screw, current part and connection reliability test**

Tested by:K1 Date:13.-23.01.2009

Type: lightning arrester

802532-08/01

Type: HZ110

Un:230 V/50 Hz, I<sub>imp</sub>: 110 kA(10/350), In: 110 kA(8/20), Up: < 2,5 kV.

The sample was fixed with the holder SP50U10 (OEZ)

And screw M10 was five time fastened and unfastened with the torque of 10 NmV in accordance with tab. 5 col. III.

After the test, there was no damage to the screw joint preventing from further use.

**Passed**

#### **Cl. 7.3.2.2 Terminal reliability test for connection of external conductors**

Conductors are connected with the cable lug with size of approx 50 mm<sup>2</sup> (manufacturer's info in the catalogue sheet).

**Passed**

#### **Cl. 7.4 Protection against direct contact test**

##### **Cl. 7.4.1 Insulated parts**

Does not apply. Built-in version – protection of IP00

##### **Cl. 7.4.2 Metal parts**

Does not apply

#### **Cl. 7.6 Working stress test**

##### **Cl.7.7 Disconnecters and protective functions of the overloaded SPD**

Tested by the Test Record ŠKODA VÝZKUM s.r.o No.VYZ-0757-0040-01A dated 27/06/2007.

**Passed**

##### **Cl. 7.6.5 Working stress test class I and II**

Tested by the Test Record HAKEL spol.s r.o. No.08-0603 dated 03/06/2008.

**Passed**

##### **Cl. 7.7.6 Test of the characteristics of the temporary overvoltage TOV**

Tested by the Test Record HAKEL spol.s r.o. No.07-1101 dated 01/11/2007.

**Passed**

#### **Cl. 7.9.2 Mechanical strength**

- 7.9.2.1 Tested with beater in height 10 cm (taken as the built-in version). The total number of 5 impacts were applied.

After the test, there was no damage or breach of the desired protection degree.

**Passed**

#### **Cl. Cl.7.9.3 Thermal resistance**

-7.9.3.1 Tested in the heat box under temperature of (100 ± 2) °C

No change to the sample after the test.

**Passed**

-7.9.3.2 A test with ball impression was carried out resulting in:

<u>Tested part</u>	<u>Set temperature (°C)</u>	<u>Diameter of impression (mm)</u>
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Halved plastic casing blue (Slovamid 6FRC2)	125 ± 2	0,8
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Insulating parts (holder of the connecting bolt) are ceramic – not subject to test.

Prescribed max. 2 mm

**Passed**

**Cl. 7.9.4 Resistance to abnormal heat and fire**

Tested in accordance with ČSN EN 60695-2-11: 2001 with the following result:

Tested part	Loop temperature (°C)	Result:
Halved plastic casing blue (Slovamid 6FRC2)	850 ± 15	burns, melts, fumes, does not trickle, after removal burning stops n 20 s.
		Passed
Insulating parts (holder of the connecting bolt) are ceramic – not subject to test.		<b>Passed</b>

**Cl. 7.9.5 Creepage distances and clearances check****-7.9.5.1 SPD for exterior use**

Does not apply

**-7.9.5.2 SPD for interior use**

Check carried out according to the table 15 (up to 200-450 V)

**-7.9.5.2.1 Test: Measuring****Clearances (mm):**

Measured between	Prescribed	Measured
1) Live parts of different polarity	3	56 (measured between electrodes through the casing)
2) live parts and -screws for fixation of the cover, which must be removed during installation of SPD	3	---
--attachment surfaces (note 2)	6 (3)	11.36 (measured between the electrode and a metal holder, SP50U10)
- with screws or other means of attachment of SPD (note 2)	6 (3)	11.36 (measured between the electrode and a metal holder, SP50U10)
-with bodies (note 1 and 2)	3	24.5 (measured between the electrode and a metal holder, SP50U10)
3) metal parts of the mechanism of the disconnecter and -bodies ( note 1 )	3	---
- screws or other means of attachment of SPD ( note 1 )	3	---

**Passed**

**Creepage distances (mm):**

Measured between	Prescribed	Measured
4)live parts of various polarity	3	56 (measured between electrodes through the casing)

5)live parts and -screws and other means of attachment of the covers, which must be removed during the assembly of SSPD	3	---
-screws or other means of attachment of SPD (note 2)	6 (3)	24.5 (measured between the electrode and the metal holder, SP50U10)
-bodies (note 1)	3	24.5 (measured between the electrode and the metal holder, SP50U10)

Note 1: For definitions see Cl. 7.9.7.2.

Note 2: If the creepage distances and clearances between the live parts of the device and the metal shielding and the surface on which the SPD is attached are dependent only on the construction of SPD, they cannot be reduced in case the SPD is attached in the most favourable position (in the metal case), the values on lines 1 and 4 are satisfactory.

**Passed**

**Cl. 7.9.6 Surface railway resistance**

The insulating material is made of SLOVAMID 6 GF 25 FRA 5, manufacturer PLASTCOM spol. s r.o.  
The manufacturer guarantees resistance to sneak currents > 225

**Cl. 7.9.7 Insulating resistance**

-7.9.7.1 The humidity test for the duration of 48 h was carried out  
Relative humidity 95%.  
Ambient temperature ( 22±2 )°C.

After the test, there were no changes preventing further use.

- 7.9.7.2 Measured with ss voltage of 500V after the humidity test and with the following configuration:

Measured between	Insulating resistance ( MΩ)	Test voltage (kV)
all interconnected live parts and the SPD body accessible to the dangerous touch	5.103	2.2

Prescribed max. 5 MΩ

**Passed**

**Cl. 7.9.8 Electrical strength**

Tested in the same configuration as in Cl.7.9.7.2.  
During the test no puncture or flashover occurred.

**Passed**

**Cl. 7.9.9 Resistance to ingress of solid objects and harmful ingress of water**

Built-in version – protection IP00.

Not evaluated



**Apparatus used:**

Slide gauge	No.DHM 20264
Test beater	No.DKP 3317
Torque spanner	No. DKP 9749
Power supply vn WIP 6	ZP 76-3921
PPU 311	DKP 16980
Digital stopwatch DS 35	DKP 16300
Thermistor thermometer	DHM 20233

Tested by: J.Klípa

23rd January 2009.