


## TEST REPORT No KA-167-23-005

10.02.2023

<b>Product:</b>	Low-voltage switchgear and controlgear assemblie
<b>Name and address of the applicant:</b>	Raasiku Elekter AS, Tehase tee 41, Raasiku 75203
<b>Country of the manufacturer:</b>	Estonia
<b>Name and address of the manufacturer:</b>	Same as applicant
<b>Rating and principal characteristics:</b>	Un 230/400 V, IP44
<b>Normative references:</b>	EVS-EN 62208:2012
<b>Test method:</b>	QMW-1307, QMW-1308
<b>Date(s) of the test(s)</b>	03.02.-09.02.2023
<b>Test scope:</b>	Tests according to order, No 7.1-3/676- 23 03.02.2023
<b>Trade mark (if any):</b>	
<b>Model/type reference:</b>	REJ-48-24
<b>Note</b>	The test results relate only to the tested object
<b>Additional information:</b>	Appendix 1

**Product label**



**Product**



**Tested by:**

Harri Põldsalu  
Expert

  
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**Test results**

IEC/EN 62208			
Clause	Requirement - Test	Result - Remark	Verdict
6	INFORMATION TO BE GIVEN REGARDING THE ENCLOSURE		
6.2	Marking	Inspected	
	Name or trade mark of The manufacturer	Inspected	P
	Type designation or identification number of the enclosure	Inspected PL-J 54-18	P
	The marking shall be durable and easily legible and may be inside the enclosure	Inspected	P
	Compliance is checked according to the test of 9.2 and by inspection.	Tested See picture	P
6.3	Documentation	Inspected	P
	The enclosure manufacturer's documentation shall include:		
	- relevant constructional and mechanical characteristics	Inspected	P
	- material type	Inspected Steel coated RAL 7035	P
	- instruction necessary for the correct handling, assembling, mounting and service conditions of the enclosure.	Inspected	P
	-thermal power dissipation capability	Inspected 79 W	P
	-service conditions	Inspected	
6.3.2	Dimensions	Inspected	P
	Dimensions shall be given in [mm]	Dimensions given in [mm]	P
	The external dimensions: height, width and depth are nominal values and shall be indicated in the catalogue of the enclosure manufacturer.	Inspected 490x540x145	P
6.3.3	Mounting arrangements	Inspected	N/A
	The location and means of the enclosure defined in the manufacturer's documentation.	Mounting on the surface	P
	The location of the equipment mounting surfaces and their means of fixing shall be defined in the manufacturer's documentation	Inspected Mounting on wall Bolts/screws/dowels	P
7	SERVICE CONDITIONS	Inspected	P
	Location for which the enclosure is intended	Indoor use	P
7.2	Normal service conditions	Inspected	P
7.2.1	Ambient air temperature		
7.2.1.1	- indoor locations (max. +40 °C, average over 24 h = 35°C; lower limit : -5°C)	Indoor use Max +40°C min-5°C	P
7.2.1.2	- outdoor locations (max. +40 °C, average over 24 h = 35°C; lower limit : -25°C/ arctic: -50°C):		N/A
7.2.2	Atmospheric conditions		
7.2.2.1	- indoor locations (= 50% RH at max. +40°C)	Indoor use	P
7.2.2.2	- outdoor locations (up to 100% RH at max. +25°C)		N/A

IEC/EN 62208			
Clause	Requirement - Test	Result - Remark	Verdict
8	DESIGN AND CONSTRUCTION		
8.1	General		
	The enclosure constructed of materials capable of withstanding the mechanical, electrical and thermal stresses, as specified in clause 9, as well as the effects of humidity which are likely to be encountered in normal use.	Tested cl 9.7	P
	The projection of cable gland plates, removable covers and handles not included in the external nominal dimensions, the dimensions of such included in the manufacturer's documentation.	Inspected	P
8.4	Access to the interior of the enclosure	Inspected	P
	A door or removable cover allow adequate access to the protected space. This may only be opened by use of a key or a tool.	Door opened for by use of a key or a tool	P
8.5	Protective circuit		
	Metallic enclosures shall ensure the electric continuity.	Inspected	P
	- by conductive structural parts of the enclosure	Tested	P
	- by separate protective conductor to earth		
	The enclosure manufacturer shall provide means to facilitate the connection of the external protective conductor by the final assembly manufacturer. The location and the designed I <sup>2</sup> t withstand capacity under fault conditions of such means shall be indicated in the enclosures manufacturers documentation.		
8.8	Dielectric strength		N/A
	Enclosure constructed of an insulating material fulfil the dielectric test of 9.9		
8.7	Degree of protection (IK-Code)	Inspected and tested	P
	Degree of protection according to IEC / EN 62262	IK07	P
	Compliance is checked according to the test of 9.6	Tested See additional information	P
8.8	Degree of protection (IP-Code)	Inspected and tested	P
	Degree of protection according to IEC / EN 60529		
	Compliance is checked according to the test of 9.7	Tested See additional information	
9.	Type tests		
9.3	Marking	Tested	
	Test: 15 s with water / 15 s with hexane	Tested	P
	After the test markings easily legible	See picture 19	P
9.6	Verification of degree of protection against external mechanical impacts	Tested See additional information IK07 test	P
	- according to IEC / EN 62282 with a test hammer according to IEC / EN 60068-2-75		P

IEC/EN 62208			
Clause	Requirement - Test	Result - Remark	Verdict
	Values according to table 3:	IK07 / Impact Energy = 2 J	P
	- 3 times to each exposed surfaces in normal use whose largest dimensions is not above 1m	3 times for all points on front surface, left and right surface	P
	- 5 times to each exposed surfaces in normal use whose largest dimensions is greater than 1m		N/A
	Impacts applied evenly distributed to the faces of the enclosure		N/A
	After the test:		
	- enclosure continue to provide the IP code and dielectric strength	IP44 is maintained See additional information IP44 tests	P
	- removable covers be removed and reinstalled	Inspected	P
	- doors opened and closed	Door opened and closed	P
9.7	Verification of degree of protection (IP-Code)	Tested IP44 See additional information IP44 tests	P
9.7.1.1	Verification of degree of protection against access to hazardous parts	Tested IP4X	P
	Enclosures IPXXA, IPXXB, IPXXC, IPXXD according to 12.1 and 12.2 of IEC / EN 60529.		N/A
9.7.1.2	Verification of degree of protection against the ingress of solid foreign objects	Tested IP4X	P
	Enclosures IP2X, IP3X, IP4X according to 13.2 and 13.3 of IEC / EN 60529.	In accordance with the requirements	P
9.7.2	Verification of degree of protection against ingress of water as indicated by the second characteristic numeral.	Tested IPX4	P
	Test according to 14.1 and 14.2 of IEC / EN 60529.	In accordance with the requirements	P
	After the test, water has not ingressed into the protected space.	See additional information IP tests	P
9.10	Verification of the continuity of the protective circuit	Tested 10 A Enclosure and door	P
	Exposed conductive parts of the enclosure connected to the protective circuit	Inspected	P
	Resistance not exceeding 0,1 $\Omega$	< 0,1 $\Omega$	P
9.14	Thermal power dissipation capability	Tested	P
	Test IEC 61439-1 cl10.10.4.2.2	See additional information	

Possible-test case verdicts:

N/A..... test case does not apply to the test object

Pass..... test object does meet the requirement by inspection (P)

Fail..... test object does not meet the requirement by inspection or tests (F)

### Additional information

#### IK07 Testing EN 62262:2008 + EN 61439-3

Date of performance of test: 06.02.2023

#### General data

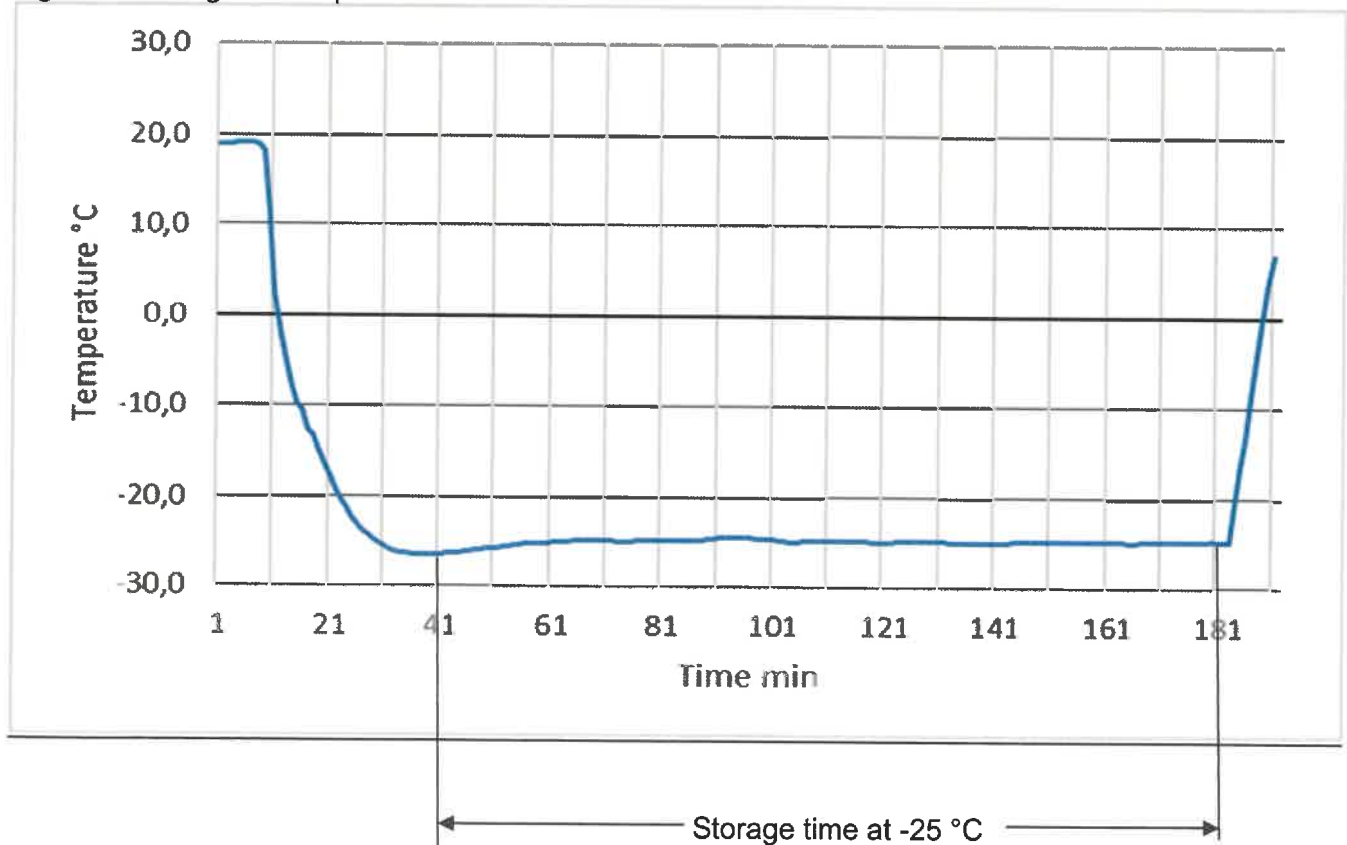
ambient temperature: 23 °C ±3 °C

relative humidity: 60 % to 75 % RH

#### Summary of test results EN 62262 (cl 10.2.6 EN 61439-3)

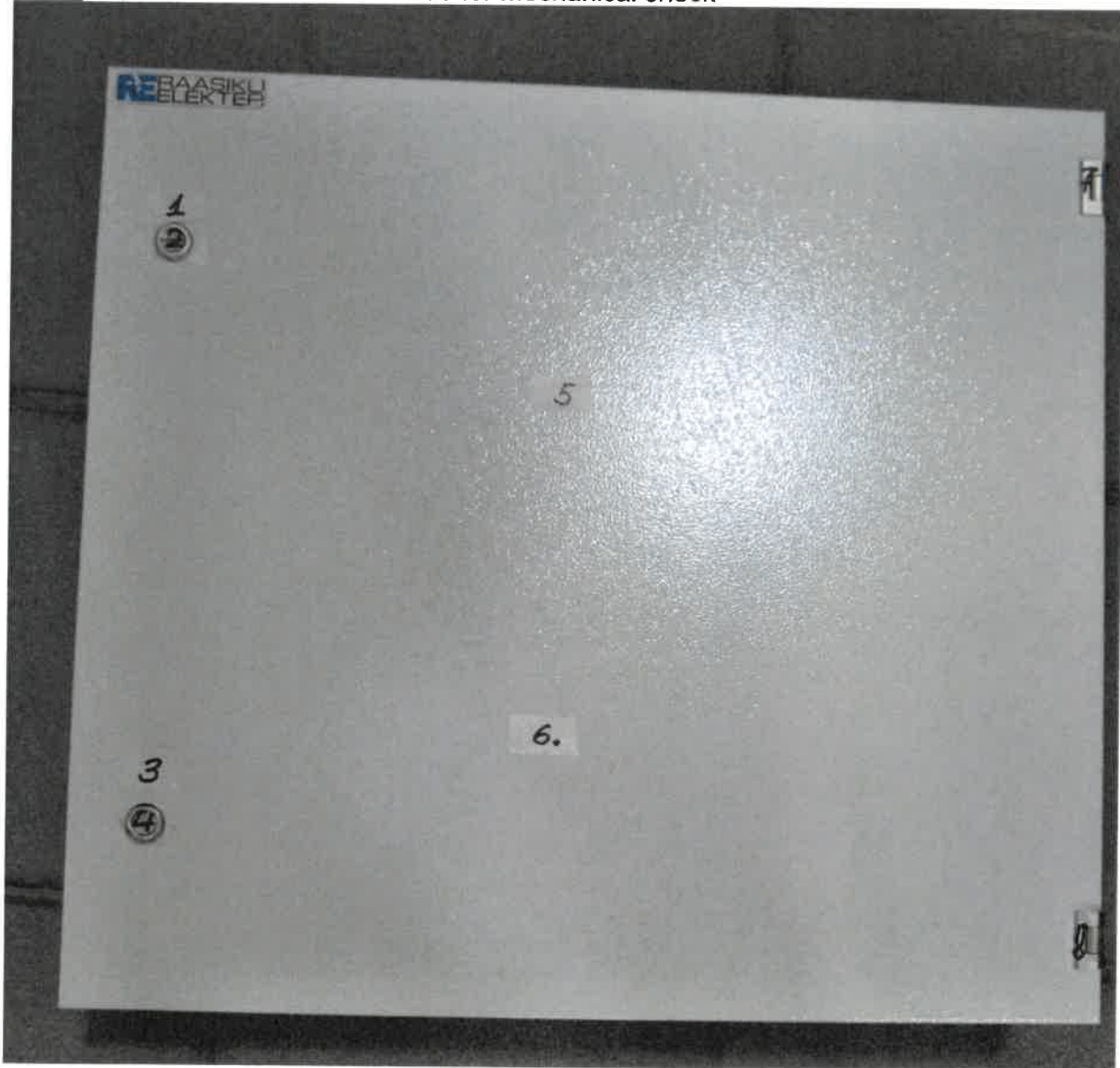
Verification Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code) EN 62208 cl.9.6			
Clause	Requirement Test EN 61439-3 cl 10.2.6 EN 62208 cl.9.7	Result - Remark	Verdict
cl 10.2.6	EN 61439-3 Storage of samples at -25°C for 2 hours	See figure 1	P
cl 9.7	EN 62208 Tests to verify the protection against mechanical impacts IK07.	Applied 3 mechanical impacts to all points front, left side and right side of enclosure and	P
cl 7 table 2	EN 62262 table 2 Free fall hammer 0,5 kg, Height of fall h=400 mm. Energy 2 J	Results: No visible damages (breakage and cracks) of enclosure. IP4X protection level, against foreign objects and protection against access has been maintained. See picture 1-12	P

Figure 1. Storage of samples at -25°C





Picture 1. Places No1-6 on front side for mechanical shock



Picture 2. Places No 11,12 on left side



Picture 3. Places No 11,12 on right side



Picture 4. IK07 test set up for front of the enclosure



Picture 5. IK07 test set up for left side of the enclosure

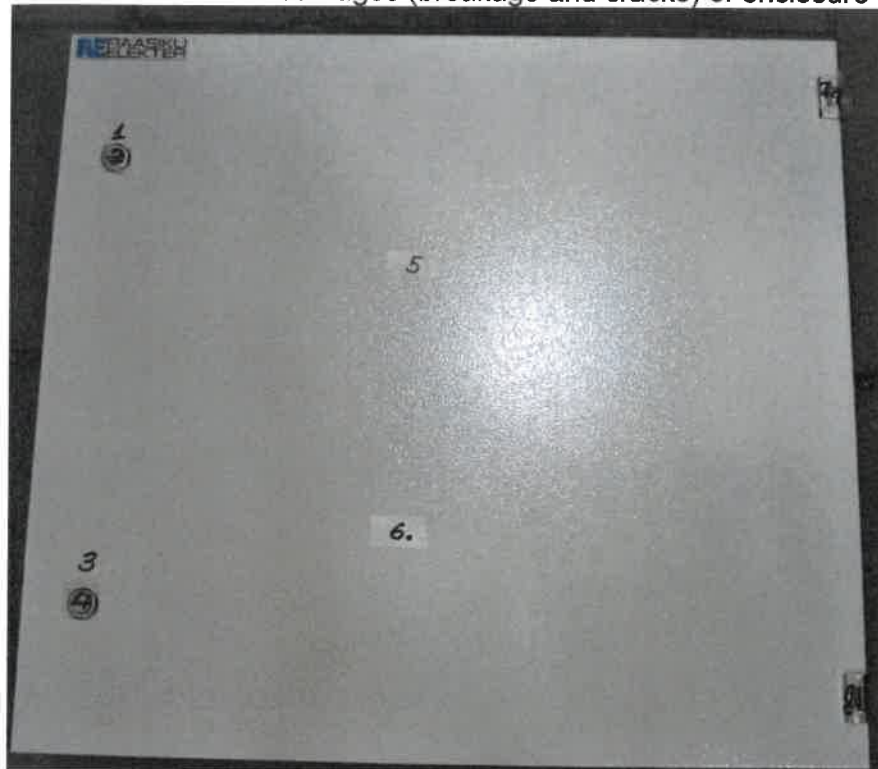


Picture 6. IK07 test set up for right side of the enclosure

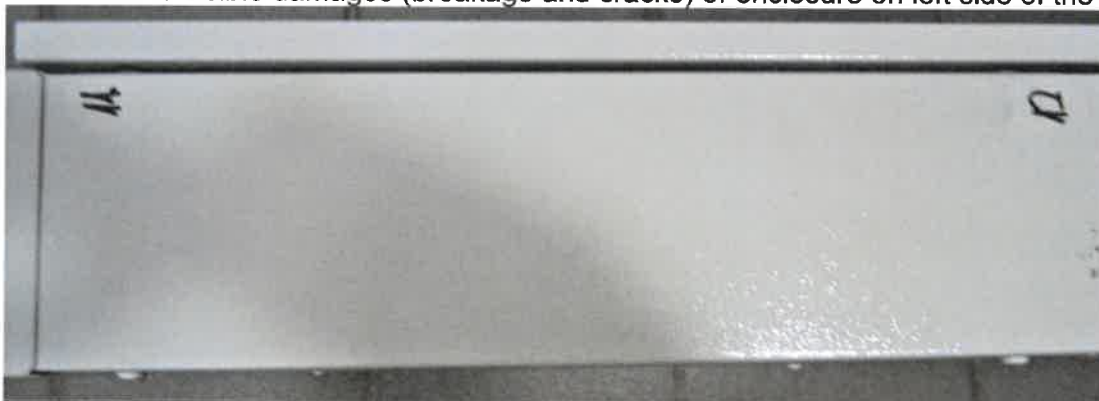




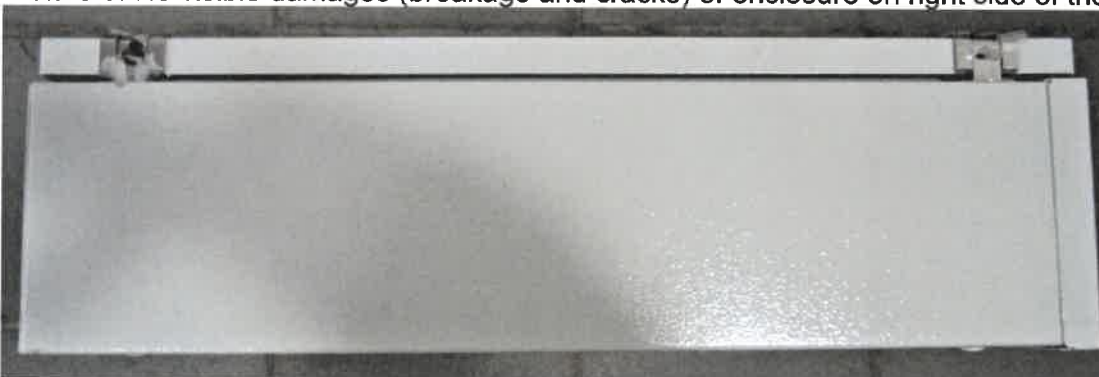
Picture 7. No visible damages (breakage and cracks) of enclosure



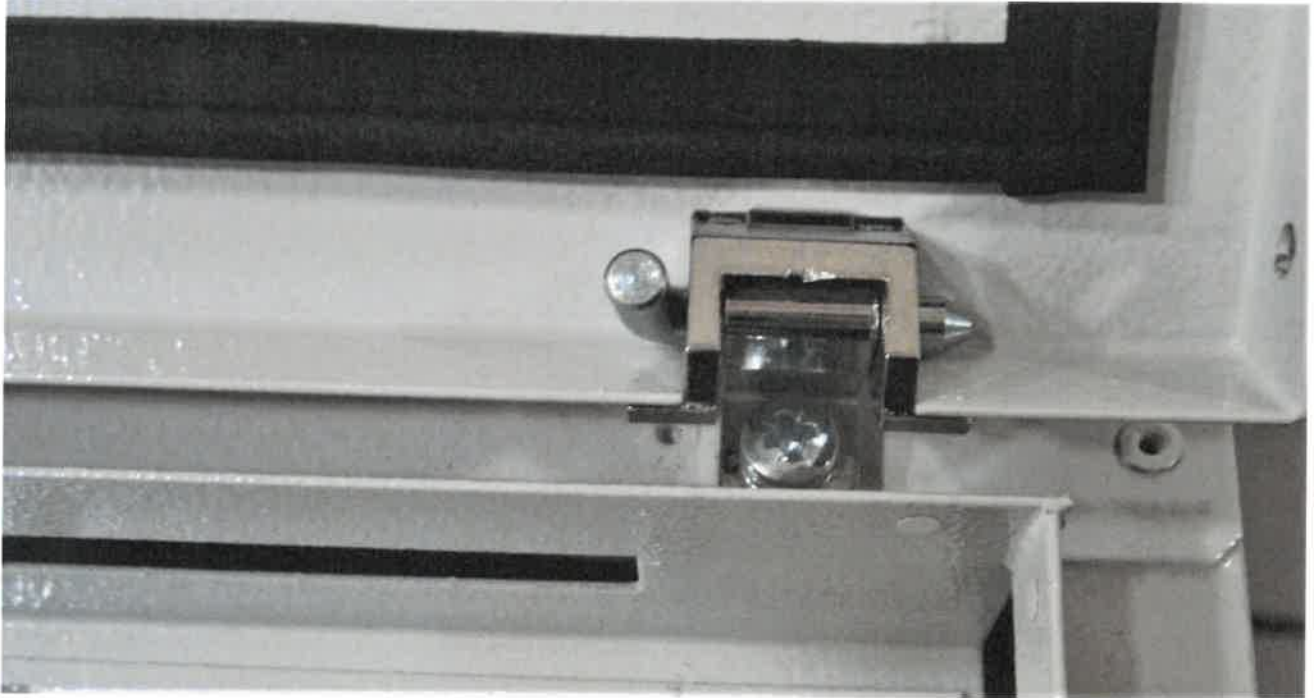
Picture 8. No visible damages (breakage and cracks) of enclosure on left side of the enclosure



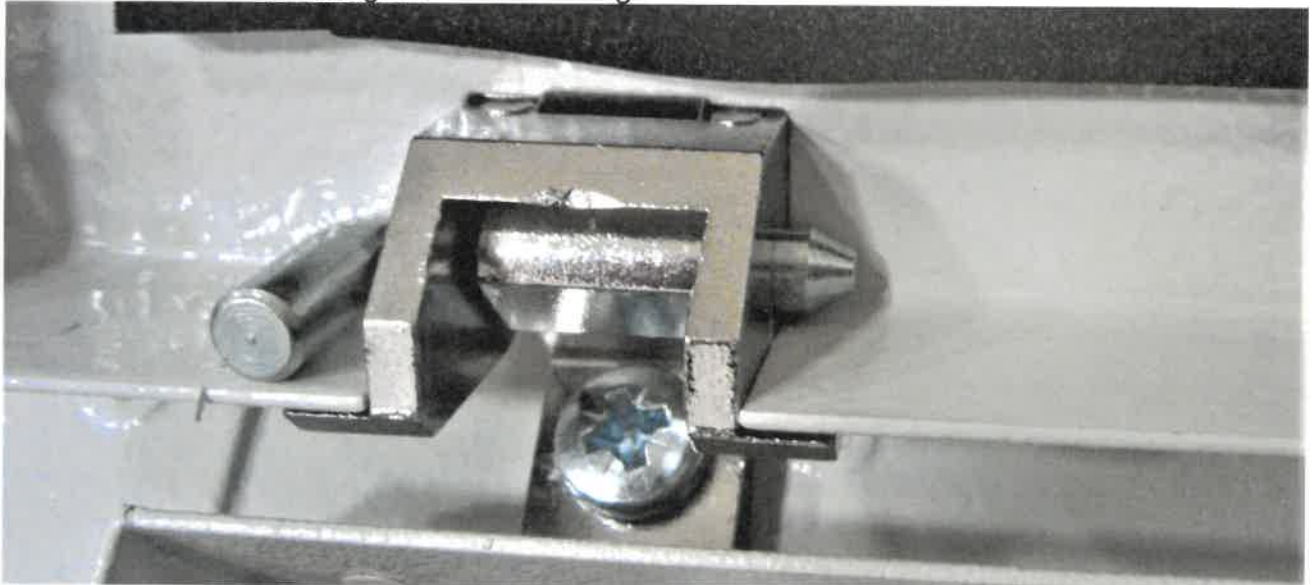
Picture 9. No visible damages (breakage and cracks) of enclosure on right side of the enclosure



Picture 10. No visible damages on the door hinge



Picture 11. No visible damages on the door hinge



Picture 12. No visible damages inside housing



### IP44 tests

**Verification degree of protection enclosure EN 60529:2001 +A2:2014**

### Testing

Date of performance of test: 06.02.2023

### General data

- ambient temperature: 17 °C
- relative humidity: < 75% RH
- water temperature differ from that of the equipment < 5 K

### Uncertainty of measurement:

1. The temperature measurements –  $\pm 1$  °C
2. The humidity measurements -  $\pm 3\%$

### Test equipment

Equipment	Manufacturer	Type
Water spray nozzle	Elektrikkontrollikeskus OÜ	EVS-EN 60529, Figure 5

Tests were carried out in coordination of the standard rules. The specimen on a in mounting position. Test set-up and conditions according to Table 8. EVS-EN 60529:2001+A2  
After the test, the harmful effects of the water are visually inspected.

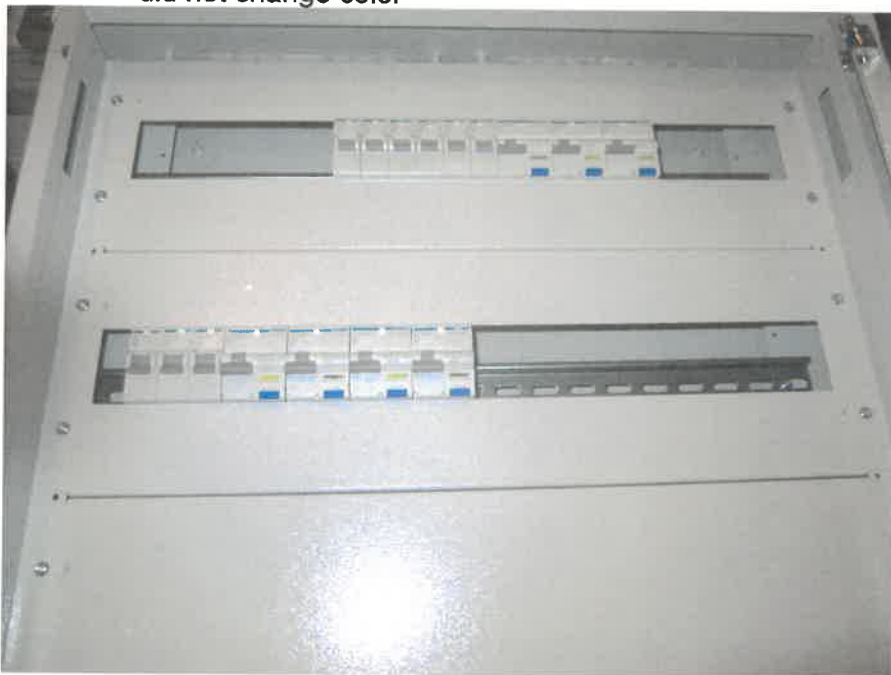
### Test results

Verification degree of protection enclosure EN 60529:2001 (EN 62208 cl.9.7)			
Clause	Requirement Test	Result - Remark	Verdict
11.1	Ambient temperature	17 °C	P
14.2	Water temperature difference between ambient temperature	$\Delta T < 5$ K (water temperature 15 °C)	P
5	The first identification number IP3XD	Tested	P
5.1 tab.1 12.3	Protection against access to hazardous parts IP4X	Test probe $\varnothing$ 1,0 mm l=100 mm long do not enter and not access inside parts	P
5.1 tab.2	Protection against solid foreign objects	The test probe $\varnothing$ 1.0 mm did not enter	P
6	Second identification number IPX4	IPX4	
14.2.7	Test for second characteristic numeral 4 (IPX4) Test with Water shower nozzle. Test set up accordance figure 5 Test conditions accordance Table 8. Sample in mounting position	Water shower nozzle fig. 5 time 5 min. Water flow rate 10 l/min $\pm$ 5%.	P
		Results: Water that splashes on the housing from any direction did not enter to the housing and cannot have a harmful effects See picture 13-18	P

Picture 13. Test set up IPX4



Picture 14. There are no traces of water on the components. The control markers did not change color

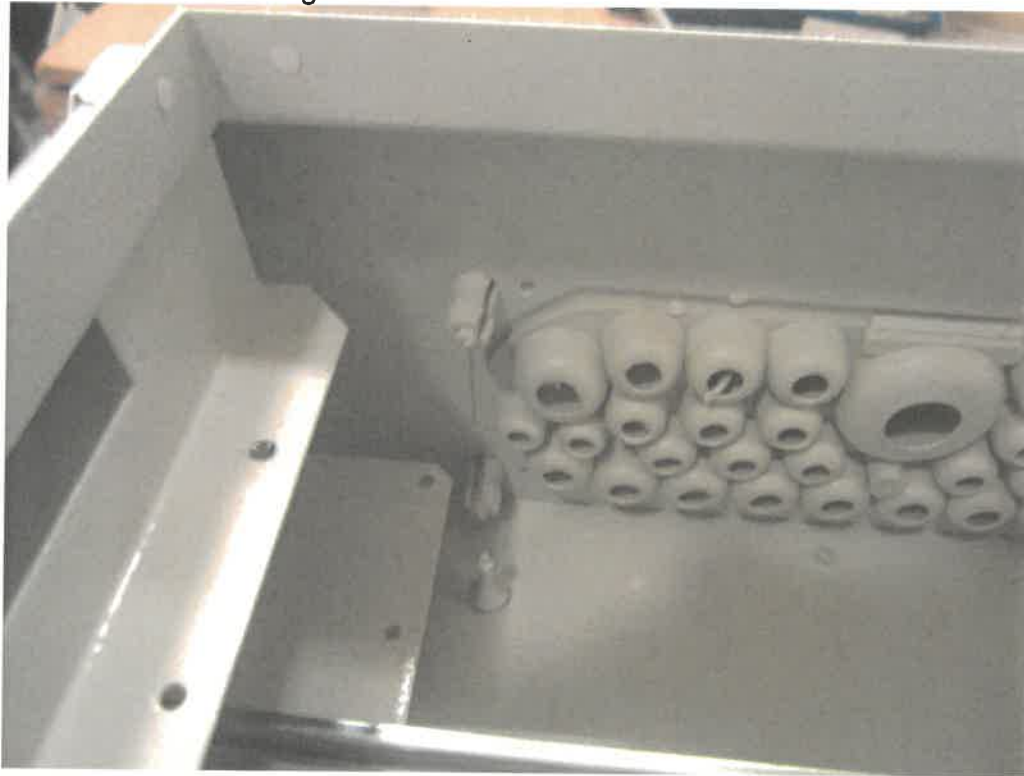


Picture 15. No water traces on the door. The control markers inside did not change color

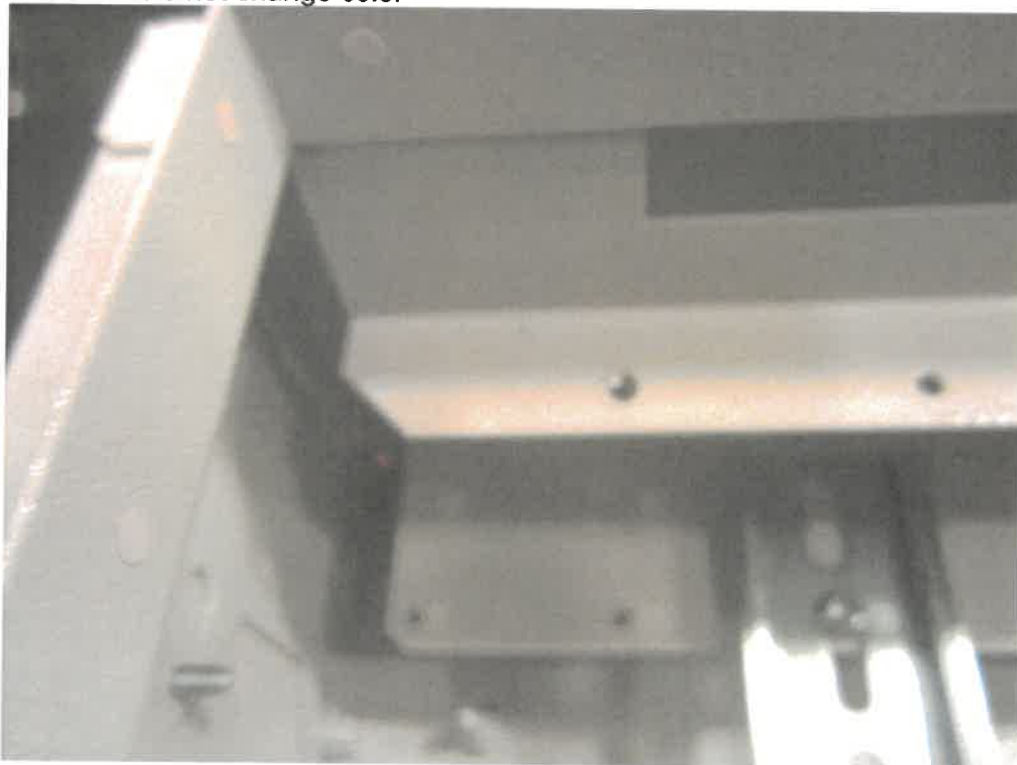




Picture 16. Water does not penetrate the shell from the up corner. The control markers did not change color



Picture 17. Water does not penetrate the shell from the down corner. The control markers did not change color



Picture 18. Water does not penetrate the through-plate into the shell. The control markers down did not change color



Picture 19. After the test markings are easily legible

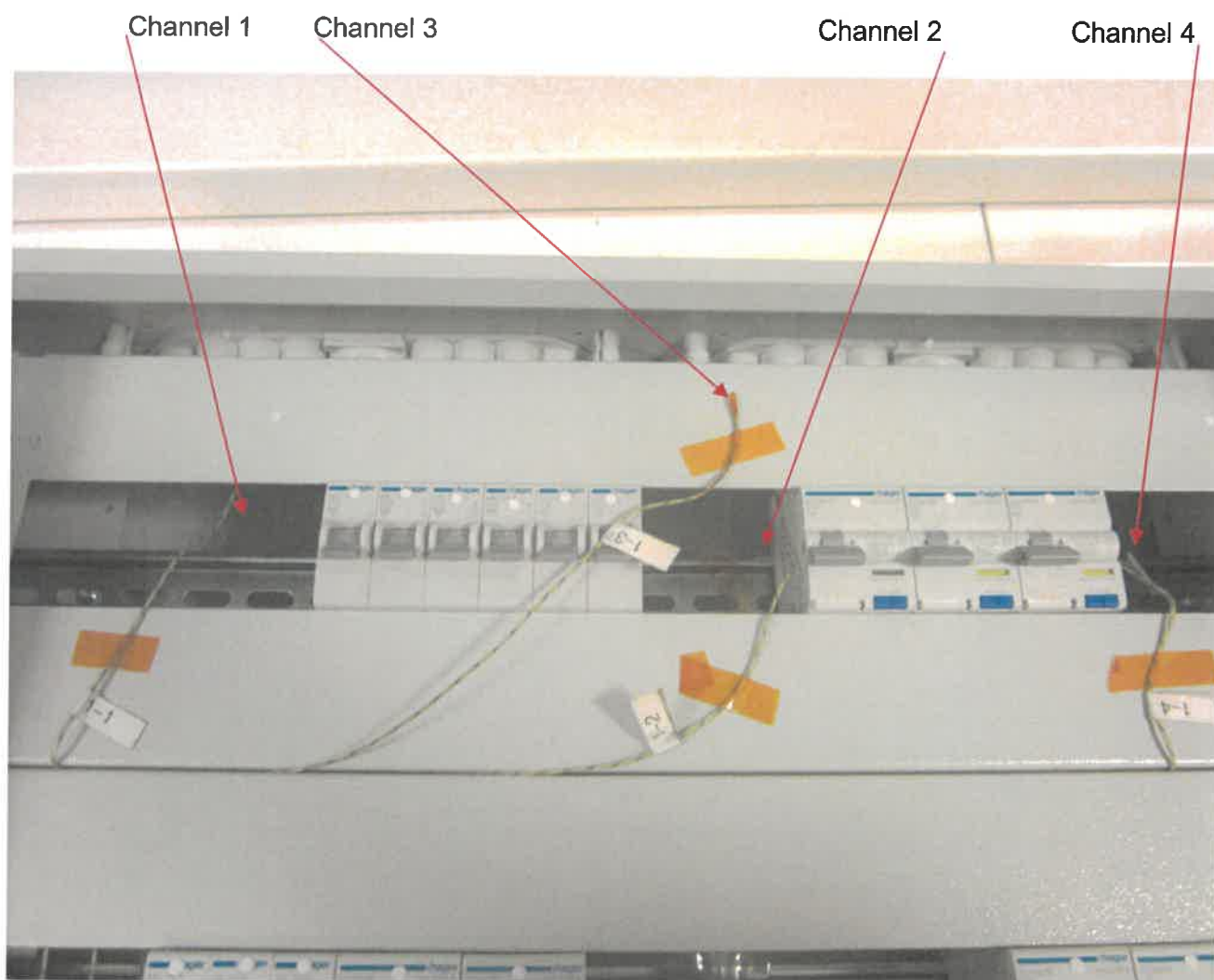


**Thermal power dissipation capability Testing EN 61439-1 cl 10.10.4.2.2**

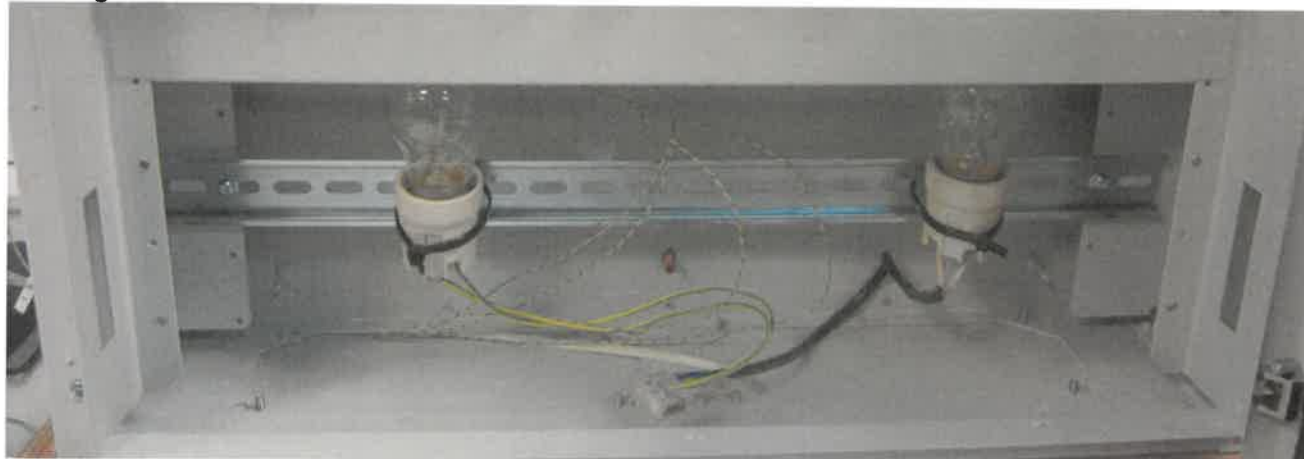
Date of performance of test: 08.02.-09.02.2023

Temperature test using for heating two heat element (tungsten filament lamp)

Temperature sensors locations



Heating element locations



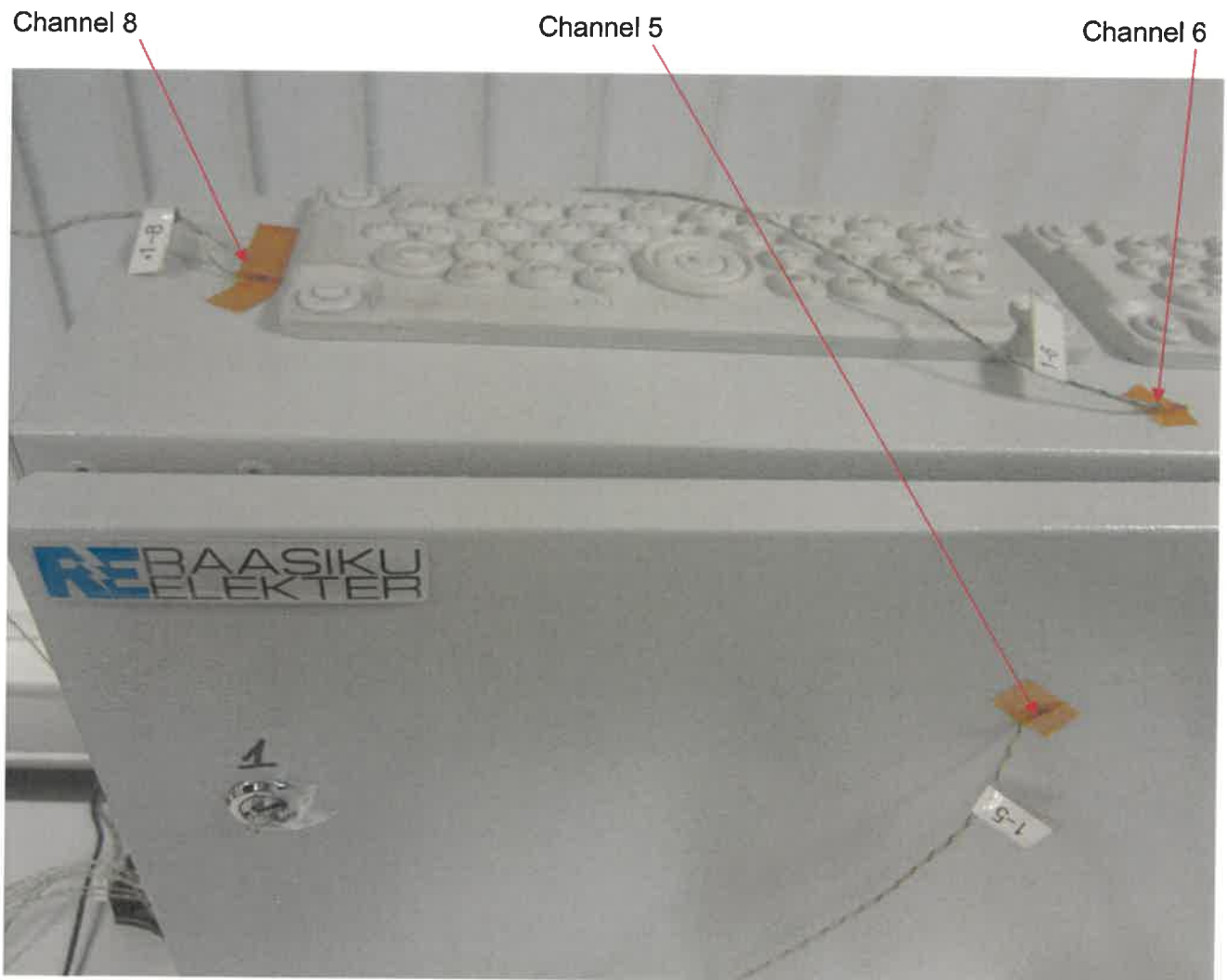


Figure 2. Temperatures during the test

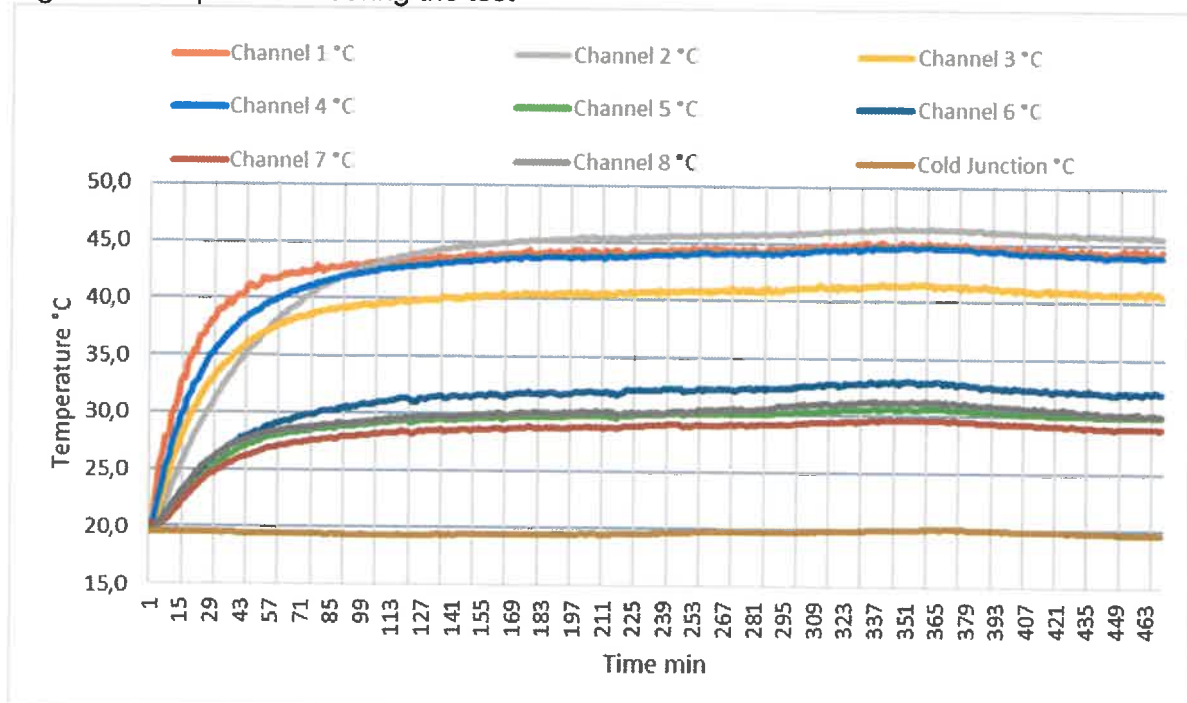
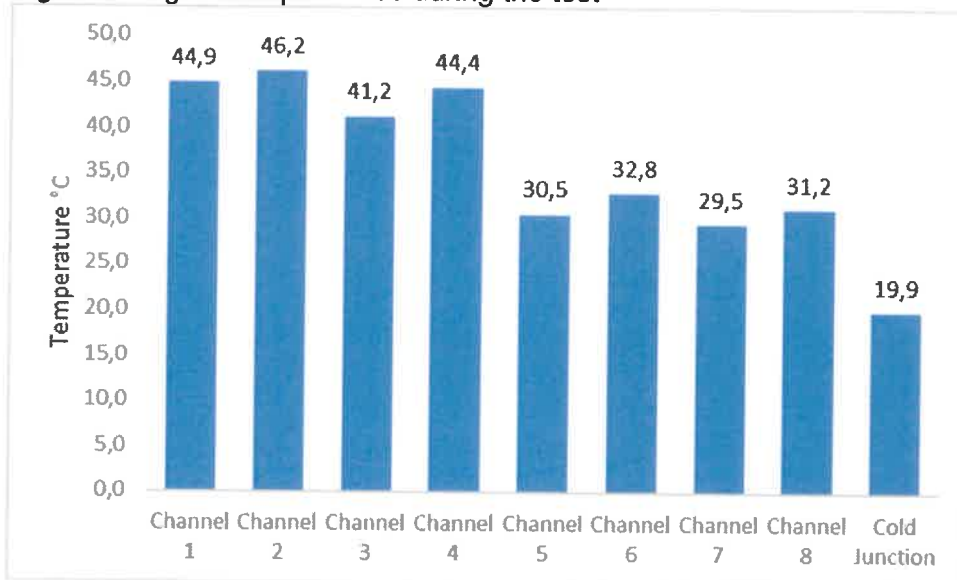
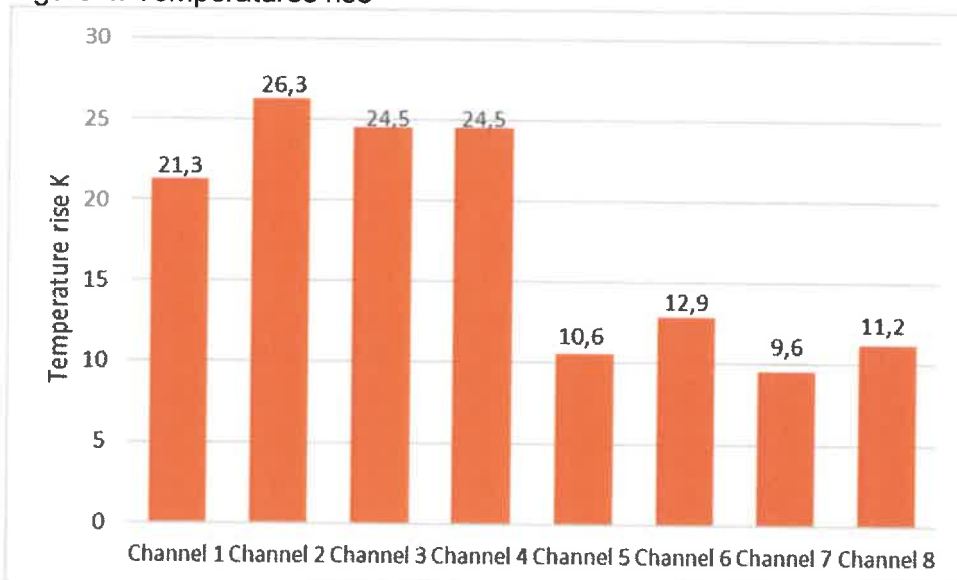


Figure 3. Higher temperatures during the test



Cold junction-test room temperature

Figure 4. Temperatures rise





### Additional test temperature rise with heating element on the middle DIN rail of the shield

Figure 5. Temperatures during the test

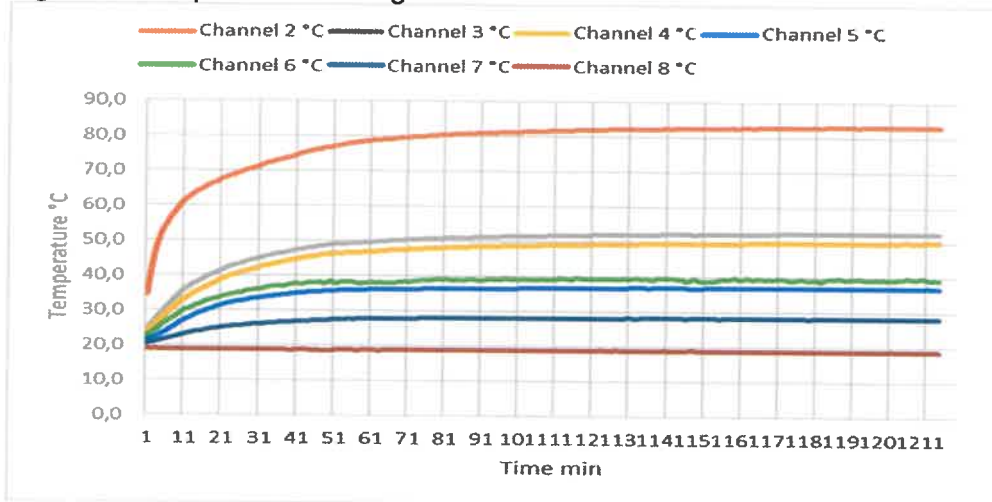
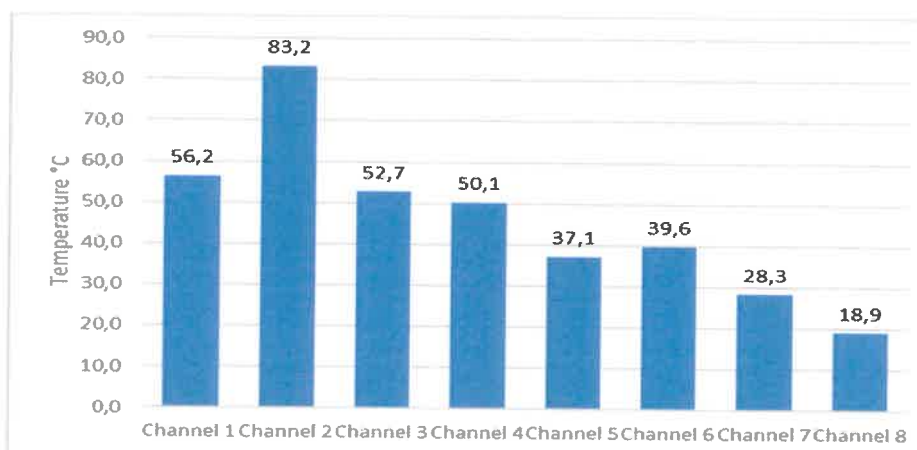


Figure 6. Higher temperatures during the test



Channel 8 test room temperature

Figure 7. Temperatures rise

