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## Laboratory Test Report

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Equipment Under Test: MRL003RiEU61-07-1.8

Client: EH4 GmbH  
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Release Date: 2023-08-09

Reviewed by: .....

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<b>List of Revisions</b>				
<b>Issue</b>	<b>Date</b>	<b>Affected Section</b>	<b>Issued by</b>	<b>Reasons for Revision</b>
1	2023-08-08	./.	K. Wandler	Initial Release
2	2023-08-09	./.	K. Wandler	Changes of details in the layout

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## 2 Test Overview and Results

Table 1: Results

Sec.	Test	Responsible Person	Date	EUT No.	Result
4	Impact Test IK 09  DIN EN 62262: 2022-02  DIN EN 60068-2-75: 2015-08	K. Wandler	2023-07-05	01 02	Passed
5	Impact Test IK 10  DIN EN 62262: 2022-02  DIN EN 60068-2-75: 2015-08	K. Wandler	2023-07-05	01 02	Failed

This test report may contain test methods which are not part of our accredited test areas. These tests are marked with an asterisk (\*). Tests implemented in an accredited external laboratory are marked with two asterisks (\*\*). Tests implemented in a non-accredited external laboratory are marked with three asterisks (\*\*\*)

Text written in *italic type* is external information, not provided by TREO. This can be for example results or additional information provided by the client. The information is not part of results witnessed by TREO, hence TREO is not in charge for the content.

Table 2: Logistics

EUT No.	Date	Description
01-02	2023-07-03	Delivery at TREO-Hamburg
01-02	2023-07-06	Packaging and shipment to the Client

### 3 Equipment Under Test (EUT)

#### 3.1 Description of EUT

Table 3: Description of EUT No. 01-02

<b>Equipment No.</b>	01-02		
<b>Manufacturer</b>	EH4 GmbH		
<b>Product No.</b>	./.	<b>Revision</b>	./.
<b>Type</b>	MRL003RiEU61-07-1.8		
<b>Serial No.</b>	EUT 01	37-33-33-35-65-32-8b-11	
	EUT 02	37-33-33-35-54-32-6b-09	
<b>Software</b>	./.	<b>Version</b>	./.
<b>Voltage</b>	./.	<b>Frequency</b>	./.
<b>Dimensions</b>	./.	<b>Weight</b>	./.
<b>Description</b>	./.		



Figure 1: Equipment under test No. 01.



Figure 2: Label of equipment under test No. 01.

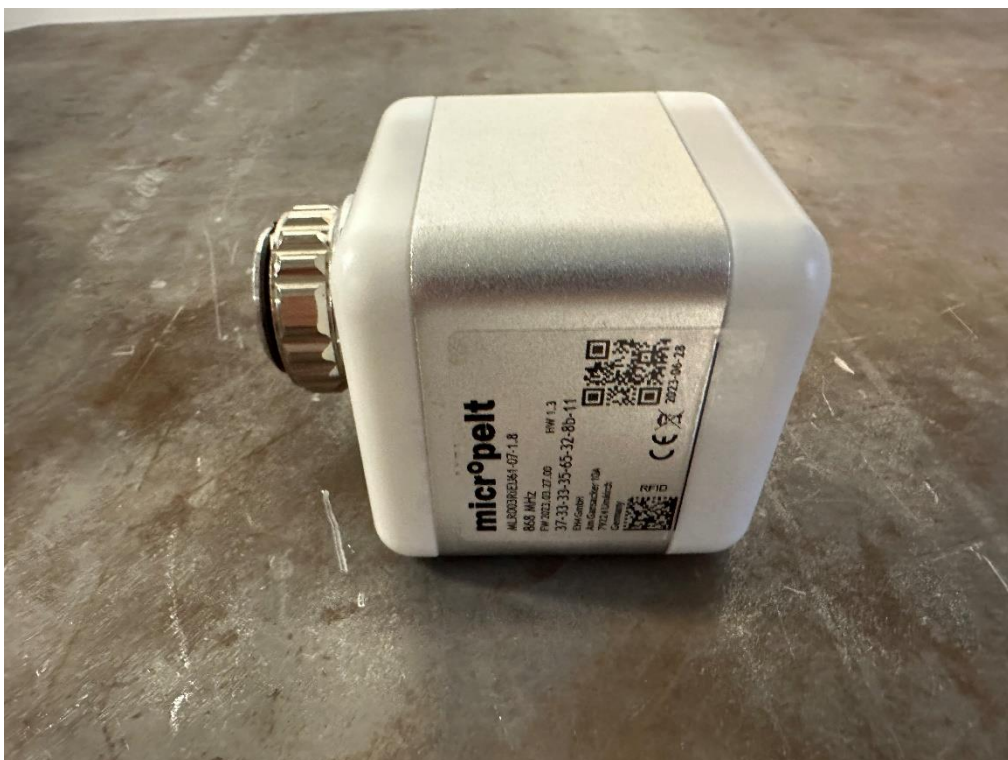


Figure 3: Equipment under test No. 02.



Figure 4: Label of equipment under test No. 02.

### 3.2 Description of Auxiliary Equipment (AE)

./.

### 3.3 Entrance Examination

The test equipment was checked after arrival by visual inspection. No external damage was detected.

### 3.4 Description of Connections

./.

### 3.5 Description of Functional Checks

./.

### 3.6 Description of general Pass / Fail Criteria for Immunity tests

./.



## 4 Impact Test IK 09

### 4.1 Test Specifications

#### 4.1.1 Adapted Standard

- DIN EN 62262: 2022-02
- DIN EN 60068-2-75: 2015-08

#### 4.1.2 Qualification Test Plan

./.

#### 4.1.3 Test Parameters / Category

Category: IK09

Table 4: Parameter

Parameter	Value	Comment
Weight [kg]	5.0	./.
Height of fall [mm]	200	./.
Energy [J]	10	./.
Numbers of positions	min. 5	./.
Numbers of positions for EUT 01	5	Impact positions were marked in agreement with the client.
Numbers of positions for EUT 02	5	Impact positions were marked in agreement with the client.

#### 4.1.4 Deviations

./.

#### 4.1.5 Remarks

./.

#### 4.1.6 Pass/Fail Criteria

- No damages shall be detected that allow the 1 mm diameter test probe to penetrate.
- The EUT must pass the functional check after the test.

#### 4.2 Test Location and Conditions

Test Facility: TREO – Hamburg

Ambient Conditions in the Laboratory:

**Table 5: Limits of Ambient Conditions**

Temperature [°C]	Ambient Pressure abs.[mbar]	Relative Humidity [% RH]
+15 to +35	860 to 1060	30 to 75

#### 4.3 Test Equipment

**Table 6: Test Equipment**

Description	Type	Manufacturer	Inventory No.	Calibration due
IK-Test	./.	Treo	11209-P	./.
IK probe	08	Nordwig	11205-P	Verified with 10319
Power supply	6070	PEAK TECH	10459	./.
Scale	PE 3600	Mettler-Toledo	10319	2025-01-23
Ruler	500mm	WÜRTH	10553	2027-11-23

Expanded measurement uncertainty: Dimension 0.62 mm, Weight 28g.

#### 4.4 External Witnessing Persons

./.

#### 4.5 Test Set-up

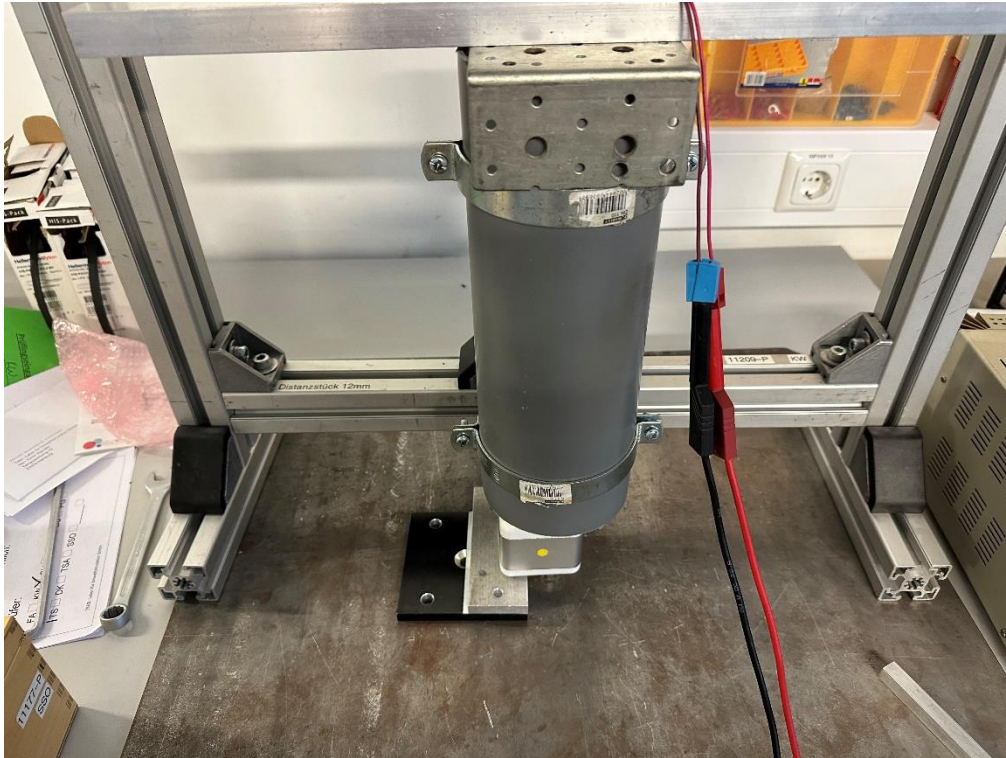


Figure 5: Exemplary picture of the test set-up.

#### 4.6 Results

A functional check was performed successfully after the test.

During the naked eye visual inspection after the test, damages were detected. Please refer to the respective figures.

The 1mm probe did not enter the EUT.

The EUT passed the test.

**Table 7: Overview of Results**

<b>EUT No.</b>	<b>Result</b>	<b>Comment</b>
01	Passed	The gap increased
02	Passed	Cracks were detected

4.6.1 Results EUT No. 01



Figure 6: Test results



Figure 7: Test results



Figure 8: Test results



Figure 9: Test results



#

Figure 10: Test results

4.6.2 Results EUT No. 02



Figure 11: Test results



Figure 12: Test results





Figure 13: Test results



Figure 14: Test results



Figure 15: Test results

## 5 Impact Test IK 10

### 5.1 Test Specifications

#### 5.1.1 Adapted Standard

- DIN EN 62262: 2022-02
- DIN EN 60068-2-75: 2015-08

#### 5.1.2 Qualification Test Plan

./.

#### 5.1.3 Test Parameters / Category

Category: IK10

**Table 8: Parameter**

Parameter	Value	Comment
Weight [kg]	5.0	./.
Height of fall [mm]	400	./.
Energy [J]	20	./.
Numbers of positions	min. 5	./.
Numbers of positions for EUT 01	5	Impact positions were marked in agreement with the client.
Numbers of positions for EUT 02	5	Impact positions were marked in agreement with the client.

#### 5.1.4 Deviations

./.

#### 5.1.5 Remarks

./.

#### 5.1.6 Pass/Fail Criteria

- No damages shall be detected that allow the 1 mm diameter test probe to penetrate.
- The EUT must pass the functional check after the test.

## 5.2 Test Location and Conditions

Test Facility: TREO – Hamburg

Ambient Conditions in the Laboratory:

**Table 9: Limits of Ambient Conditions**

Temperature [°C]	Ambient Pressure abs.[mbar]	Relative Humidity [% RH]
+15 to +35	860 to 1060	30 to 75

## 5.3 Test Equipment

**Table 10: Test Equipment**

Description	Type	Manufacturer	Inventory No.	Calibration due
IK-Test	./.	Treo	11209-P	./.
IK probe	08	Nordwig	11205-P	Verified with 10319
Power supply	6070	PEAK TECH	10459	./.
Scale	PE 3600	Mettler-Toledo	10319	2025-01-23
Ruler	500mm	WÜRTH	10553	2027-11-23

Expanded measurement uncertainty: Dimension 0.62 mm, Weight 28g.

## 5.4 External Witnessing Persons

./.

## 5.5 Test Set-up



Figure 16: Exemplary picture of the test set-up.

## 5.6 Results

A functional check was performed successfully after the test.

During the naked eye visual inspection after the test, damages were detected. Please refer to the respective figures.

The 1mm probe did enter the EUT.

The EUT failed the test.

**Table 11: Overview of Results**

<b>EUT No.</b>	<b>Result</b>	<b>Comment</b>
01	Failed	The gap increased
02	Failed	Cracks were detected, Deformation was detected.

5.6.1 Results EUT No. 01



Figure 17: Test results



Figure 18: Test results



Figure 19: Test results



Figure 20: Test results





Figure 21: Test results

5.6.2 Results EUT No. 02



Figure 22: Test results



Figure 23: Test results



Figure 24: Test results



Figure 25: Test results



**Figure 26: Test results**

**END OF REPORT**