

 **DEKRA**  
Test Report

2147810.01A-INC

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Applicant : Rolec Gehäuse-Systeme GmbH  
Kreuzbreite 2  
D-31737 Rinteln  
Germany

Application date : 21-March 2012

Order number : 2147810.00-INC

Subject : Degree of protection provided by enclosure, IP66  
Degree of protection provided by enclosure, IPX7  
Degree of protection provided by enclosure, IPX9K

Trademark : ROLEC

Type(s) : aluDISC

Arnhem, 19-02-2013

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Manufacturer/ Production site: Rolec Gehäuse-Systeme GmbH  
Kreuzbreite 2  
D-31737 Rinteln  
Germany

Overview of tests : See page 4

Test requirements : IEC 60529:1989 + A1:1999  
EN 60529:1991 + A1:2000  
DIN 40050:1993 / NEN-ISO 20653:2006

Conclusion : The tested sample complies with the specified requirements

Tested by : J.G.H. Gelink / M.T.H. van Gemen / C.H.J. Addink

Checked by : H.G.W. Willemsen

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## 1 Subject

Empty enclosure, Painted aluminium with or without additional polymeric cover, with out without mounting screw covers, shaped as shown.

### Product information

Trademark	:	ROLEC
Type	:	aluDISC
Dimensions	:	Height: 55-90 mm Width: 97-179 mm Depth: 110-190 mm
Material	:	Painted Aluminum
Number of samples tested	:	4 sizes covering the range.

## 2 Tested Ratings

Degree of protection	:	IP66
Degree of protection	:	IPX7
Degree of protection	:	IPX9K

## 3 Object identification



#### 4 Summary of type tests

- Verification of the degree of protection IP6X
- Verification of the degree of protection IPX6
- Verification of the degree of protection IPX9K

Type	IP6X	IPX6	IPX&	IPX9K
AR 080	√	√	√	√
AR 100	√	√	√	√
AR 120	√	√	√	√
AR 120 SH	√	√	-	-
AR 160	√	√	√	√

#### 5 General Items

Tests were carried out by

J.G.H. Gelink DEKRA Certification B.V., Arnhem, The Netherlands.  
M.T.H. van Gemen

Manufacturer's representative(s) during tests

N/A

The tests were supervised by

H.G.W. Willemsen DEKRA Certification B.V., Arnhem, The Netherlands  
C.H.J. Addink

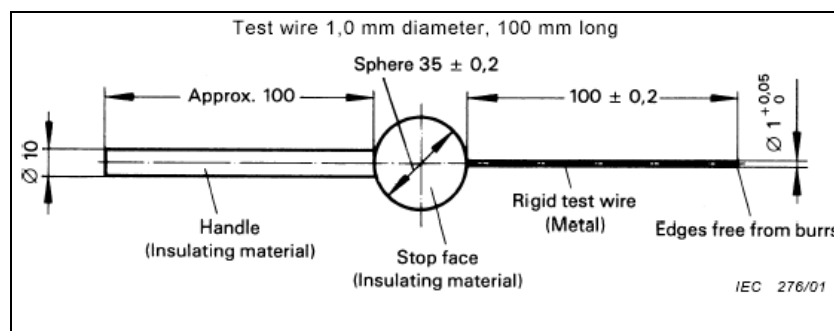
## 6 Description of the tests

### 6.1 Test for IP6X (the first numeral 6)

#### Protection against access to hazardous parts

#### Performance of the test:

The access probe as shown in figure on this page was pushed against any openings of the enclosure with a force of  $1\text{N} \pm 10\%$



#### Pass criteria:

The protection is satisfactory if the access probe specified does not penetrate and adequate clearance is kept between the access probe and hazardous parts.

#### Test results:

The full diameter of the access probe did not penetrate through an opening of the enclosure and adequate clearance was kept.

The tested sample passed the test and complies with the specified requirements.

## 6.2 Test for IP6X (the first numeral 6)

### Protection against solid foreign objects:

#### Performance of the test:

The test was made using a dust chamber incorporating the basic principles shown in figure 2 of the standard EN/IEC 60529 in which talcum powder was maintained in suspension.

The talcum powder used is able to pass through a square-meshed sieve with a nominal wire diameter of 50  $\mu\text{m}$  and a nominal width of a gap between wires of 75  $\mu\text{m}$ .

The amount of talcum powder used is 2 kg per cubic meter of the test chamber.

The enclosure shall be deemed category 1, whether reductions in pressure below the atmospheric pressure are present or not.

The enclosure under test was supported inside the test chamber and the pressure inside the enclosure was maintained below the surrounding atmospheric pressure by a vacuum pump.

The suction connection was made to a hole specially provided for this test. This hole was in the vicinity of the vulnerable parts.

The object of the test was to draw into the enclosure, by means of depression, a volume of air 80 times the volume of the sample enclosure tested without exceeding the extraction rate of 60 volumes per hour. The depression did not exceed 2 kPa (20 mbar) on the manometer.

The duration of the test was 8 hours.

#### Pass criteria:

The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.

#### Test results:

After the test there was no dust found inside the tested sample. Except for the sample with the plastic cover there was some dust inside.

The tested sample with plastic cover did not pass the test and does not comply with the specified requirements.

The other tested samples passed the test and complies with the specified requirements.

### 6.3 Test for IPX6 (the second numeral 6)

#### Protection against powerful water jets

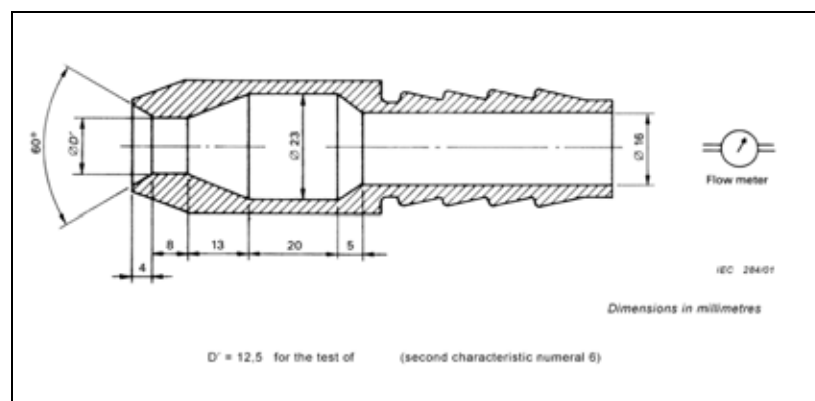
#### Performance of the test:

The test was made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle as shown in figure on this page.

The conditions to be observed are as follows:

- internal diameter of the nozzle: 12,5 mm;
- delivery rate: 100 l/min  $\pm$  5 %;
- water pressure: to be adjusted to achieve the specified delivery rate;
- core of the substantial stream: circle of approximately 120 mm diameter at 2,5 m distance from nozzle;
- test duration per square meter of enclosure surface area likely to be sprayed: 1 min;
- minimum test duration: 3 min;
- distance from nozzle to enclosure surface: between 2,5 m and 3 m.

The duration of the test was 3 minutes.



#### Pass criteria:

After testing the enclosure shall be inspected for ingress of water.

In general, if any water has entered, it shall not:

- be sufficient to interfere with the correct operation of the equipment or impair safety
- deposit on insulation parts where it could lead to tracking along the creepage distances
- reach live parts or windings not designed to operate when wet
- accumulate near the cable end or enter the cable if any

#### Test results:

After the test there was no ingress of water.

The tested sample passed the test and complies with the specified requirements.



#### 6.4 Test for IPX7 (the second numeral 7)

##### Protection against the effects of temporary immersion in water

##### Performance of the test:

The test, temporary immersion between 0,15 m and 1 m, is made by completely immersing the enclosure in water in its service position as specified by the manufacturer so that the following conditions are satisfied:

- a) the lowest point of enclosures with a height less than 850 mm is located 1000 mm below the surface of the water;
- b) the highest point of enclosures with a height equal to or greater than 850 mm is located 150 mm below the surface of the water;
- c) the duration of the test is 30 minutes;
- d) the water temperature does not differ from that of the equipment by more than 5 K.  
However, a modified requirement may be specified in the relevant product standard if the tests are to be made when the equipment is energized and/or its parts in motion.

##### Pass criteria:

After testing the enclosure shall be inspected for ingress of water.

In general, if any water has entered, it shall not:

- be sufficient to interfere with the correct operation of the equipment or impair safety
- deposit on insulation parts where it could lead to tracking along the creepage distances
- reach live parts or windings not designed to operate when wet
- accumulate near the cable end or enter the cable if any

##### Test results:

After the test at 1m depth for 30 minutes, there was no ingress of water.

The tested sample passed the test and complies with the specified requirements.

##### Remark:

An enclosure designated with second characteristic numeral 7 is considered unsuitable for exposure to water jets (designated by second characteristic numeral 5 or 6) and need not comply with requirements for numeral 5 or 6 unless it is successfully tested and dual coded as follows: IPX5/IPX7 or IPX6/IPX7.

## 6.5 Test for IPX9K (the second numeral 9) (DIN40050 teil 9 / NEN ISO 20653-2006)

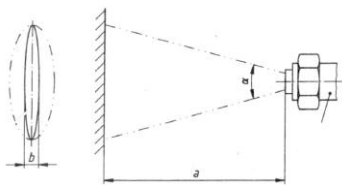
### Protection against the effects of high pressure steam jet cleaning

#### Performance of the test:

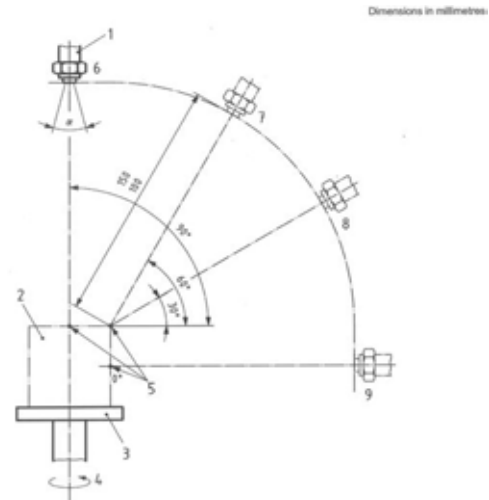
The test was made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle as shown in figures.

The conditions to be observed are as follows:

- Enclosure on turntable,  $(5 \pm 1)$  r/min.
- Spray at  $0^\circ$ ,  $30^\circ$ ,  $60^\circ$  and  $90^\circ$ ;
- Core of the stream, 100-150 mm from enclosure.;
- Delivery rate:  $(14-16)$  l/min  $\pm 5\%$ ;
- Water pressure:  $(8.000 \text{ to } 10.000)$  kPa;
- Water temperature  $(80 \pm 5)^\circ\text{C}$ ;
- Minimum test duration: 30s per position;



a (mm)	b (mm)	$\alpha$ (°)
100	$8 \pm 2$	$30 \pm 5$
150	$10 \pm 2$	



- mm
- |  |              |
|--|--------------|
| 1 fan jet nozzle   | 6 position 1 |
| 2 DUT  | 7 position 2 |
| 3 turntable  | 8 position 3 |
| 4 swivel axis  | 9 position 4 |
| 5 reference points ( $0^\circ$ , $30^\circ$ , $60^\circ$ , $90^\circ$ ) enclosing cylinder for DUT |              |

#### Pass criteria:

After testing the enclosure shall be inspected for ingress of water.

In general, if any water has entered, it shall not:

- be sufficient to interfere with the correct operation of the equipment or impair safety
- deposit on insulation parts where it could lead to tracking along the creepage distances
- reach live parts or windings not designed to operate when wet
- accumulate near the cable end or enter the cable if any

#### Test results:

After the test there was no ingress of water in the enclosure.

The tested sample did withstand withstood the test as described well.

The tested sample is in compliance with the specified requirements.

#### Remark:

- 1) Polymeric cover not included in IPX9K rating.
- 2) An enclosure designated with second characteristic numeral 9K is considered unsuitable for exposure to water jets (designated by second characteristic numeral 5 or 6) and need not comply with requirements for numeral 5 or 6 unless it is successfully tested and dual coded as follows: IPX5/IPX9K or IPX6/IPX9K.

**Appendix A – Photos**

Photo 1:



Photo 2:



Photo 3:



Photo 4:

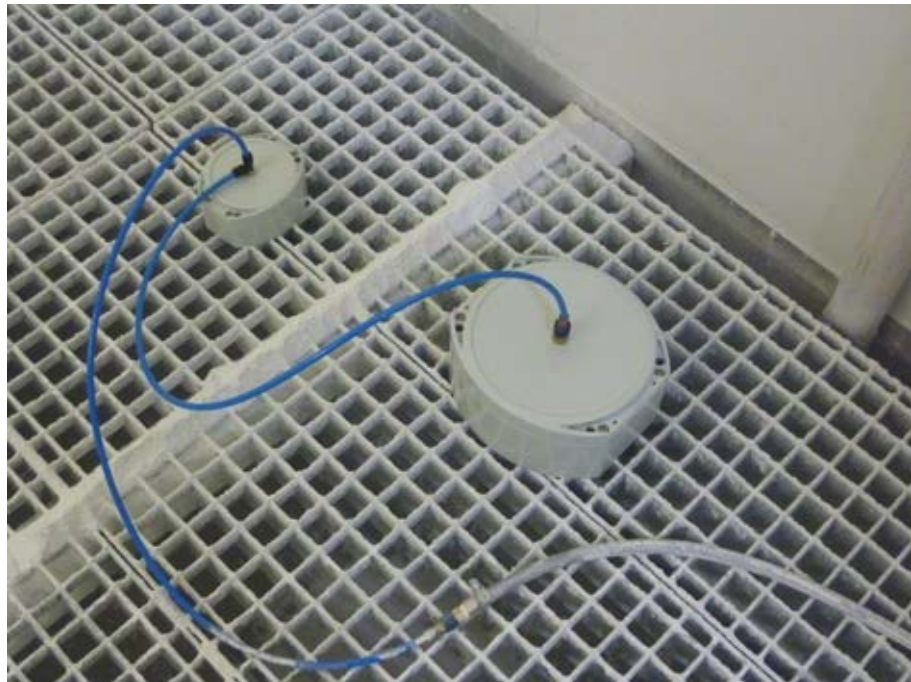


Photo 5:

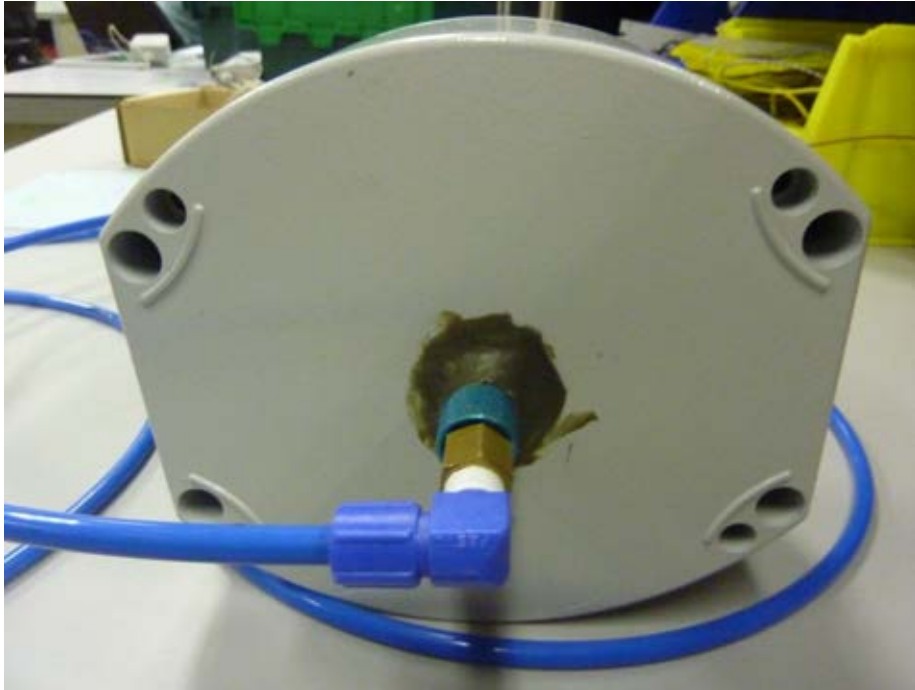


Photo 6:

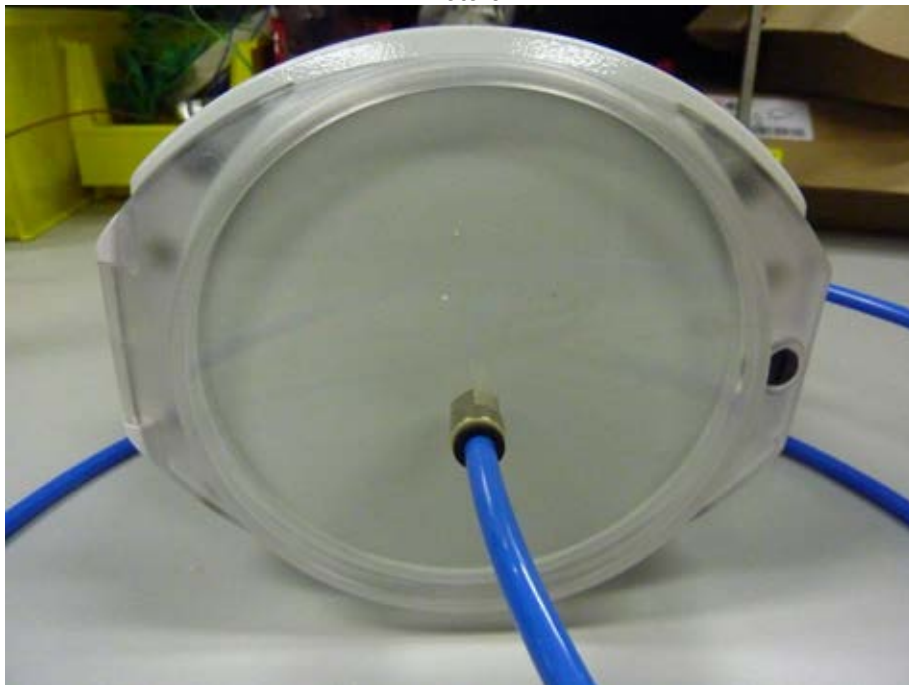
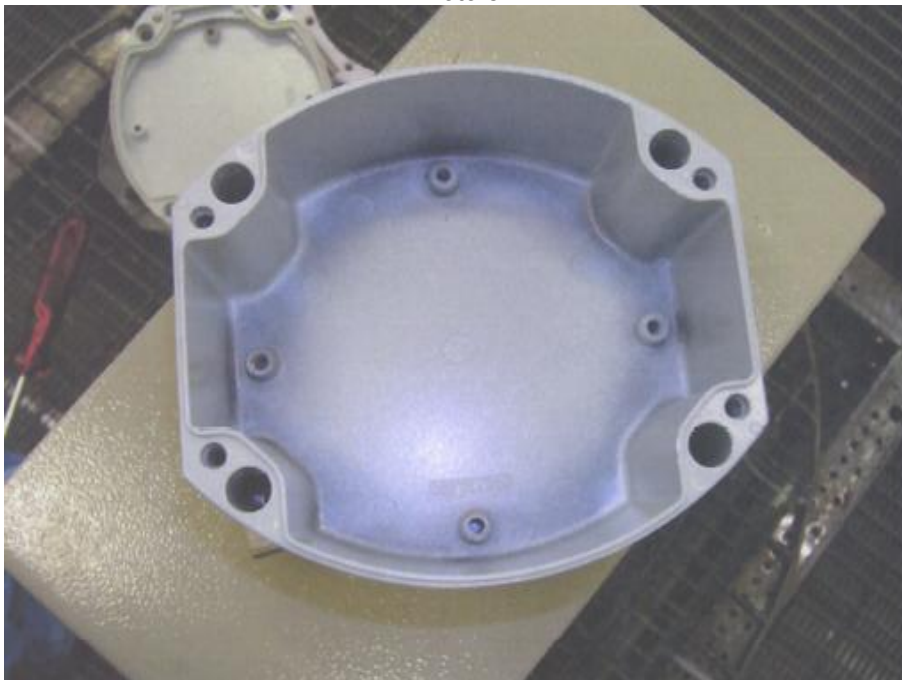


Photo 7:



Photo 8:

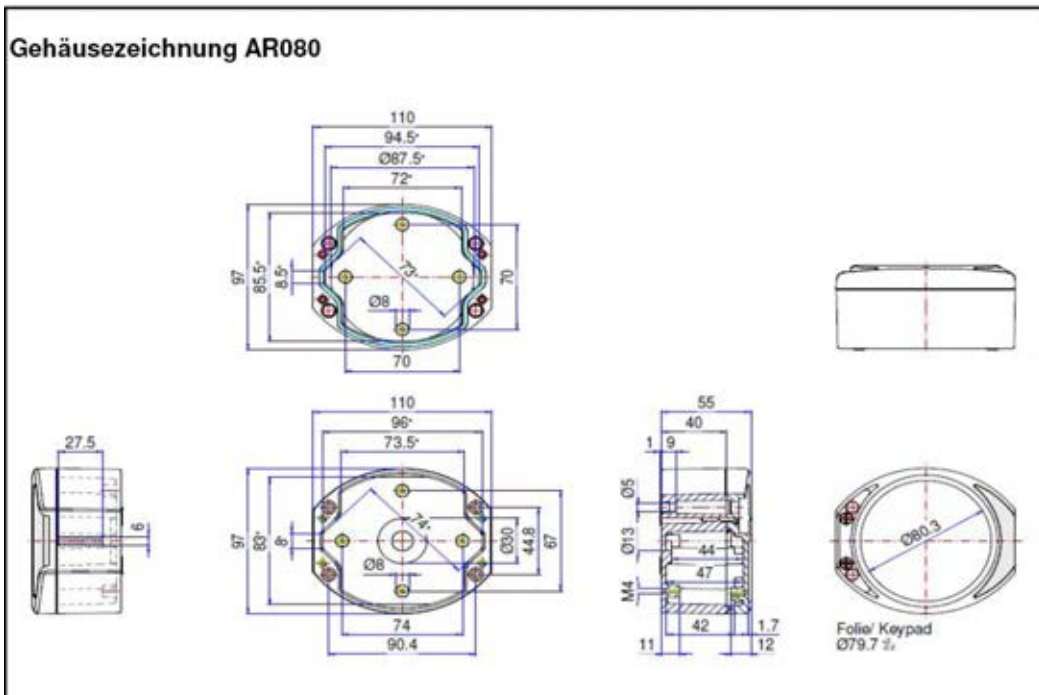


Appendix B – Drawings



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Gehäusestückliste aluDISC AR080			
Artikel-Nr	Bezeichnung	Menge	Material
008.080.001	aluDISC-Oberteil AR 080	1	GD AL Si 12
008.080.000	aluDISC-Unterteil AR 080	1	GD AL Si 12
600.012.080	Dichtung aluDISC 080	1	Silikon (Elastosil LR 3003/20 A, B)
700.000.000	Deckelschraube M4x17,5	4	1.4567
598.012.080	Design-Blenden aluDISC 080	2	Polyoxymethylen (POM)
702.000.934	aluDISC 080 Zubehörsatz	1	
000.000.149	MA aluDISC Gehäuse	1	
055.280.080	Karton aluDISC AR 080	1	
000.000.008	Etikett 88 x 42 mm Vordruck "ROLEC"	1	
Stückliste Zubehörsatz			
702.000.117	Li M4x6 DIN 7985 vz	5	Stahl, verzinkt
000.000.001	Erdsymbol Aufkleb.ø 9 mm weiß	2	
910.002.005	PolyGrip-Beutel 40x60	1	





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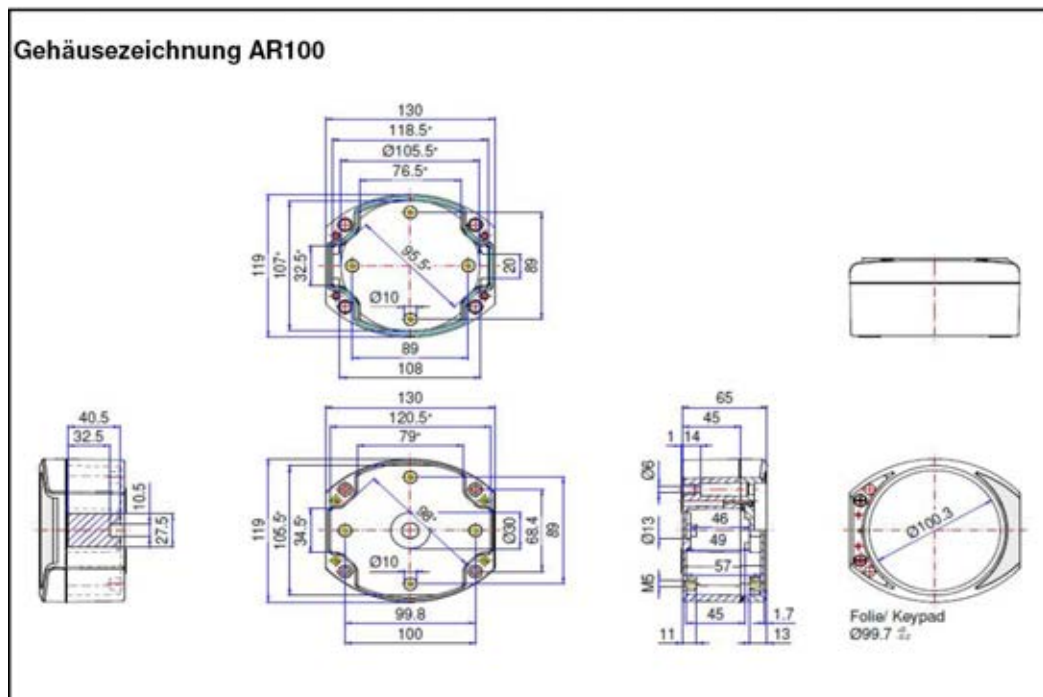
### Gehäusestückliste aluDISC AR100

Artikel-Nr	Bezeichnung	Menge	Material
008.100.001	aluDISC-Oberteil AR 100	1	GD AL Si 12
008.100.000	aluDISC-Unterteil AR 100	1	GD AL Si 12
600.012.100	Dichtung aluDISC 100	1	Silikon (Elastosil LR 3003/20 A, B)
700.000.030	Deckelschraube aluCASE M5x19,5	4	1.4567
598.012.100	Design-Blenden aluDISC 100	2	Polyoxymethylen (POM)
702.000.932	aluDISC 100-160 Zubehörsatz	1	
000.000.149	MA aluDISC Gehäuse	1	
055.280.100	Karton aluDISC AR 100	1	
000.000.008	Etikett 88 x 42 mm Vordruck "ROLEC"	1	

Stückliste Zubehörsatz			
701.000.004	Li M5x8 DIN 7985 vz	5	Stahl, verzinkt
000.000.001	Erdsymbol Aufkleb.o 9 mm weiß	2	
910.002.005	PolyGrip-Beutel 40x60	1	

### Gehäusezeichnung AR100





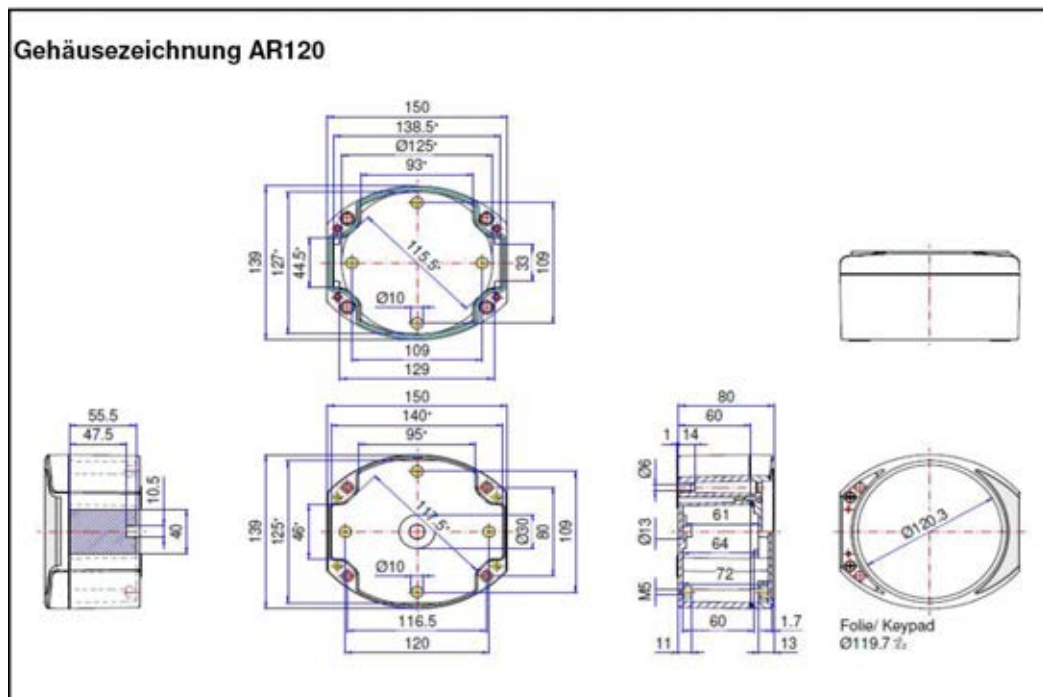


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### Gehäusestückliste aluDISC AR120

Artikel-Nr	Bezeichnung	Menge	Material
008.120.001	aluDISC-Oberteil AR 120	1	GD AL Si 12
008.120.000	aluDISC-Unterteil AR 120	1	GD AL Si 12
600.012.120	Dichtung aluDISC 120	1	Silikon (Elastosil LR 3003/20 A, B)
700.000.030	Deckelschraube aluCASE M5x19,5	4	1.4567
598.012.120	Design-Blenden aluDISC 120	2	Polyoxymethylen (POM)
702.000.932	aluDISC 100-160 Zubehörsatz	1	
000.000.149	MA aluDISC Gehäuse	1	
055.280.120	Karton aluDISC AR 120	1	
000.000.008	Etikett 88 x 42 mm Vordruck "ROLEC"	1	
<b>Stückliste Zubehörsatz</b>			
701.000.004	Li M5x8 DIN 7985 vz	5	Stahl, verzinkt
000.000.001	Erdsymbol Aufkleb.ø 9 mm weiß	2	
910.002.005	PolyGrip-Beutel 40x60	1	

### Gehäusezeichnung AR120





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### Gehäusestückliste aluDISC AR160

Artikel-Nr	Bezeichnung	Menge	Material
008.160.001	aluDISC-Oberteil AR 160	1	GD AL Si 12
008.160.000	aluDISC-Unterteil AR 160	1	GD AL Si 12
600.012.160	Dichtung aluDISC 160	1	Silikon (Elastosil LR 3003/20 A, B)
700.000.030	Deckelschraube aluCASE M5x19,5	4	1.4567
598.012.160	Design-Blenden aluDISC 160	2	Polyoxymethylen (POM)
702.000.932	aluDISC 100-160 Zubehörsatz	1	
000.000.149	MA aluDISC Gehäuse	1	
055.280.160	Karton aluDISC AR 160	1	
000.000.008	Etikett 88 x 42 mm Vordruck "ROLEC"	1	

Stückliste Zubehörsatz			
701.000.004	Li M5x8 DIN 7985 vz	5	Stahl, verzinkt
000.000.001	Erdsymbol Aufkleb.ø 9 mm weiß	2	
910.002.005	PolyGrip-Beutel 40x60	1	

### Gehäusezeichnung AR160

