



## **Test Report**

### **Determination of electrostatic characteristics of sample siliconen balgen**

**of Filcoflex B.V.  
5171 PK Kaatsheuvel  
Niederlande**

**Project-No. TL/15270/21  
Möhnesee, 23 April 2021**

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Sample	260mm diameter (with tube and siliconen balgen)		
Test No.	Test method	Norm	Test Result
TL15270W01	resistance between two measuring points	IEC 60079-32-1, chapter 4.2	$> 2 \times 10^{12} \Omega$ The sample can be classified as insulating.

Sample	siliconen balgen (only material)		
Test No.	Test method	Norm	Test Result
TL15270W05	resistance between two measuring points	IEC 60079-32-1, chapter 4.2	$> 2 \times 10^{12} \Omega$ The sample can be classified as insulating.
TL15270DW05	volume resistivity between two measuring points	IEC 60079-32-1, chapter 4.2	$> 2 \times 10^{13} \Omega \text{ m}$ The sample can be classified as insulating.
TL15270DS05	breakdown voltage	DIN EN 60243-1+2	Breakdown voltage $> 20\text{kV}$

Place, Date Mönnesee, 23. April 2021

Signatures



i.A. Ewa Müller  
Laboratory Technician





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Managing Director

Test results are obtained exclusively with the substance provided for the purpose of investigation by the customer and are based on the sample state at the time of analysis. Further conclusions and evaluations based on these findings are exclusively in the customer's sphere of responsibility. It is only permitted to pass the complete test report without the written consent of the test laboratory, but not in part.



**Determination of the resistance between two measuring points**

Reference IEC 60079-32-1, chapter 4.2

<b>Test Report No.</b>	TL/15270/21_W01	<b>Client</b>	Filcoflex B.V.
<b>Sample</b>	260mm diameter (with tube and siliconen balgen)		5171 PK Kaatsheuvel Niederlande
<b>Test No.</b>	TL15270W01	<b>Contact person</b>	Mr. Werner van Loon

<b>Sample characterization</b>
The substance was tested as delivered.

<b>Test method</b>
The resistance was determined between two measurement points. For the measured range the measurement voltage was 500 V.

<b>Remarks on test methods and results</b>
The room temperature was 21 °C, the relative humidity 30 % rH. The measurement has been carried out in a Faraday cage.

<b>Result</b>			
Test-No.	Measuring points	Resistance [ $\Omega$ ]	the resistance is:
1	metal case 1 between metal case 2	$> 2 \times 10^{12}$	insulating
2	metal ring 1 between metal ring 2	$> 2 \times 10^{12}$	insulating
3	siliconen balgen between metal case 1	$> 2 \times 10^{12}$	insulating
4	siliconen balgen between metal case 2	$> 2 \times 10^{12}$	insulating
5	siliconen balgen between metal ring 1	$> 2 \times 10^{12}$	insulating
6	siliconen balgen between metal ring 2	$> 2 \times 10^{12}$	insulating
7	siliconen balgen between siliconen balgen	$> 2 \times 10^{12}$	insulating

Concerning TRGS 727 the surface resistance: conductive:  $\rho < 10^4 \Omega$ , electrostatically dissipative:  $10^4 \Omega < \rho < 10^{11} \Omega$ , insulating:  $> 10^{11} \Omega$ . These values are valid for a temperature of  $(23 \pm 2) ^\circ\text{C}$  and a relative air humidity of  $(25 \pm 5) \%$ .

Concerning TRGS 727 the surface resistance: conductive:  $\rho < 10^4 \Omega$ , electrostatically dissipative:  $10^4 \Omega \leq \rho < 10^9 \Omega$ , insulating:  $> 10^9 \Omega$ . These values are valid for a temperature of  $(23 \pm 2) ^\circ\text{C}$  and a relative air humidity of  $(50 \pm 5) \%$ .

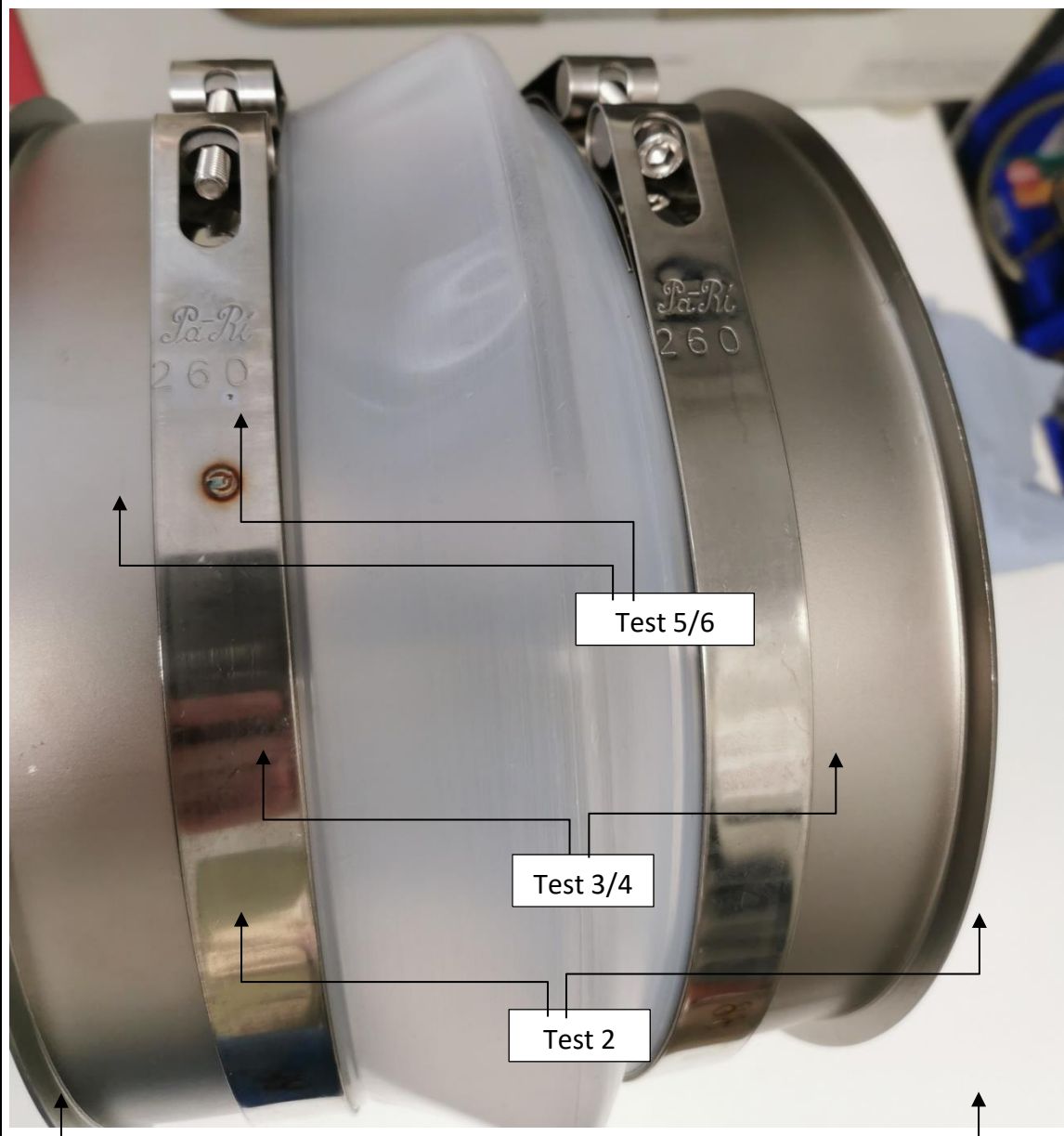


### Determination of the resistance between two measuring points

Reference IEC 60079-32-1, chapter 4.2

Test Report No.	TL/15270/21_W01	Client	Filcoflex B.V.
Sample	260mm diameter (with tube and siliconen balgen)		5171 PK Kaatsheuvel Niederlande
Test No.	TL15270W01	Contact person	Mr. Werner van Loon

### Sample characterization & measuring points





## Determination of the resistance between two measuring points

Reference IEC 60079-32-1, chapter 4.2

<b>Test Report No.</b>	TL/15270/21_OW05	<b>Client</b>	Filcoflex B.V.
<b>Sample</b>	siliconen balgen (only material)		5171 PK Kaatsheuvel Niederlande
<b>Test No.</b>	TL15270OW05	<b>Contact person</b>	Mr. Werner van Loon

### Sample characterization

The substance was tested as delivered.

### Test method

The surface resistance was determined between two measurement points.  
For the measured range the measurement voltage was 500 V.

### Remarks on test methods and results

The room temperature was 21 °C, the relative humidity 30 % rH. The measurement has been carried out in a Faraday cage.

### Result

Test-No.	Measuring points	Resistance [ $\Omega$ ]	the resistance is:
1	siliconen balgen between siliconen balgen distance 10 cm	$> 2 \times 10^{12}$	insulating
2	siliconen balgen between siliconen balgen distance 5 cm	$> 2 \times 10^{12}$	insulating
3	siliconen balgen between siliconen balgen distance 1 cm	$> 2 \times 10^{12}$	insulating

Concerning TRGS 727 the surface resistance: conductive:  $\rho < 10^4 \Omega$ , electrostatically dissipative:  $10^4 \Omega < \rho < 10^{11} \Omega$ , insulating:  $> 10^{11} \Omega$ .

These values are valid for a temperature of  $(23 \pm 2) ^\circ\text{C}$  and a relative air humidity of  $(25 \pm 5) \%$ .

Concerning TRGS 727 the surface resistance: conductive:  $\rho < 10^4 \Omega$ , electrostatically dissipative:  $10^4 \Omega \leq \rho < 10^9 \Omega$ , insulating:  $> 10^9 \Omega$ .

These values are valid for a temperature of  $(23 \pm 2) ^\circ\text{C}$  and a relative air humidity of  $(50 \pm 5) \%$ .



### Determination of the volume resistivity between two measuring points

Reference IEC 60079-32-1, chapter 4.2

<b>Test Report No.</b>	TL/15270/21_DW05	<b>Client</b>	Filcoflex B.V.
<b>Sample</b>	siliconen balgen (only material)		5171 PK Kaatsheuvel Niederlande
<b>Test No.</b>	TL15270DW05	<b>Contact person</b>	Mr. Werner van Loon

#### Sample characterization

The substance was tested as delivered.

#### Test method

The volume resistivity was determined between two measurement points.  
For the measured range the measurement voltage was 500 V.

#### Remarks on test methods and results

The room temperature was 21 °C, the relative humidity 30 % rH. The measurement has been carried out in a Faraday cage.

#### Result

Test-No.	Resistance [ $\Omega$ m]	the resistance is:
1	$> 2 \times 10^{13}$	insulating
2	$> 2 \times 10^{13}$	insulating
3	$> 2 \times 10^{13}$	insulating

Concerning TRGS 727 the volume resistivity of bulk material is categorized as conductive ( $\leq 10^4 \Omega$ m), electrostatically dissipative ( $10^4 \Omega$ m up to  $10^9 \Omega$ m) or insulating ( $> 10^9 \Omega$ m).



### Determination of the breakdown voltage

Reference            DIN EN 60243-1+2

<b>Test Report No.</b>	TL/15270/21_DS05	<b>Client</b>	Filcoflex B.V.
<b>Sample</b>	siliconen balgen (only material)		5171 PK Kaatsheuvel Niederlande
<b>Sample No.</b>	TL15270DS05	<b>Contact person</b>	Mr. Werner van Loon

#### Sample characterization

#### Test method

The electrode arrangement according to DIN EN 60243-1 Section 4.1 is applied to the specimen. By the means of a high voltage source, a potential will be impressed on the electrodes and stepwise increased until a breakdown or spark over takes place.  
The breakdown/ spark over will be determined visually as well as by data logging of the current flow.

#### Remarks on test methods and results

The samples were acclimated at 21 °C and 30 % relative humidity and then measured in this climate.

#### Result

Applied voltage [kV]	Observation			
	Breakdown/Spark over noticed visibly		Immediate increase of the current flow	
	Yes	No	Yes	No
5		X		X
10		x		x
15		x		x
20		x		x
<b>Breakdown voltage &gt;20kV</b>				