

# Original operating instructions



For lift buffers from the Diepocell® BM series: D & D-55 & D-85

"Energy-accumulating lift buffers with non-linear characteristic"

according to EN 81-20/50:2020

Type examination certificate no.	Nominal speed	Type	Dimension [mm]
F-0529/2022	0.63m/s and 1m/s	D0	Ø80x80
F-0530/2022	0.63m/s and 1m/s	D1	Ø100x80
F-0531/2022	0.63m/s and 1m/s	D2	Ø100x80
F-0532/2022	0.63m/s and 1m/s	D3	Ø125x80
F-0533/2022	0.63m/s and 1m/s	D4	Ø140x80
F-0534/2022	0.63m/s and 1m/s	D5	Ø165x80
F-0535/2022	0.63m/s and 1m/s	D6	Ø220x80
F-0536/2022	0.63m/s and 1m/s	D7	Ø165x160

Type examination certificate no.	Nominal speed	Type	Dimension [mm]
F-0537/2022	0.63m/s and 1m/s	D0-55	Ø80x80
F-0538/2022	0.63m/s and 1m/s	D2-55	Ø100x80
F-0539/2022	0.63m/s and 1m/s	D5-55	Ø165x80

Type examination certificate no.	Nominal speed	Type	Dimension [mm]
F-0540/2022	0.63m/s and 1m/s	D0-85	Ø80x80
F-0541/2022	0.63m/s and 1m/s	D2-85	Ø100x80
F-0542/2022	0.63m/s and 1m/s	D3-85	Ø125x80
F-0543/2022	0.63m/s and 1m/s	D4-85	Ø140x80

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## 1. Important information

### 1.1. Important information

#### **Purpose of this document**

This document provides important instructions for the installer, the fitter, the operator and the person who is responsible (assembly, maintenance) for ensuring the function of the safety component.

#### **Intended use**

##### **- EU**

Diepocell® BM lift buffers series D & D-55 & D-85 may only be used as safety components in systems that comply with Directive 2014/33/EU and have been constructed and designed in accordance with EN 81-20/50:2020 standards.

#### **Liability**

Should the safety component be used outside the specified area of application, it is no longer suitable for the intended purpose. The manufacturer accepts no liability for any resulting damage. Use of the safety component for the intended purpose also includes the maintenance conditions as described in these operating instructions.

### 1.2. Terms

#### **Installation:**

- Consisting of one or more lifts including cabs, shafts, machine room areas and the entrance to the spaces.

#### **Notified body:**

An independent organisation with technical competence and experience with safety components in the lift sector, as well as the competence to carry out a manufacturing site inspection and to issue type conformity certificates.

- For EU; determined by the EU member states

#### **System operator:**

- Natural or legal person who operates the lift and who is responsible for operational safety, intended use and maintenance.





## Qualified personnel:

- Persons who have been trained to carry out maintenance work on lifts, who have the necessary technical knowledge and have appropriate tools and additional equipment
- Persons who are trained to recognise possible hazards that may arise for themselves and other persons

## Competent personnel:

- Persons appointed by the owner of the system, trained by the maintenance company to be able to perform specific tasks.

## Maintenance work:

- All necessary work for preventive maintenance, troubleshooting and repairs

## Safety components fitter:

- A natural or legal person who is responsible for the correct installation of the safety components during the construction or installation of the lift or part of a lift
- Who replaces safety components on a lift and has the appropriate training

## Repair:

Replacement or repair of defective or worn components

## Safety components:

Components that have been specified as such in the relevant standard

## Maintenance operation:

Is a company that carries out the maintenance on the lift under its own responsibility and has competent personnel.

## Preventive maintenance:

All measures necessary to ensure correct operation





## 1.3. Responsibility

### Duties of the operator:

The operator/owner of the lift is responsible for,

- ensuring that the safety components are maintained in a safe operating condition,
- ensuring safe operation. For this purpose, the safety components must be checked regularly by competent persons,
- ensuring that these instructions are always available and freely accessible to the responsible persons,
- ensuring that the lift, as well as the safety components, are used as defined in this document.

### Responsibility:

Only qualified personnel are authorised to carry out the following work on safety components:

- Installation
- Maintenance, including cleaning and lubrication, checks, repairs and recommissioning after activation

### Permitted activities:

No activities other than the work described in this document may be carried out. Work on the safety components may only be carried out by qualified personnel.

### Manufacturer:

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## 2. Safe operation

### 2.1. Abbreviations/ Units

Abbreviation	Description	Unit (metric)
$m_{\min}$	Load	kg
$m_{\max}$	Load	kg
v	Nominal speed	m/s
v	Speed	m/s
Ø	Diameter	mm
H	Height	mm
A	Dimension	mm
S	Strength	mm
E	Hole spacing	mm
D	Borehole	mm
D1	Transverse deformation	mm
T	Temperature	°C
F	Power	kN

### 2.2. General documents

P+S lift buffers are energy-accumulating lift buffers with non-linear characteristic. They are defined as a safety component in the Lift Regulations.

- EU; safety component according to Annex III of Directive 2014/33/EU.

#### Material

Diepocell® BM is a polyether-based foamed polyurethane elastomer:

- Density from 0.30g/cm<sup>3</sup> - 0.85g/cm<sup>3</sup>

Diepocell® BM is a specially developed material for dampers featuring the following properties:

- Abrasion resistant
- Hydrolysis resistant
- Resistant to oil and grease
- Ozone and UV resistant
- Sensitive to acids and alkaline solutions





## 2.3. Lift buffers area of application

### - EU

Diepocell® BM lift buffers D & D-55 & D-85 are safety components for passenger and goods lifts and are tested according to the Lift Regulation 2014/33/EU **energy-accumulating lift buffers with non-linear characteristic**. Assessment basis according to EN 81-20:2020 and EN 81-50:2020. Intended use is only guaranteed, if it is ensured that the lift complies with Directive 2014/33/EU and EN 81-20:2020 and EN 81-50:2020.

Lift buffers series D & D-55 & D-85 may be used for lifts with a nominal speed of [ $v_{max.} = 1\text{m/s}$ ]. **At nominal speeds  $> [v = 1\text{m/s}]$  these lift buffers must not be used.**

The load range determined for these lift buffers is listed in the columns [min. + max.] in [kg].

For the load ranges for a nominal speed of  $v = 1\text{m/s}$ , see:

Table 1: D-series load ranges (1m/s)

Table 2: D-55 series load ranges (1m/s)

Table 3: D-85 series load ranges (1m/s)

For the load ranges for a nominal speed of  $v = 0.63\text{m/s}$ , see:

Table 4: D-series load ranges (0.63m/s)

Table 5: D-55 series load ranges (0.63m/s)

Table 6: D-85 series load ranges (0.63m/s)

For speeds not explicitly listed, the next higher tested nominal speed is always used. The values for 1m/s from table 1, 2 and 3 consequently apply for the nominal speeds of 0.70m/s and 0.85m/s.

If several buffers are used in parallel, the values for the min. and max. load range specified in the type examination certificate are multiplied according to the number of buffers. The decisive speed remains the same. All lift buffers must be loaded equally.

The use of buffers placed against / on top of each other is not permitted.





## 2.4. Technical properties tables

Table 1: D-series load ranges (1m/s)

Lift buffers load ranges 1m/s [D-series]							
Type test data						Load ranges	
Type	Diameter Ø [mm]	Height [mm]	Nominal speed [m/s]	Residual height [mm]	Transverse deformation (D1) Ø [mm]	min. [kg]	max. [kg]
<b>D0</b>	80	80	v= 1m/s	55,54	93	180	-
				28,12	111	-	600
<b>D1</b>	100	80	v= 1m/s	48,19	116	220	-
				25,09	134	-	700
<b>D2</b>	100	80	v= 1m/s	52,82	115	330	-
				20,75	146	-	1250
<b>D3</b>	125	80	v= 1m/s	50,39	143	600	-
				20,4	180	-	1850
<b>D4</b>	140	80	v= 1m/s	52,62	157	450	-
				25,11	184	-	1500
<b>D5</b>	165	80	v= 1m/s	57,82	185	650	-
				22,4	214	-	2700
<b>D6</b>	220	80	v= 1m/s	52,29	243	1500	-
				25,77	277	-	5500
<b>D7</b>	165	160	v= 1m/s	130,73	178	310	-
				39,32	231	-	3600



Table 2: D-55 series load ranges (1m/s)

Lift buffers load ranges 1m/s [D-55 series]							
Type test data						Load ranges	
Type	Diameter Ø [mm]	Height [mm]	Nominal speed [m/s]	Residual height [mm]	Transverse deformation (D1) Ø [mm]	min. [kg]	max. [kg]
<b>D0-55</b>	80	80	v= 1m/s	49,38	98	320	-
				18,02	137	-	1200
<b>D2-55</b>	100	80	v= 1m/s	52,83	119	500	-
				22,62	145	-	2100
<b>D5-55</b>	165	80	v= 1m/s	56,34	185	850	-
				25,68	220	-	3800

Table 3: D-85 series load ranges (1m/s)

Lift buffers load ranges 1m/s [D-85 series]							
Type test data						Load ranges	
Type	Diameter Ø [mm]	Height [mm]	Nominal speed [m/s]	Residual height [mm]	Transverse deformation (D1) Ø [mm]	min. [kg]	max. [kg]
<b>D0-85</b>	80	80	v= 1m/s	52,65	101	350	-
				25,88	142	-	1700
<b>D2-85</b>	100	80	v= 1m/s	53,68	124	700	-
				22,07	151	-	3000
<b>D3-85</b>	125	80	v= 1m/s	58,96	149	1000	-
				26,91	182	-	4300
<b>D4-85</b>	140	80	v= 1m/s	55,27	161	1600	-
				29,32	193	-	5700



Table 4: D-series load ranges (0.63m/s)

Lift buffers load ranges 0.63m/s [D-series]							
Type test data						Load ranges	
Type	Diameter Ø [mm]	Height [mm]	Nominal speed [m/s]	Residual height [mm]	Transverse deformation (D1) Ø [mm]	min. [kg]	max. [kg]
<b>D0</b>	80	80	v= 0.63m/s	65,72	88	150	-
				19,52	123	-	1200
<b>D1</b>	100	80	v= 0.63m/s	63,18	109	200	-
				17,16	146	-	1500
<b>D2</b>	100	80	v= 0.63m/s	65,35	109	250	-
				9,41	158	-	3200
<b>D3</b>	125	80	v= 0.63m/s	62,82	137	500	-
				13,59	186	-	5200
<b>D4</b>	140	80	v= 0.63m/s	67,01	150	320	-
				17,22	195	-	4000
<b>D5</b>	165	80	v= 0.63m/s	66,93	176	600	-
				15,3	242	-	7500
<b>D6</b>	220	80	v= 0.63m/s	70,56	231	950	-
				18,16	295	-	9400
<b>D7</b>	165	160	v= 0.63m/s	146,51	172	310	-
				29,14	249	-	5800



Table 5: D-55 series load ranges (0.63m/s)

Lift buffers load ranges 0.63m/s [D-55 series]							
Type test data						Load ranges	
Type	Diameter Ø [mm]	Height [mm]	Nominal speed [m/s]	Residual height [mm]	Transverse deformation (D1) Ø [mm]	min. [kg]	max. [kg]
<b>D0-55</b>	80	80	v= 0.63m/s	68,8	88	160	-
				14,84	141	-	2100
<b>D2-55</b>	100	80	v= 0.63m/s	69,7	109	250	-
				16,78	157	-	4200
<b>D5-55</b>	165	80	v= 0.63m/s	69,19	180	600	-
				18,15	240	-	7500

Table 6: D-85 series load ranges (0.63m/s)

Lift buffers load ranges 0.63m/s [D-85 series]							
Type test data						Load ranges	
Type	Diameter Ø [mm]	Height [mm]	Nominal speed [m/s]	Residual height [mm]	Transverse deformation (D1) Ø [mm]	min. [kg]	max. [kg]
<b>D0-85</b>	80	80	v= 0.63m/s	67,1	92	200	-
				15,73	149	-	3200
<b>D2-85</b>	100	80	v= 0.63m/s	66,7	113	400	-
				16,21	157	-	6000
<b>D3-85</b>	125	80	v= 0.63m/s	69,59	141	700	-
				21,03	187	-	9300
<b>D4-85</b>	140	80	v= 0.63m/s	69,62	151	800	-
				29,19	193	-	10200

## 2.5 Buffer types / certificate no. / dimensions / item no.

Table 7: Item no. Version A

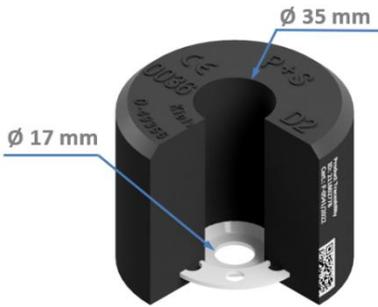
Type	Dim. D x H [mm]	Type examination certificate/ certificate no.	S [mm]	Item no.
<p><b>Version A with round steel plate</b></p>				
<b>D0</b>	80 x 80	F-0529/2022	4	211800074
<b>D1</b>	100 x 80	F-0530/2022	4	211801074
<b>D2</b>	100 x 80	F-0531/2022	4	211802074
<b>D3</b>	125 x 80	F-0532/2022	4	211803074
<b>D4</b>	140 x 80	F-0533/2022	4	211804074
<b>D5</b>	165 x 80	F-0534/2022	6	211805074
<b>D6</b>	220 x 80	F-0535/2022	6	211806074
<b>D7</b>	165 x 160	F-0536/2022	6	211807074
<b>D0-55</b>	80 x 80	F-0537/2022	4	211800075
<b>D2-55</b>	100 x 80	F-0538/2022	4	211802075
<b>D5-55</b>	165 x 80	F-0539/2022	6	211805075
<b>D0-85</b>	80 x 80	F-0540/2022	4	211800078
<b>D2-85</b>	100 x 80	F-0541/2022	4	211802078
<b>D3-85</b>	125 x 80	F-0542/2022	4	211803078
<b>D4-85</b>	140 x 80	F-0543/2022	4	211804078

Table 8: Item no. Version C

Version C with square steel plate							
Type	Dim. D x H [mm]	Type examination certificate/ certificate no.	A [mm]	E [mm]	Ød [mm]	S [mm]	Item no.
<b>D0</b>	80 x 80	F-0529/2022	105	80	12	4	211800174
<b>D1</b>	100 x 80	F-0530/2022	130	100	14	6	211801174
<b>D2</b>	100 x 80	F-0531/2022	130	100	14	6	211802174
<b>D3</b>	125 x 80	F-0532/2022	155	125	18	6	211803174
<b>D4</b>	140 x 80	F-0533/2022	180	140	18	6	211804174
<b>D5</b>	165 x 80	F-0534/2022	205	165	18	6	211805174
<b>D6</b>	220 x 80	F-0535/2022	260	220	18	6	211806174
<b>D7</b>	165 x 160	F-0536/2022	205	165	18	6	211807174
<b>D0-55</b>	80 x 80	F-0537/2022	105	80	12	4	211800175
<b>D2-55</b>	100 x 80	F-0538/2022	130	100	14	6	211802175
<b>D5-55</b>	165 x 80	F-0539/2022	205	165	18	6	211805175
<b>D0-85</b>	80 x 80	F-0540/2022	105	80	12	4	211800178
<b>D2-85</b>	100 x 80	F-0541/2022	130	100	14	6	211802178
<b>D3-85</b>	125 x 80	F-0542/2022	155	125	18	6	211803178
<b>D4-85</b>	140 x 80	F-0543/2022	180	140	18	6	211804178



Table 9: Item no. Version D

Version D with foamed-in metal insert			
Type	Dim. D x H [mm]	Type examination certificate/certificate no.	Item no.
<b>D0</b>	80 x 80	F-0529/2022	211800774
<b>D1</b>	100 x 80	F-0530/2022	211801774
<b>D2</b>	100 x 80	F-0531/2022	211802774
<b>D3</b>	125 x 80	F-0532/2022	211803774
<b>D4</b>	140 x 80	F-0533/2022	211804774
<b>D5</b>	165 x 80	F-0534/2022	211805774
<b>D6</b>	220 x 80	F-0535/2022	211806774
<b>D7</b>	165 x 160	F-0536/2022	211807774
<b>D0-55</b>	80 x 80	F-0537/2022	211800775
<b>D2-55</b>	100 x 80	F-0538/2022	211802775
<b>D5-55</b>	165 x 80	F-0539/2022	211805775
<b>D0-85</b>	80 x 80	F-0540/2022	211800778
<b>D2-85</b>	100 x 80	F-0541/2022	211802778
<b>D3-85</b>	125 x 80	F-0542/2022	211803778
<b>D4-85</b>	140 x 80	F-0543/2022	211804778





## 2.6. Environmental influences / temperature / humidity

### Test condition description

Diepocell® BM buffers have been tested in the climatic chamber over a period of 12 weeks at a temperature of 85°C / 185°F and a relative humidity of 98%. The lift buffers showed no significant deviation in the force-displacement diagram at a deformation of 90%. Since there is no standardised test for the service life of an elastomer, the service life is calculated using the above test. The expected service life doubles at a temperature drop of 10°C / 50°F due to the slower ageing of the elastomer, as the reaction rate of ageing is halved at a temperature drop of 10°C / 50°F. Further test parameters remain constant. The values determined are listed in the table below.

Table 10: Environmental influences

Temperature [°C / °F]	Humidity [%]	Load [%]	Lifetime [Weeks]	Result
85 / 185	98	90	12	o.k.
75 / 167	98	90	24	o.k.
65 / 149	98	90	48	o.k.
55 / 131	98	90	96	o.k.
45 / 113	98	90	192	o.k.
35 / 95	98	90	384	o.k.
25 / 77	98	90	768	o.k.

### Operating temperature for the lift buffers during use

The buffer can be used at a temperature of +5°C to +70°C.

Please note the changing compressive stresses that occur at different temperatures. The compressive stress increases and the spring stiffness increases at temperatures below room temperature. Temperatures above room temperature lead to slightly lower compressive stress values and the spring stiffness decreases.

Diepocell® BM can be used in the temperature range of -30°C to +80°C.





## 2.7. Requirements for the place of use

It should be noted that the base plates of types A and C are not to be used as support and counter-pressure surfaces, as these cannot absorb the occurring forces.

Generally, the attachment of the lift buffers must be made in such a way that the forces that occur during use are absorbed.

Counter-pressure surfaces must also be designed in such a way that the forces occurring during use are absorbed.

Counter-pressure surfaces must be designed in such a way that a full-surface contact with the buffer is achieved. Possible tolerances in the design (guide-related play) must also be taken into account.

The transverse deformation of the buffers during deflection must be taken into account when designing the size of the counter-pressure surface. See the following tables:

Table 1: D-series load ranges (1m/s)

Table 2: D-55 series load ranges (1m/s)

Table 3: D-85 series load ranges (1m/s)

Table 4: D-series load ranges (0.63m/s)

Table 5: D-55 series load ranges (0.63m/s)

Table 6: D-85 series load ranges (0.63m/s)

### 2.7.1. Car

If lift buffers are fitted to the car, the car with the buffers must not be placed on the buffers. Static loads on the buffer may only ever be applied for a short time and should not exceed 5 minutes. When attaching the buffers, please note that the diameter of the buffers increases under load (transverse deformation) see [Table 1](#) to [Table 6](#) "Transverse deformation". The table shows the diameter "D1" that occurs at max. load and the residual buffer height, when the buffer is compressed. A free deformation is necessary to ensure a correct function of the buffer. The buffer must not be **significantly restricted** in its transverse deformation

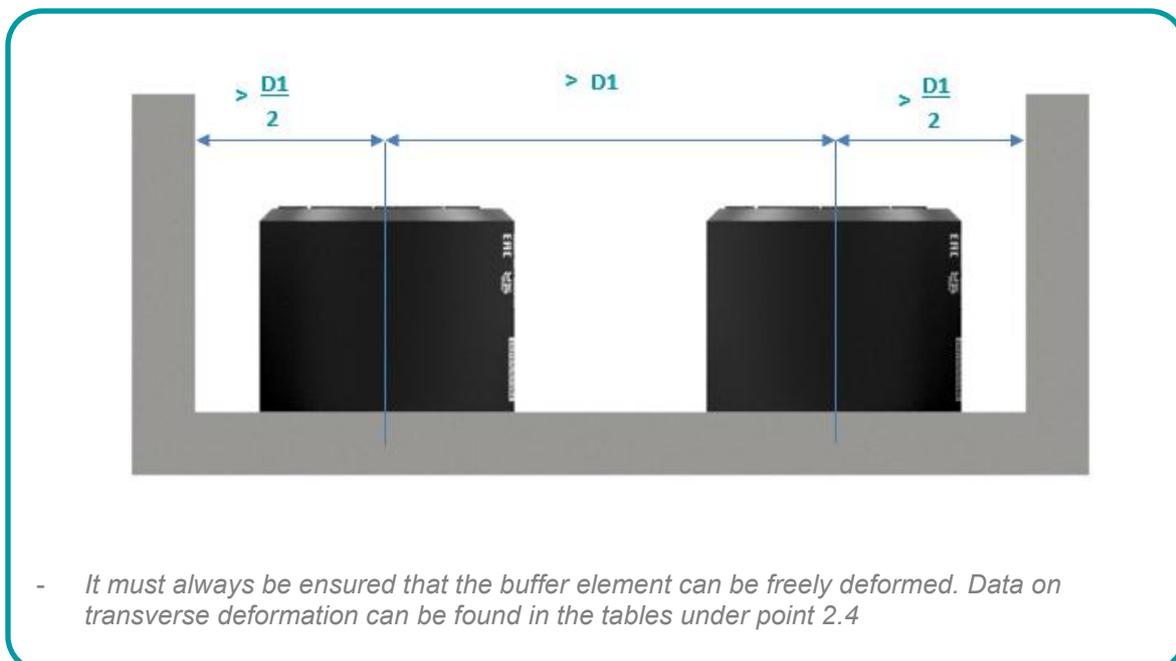
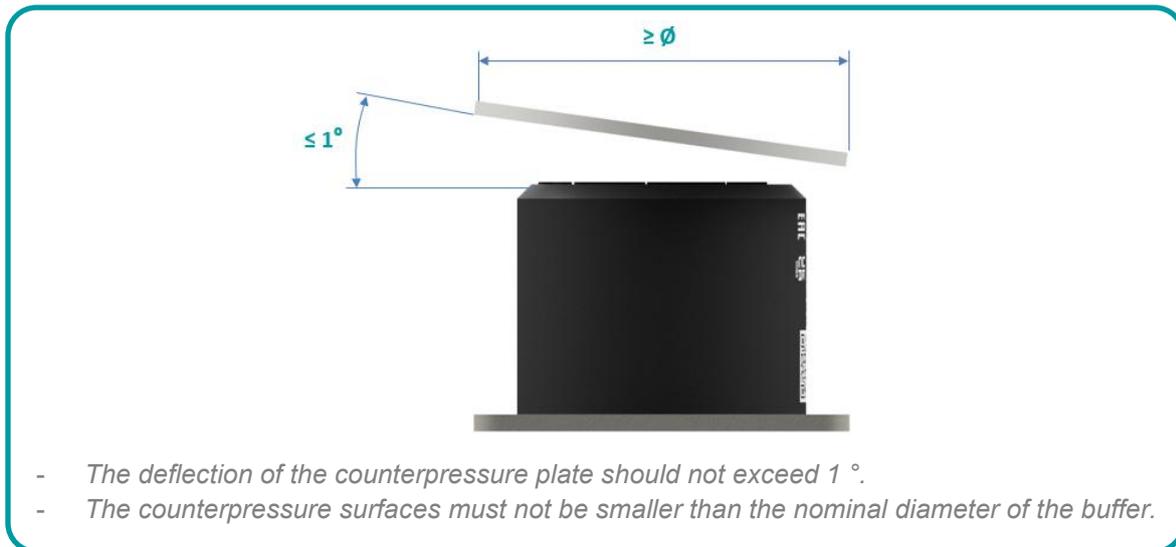
### 2.7.2. Counterweight

If lift buffers are fitted to the counterweight, the counterweight must not be placed on the buffer. Static loads on the buffer may only ever be applied for a short time and should not exceed 5 minutes. When attaching the buffers, please note that the diameter of the buffers increases under load (transverse deformation). See [Table 1](#) to [Table 6](#) "Transverse deformation". The table shows the diameter "D1" that occurs at max. load and the residual buffer height, when the buffer is compressed. A free deformation is necessary to ensure a correct function of the buffer. The buffer must not be **significantly restricted** in its transverse deformation



## 3. Safety component installation

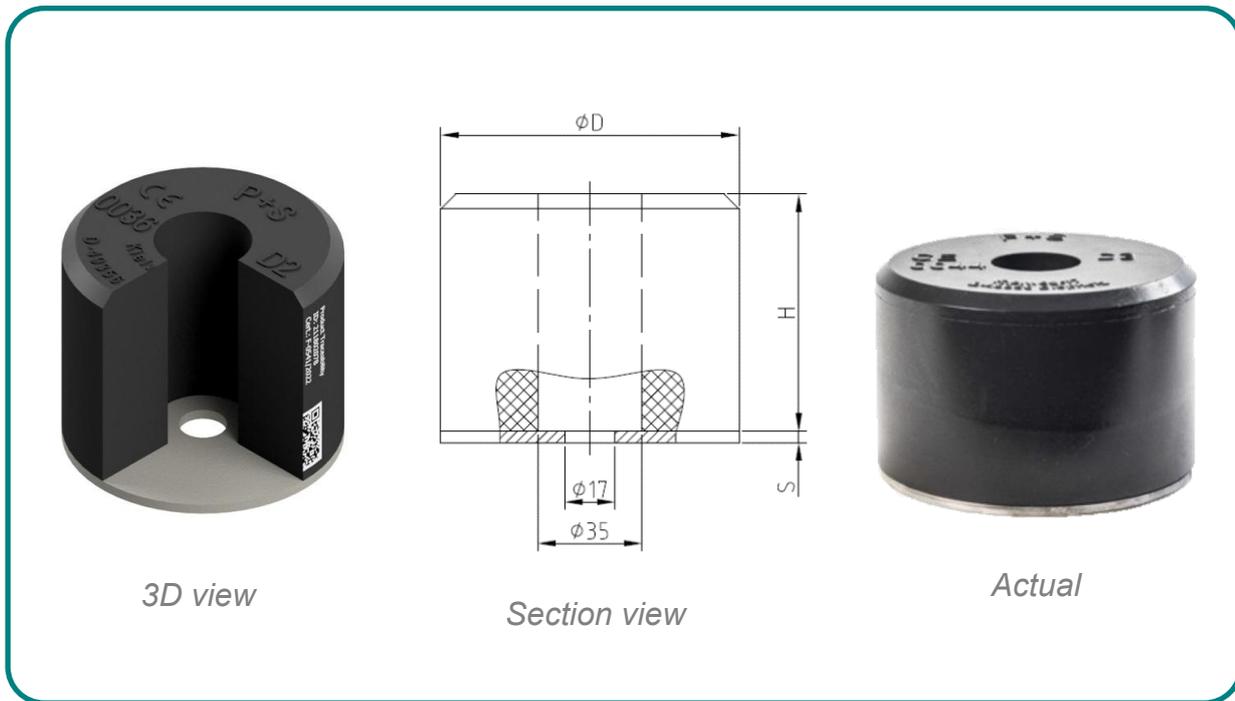
### 3.1. Installation instructions



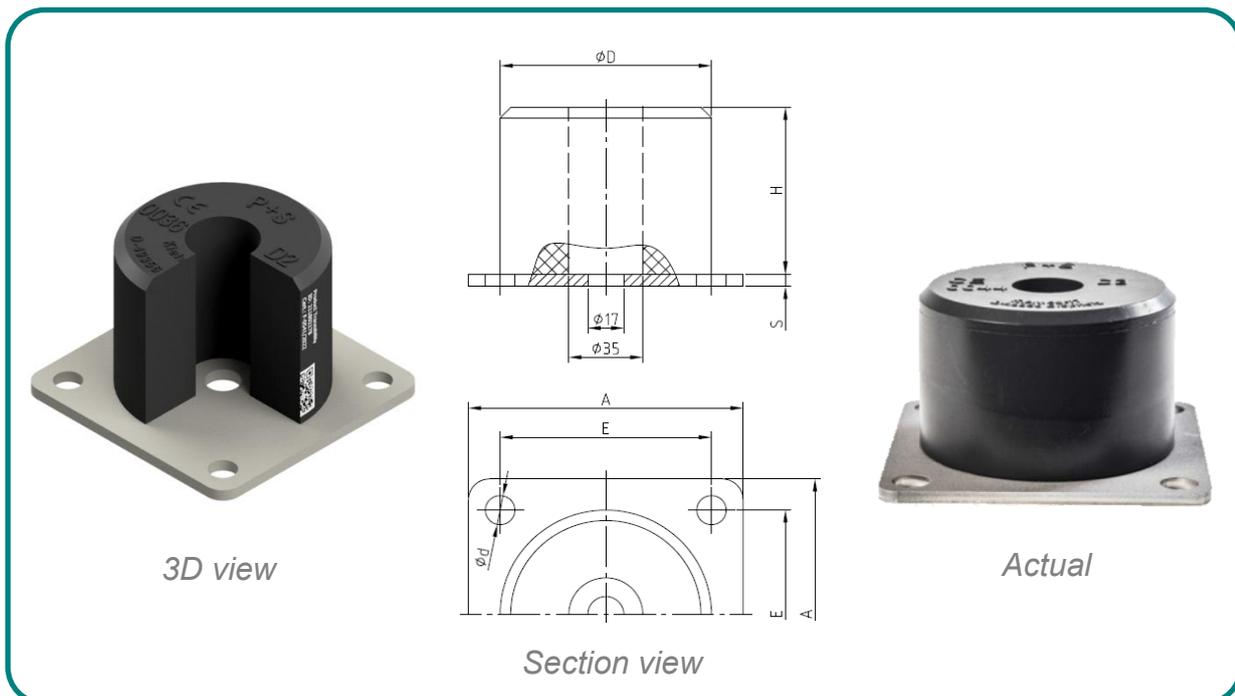


## 3.2. Attachment variants

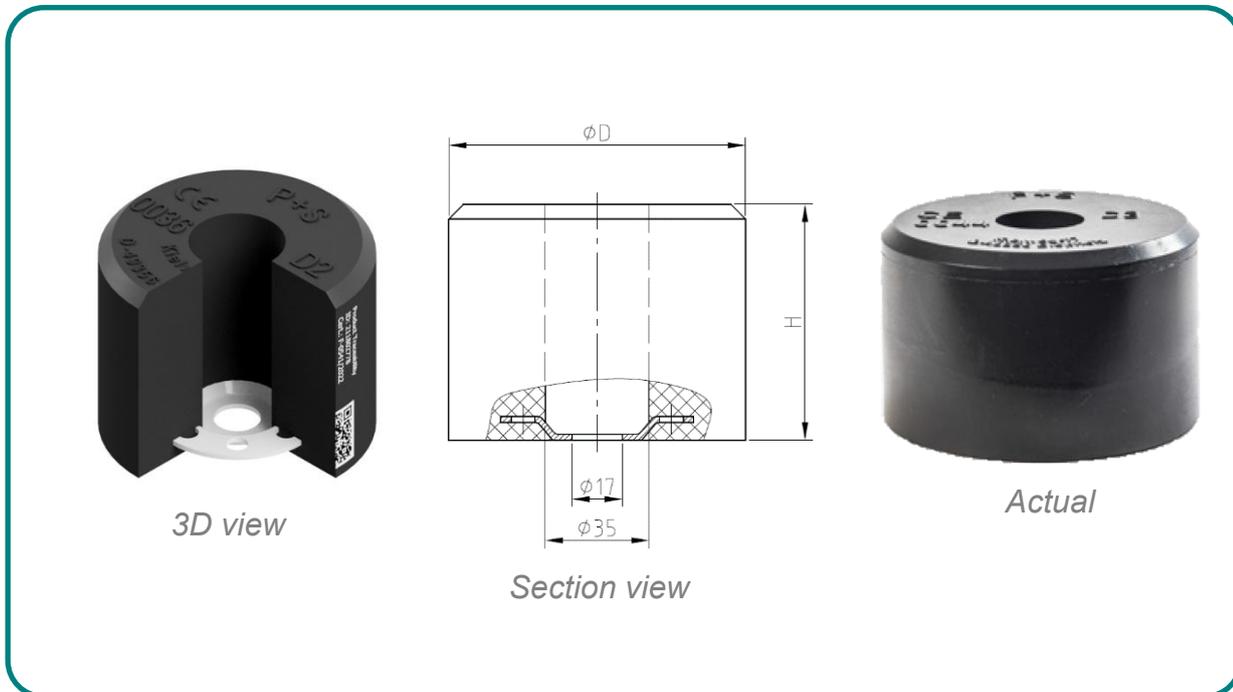
Version A [Lift buffer with round mounting plate]



Version C [Lift buffer with square mounting plate]



## Version D [Lift buffer with foamed-in metal insert]



### Description:

The attachment of the lift buffers is to be carried out in such a way that the fastening elements (**screw head**) are lower than the residual buffer height at [max. load] (see [Table 1](#) to [Table 6](#) "Residual height").

The type of attachment of the lift buffers is influenced by the installation situation, so that a general specification is not possible.

- Version A:** Screwing through the central hole in the lift buffer
- Version C:** Screwing through the 4 holes of the square fixing plate and/or through the central hole
- Version D:** Screwing through the central hole in the lift buffer

The user / installer / service company is responsible for a permanent and secure mounting and attachment, which must be carried out in such a way that the buffer function is not impaired.

For all attachments, ensure that the mounting parts do not collide with the counter-pressure plate when the buffer is compressed.



## 4. Settings

No setting work is required for the lift buffer. The buffer is delivered ready for use.

### 4.1. Testing prior to commissioning

The installed buffer must be tested prior to the commissioning of the lift system to ensure that it is undamaged and that its dimensions and type designation correspond to the type examination certificate documents.

## 5. Maintenance

### 5.1. Cleaning

The lift buffer should, if necessary, only be cleaned with water **without additives**. Solvents as well as acids and alkaline solutions can damage the lift buffer.

### 5.2. Maintenance

The lift buffer has a service life of at least 10 years. The service life is influenced by environmental factors (temperature, humidity, dirt and mechanical stress).

The lift buffer should be visually inspected for damage at least once a year. The lift buffer must be checked for cracks and material chipping during the visual inspection. Cracks in the outer surface of a length of  $\geq 40\text{mm}$  and a depth  $\geq 3\text{mm}$  are not permitted. Material chippings or outer surface detachments  $\geq 20\text{mm} \times 20\text{mm}$  are not permitted. Check the height of the buffer, if it is visibly deformed. The buffer must be replaced, if the height of the buffer has changed by more than 5mm compared to the nominal dimension (Height H (according to [Table 7](#) to [Table 9](#)) plus the base plate thickness for version A+C),

### 5.3. Repairs

Lift buffers must not be repaired.

### 5.4. Replacement

When replacing a lift buffer, ensure that an identical buffer with the same performance characteristics is installed.





## 6. Disposal

### 6.1. Proper disposal

Diepocell® BM lift buffers do not require labelling and are not classified as hazardous goods.

In Germany, the lift buffer can be disposed of as commercial waste similar to household waste (a waste code number is not available). Energy recovery is possible.

Official requirements may vary in Germany depending on the federal state and must be taken into account. For use and disposal in other countries, the country-specific disposal guidelines must be observed.

### Attachments

Drawings for the D & D-55 & D-85 series lift buffers in the "A"- "C"- "D" versions

Type examination certificates for the D & D-55 & D-85 series.

Diepholz, 31 May 2023

Place, date

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