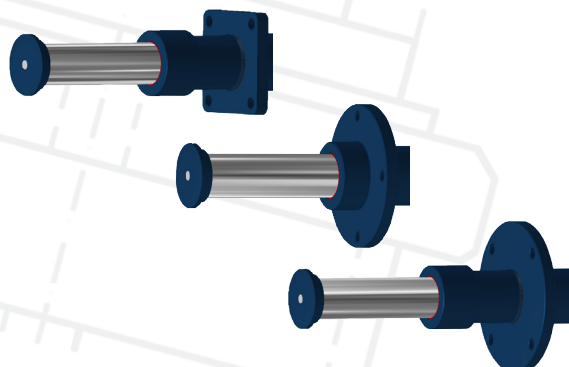


## **Hydraulic Buffers**

Industrial Brakes · Thrusters · Pressure Oil Pumps · Couplings · Hydraulic Buffers · Cellular Buffers  
Rail Pliers · Sheaves · Hook Blocks · Crane Rail Wheels · Rail Clamps · Reparation · Service

The hydraulic buffers of the KHP series have been designed to be used for many different technical applications.

The buffer can be used for any kind of technical application due to its self-contained system. Since there is no need for this damping device to be supplied with external energy or other external means, it is outstandingly suited to decelerate moving masses along the shortest possible path considering the company requirements.



## Facts of the KHP-series:

- Diameter range of 75mm up to 175mm
- Buffer stroke of 50mm up to 1600mm
- max. buffer power of up to 1000kN
- Operating temperature of -30 up to 100°C
- Wear-resistant piston rod by means of hard-chrome plating
- optional mounted piston rod protection

## Advantages of the KHP-series

In the development of the KHP hydraulic buffer the individuality was emphasized!

For instance, we do supply our buffers as a pre-finished version (front flange) for buffers of the product OLEO and RIW regarding the installation dimensions and the buffer characteristics.

Optimal throttle features due to the application dependent, customer specific throttle design considering possible desired special characteristics!

Paints according to customer requirement are also possible.

**We readily work out with you the optimal hydraulic buffer design for your application – also for different cases as comprised in our standard programme!**

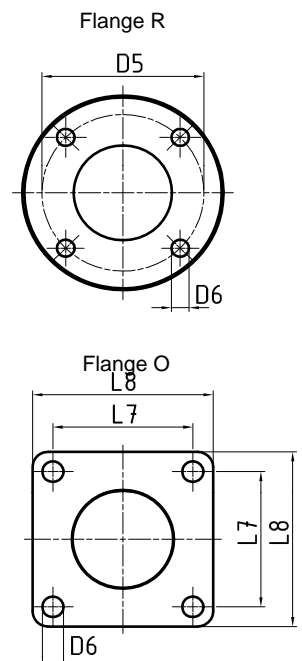
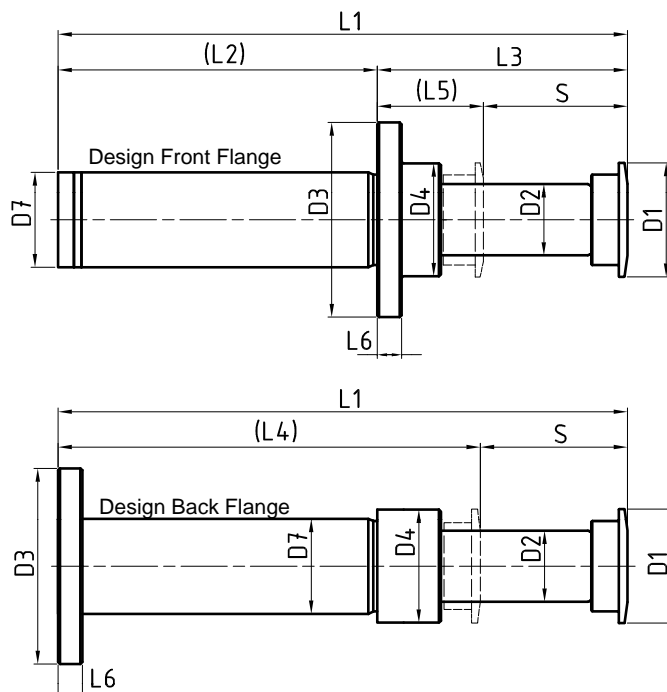
Performance data					Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request				
Nominal- Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy- absorp./stroke <sup>1</sup> [kJ/Hub]	max. Energy- absorption/h <sup>2</sup> [kJ/h]	Static recoil force		max. Angle deviation <sup>4</sup> F [°] B [°]		Weight approx. [kg]
					beginning of stroke <sup>3</sup> [kN]	end of stroke <sup>3</sup> [kN]			
75	100	200	20	1300	1,4	13,5	4,3	3,2	22
	150	200	30	1850		17,0	3,2	2,4	24
	200	200	38	2500		17,2	2,5	1,9	26
	300	180	50	3350		16,4	2,0	1,5	28
	400	160	55	3700		15,2	1,7	1,3	30
	500	140	58	3900		13,8	1,6	1,2	32
	600	120	60	4000		13,6	1,5	1,1	36

<sup>1)</sup> for standard characteristic

<sup>2)</sup> at 30°C ambient temperature

<sup>3)</sup> at 5 bar gas pressure

<sup>4)</sup> at max. buffer force



Dimensions [mm]																
Nominal- Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7	L8
75	100	120	60	170	100	135	R 18 O 18	80	425	R 230 O 241	R 195 O 184	325	R 95 O 84	25	120	150
	150								560	R 315 O 326	R 245 O 234	410	R 95 O 84			
	200								700	R 405 O 340	R 295 O 360	500	R 95 O 160			
	300								980	R 585 O 403	R 395 O 577	680	R 95 O 277			
	400								1265	R 770 O 588	R 495 O 677	865	R 95 O 277			
	500								1555	R 960 O 723	R 595 O 832	1055	R 95 O 332			
	600								1840	R 1145 O 908	R 695 O 932	1240	R 95 O 332			

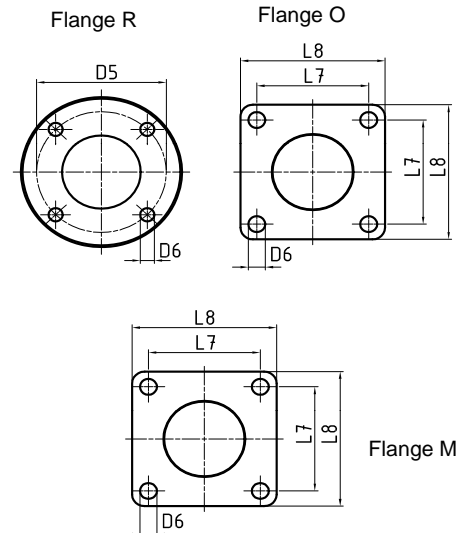
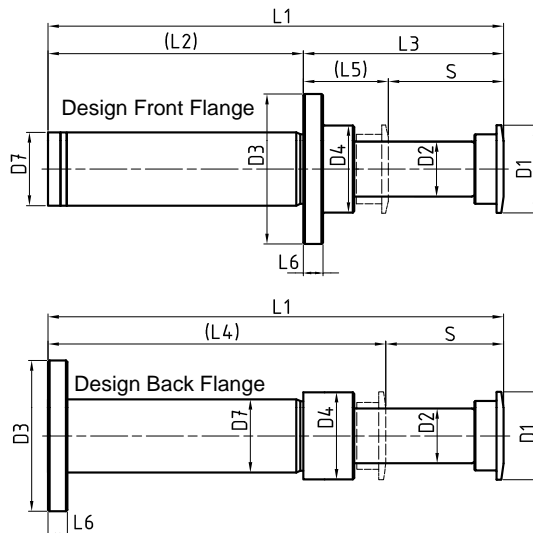
Performance data					Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request				
Nominal- Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy- absorp./stroke <sup>1</sup> [kJ/Hub]	max. Energy- absorption/h <sup>2</sup> [kJ/h]	Static recoil force		max. Angle deviation <sup>4</sup> F [°] B [°]		Weight approx. [kg]
					beginning of stroke <sup>3</sup> [kN]	end of stroke <sup>3</sup> [kN]			
95	100	260	25	1600	2,3	12,8	5,0	4,4	23
	150	260	37	2300		15,8	4,5	3,3	26
	200	260	49	3100		15,0	4,0	2,6	30
	300	250	67	4100		18,0	3,0	1,9	36
	400	230	82	5100		21,0	2,5	1,6	41
	500	210	92	6100		20,3	2,2	1,5	46
	600	190	100	7100		20,0	2,1	1,4	53
	800	150	105	9100		19,0	2,0	1,3	67

<sup>1)</sup> for standard characteristic

<sup>2)</sup> at 30°C ambient temperature

<sup>3)</sup> at 5 bar gas pressure

<sup>4)</sup> at max. buffer force



Dimensions [mm]																
Nominal- Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7	L8
95	100	120	75	205	119	165	R 18 O 18 M 21	100	440	R 235 O 256 M 178	R 205 O 184 M 262	340	R 105 O 84 M 162	25	O 120 M 133	O 150 M 172
	150								580	R 325 O 346 M 226	R 255 O 234 M 354	430	R 105 O 210 M 204			
	200								730	R 425 O 370	R 305 O 360	530	R 105 O 327			
	300								1010	R 605 O 433 M 416	R 405 O 577 M 594	710	R 105 O 277 M 294			
	400								1285	R 780 O 608 M 531	R 505 O 677 M 754	885	R 105 O 277 M 354			
	500								1575	R 970 O 743	R 605 O 832	1075	R 105 O 332			
	600								1865	R 1160 O 933	R 705 O 932	1265	R 105 O 332			
	800								2450	R 1545 O 1535	R 905 O 915	1650	R 105 O 115			

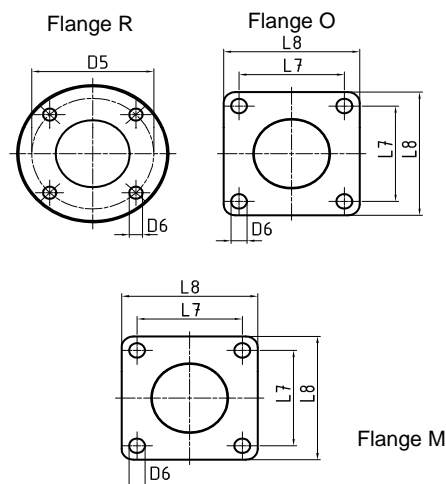
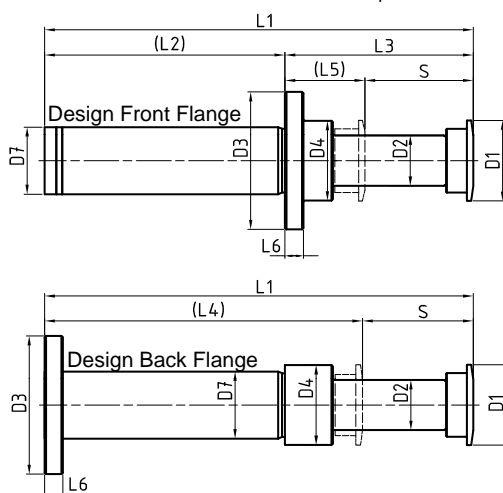
Performance data					Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request				
Nominal- Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy- absorp./stroke <sup>1</sup> [kJ/Hub]	max. Energy- absorption/h <sup>2</sup> [kJ/h]	Static recoil forces		max.		Weight
					beginning of stroke <sup>3</sup> [kN]	end of stroke <sup>3</sup> [kN]	Angle deviation <sup>4</sup> F [°]	B [°]	approx. [kg]
115	100	520	49	3150	3,7	16,4	5,0	4,5	44
	200	520	97	6150		19,3	3,9	3,1	56
	250	520	115	7650		21,2	3,2	2,6	62
	300	480	133	9150		21,6	3,0	2,4	68
	400	440	162	12150		22,1	2,5	2,0	81
	500	400	185	13600		23,1	2,2	1,8	90
	600	360	198	15100		25,9	2,1	1,7	98
	800	300	220	17100		26,4	1,9	1,5	130

<sup>1)</sup> for standard characteristics

<sup>2)</sup> at 30°C ambient temperature

<sup>3)</sup> at 5 bar gas pressure

<sup>4)</sup> at max. buffer force



Dimensions [mm]																
Nominal- Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7	L8
115	100	140	95	260	148	210	R 23 O 26 M 27	130	460	R 230 O 276	R 230 O 184	360	R 130 O 84	30	O 210 M 178	O 270 M 229
	200								750	R 420 O 390 M 272	R 330 O 360 M 478	550	R 130 O 160 M 278			
	250								890	R 510 O 363	R 380 O 527	640	R 130 O 277			
	300								1035	R 605 O 458 M 508	R 430 O 577 M 527	735	R 130 O 277 M 227			
	400								1325	R 795 O 648 M 682	R 530 O 677 M 643	925	R 130 O 277 M 243			
	500								1610	R 980 O 778 M 854	R 630 O 832 M 756	1110	R 130 O 332 M 256			
	600								1880	R 1150 O 948	R 730 O 932	1280	R 130 O 332			
	800								2450	R 1520 O 1535	R 930 O 915	1650	R 130 O 115			

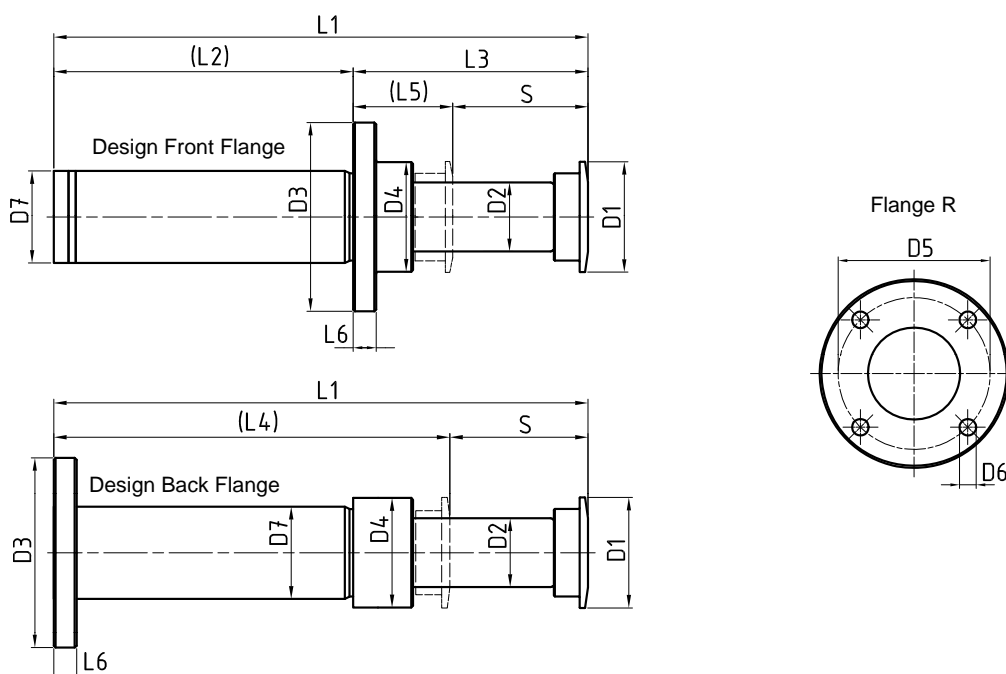
Performance data					Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request				
Nominal- Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy- absorp./stroke <sup>1</sup> [kJ/Hub]	max. Energy- absorption/h <sup>2</sup> [kJ/h]	static recoil force		max. Angel deviation <sup>4</sup> F [°]    B [°]		Weight approx. [kg]
					beginning of stroke <sup>3</sup> [kN]	end of stroke <sup>3</sup> [kN]			
135	200	700	127	8000	5,5	70	4,5	3,5	72
	300	650	177	12000		70	3,1	2,5	89
	400	650	236	15000		75	2,7	1,7	99
	600	550	300	17000		75	2,3	1,3	125
	800	450	327	19000		75	1,7	0,9	160
	1000	400	364	21000		75	1,3	0,7	192
	1200	400	436	23000		75	1,0	0,6	225

<sup>1)</sup> for standard characteristics

<sup>2)</sup> at 30°C ambient temperature

<sup>3)</sup> at 5 bar gas pressure

<sup>4)</sup> at max. buffer force



Dimensions [mm]														
Nominal- Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6
135	200	177	115	300	185	245	27	156	750	395	355	550	155	35
	300								1035	580	455	735		
	400								1325	770	555	925		
	600								1880	1125	755	1280		
	800								2450	1495	955	1650		
	1000								3020	1865	1155	2020		
	1200								3590	2235	1355	2390		

interchangeable dimensions for renowned producers upon request!

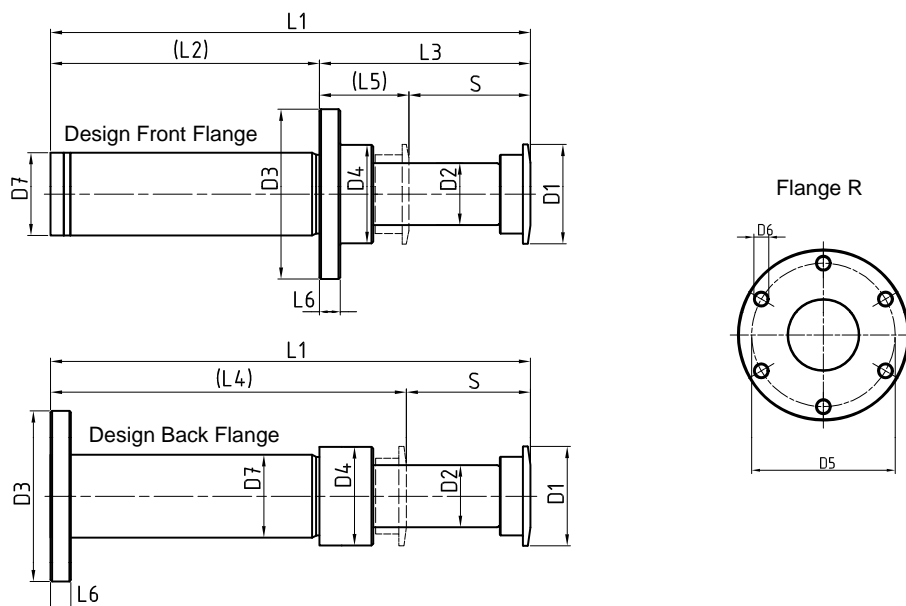
Performance data					Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request				
Nominal- Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy- absorp./stroke <sup>1</sup> [kJ/Hub]	max. Energy- absorption/h <sup>2</sup> [kJ/h]	Static recoil force		max.		Weight approx. [kg]
					beginning of stroke <sup>3</sup> [kN]	end of stroke <sup>3</sup> [kN]	Angle deviation <sup>4</sup> F [°]	B [°]	
175	200	1000	182	8000	9,5	80	6,0	5,0	105
	400	950	345	14400		80	5,0	4,0	165
	500	900	409	17500		90	4,5	3,5	195
	600	860	469	20500		95	4,0	3,0	230
	800	750	545	25000		100	3,0	2,0	290
	1000	600	545	28000		110	2,3	1,3	350
	1200	500	545	28000		110	1,7	0,8	410
	1600	400	582	32000		110	1,5	0,6	530

<sup>1)</sup> for standard characteristics

<sup>2)</sup> at 30°C ambient temperature

<sup>3)</sup> at 5 bar gas pressure

<sup>4)</sup> at max. buffer force



Dimensions [mm]														
Nominal- Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6
175	200	210	150	350	230	295	27	206	860	420	440	660	240	50
	400								1485	845	640	1085		
	500								1765	1025	740	1265		
	600								2065	1225	840	1465		
	800								2660	1620	1040	1860		
	1000								3225	1985	1240	2225		
	1200								3815	2375	1440	2615		
	1600								4995	3155	1840	3395		

interchangeable dimensions for renowned producers upon request!

Company:

Project:

Name:

Date:

## General information

desired buffer size

size x stroke: \_\_\_\_\_

## Fastening type

- ☐ front flange F  
☐ back flange B

## Field of application

- ☐ outdoor application  
☐ indoor application

## Definitions and calculations

R1...R4	[kg]
M <sub>pu</sub>	[kg]
v	[m/s]
E <sub>pu</sub>	[Nm]
F <sub>pu</sub>	[kN]

wheel loads resulting from deadweight and rigidly attached loads  
mass acting on one buffer  
max. travel speed  
energy acting on one buffer  
buffer end force

## Determine the masses acting on the buffer m<sub>pu</sub>

For cranes:

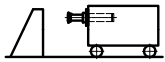
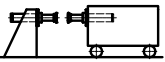
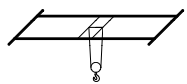
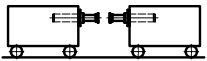
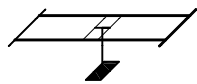
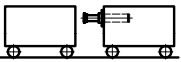
$$m_{pu} = R1 + R2 + R3 + R4 + \dots Rn \quad ^1)$$

<sup>1)</sup>For cranes with more than 4 wheels/side

For trolley:

$$m_{pu} = \max. \text{ from } (R1 + R3) \text{ or } (R2 + R4)$$

## Impact conditions

-  V1 case I ☐ Crane/trolley weight \_\_\_\_\_ kg  
Crane/trolley nominal speed \_\_\_\_\_ m/min
-  V1 case II ☐ pendulation 
- V2 →  V1 case III ☐ fixed load 
- V2 →  V1 case IV ☐ Crane/trolley drive switched off before buffer impact (fab=0,7)

## Type of operation

- ☐ emergency-stop application  
☐ impact at creep speed  
☐ operational actuation

Stroke frequency \_\_\_\_\_ 1/h

## Information regarding buffer design

- ☐ max. perm. buffer force \_\_\_\_\_ kN  
☐ max. perm. buffer stroke \_\_\_\_\_ mm  
☐ max. perm. deceleration \_\_\_\_\_ m/s<sup>2</sup>

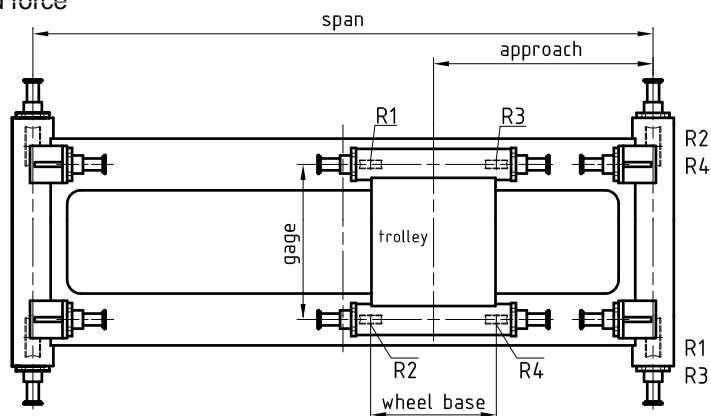
## Case of application

### Horizontally moved mass

- ☐ a) mass without propelling force (motor switched off)  
☐ b) mass with propelling force (motor runs)  
sum of motor power per crane side \_\_\_\_\_ kW  
breakdown torque factor \_\_\_\_\_ Mk/Mn

### Ambient temperatures

from \_\_\_\_\_ °C to \_\_\_\_\_ °C



Crane/trolley weight \_\_\_\_\_ kg  
Crane/trolley nominal speed \_\_\_\_\_ m/min

☐ pendulation

☐ fixed load

☐ Crane/trolley drive switched off before buffer impact (fab=0,7)

## Operating conditions

- ☐ normal ☐ dry ☐ humid  
☐ oily ☐ dusty ☐ aggressive

## Design data of the buffer

Impact mass per buffer m<sub>pu</sub> \_\_\_\_\_ [kg]  
Impact speed v \_\_\_\_\_ [m/s]  
Propelling force F<sub>v</sub> \_\_\_\_\_ [N]