Applications

The hydraulic buffers were designed for use in all applications in general engineering, the iron and steel industry, the material handling industry and can also be used on railways applications.

The KHP is an entirely closed hydraulic buffer system and can therefore be used in any orientation on an application.

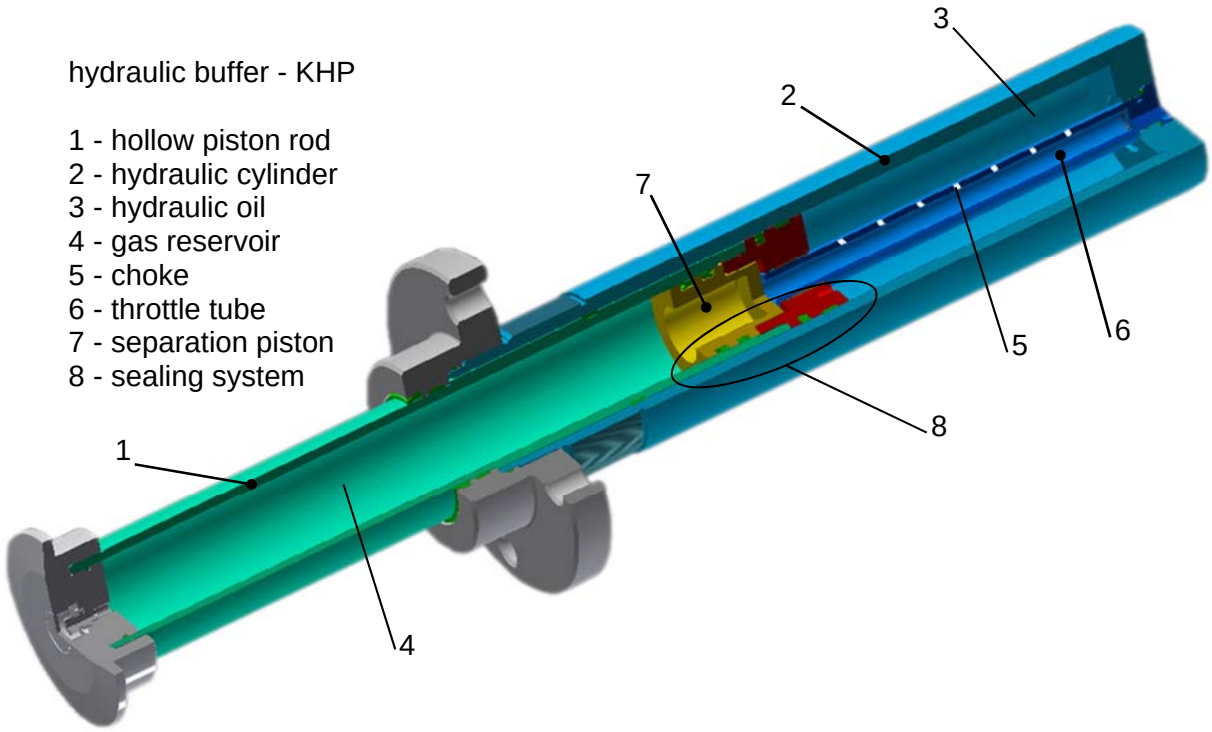
The KHP will arrest moving masses in the shortest possible distance with minimum force. One of the special features of the buffer of this series is their heavy duty construction. Another is the ability of the KHP to universally adapt its performance to match the energy in the impacting mass. The modular design of this series makes it possible to select precisely the right buffer to suit the application conditions.

KHP hydraulic buffers are available with diameters of 75mm to 175mm and strokes of 100mm right up to 1600mm. The buffer can be equipped as standard with different flange types. Optionally front mounted flange or back mounted flange. Special mounting systems can be supplied if required!

Operating Principle

hydraulic buffer - KHP

1 - hollow piston rod
2 - hydraulic cylinder
3 - hydraulic oil
4 - gas reservoir
5 - choke
6 - throttle tube
7 - separation piston
8 - sealing system



In case of collision a hollow piston rod (1) with integrated gas reservoir (4) is compressed into a heavy duty cylinder (2) containing hydraulic oil. The hydraulic oil is thereby forced through a series of choke (5) into the throttle tube (6). The oil flowing forward into the hollow piston rod forces a separating piston (7), which seals the gas from the oil, along the inside of the hollow piston rod thus compressing the gas.

The resistance of the flow of the oil through the choke, and thus the pressure in the cylinder, is a function of velocity. As the piston rod is compressed into the cylinder the choke are progressively closed off in such a way that the pressure in the cylinder is maintained at a constant or predetermined level.

At the end of the stroke the buffer recoils under the influence of the compressed gas acting on the separating piston which forces the oil back through the choke into the hydraulic cylinder while piston rod moves into the end position.

The static resistance force of the buffer is proportional to the gas pressure - it is a function of distance by which the piston has been pushed into the cylinder.

While acting the buffer with slow speed, the approach can be extended by the stroke exceptionally. At this range of the buffer stroke the impact works just against the static resistance which results from the compressed gas.

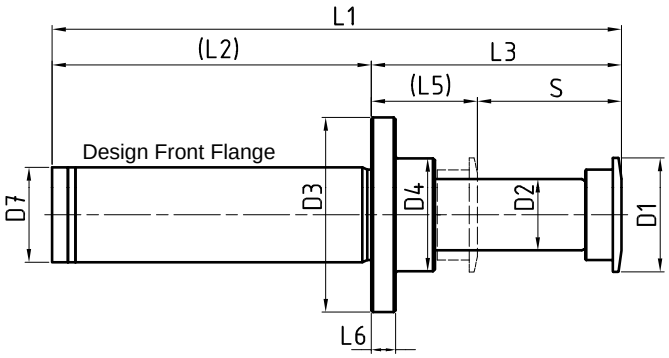
The normal operating temperatures range is from -30 °C to 100 °C but the operating conditions of the buffer must also be taken into consideration.

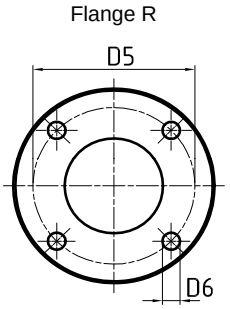
Buffers for higher impact velocity and operating temperatures are available if required!

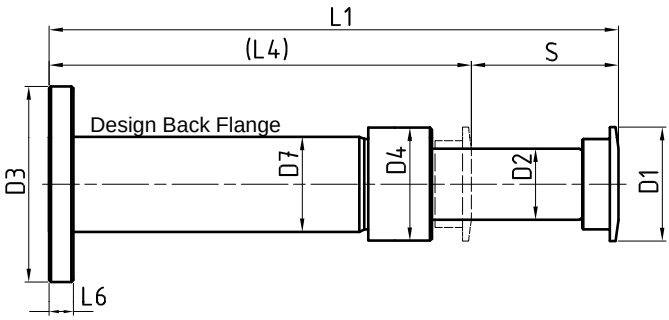
For reasons of corrosion and wear protection the piston rod is double hard chrome plated with a deposition thickness of 40 µm. The buffer itself is usually protected by priming and finish coat with approx. 80 µm film thickness. Standard colour RAL 5009. Another painting is suppliable on request.

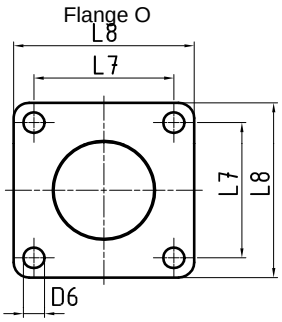
Performance data					**Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request**				
Nominal-Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy-absorp./stroke[1] [kJ/Hub]	max. Energy-absorption/h[2] [kJ/h]	Static recoil force beginning of stroke[3] [kN]	Static recoil force end of stroke[3] [kN]	max. Angle deviation[4] F [°]	max. Angle deviation[4] B [°]	Weight approx. [kg]
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

[1] for standard characteristic [2] at 30°C ambient temperature [3] at 5 bar gas pressure [4] at max. buffer force





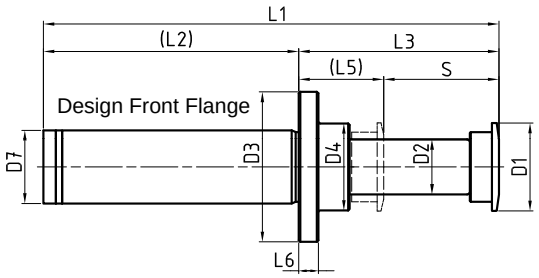


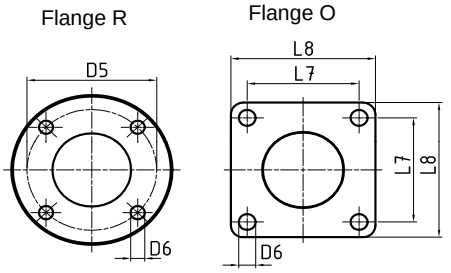


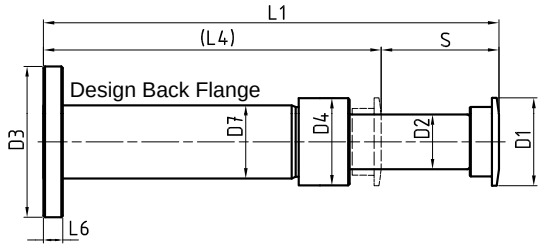
Dimensions [mm]																	
Nominal-Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7	L8
75	100	120	60	170	100	135	R 18 O 18	80	425	R 230 O 241	R 195 O 184	325	R 95 O 84	25	120	150
	150								560	R 315 O 326	R 245 O 234	410	R 95 O 84			
	200								700	R 405 O 340	R 295 O 360	500	R 95 O 160			
	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			

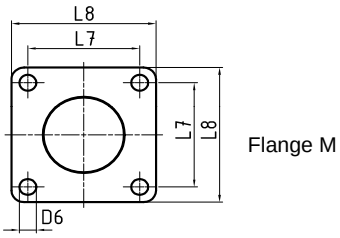
Performance data					**Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request**				
Nominal-Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy-absorp./stroke[1] [kJ/Hub]	max. Energy-absorption/h[2] [kJ/h]	Static recoil force beginning of stroke[3] [kN]	Static recoil force end of stroke[3] [kN]	max. Angle deviation[4] F [°]	max. Angle deviation[4] B [°]	Weight approx. [kg]
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

[1] for standard characteristic [2] at 30°C ambient temperature [3] at 5 bar gas pressure [4] at max. buffer force





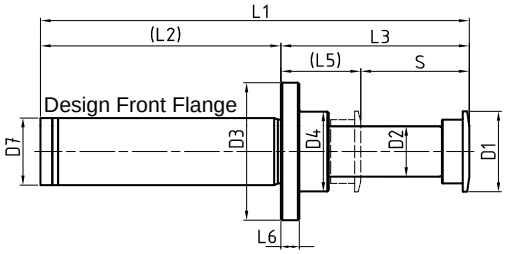


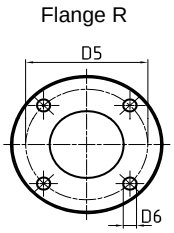


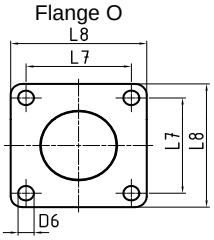
Dimensions [mm]																	
Nominal-Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7	L8
95	100	120	75	205	119	165	R 18 O 18 M 21	100	440	R 235 O 256 M 178	R 205 O 184 M 262	340	R 105 O 84 M 162	25	O 120 M 133	O 150 M 172
	150								580	R 325 O 346 M 226	R 255 O 234 M 354	430	R 105 O 210 M 204			
	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			

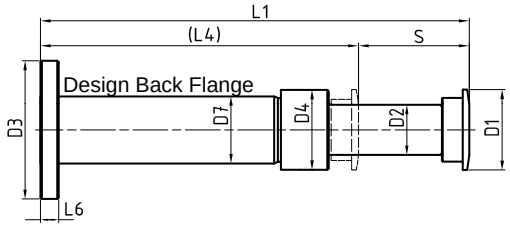
Performance data					**Buffer design speed 0,5 up to 4,0 m/s lower and higher speeds upon request**				
Nominal-Ø [mm]	Stroke S [mm]	max. Buffer force [kN]	max. Energy-absorp./stroke[1] [kJ/Hub]	max. Energy-absorption/h[2] [kJ/h]	Static recoil forces beginning of stroke[3] [kN]	Static recoil forces end of stroke[3] [kN]	max. Angle deviation[4] F [°]	max. Angle deviation[4] B [°]	Weight 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

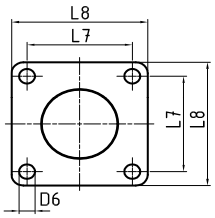
[1] for standard characteristics [2] at 30°C ambient temperature [3] at 5 bar gas pressure [4] at max. buffer force









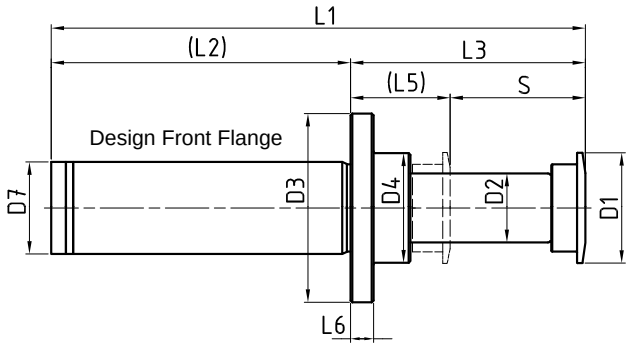


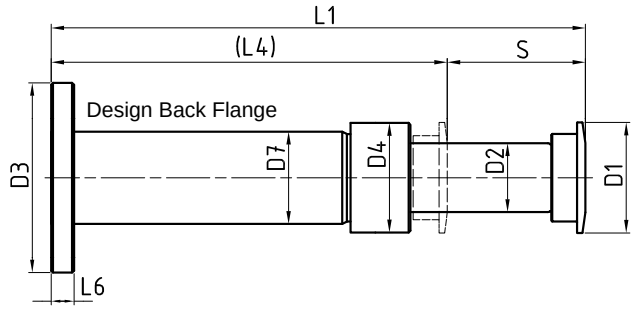
Flange M

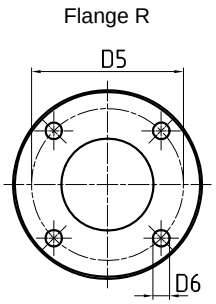
Dimensions [mm]																
Nominal-Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7	L8
115	100	140	95	260	148	210	R 23 O 26 M 27	130	460	R 230 O 276	R 230 O 184	360	R 130 O 84	30	O 210 M 178	O 270 M 229
	200								750	R 420 O 390 M 272	R 330 O 360 M 478	550	R 130 O 160 M 278			
	250								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[1] [kJ/Hub]	max. Energy-absorption/h[2] [kJ/h]	static recoil force beginning of stroke[3] [kN]	static recoil force end of stroke[3] [kN]	max. Angel deviation[4] F [°]	max. Angel deviation[4] B [°]	Weight approx. [kg]
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

[1] for standard characteristics [2] at 30°C ambient temperature [3] at 5 bar gas pressure [4] at max. buffer force





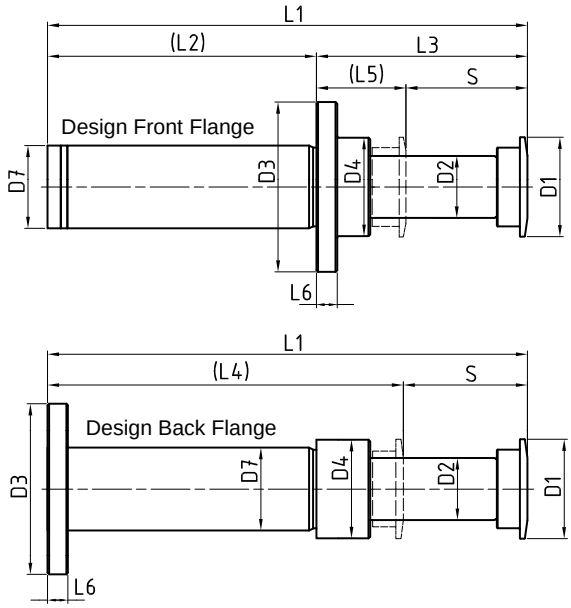


Dimensions [mm]														
Nominal-Ø	Stroke S	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6
135	200	177	115	300	185	245	27	156	750	395	355	550	155	35
	300								1035	580	455	735		
	400								1325	770	555	925		
	600								1880	1125	755	1280		
	800								2450	1495	955	1650		
	1000								3020	1865	1155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

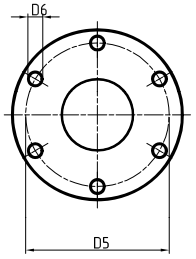
interchangeable dimensions for renowned producers upon request!

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[1] [kJ/Hub]	max. Energy-absorption/h[2] [kJ/h]	Static recoil force beginning of stroke[3] [kN]	Static recoil force end of stroke[3] [kN]	max. Angle deviation[4] F [°]	max. Angle deviation[4] B [°]	Weight approx. [kg]
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

[1] for standard characteristics [2] at 30°C ambient temperature [3] at 5 bar gas pressure [4] at max. buffer force



Flange R



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!

Hydraulic Buffers Design Data

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

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

Definitions and calculations	R1…R4	[kg]	wheel loads resulting from deadweight and rigidly attached loads
	M_{pu}	[kg]	mass acting on one buffer
	v	[m/s]	max. travel speed
	E_{pu}	[Nm]	energy acting on one buffer
	F_{pu}	[kN]	buffer end force

Determine the masses acting on the buffer m_{pu}

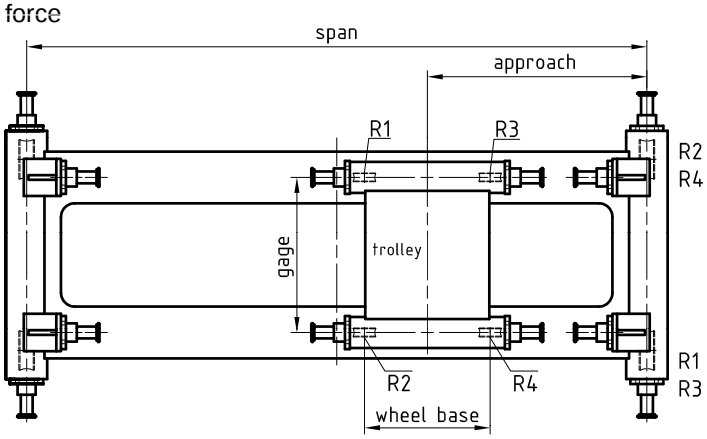
For cranes:

m_{pu} = R1+R2+R3+R4+…Rn [1])

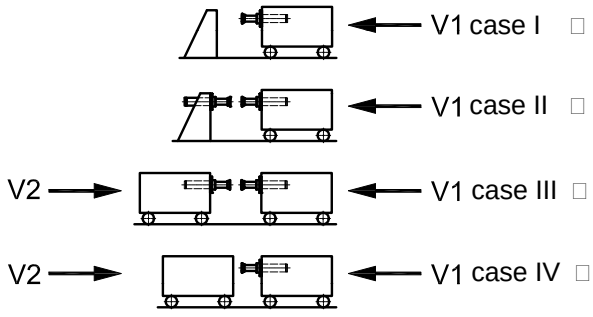
[1])For cranes with more than 4 wheels/side

For trolley:

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



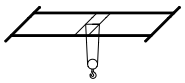
Impact conditions



Crane/trolley weight _____ kg

Crane/trolley nominal speed_____m/min

☐ pendelation



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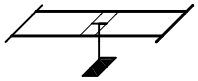

☐ Crane/trolley drive switched off before buffer impact (fab=0,7)

Type of operation

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

Stroke frequency _____1/h

Operating conditions

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

Information regarding buffer design

☐ max. perm. buffer force _____ kN
☐ max. perm. buffer stroke _____ mm
☐ max. perm. deceleration _____ m/s^2

Design data of the buffer

Impact mass per buffer m_{pu} _____ [kg]
Impact speed v _____ [m/s]
Propelling force F_v _____ [N]