

Buffer elements



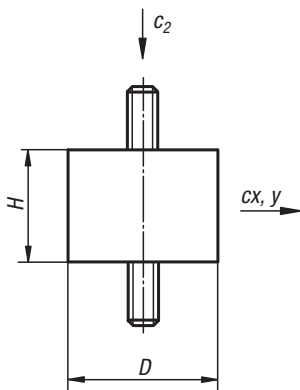
Technical information for rubber-metal buffers

Note:

Our rubber-metal buffers are simple and cost-efficient standard units for elastic mounting. They are ideally suited for compressive and axial loads of the most diverse ranges of application. With shear stress however, they are substantially less resilient than with compressive stress. The adjacent tables provide a guide to the static load values. By high dynamic alternating loads or high frequencies the loading should be reduced proportionately.

Guide values for static load (excerpt from K0566, K0568, K0569 and K0571)

Type	D	H	Compressive loads						Shear stresses					
			Spring rate c2 in N/mm			Permissible load F in N			Spring rate cx, y in N/mm			Permissible load F in N		
			hard	medium	soft	hard	medium	soft	hard	medium	soft	hard	medium	soft
A	20	15	300	190	120	500	320	200	60	40	30	190	120	70
A	30	15	670	410	250	1100	700	400	90	60	40	350	210	130
A	30	30	240	150	100	900	570	340	50	30	20	430	280	170
A	40	30	480	300	170	1800	1110	670	90	60	30	770	500	250
A	50	20	240	1500	90	5000	3190	1870	240	160	100	1200	770	460
A	50	40	600	280	220	2800	1750	1050	120	80	50	1280	800	460
A	75	25	5000	2900	1700	8000	5000	3300	410	260	160	2800	1750	1030
A	75	55	650	400	240	4700	3000	1750	130	80	50	2100	1300	800
B	25	20	320	160	120	490	320	190	70	45	25	230	160	90
B	30	20	660	430	260	830	520	310	100	75	50	330	210	130
B	40	30	550	350	210	1250	750	450	110	70	40	520	330	200
B	40	30	550	350	210	1250	750	450	110	70	40	520	330	200
B	50	40	560	370	220	2100	1270	760	120	80	45	930	580	350
B	50	50	350	220	130	1750	1100	650	80	50	30	800	510	310
B	75	50	950	630	330	4700	2910	1720	180	120	80	1900	1200	710
C	20	25	200	130	80	300	190	120	50	30	20	150	90	60
C	30	30	590	380	220	720	450	270	90	60	50	260	170	110
C	40	30	900	570	340	1080	680	410	150	90	60	380	240	140
C	50	30	1700	1090	650	2500	1750	950	210	150	70	470	290	170
C	50	50	360	220	140	1390	870	520	80	40	30	610	390	230
C	75	50	1010	630	370	3650	2050	1200	200	130	80	1560	980	580



Type	D	H	Compressive loads	
			Spring rate c2 in N/mm medium	Permissible load F in N medium
D	25	20	150	260
D	30	20	330	730
D	40	30	250	950
D	50	20	660	1750
D	75	25	1430	4650

Rubber hardness:

hard = 70 Shore medium = 55 Shore soft = 45 Shore

For general guidance natural rubber is ca. 55 Shore.

static compression load: F (max.) = ca. 6.5 kg/cm² (63.77 N/cm²)

static axial load: F (max.) = ca. 1.5 kg/cm² (14.72 N/cm²)

by 10 % spring displacement, or transverse travel during axial load.

Naturally, much higher loads are possible without damage. However, these considerably effect the rubber-metal buffer in its primary purpose. Tensile loads are possible but should be avoided on account of the peak stress at the contact edges and the notch sensitivity of rubber.

Tolerances for rubber-metal buffers:

Permissible dimensional deviations per DIN 7751 Part 2. Permissible hardness deviation ±5 Shore A.

Synoptical Table - Properties of the Individual Material

Rubber material		Main Characteristics - Resistance to									
Abbreviation	Polymer	Temperature	Tensile strength	Fracture strain	Aging	Ozone	Petrol	Oil	Acid	Alkalis	Tensile strain
NR (NK)	Natural rubber	-30 °C – +80 °C	1	1	3	4	6	6	3	3	600%
SBR	Styrene-butadiene rubber	-30 °C – +80 °C	5	2	3	4	4	5	3	3	450%
CR	Chloroprene rubber	-20 °C – +110 °C	3	2	2	2	2	2	2	2	450%
NBR	Acrylonitrile-butadiene rubber	-30 °C – +120 °C	5	2	3	3	1	1	4	3	450%
EPDM	Ethylene propylene terpolymer	-30 °C – +130 °C	5	3	1	1	5	4	1	2	450%
SI	Silicone rubber	-60 °C – +200 °C	6	4	1	1	5	4	5	5	500%

1 = excellent 2 = very good 3 = good 4 = moderate 5 = low 6 = insufficient

Rubber-metal buffers

steel or stainless steel, type A



KIPP Rubber-metal buffers, steel or stainless steel, type A

Order No.	Material	D	G	L	H	Spring stiffness N/mm	Load N
K0566.00800855	steel	8	M3	6	8	24	31
K0566.01001055	steel	10	M4	10	10	35	32
K0566.01001555	steel	10	M4	10	15	50	50
K0566.01500855	steel	15	M4	10	8	130	104
K0566.01501055	steel	15	M4	10	10	122	122
K0566.01501555	steel	15	M4	10	15	59	88
K0566.02000855	steel	20	M6	18	8	725	580
K0566.02001055	steel	20	M6	18	10	300	300
K0566.02001555	steel	20	M6	18	15	200	300
K0566.02002055	steel	20	M6	18	20	133	332
K0566.02002555	steel	20	M6	18	25	90	270
K0566.02501055	steel	25	M6	18	10	800	800
K0566.02501555	steel	25	M6	18	15	294	441
K0566.02502055	steel	25	M6	18	20	200	500
K0566.02502555	steel	25	M6	18	25	94	282
K0566.02503055	steel	25	M6	18	30	70	280
K0566.03001555	steel	30	M8	23	15	587	880
K0566.03002055	steel	30	M8	23	20	318	795
K0566.03002555	steel	30	M8	23	25	183	549
K0566.03003055	steel	30	M8	23	30	150	600
K0566.03004055	steel	30	M8	23	40	77	385
K0566.04001555	steel	40	M8	23	15	1250	1875
K0566.04002055	steel	40	M8	23	20	565	1412
K0566.04003055	steel	40	M8	23	30	300	1200
K0566.04004055	steel	40	M8	23	40	189	945
K0566.05002055	steel	50	M10	28	20	1300	3250
K0566.05002555	steel	50	M10	28	25	667	2000
K0566.05003055	steel	50	M10	28	30	500	2000
K0566.05004055	steel	50	M10	28	40	300	1500
K0566.05005055	steel	50	M10	28	50	193	1153
K0566.06004055	steel	60	M10	28	40	377	1885
K0566.07004555	steel	70	M10	28	45	410	2255
K0566.07502555	steel	75	M12	37	25	1655	4965
K0566.07504055	steel	75	M12	37	40	717	3585
K0566.07505055	steel	75	M12	37	50	470	2820
K0566.07505555	steel	75	M12	37	55	405	2835
K0566.015015551	Stainless steel	15	M4	12	15	59	88
K0566.020015551	Stainless steel	20	M6	18	15	200	300
K0566.025020551	Stainless steel	25	M6	18	20	200	500
K0566.030020551	Stainless steel	30	M8	23	20	318	795
K0566.030025551	Stainless steel	30	M8	23	25	183	549
K0566.040030551	Stainless steel	40	M8	23	30	300	1200

Material:

Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.
Stainless steel bright.

Sample order:

K0566.00800855

Note:

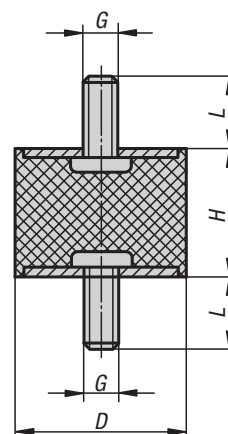
The rubber-metal buffers are widely-used construction devices for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:

-30 °C to +80 °C.

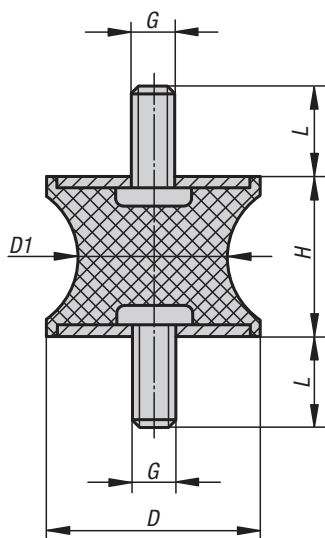
On request:

Other Shore grades.



Rubber-metal buffers

type AT tapered


Material:

Metal parts, steel, grade 5.6.

Elastomer natural rubber, medium hardness, 57 Shore A.

Version:

Steel galvanized.

Sample order:

K0567.01001057

Note:

The rubber-metal buffers are widely-used construction devices for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Rubber-metal buffers with tapered rubber contour reduce high edge loads of the rubber by radial deflection and so increase the components service life.

Temperature range:

-30 °C to +80 °C.

On request:

Other Shore grades.

KIPP Rubber-metal buffers type AT tapered

Order No.	D	D1	H	G	L	Spring stiffness N/mm	Load N
K0567.01001057	10	8	10	M4	13	31	37
K0567.01501557	15	12	15	M4	13	71	135
K0567.02001557	20	14	15	M6	18	177	283
K0567.03002057	30	22	20	M8	23	212	763
K0567.04003057	40	33	30	M8	23	202	1.111
K0567.04004857	40	20	48	M8	23	101	626
K0567.05003057	50	40	30	M10	28	351	1.229
K0567.07504057	75	50	40	M12	37	466	2.330

Rubber-metal buffers

steel or stainless steel, type B


Material:

Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.
Stainless steel bright.

Sample order:

K0568.00800855

Note:

The rubber-metal buffers are widely-used construction devices for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:

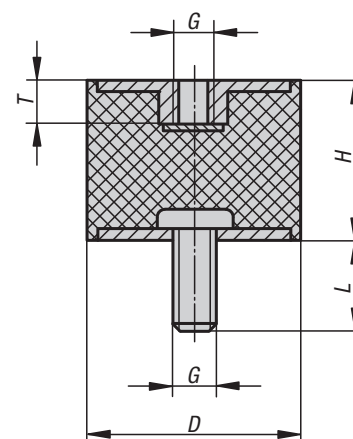
-30 °C to +80 °C.

On request:

Other Shore grades.

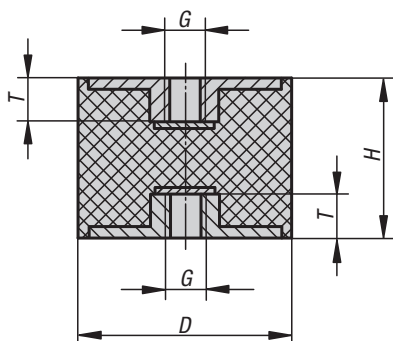
KIPP Rubber-metal buffers, steel or stainless steel, type B

Order No.	Material	D	H	G	L	T	Spring stiffness N/mm	Load N
K0568.00800855	steel	8	8	M3	6	3	35	17
K0568.01001055	steel	10	10	M4	10	4	75	75
K0568.01001555	steel	10	15	M4	10	4	50	60
K0568.01500855	steel	15	10	M4	10	4	130	130
K0568.01501555	steel	15	15	M4	10	4	100	120
K0568.02001555	steel	20	15	M6	18	6	325	390
K0568.02002055	steel	20	20	M6	18	6	130	260
K0568.02002555	steel	20	25	M6	18	6	95	210
K0568.02501555	steel	25	15	M6	18	6	333	399
K0568.02502055	steel	25	20	M6	18	6	195	410
K0568.02502555	steel	25	25	M6	18	6	117	257
K0568.02503055	steel	25	30	M6	18	6	100	300
K0568.03001555	steel	30	15	M8	23	8	590	708
K0568.03002055	steel	30	20	M8	23	8	280	560
K0568.03002555	steel	30	25	M8	23	8	180	396
K0568.03003055	steel	30	30	M8	23	8	168	504
K0568.03004055	steel	30	40	M8	23	8	88	308
K0568.04002055	steel	40	20	M8	23	8	700	840
K0568.04003055	steel	40	30	M8	23	8	273	820
K0568.04004055	steel	40	40	M8	23	8	189	660
K0568.05002055	steel	50	20	M10	28	10	1471	2500
K0568.05002555	steel	50	25	M10	28	10	630	1386
K0568.05003055	steel	50	30	M10	28	10	545	1635
K0568.05004055	steel	50	40	M10	28	10	310	1116
K0568.05005055	steel	50	50	M10	28	10	180	900
K0568.06004055	steel	60	40	M10	28	10	500	1750
K0568.07004555	steel	70	45	M10	28	10	600	2400
K0568.07502555	steel	75	25	M12	37	12	2440	3660
K0568.07504055	steel	75	40	M12	37	12	700	2450
K0568.07505055	steel	75	50	M12	37	12	520	2600
K0568.07505555	steel	75	55	M12	37	12	396	2178
K0568.008008551	Stainless steel	8	8	M3	8	3	35	17
K0568.010010551	Stainless steel	10	10	M4	12	4	75	75
K0568.015010551	Stainless steel	15	10	M4	12	4	-	-
K0568.020020551	Stainless steel	20	20	M6	18	6	130	260
K0568.025020551	Stainless steel	25	20	M6	18	6	195	410
K0568.030020551	Stainless steel	30	20	M8	23	8	280	560
K0568.040020551	Stainless steel	40	20	M8	23	8	700	840



Rubber-metal buffers

steel or stainless steel, type C


Material:

Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.
Stainless steel bright.

Sample order:

K0569.01001055

Note:

The rubber-metal buffers are widely-used construction devices for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:

-30 °C to +80 °C.

On request:

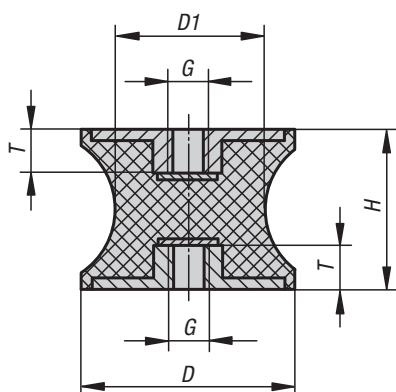
Other Shore grades.

KIPP Rubber-metal buffers, steel or stainless steel, type C

Order No.	Material	D	H	G	T	Spring stiffness N/mm	Load N
K0569.01001055	steel	10	10	M4	4	100	50
K0569.01001555	steel	10	15	M4	4	50	50
K0569.01501555	steel	15	15	M4	4	100	100
K0569.02002055	steel	20	20	M6	6	230	276
K0569.02002555	steel	20	25	M6	6	120	180
K0569.02502055	steel	25	20	M6	6	230	276
K0569.02502555	steel	25	25	M6	6	110	165
K0569.02503055	steel	25	30	M6	6	80	160
K0569.03002055	steel	30	20	M8	8	425	637
K0569.03003055	steel	30	30	M8	8	175	350
K0569.03004055	steel	30	40	M8	8	133	400
K0569.04003055	steel	40	30	M8	8	530	1060
K0569.04004055	steel	40	40	M8	8	222	666
K0569.05003055	steel	50	30	M10	10	680	1360
K0569.05004055	steel	50	40	M10	10	333	1000
K0569.05005055	steel	50	50	M10	10	190	665
K0569.07504055	steel	75	40	M12	12	750	2250
K0569.07505055	steel	75	50	M12	12	636	2225
K0569.010010551	Stainless steel	10	10	M4	4	100	50
K0569.015015551	Stainless steel	15	15	M4	4	100	100
K0569.020020551	Stainless steel	20	20	M6	6	230	276
K0569.025025551	Stainless steel	25	25	M6	6	110	165
K0569.030020551	Stainless steel	20	30	M8	8	425	637
K0569.030030551	Stainless steel	30	30	M8	8	175	350
K0569.040030551	Stainless steel	40	30	M8	8	530	1060

Rubber-metal buffers

type CT tapered


Material:

Metal parts, steel, grade 5.6.

Elastomer natural rubber, medium hardness, 57 Shore A.

Version:

Steel galvanized.

Sample order:

K0570.01501557

Note:

The rubber-metal buffers are widely-used construction devices for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Rubber-metal buffers with tapered rubber contour reduce high edge loads of the rubber by radial deflection and so increase the components service life.

Temperature range:

-30 °C to +80 °C.

On request:

Other Shore grades.

KIPP Rubber-metal buffers type CT tapered

Order No.	D	D1	H	G	T	Spring stiffness N/mm	Load N
K0570.01501557	15	12	15	M4	4	111	122
K0570.02001557	20	14	15	M6	6	227	227
K0570.03002057	30	22	20	M8	8	252	504
K0570.04003057	40	33	30	M8	8	199	796
K0570.04004857	40	20	48	M8	8	111	555
K0570.05003057	50	40	30	M10	10	499	998
K0570.07504057	75	50	40	M12	12	597	2.030



Rubber-metal buffers

steel or stainless steel, type D



KIPP Rubber-metal buffers, steel or stainless steel, type D

Order No.	Material	D	H	G	L	Spring stiffness N/mm	Load N
K0571.00800855	steel	8	8	M3	6	40	40
K0571.01001055	steel	10	10	M4	10	35	35
K0571.01001555	steel	10	15	M4	10	26	40
K0571.01500655	steel	15	6	M4	10	175	88
K0571.01500855	steel	15	8	M4	10	187	187
K0571.01501055	steel	15	10	M4	10	100	100
K0571.01501555	steel	15	15	M4	10	50	100
K0571.02000555	steel	20	5	M6	18	135	95
K0571.02000855	steel	20	8	M6	18	250	250
K0571.02001055	steel	20	10	M6	18	240	240
K0571.02001555	steel	20	15	M6	18	110	220
K0571.02002055	steel	20	20	M6	18	75	225
K0571.02002555	steel	20	25	M6	18	65	227,5
K0571.02500855	steel	25	8	M6	18	850	850
K0571.02501055	steel	25	10	M6	18	400	400
K0571.02501555	steel	25	15	M6	18	210	420
K0571.02502055	steel	25	20	M6	18	140	420
K0571.02502555	steel	25	25	M6	18	100	350
K0571.02503055	steel	25	30	M6	18	79	316
K0571.03001555	steel	30	15	M8	23	270	540
K0571.03002055	steel	30	20	M8	23	238	714
K0571.03002555	steel	30	25	M8	23	153	535,5
K0571.03003055	steel	30	30	M8	23	127	508
K0571.03004055	steel	30	40	M8	23	88	528
K0571.04001555	steel	40	15	M8	23	710	1420
K0571.04002055	steel	40	20	M8	23	365	1095
K0571.04003055	steel	40	30	M8	23	205	820
K0571.04004055	steel	40	40	M8	23	143	858
K0571.05002055	steel	50	20	M10	28	646	1938
K0571.05003055	steel	50	30	M10	28	354	1416
K0571.05004055	steel	50	40	M10	28	230	1380
K0571.05005055	steel	50	50	M10	28	160	1280
K0571.06004055	steel	60	40	M10	28	317	1902
K0571.07002555	steel	70	25	M10	28	980	3430
K0571.07004555	steel	70	45	M10	28	438	3066
K0571.07502555	steel	75	25	M12	37	1318	4613
K0571.07504055	steel	75	40	M12	37	643	3858
K0571.07505055	steel	75	50	M12	37	472	3776
K0571.07505555	steel	75	55	M12	37	310	3100
K0571.008008551	Stainless steel	8	8	M3	8	40	40
K0571.010010551	Stainless steel	10	10	M4	10	35	35
K0571.015015551	Stainless steel	15	15	M4	10	50	100
K0571.020015551	Stainless steel	20	15	M6	18	110	220
K0571.025020551	Stainless steel	25	20	M6	18	140	420
K0571.030030551	Stainless steel	30	30	M8	23	127	508
K0571.040030551	Stainless steel	40	30	M8	23	205	820



Material:

Metal parts steel grade 5.6 or stainless steel.
Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.
Stainless steel bright.

Sample order:

K0571.00800855

Note:

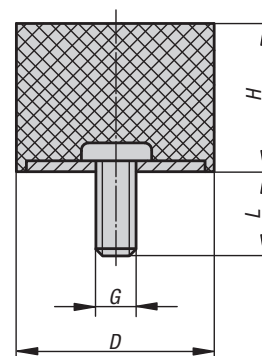
Rubber-metal buffers are used among other things, for mounting aggregates and as elastic buffers to limit the travel by moving masses or as feet that are not firmly fixed in the floor and where the floor is sensitive i.e. office machinery.

Temperature range:

-30 °C to +80 °C.

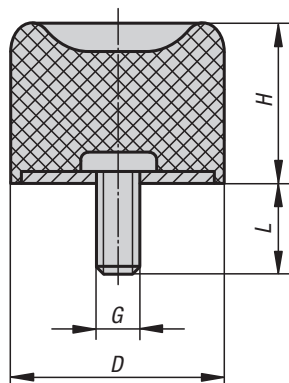
On request:

Other Shore grades.



Rubber-metal buffers

type DS suction base



Material:

Metal parts, steel, grade 5.6.

Elastomer natural rubber, medium hardness, 57 Shore A.

Version:

Steel galvanized.

Sample order:

K0572.01501457

Note:

Rubber-metal buffers are used among other things, for mounting aggregates and as elastic buffers to limit the travel by moving masses.

Temperature range:

-30 °C to +80 °C.

On request:

Other Shore grades.

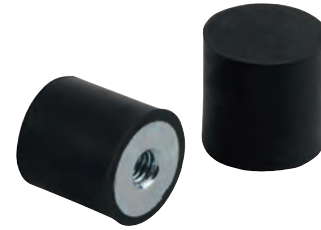
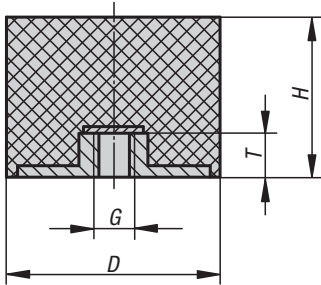
KIPP Rubber-metal buffers type DS suction base

Order No.	D	H	G	L	Spring stiffness N/mm	Load N
K0572.01501457	15	14	M4	13	50	100
K0572.02501857	25	18,5	M6	18	95	285
K0572.03002857	30	28,5	M8	23	97	340
K0572.04002857	40	28	M8	23	120	480
K0572.05002857	50	28	M10	28	220	990
K0572.07003057	70	30	M10	28	360	2160
K0572.07503757	75	37	M12	37	390	3510
K0572.10005057	100	50	M16	42	540	8100



Rubber-metal buffers

type E



Material:

Metal parts, steel, grade 5.6.

Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.

Sample order:

K0573.00800855

Note:

The rubber-metal buffers are widely-used construction devices for elastic mounting. They are used, among other things, as mountings for aggregates, motors, compressors, pumps and testing machinery.

Temperature range:

-30 °C to +80 °C.

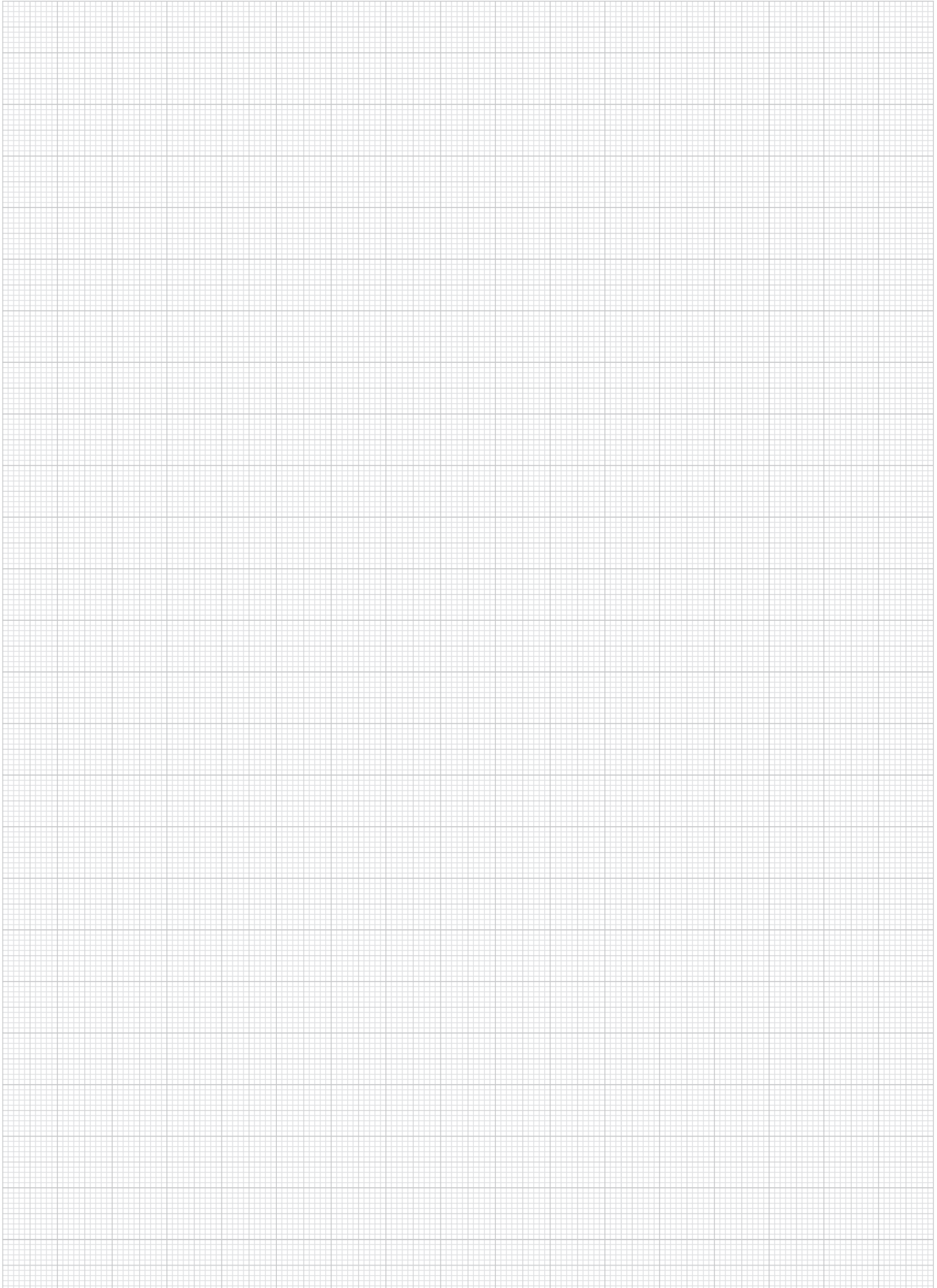
On request:

Other Shore grades.

KIPP Rubber-metal buffers type E

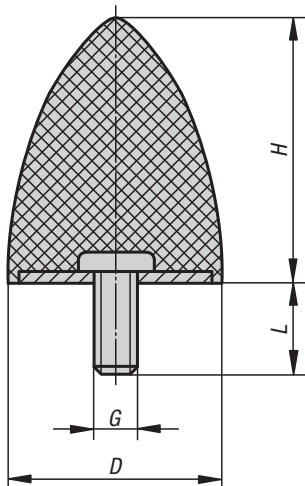
Order No.	D	H	G	T	Spring stiffness N/mm	Load N
K0573.00800855	8	8	M3	3	88	44
K0573.01501255	15	12	M4	4	165	182
K0573.01501555	15	15	M4	4	100	130
K0573.01502055	15	20	M4	4	75	113
K0573.02001555	20	15	M6	6	145	246
K0573.02002055	20	20	M6	6	94	216
K0573.02002555	20	25	M6	6	65	169
K0573.02501555	25	15	M6	6	270	540
K0573.02502555	25	25	M6	6	105	315
K0573.02503055	25	30	M6	6	85	281
K0573.02504055	25	40	M6	6	75	300
K0573.03001555	30	15	M8	8	545	491
K0573.03002555	30	25	M8	8	160	416
K0573.03003055	30	30	M8	8	125	425
K0573.03004055	30	40	M8	8	85	315
K0573.04002055	40	20	M8	8	550	660
K0573.04002555	40	25	M8	8	500	1000
K0573.04003055	40	30	M8	8	300	870
K0573.04004055	40	40	M8	8	260	1040
K0573.05002055	50	20	M10	10	860	860
K0573.05002555	50	25	M10	10	700	1400
K0573.05003055	50	30	M10	10	450	1575
K0573.05004055	50	40	M10	10	350	1400
K0573.05005055	50	50	M10	10	170	850
K0573.06003055	60	30	M10	10	700	1400
K0573.06004055	60	40	M10	10	400	1600
K0573.06005055	60	50	M10	10	240	1200
K0573.07004255	70	42	M10	10	520	2600
K0573.07004555	70	45	M10	10	680	3060
K0573.07502555	75	25	M12	12	1211	1816
K0573.07503055	75	30	M12	12	1090	2289
K0573.07504055	75	40	M12	12	500	2000
K0573.07505055	75	50	M12	12	550	2750

Notes



Rubber impact buffers

parabolic



Material:

Metal parts, steel, grade 5.6.

Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.

Sample order:

K0574.02002455

Note:

Rubber impact buffers are robust and effective elastic cushioning elements and shock absorbers. They are ideal for elastic travel limitation and cushioning knocks by mobile and immobile aggregates and machines and as use as door stops.

Temperature range:

-30 °C to +80 °C.

On request:

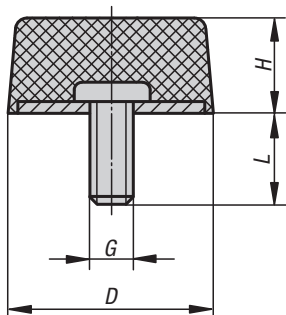
Other Shore grades.

KIPP Rubber impact buffers, parabolic

Order No.	D	H	G	L	Spring stiffness N/mm	Load N
K0574.02002455	20	24	M6	18	14	500
K0574.03003655	30	36	M8	20	15	750
K0574.03504055	35	40	M8	20	-	-
K0574.05005855	50	58	M10	28	30	3000
K0574.05006755	50	67	M8	38	30	3200
K0574.07508955	75	89	M12	37	50	8000

Rubber impact buffers

conical



KIPP Rubber impact buffers, conical

Order No.	D	H	G	L	Spring stiffness N/mm	Load N
K0575.02501755	25	17	M6	18	3,7	678
K0575.05001855	50	18	M10	28	4	3600



Material:

Metal parts, steel, grade 5.6.
Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.

Sample order:

K0575.02501755

Note:

Rubber impact buffers are robust and effective elastic cushioning elements and shock absorbers. They are ideal for elastic travel limitation and cushioning knocks by mobile and immobile aggregates and machines and as use as door stops.

Temperature range:

-30 °C to +80 °C.

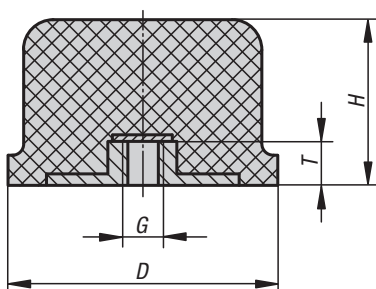
On request:

Other Shore grades.

K0576

Rubber impact buffers

spherical



KIPP Rubber impact buffers, spherical

Order No.	D	H	G	T	Spring stiffness N/mm	Load N
K0576.05003555	50	35	M10	10	120	3000
K0576.08006055	80	60	M12	12	150	11000
K0576.12509055	125	93	M16	16	200	20000



Material:

Metal parts, steel, grade 5.6.
Elastomer natural rubber, medium hardness, 55 Shore A.

Version:

Steel galvanized.

Sample order:

K0576.05003555

Note:

Rubber impact buffers are robust and effective elastic cushioning elements and shock absorbers. They are ideal for elastic travel limitation and cushioning knocks by mobile and immobile aggregates and machines and as use as door stops.

Temperature range:

-30 °C to +80 °C.

On request:

Other Shore grades.



