Gummi · Metall · Technik

Product information

BUFFERS

RAILS

ELASTOMERIC MOUNTINGS

BUSHES & BALL JOINTS

SPECIAL ELEMENTS

Isolation of mechanical vibrations and solid-borne noise

To select the correct anti-vibration spring elements it is basically essential to determine first of all what events occur in the particular case:

- forced vibrations caused by changing cyclic forces and impulses
- impact-like disturbances (shocks) caused by pulses or earth movements
- solid-borne noise caused by any sound-waves propagated in solid bodies.

Mechanical vibrations

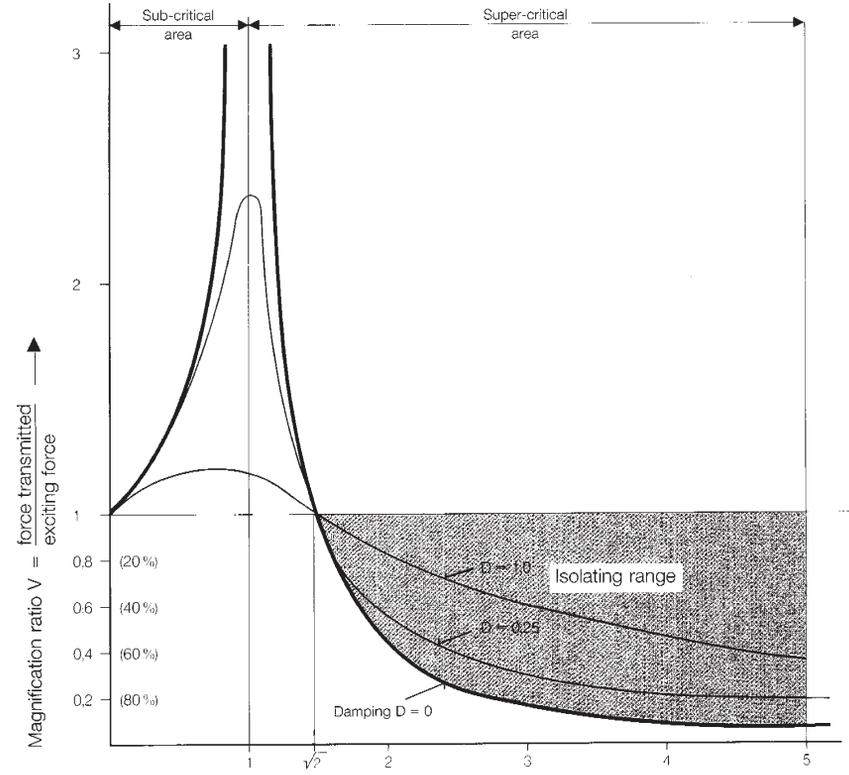
The principle of vibration isolation is the separation of the interfering object (active suppression of vibration) or the object which is to be protected (passive protection of vibration) from the surroundings and, by fitting intermediate springs, making it into an independent system which is capable of vibrating.

The mechanism of the suppression consists in coordinating the frequency in such a manner that the cyclic movements of the system are no longer synchronous but in anti-phase to the disturbance.

Frequency ratio λ
Isolating efficiency η

In case an exciter force directed downwards reaches its maximum, the vibrating object will be in its uppermost position which means that it moves against the exciting force. Effective vibration isolation will thus be achieved by a high frequency ratio λ.

Flexible mounting design must in principle use natural frequencies which are outside the resonance field. Unpleasant rocking must be expected to occur wherever the exciter frequency n_{err} and the natural frequency n_e coincide.

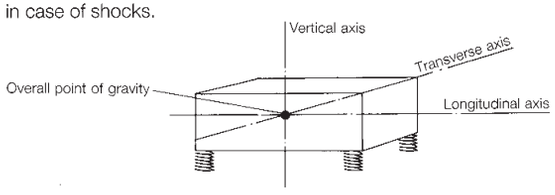


$\lambda < 1$ No vibration isolation
structure-borne noise suppression possible

$\lambda = 1$ Rocking × maximum figures depending on damping D
within the resonance area

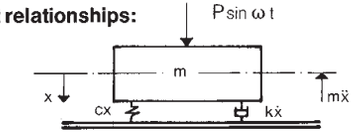
$\lambda > \sqrt{2}$ Vibration isolation; efficiency η dependent on λ
structure-borne noise suppression possible

Therefore, effective vibration isolation is achieved by deep frequency tuning, that is, by a high frequency ratio λ. A high damping effect D is obstructive here because it reduces the isolating effect. However, some degree of damping is desirable to reduce rocking in the resonance area or to cause rapid amplitudes in case of shocks.



Now, if the object which is to be isolated is artificially separated from the base, the natural frequency of the flexible mounting must be adjusted to the values which are lower than the exciter frequency by the factor $\sqrt{2}$.
This frequency ratio λ causes the inertia force of the flexibly mounted system to counteract the exciting force out of phase. The isolating effect thus introduced is referred to as the isolating efficiency η.

Important relationships:



$m\ddot{x} + k\dot{x} + cx = P \sin \omega t$

Where:
- P = Amplitude of the exciter force [N]
- ω = Exciter circuit frequency [Rad/s]
- m = Flexibly mounted weight [kg]
- k = Damping constant [kg/s]
- c = Spring constant [N/m]

The magnitudes x, ẋ and ẍ are time-dependent and designate the coordinate, the speed and the mass acceleration m. Each point stands for one time derivation, known from linguistic usage in mathematics.

Other important definitions in vibration technique:

$\omega_e = \sqrt{\frac{c}{m}}$ = Natural circuit frequency of an undamped system [Rad/s]

$f = \frac{1}{2\pi} \sqrt{\frac{c}{m}}$ = Natural frequency of an undamped system [Hz]

$n_e = \frac{30}{\pi} \sqrt{\frac{c}{m}}$ = Natural frequency of an undamped system (revolutions) [min^{-1}]

If the exciter revolution n_{err} [min^{-1}] is known, divide by n_e to obtain the frequency ratio λ..

Spring stiffness of linear springs can be represented by means of the static compression x_{st} and the weight force G. The following applies if the spring rate is independent of the frequency: $c = G/x_{st} = mg/x_{st}$.

Therefore, it follows from $\omega_e^2 = c/m$, for the natural circuit frequency: $\omega_e^2 = g/x_{st}$. By inserting g = 981 cm/s^2 for earth acceleration, we have:

$f = \frac{1}{2\pi} \sqrt{981/x_{st}} \approx 5/\sqrt{x_{st}}$ [Hz] x_{st} [cm]

$n_e \approx 300/\sqrt{x_{st}}$ [min^{-1}] x_{st} [cm]

Damping:

With the x-co-efficient for the movement equation, damping D can be specified non-dimensionally:

$D = \frac{k}{2\sqrt{cm}}$

However, it can also be obtained from measurements or roughly calculated from the flexibility of materials in accordance with DIN 53512:

$D \approx (100 - \text{flexibility [\%]})/950$

Solving the movement equation:

The statement $x = x_p = A \sin(\omega t - \varphi)$ represents a specific solution of the vibration equation. It becomes an overall solution when the „transient response" is completed and the system merely vibrates at the exciter frequency ω.
The vibration amplitude is then

$A = \frac{P}{c} \frac{1}{\sqrt{(1-\lambda^2)^2 + (2D\lambda)^2}} = \frac{P}{c} \cdot V$

V is non-dimensional and is designated as the magnifying function. Its magnitude mainly depends on the frequency ratio λ.

The relevant phase shift φ (lag angle of vibrations in relation to the excitation) can be calculated from the following relationship:

$\tan \varphi = \frac{2D\lambda}{1-\lambda^2}$

Vibration isolation:

The ratio of the vibration amplitude to the quotient from P and c is a measure of the „transmittance" of the excitation and, according to the above formula, equal to the magnification function V. Therefore, the figure of the vibration amplitude A is equal to the static compression under the constant exciter force amplitude multiplied by the magnification ratio V.

It will now be logical to introduce to it the isolation degree η as a differential amount to 100 %.

$\eta = [1 - V] \cdot 100\,\%$

For negligible damping, $\eta = 1 - \frac{1}{|1-\lambda^2|}$

Structure-borne sound-waves

These include all sound-waves which are propagated through solids.

Shakings/Vibrations: These are low-frequency structure-borne vibrations (< 50 Hz), such as those created by vehicles, during building work or by earthquakes.

Footstep noise: This type of structure-borne noise is generated for example when walking on stairs, platforms or floors.

While the isolation of the disturbing forces can be calculated by means of the vibration theory, the damping of structure-borne noise comes under the laws of wave mechanics and depends on a variety of parameters. Noise damping is quoted in decibels (dB) because the effect depends on the sound-reflecting quality (reflection) of the colliding materials.

Sound-hardness: Sound-hardness is the product of the sonic speed and density

Sound-hardness of:

Steel	=	3.95×10^7 kg/sqm.sec
Cork	=	1.18×10^5 kg/sqm.sec
Rubber	=	6.62×10^4 kg/sqm.sec
Air	=	4.45×10^2 kg/sqm.sec

The softest material as far as sound-reflection is concerned, is air, followed by soft, flexible rubbers.

Rubber-to-metal bonded elements are therefore excellent combinations of acoustically hard and soft materials. Carefully selected materials of suitable quality (density, Young's modulus) and thickness create a highly efficient damping effect over the whole frequency range, by means of the sound reflection losses.

Example of calculations for a flexible mounting

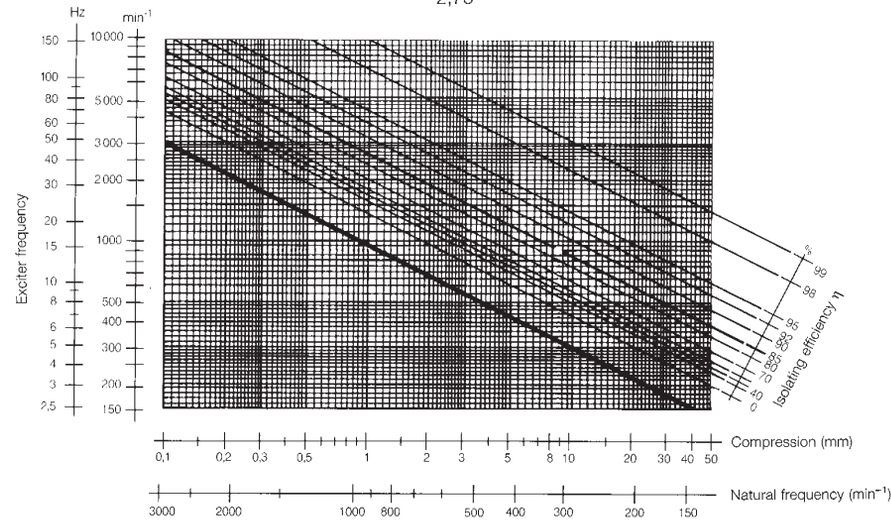
A compressor is to be supported on vibration-isolation mountings.

Technical data:

Total weight	1200 kp
Revolutions of the engine	1440 rpm^{-1}
Revolutions of the compressor	900 rpm^{-1}
Free inertia forces	none
Number of mounting points	6
Overall centre of gravity symmetrical to the mounting points Isolating efficiency η	85 %

Solution:

Load per mounting	$\frac{1200 \text{ kp}}{6}$	=	200 kp
Necessary frequency ratio	λ for η	= 85 %	2,75
Necessary natural frequency	$\frac{900}{2{,}75}$	=	317 min^{-1}



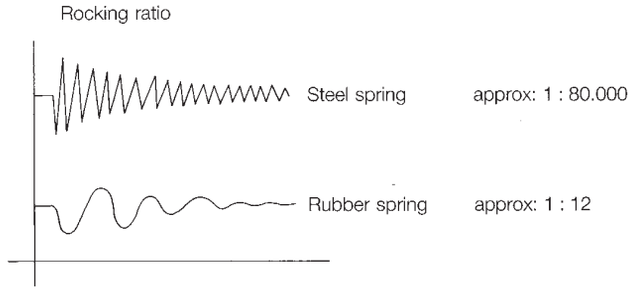
The required compression of 8,4 mm will be found in the above nomogram.

Mounting elements are required to give an 8,4 mm compression at 200 kp.

The effect of damping

Vibration isolation has nothing to do with vibration damping, as it is erroneously assumed. Effective isolation is achieved by appropriate frequency tuning alone.

Provisions for damping are required wherever resonance may occur or vibrations from impacts must rapidly decay.



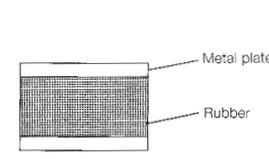
It is evident from the results of experiments that the rubber damping is essentially different from the viscose damping. Within the frequency area of 10 to 200 Hz the shape force/stroke characteristics (damping ellipses) is constant and independent of the excitation frequency. The amplitude of the damping force is proportional to the amplitude of the return force of rubber springs, the proportionality factor representing a material constant independent of the frequency. The damping factor itself is frequency-dependent in the case of rubber and tends towards zero at a rising frequency.

This means that in the case of small movements the damping forces of rubber are negligibly small and hardly affect the isolation effect.

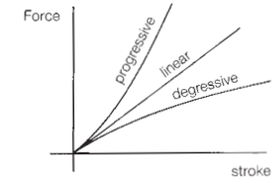
On the other hand, the damping effect increases in the case of viscose damping and increasing frequency which is leading to a deterioration of the isolation effect.

Bonded rubber elements

Rubber springs are unique anti-vibration elements regarding their vibration and sound damping action. GMT's vulcanized materials have proved their efficiency in conditions where elements of other type fail after a short time.



Bonded spring element



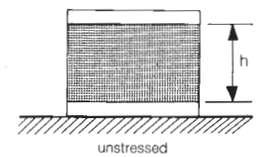
Spring characteristics

Carefully vulcanized the adherence strength between the metal plate and the rubber may be 130 kp/sq.cm. GMT is now able to bond various fittings to rubber, such as:

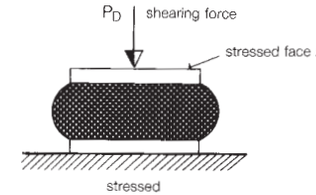
- Steel, crude or treated
- Steel, stainless
- Brass, aluminium
- Plastics

Static stresses on rubber elements

COMPRESSION



unstressed



stressed

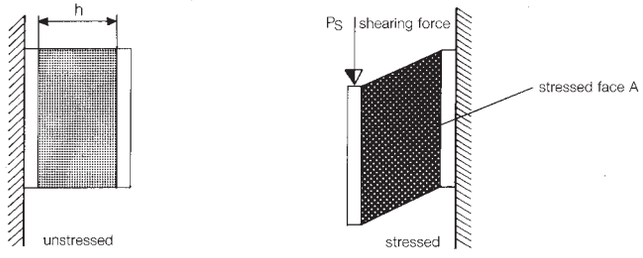
The shape factor must be taken into account when designing rubber elements for compression loads. The shape factor is understood to be the ratio of the action compression area to the open deflection face of the rubber. This is due to the restricted transverse expansion and thus the variable modulus of elasticity E_C of the incompressible rubber material.

Deformation under compression $f_D = \frac{P_D \cdot h}{A \cdot E_C}$

Applicable up to $f_D \simeq 0{,}2\ h$

Shearing loads

The shearing modulus G represents the only material constant of rubber and is specified for each compound in relation to Shore hardness. Therefore, the spring characteristic is linear with parallel shearing stresses. This effect must be accounted for specifically if there are shearing deformations at higher precompression.

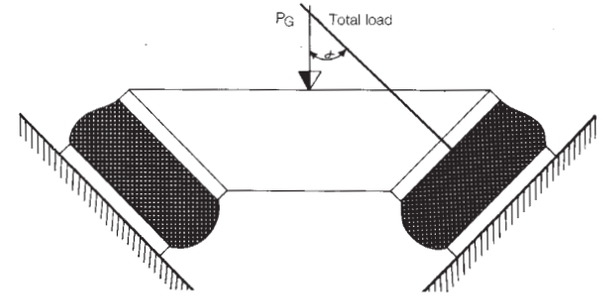


Shearing deformation $f_s = \frac{P_S \cdot h}{A \cdot G}$

Applicable up to $f_s \simeq 0{,}35\ h$

Compression shearing loads

Anti-vibration elements are often mounted at angles. A bridging connection between them adds stability to such a flexible mounting together with a corresponding softness in the vertical direction.



Total deformation $f_G = \frac{P_G \cdot h}{2 \cdot A\ (G \sin^2\alpha + E_C \cos^2 \alpha)}$

TENSION

In case the rubber-to-metal elements are subjected to tensions only, peak stresses occur at the edges of the bond. If parts are oxidized, their serviceability may be destroyed due to the notch sensitivity of rubber. Therefore, tensile stresses should be avoided.

Dynamic stresses on rubber elements

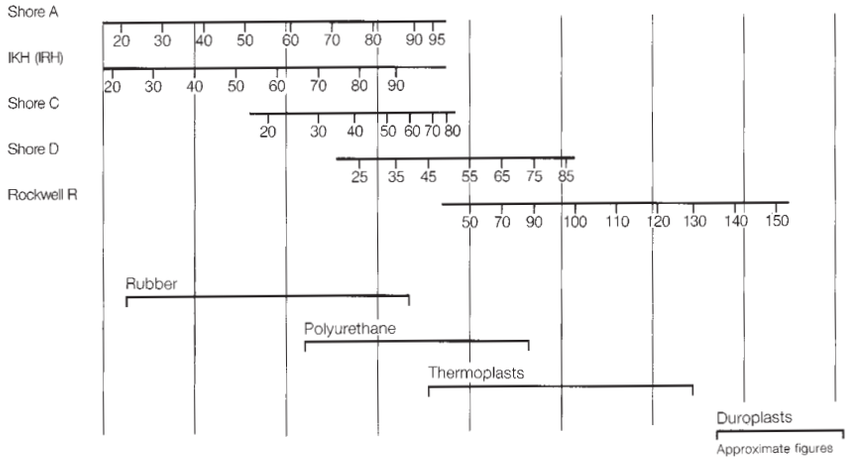
The law of non-linear compression of rubber operates only conditionally in the case of dynamic stresses and vibrations but quite extensively in situations where a large amount of energy must be absorbed.

Our specialists will be pleased to help you in solving complex problems relating to dynamic loads. Any specific figures which are required can also be measured or checked in our own laboratories.

The values for the modulus G and the corrected modulus of elasticity E_C for simpler static conditions will be found in the diagrams on the following pages.

Hardness

The hardness of rubber is normally measured in accordance with DIN 53 505 and is expressed in Shore A (C and D). It is determined by measuring the resistance to penetration of a cone penetrator.



Our stock qualities

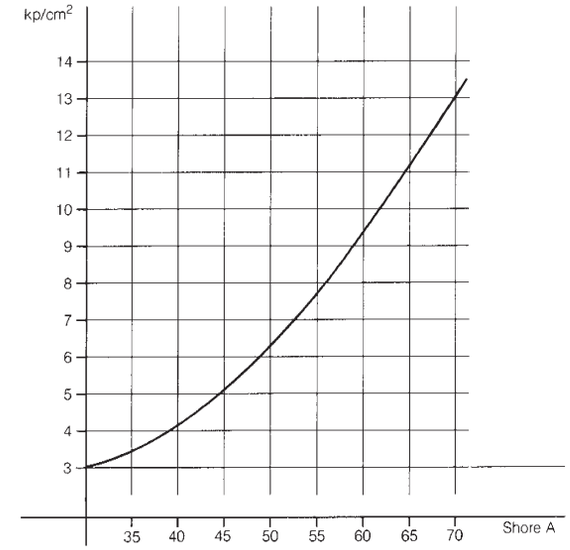
soft	43° Shore A
medium	57° Shore A
hard	68° Shore A

GMT		
	– Manufacturing tolerance	± 3° Shore A
	– Hardness range	25–95° Shore A

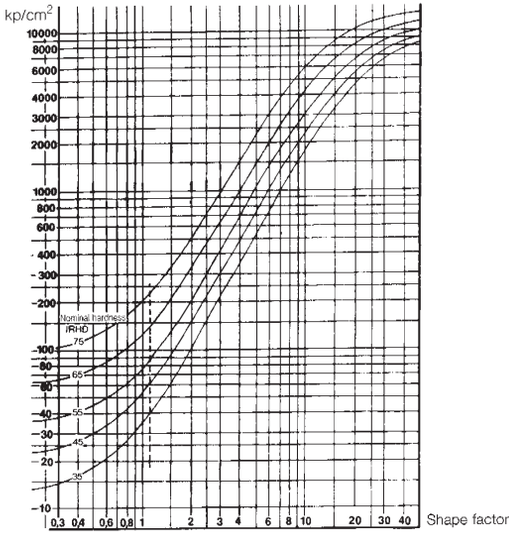
Hardness correction factor

Deviation in degrees of Shore A	Correction factor
1	1,038
2	1,087
3	1,118
4	1,161
5	1,205
6	1,251
7	1,298
8	1,348
9	1,399
10	1,458

Shearing modulus G



Modulus of elasticity E_C



Rubber quality list

Commercial name							Perbunan	Neoprene	SBR	Polyurethane	Silicone	APTK rubber	Hypalon	Viton
	Acrylic rubber	**Polyboron rubber**	**Epichlorohydrin rubber**	**Butyl rubber**	**Hydrogenated NBR**	**Natural rubber**	**Acrylonitrile butadiene rubber**	**Chloroprene rubber**	**Styrene butadiene rubber**	**Polyurethane**	**Silicone rubber**	**EPDM Ethylene-propylene diene-rubber**	**Chlorosul-phonated polyethylene**	**Fluorinated rubber**
	Good resistance to high temperatures and mineral oils, high resistance to oxygen and ozone, unfavourable low-temperature properties.	High mechanical strength, good resistance ozone, medium resistance to oil, flexibility/ damping property can be varied as required, excellent resistance to water, slight permanent set.	Low gas perme-ability, very good low-temperature properties, good resistance to mineral oils, ozone and high temperatures.	Very slightly permeable to air, steam and other gases, good resistance to heat, oxygen, ozone and many chemicals and solvents, good electrical proper-ties (isolating), good resistance to abrasion and tear propagation.	High resistance to heat, ozone and oil, good mechanical properties also at high temperatures, excellent resist-ance to wear and tear.	Characterized by flexibility, strength and low-tempera-ture resistance as well as excellent physical properties ideal for bonded rubber/metal elements. Not suitable for petrol, grease, oils and ozone.	Highly resistant to abrasion and tearing, particularly resistant to ageing. Particularly recom-mended for crude oil products, high temperatures, heating and lubri-cating oils, petrol and paraffin oil.	All-purpose syn-thetic rubber, flame resistant, resistant to abrasion, very robust, good dielectric strength, particularly re-commended for exposure to ozone and weathering.	Similar to natural rubber, resistant to abrasion, rubbing in, good resistance to high tempera-tures and cracking, resistance to extreme low temperatures, not resistant to petrol, benzene, greases and oils.	Excellent resist-ance to wear and tear, best flexibility with high shore hardness of all the elastomers, good resistance to oil, not resistant to hydrolysis.	Resistant to high temperatures, odourless and tasteless, nontoxic, can be sterilized in accordance with foodstuffs regula-tions, resistant to sea water and corrosive salt solu-tions, not to be used in conjunction with steam, concentra-ted acids and lyes, swells strongly under the effect of aromatic solvents.	Versatile in use, very good flexibility, resistant to abrasion, resistant to wear and tear, resistant to ozone and weather, resistant to low temperatures, can be used to protect against washing and spraying agents, excellent for profile cords, not usable in conjunction with petrol, solvents and mineral oils.	Fast to light, colour-fast, flame-resistant, good dielectric strength, particularly recommended for exposure to sunlight, ozone, weather and oxidizing, chemicals, however, it has a very low tensile strenght.	Hexafluoropropylene vinylidene, fluoride copolymer. Resistant to extreme tempera-tures even over 200° C. Very good mechanical properties and high resistance to tearing even at high tempera-tures. Excellent for exposure to sunlight, ozone and weather. Not recommended for use in conjunction with esters and ketones.
International designation	**ACM**	**PNR**	**ECO**	**IIR**	**HNBR**	**NR**	**NBR**	**CR**	**SBR**	**PUR**	**MVQ / SI**	**EPDM/EPM**	**CSM**	**FPM**
Hardness available	50 – 80 Shore A	10 – 80 Shore A	50 – 90 Shore A	40 – 85 Shore A	40 – 90 Shore A	25 – 95 Shore A	25 – 95 Shore A	30 – 90 Shore A	35 – 95 Shore A	55 – 98 Shore A	40 – 80 Shore A	30 – 90 Shore A	50 – 95 Shore A	65 – 90 Shore A
Resistance to temperatures	–35° C to +175° C	–40° C to +80° C	–40° C to +130° C	–40° C to +130° C	–40° C to +175° C	–40° C to +80° C	–40° C to +140° C	–30° C to +120° C	–30° C to +110° C	–30° C to +80° C	–70° C up to +180° C	–40° C up to +150° C	–40° C to +120° C	–30° C up to +225° C
Short-time peak temperature	+ 200° C	+ 100° C	+ 150° C	+ 150° C	+ 200° C	+ 100° C	up to + 160° C	up to + 150° C	up to + 150° C	up to + 100° C	up to + 225° C	up to + 180° C	up to + 175° C	up to + 350° C
Tensile strength in kp/sq. cm (N/sq. mm)	160 (16)	170 (17)	170 (17)	170 (17)	300 (30)	250 (25)	250 (25)	250 (25)	250 (25)	300 (30)	80 (8)	200 (20)	180 (18)	200 (20)
Tensile elongation in %	up to 350	300 to 700	150 to 500	400 to 800	150 to 600	800	500	450	450	800	250	450	300	400
Properties														
Abrasion	moderate	good	moderate	good	very good	good	very good	good	very good	excellent	moderate	good	moderate	moderate
Resistance to flex cracking	moderate	moderate	good	moderate	very good	good	moderate	very good	good	–	bad	very good	good	good
Elongation/tensile strength	good	good	good	good	very good	excellent	good	good	good	excellent	bad	good	good	good
Flexibility	low	as required	moderate	slight	good	excellent	good	good	good	good	good	good	good	moderate
Notch strength/strength of structure	–	moderate	good	good	good	excellent	good	good	good	excellent	moderate	moderate	good	almost good
Resistance to light	good	good	good	very good	good	bad	bad	very good	moderate	good	excellent	excellent	excellent	excellent
Resistance to oxidzing	very good	good	good	very good	good	moderate	moderate	good	moderate	good	very good	excellent	excellent	excellent
Resistance to ozone	very good	good	very good	very good	good	moderate	moderate	very good	moderate	good	excellent	excellent	excellent	excellent
Resistance to wear and tear	good	good	–	good	good	very good	very good	very good	very good	excellent	bad	good	good	almost good
Weathering effect	very good	good	good	very good	good	good	moderate	very good	good	moderate	excellent	excellent	excellent	excellent
Resistance to														
Lyes	not suitable	moderate	bad	very good	good	good	good	very good	good	not suitable	not suitable	excellent	very good	very good
Petrol	not suitable	not suitable	good	not suitable	good	not suitable	excellent	moderate	not suitable	very good	not suitable	not suitable	moderate	excellent
Benzole	not suitable	not suitable	good	not suitable	moderate	not suitable	bad	not suitable	not suitable	not suitable	not suitable	not suitable	not suitable	good
Foodstuffs*	not suitable	not suitable	not suitable	suitable	not suitable	suitable	suitable	suitable	suitable	not suitable	excellently suitable	suitable	suitable	not suitable
Solvents, aliphatic	bad	not suitable	good	not suitable	very good	not suitable	very good	moderate	not suitable	very good	not suitable	bad	moderate	very good
Solvents, aromatic	bad	not suitable	good	not suitable	conditional	not suitable	conditional	moderate	not suitable	moderate	not suitable	not suitable	moderate	good
Solvents, halogene	bad	not suitable	not suitable	not suitable	conditional	not suitable	bad	bad	not suitable	bad	not suitable	not suitable	moderate	good
Oils and greases	very good	conditional	very good	not suitable	very good	not suitable	excellent	good	not suitable	very good	good	bad	good	good
Acids	not suitable	moderate	moderate	very good	moderate (conditional)	conditional	conditional	good	conditional	not suitable	not suitable	very good	very good	very good
Water	good	excellent	moderate	good	very good	good	good	very good	very good	not suitable	good	very good	good	good

*with special formulations only · The properties referred to above are given for guidance only · The properties indicated here are affected by temperature, concentration etc. in specific applications and cannot be guaranteed.

Buffers

Type A
Type B
Type C
Type A/F
Type B/F
Type C/F
Crane stop buffers with outside thread
Crane stop buffers with base plate
Stop buffers D
Stop buffers E
Stop buffers K/D
Stop buffers K/E
Stop buffers KP/D
Suction bases
Special buffers

- **Description of parts and functions:**

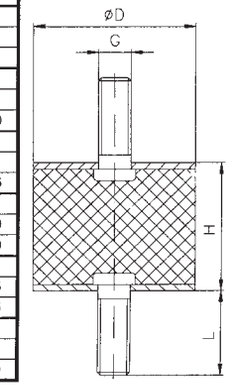
GMT buffers are simple and affordable elements, whose individual metal parts are permanently held together with a firmly adhering layer of elastomer. They are especially suitable for storage of light and moderately heavy equipment without any distinctive dynamic load. Their robustness and wide range of dimensions make an universal application possible.

- **Dimensions/spring parameters:**

TYPE A

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item numer	Dimensions (mm)			Pressure load			
	D	H	Thread	fd	Fv [N]		
			M:GxL	[mm]	40°	55°	70°
500 004	8	8	3x6	0.4	7	16	45
				0.8	15	35	90
				1.2	25	55	145
500 007	10	10	4x10	0.6	12	25	70
				1.2	25	60	145
				1.6	35	80	205
500 012	15	8	4x10	0.4	35	75	210
				0.8	75	155	450
				1.2	120	250	745
500 014	15	15	4x13	0.8	20	45	125
				1.5	40	95	225
				2.5	75	170	400
500 021	20	15	6x15	1.0	55	135	280
				2.0	115	285	600
				2.5	150	370	775
500 022	20	20	6x15	1.0	35	85	180
				2.5	90	225	475
				3.5	130	325	700
500 026	25	15	6x18	1.0	95	230	480
				1.5	145	360	745
				2.5	260	645	1340
500 027	25	20	6x18	1.0	55	140	295
				2.5	150	370	780
				3.5	220	540	1145
500 030	30	15	8x20	1.0	165	290	890
				2.0	460	800	1950
				2.5	610	1045	2560
500 031	30	20	8x20	1.0	105	210	490
				2.5	290	570	1315
				3.5	430	840	1945
500 033	30	30	8x20	1.5	80	175	395
				3.0	170	365	815
				5.3	315	675	1520



For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

TYPE A

Item number	Dimensions (mm)			Pressure load			
	D	H	Thread	fd	Fv [N]		
			M:GxL	[mm]	40°	55°	70°
500 037	40	30	8x23	1,5	160	335	745
				3,0	330	670	1555
				5,3	620	1300	2910
500 038	40	40	8x23	2,0	135	305	670
				5,0	360	780	1765
				7,0	530	1160	2565
500040	50	20	10X28	1	440	895	1830
				2	945	1910	3900
				3	1535	3085	6270
500 042	50	30	10X28	1,5	275	600	1260
				3	580	1255	2630
				4,5	915	1980	4145
500 044	50	40	10X28	3	350	785	1670
				6	745	1670	3540
				8	1045	2325	4930
500 045	50	45	10X28	2,5	240	550	1170
				5	505	1140	2435
				8,8	950	2130	4550
500 052	70	45	10X30	2	460	1010	2125
				5	1225	2100	5630
				8	2105	4580	9610
500 054	75	40	12X37	2	690	1475	3075
				4	1455	2475	6465
				7	2795	5905	12275
500 057	75	55	12X37	1,5	290	645	1370
				4,5	905	2015	4275
				7,5	1585	3520	7435
500 063	100	40	16X45	2	1760	3580	7340
				4	3785	7650	15600
				6	6140	12335	25000
500 065	100	55	16X45	3	1300	2800	5865
				6	2765	5915	12340
				9	4425	9425	19560
500 066	100	60	16X45	3	1100	2340	5045
				6	2315	5020	10540
				10,5	4400	9490	19845
500 067	100	75	16X45	6	1550	3460	7340
				12	3335	7410	15680
				16,5	4875	10775	22790
500 071	150	55	16X45	3	4145	9150	17135
				6	8920	19695	36595
				9	14520	32045	59025
500 072	150	60	16X45	3	3360	7450	14225
				7,5	9250	20465	37715
				10,5	13915	30750	57750
500 073	150	75	16X45	4	2825	6345	12595
				10	7710	17260	34010
				14	11520	25735	50425
500 076	200	100	20X45	6	5405	12040	25045
				12	11500	25500	53020
				18	18465	40735	84670

For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

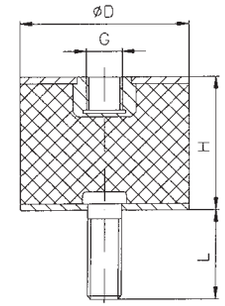
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Dimensions, spring parameters:**

TYPE B

Elastomer: natural rubber (NR) , alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item number	Dimensions (mm)			Pressure load			
	D	H	Thread	fd	Fv [N]		
			M:GxL	[mm]	40°	55°	70°
510004	8	8	3x6	0.4	8	18	50
				0.8	17	39	99
				1.2	28	61	160
510006	10	10	4x10	0.6	13	28	77
				1.2	28	66	160
				1.6	39	88	226
510010	15	10	4x10	0.4	39	83	231
				0.8	83	171	495
				1.2	132	275	820
510011	15	15	4x13	0.8	22	50	138
				1.5	44	105	248
				2.5	83	187	440
510016	20	15	6x15	1.0	61	149	308
				2.0	127	314	660
				2.5	165	407	853
510017	20	20	6x15	1.0	39	94	198
				2.5	99	248	523
				3.5	143	358	770
510020	25	15	6x18	1.0	105	253	528
				1.5	160	396	820
				2.5	286	710	1474
510021	25	20	6x18	1.0	61	154	325
				2.5	165	407	858
				3.5	242	594	1260
510024	30	15	8x20	1.0	182	319	979
				2.0	506	880	2145
				2.5	671	1150	2816
510025	30	20	8x20	1.0	116	231	539
				2.5	319	627	1447
				3.5	473	924	2140
510027	30	30	8x20	1.5	88	193	435
				3.0	187	402	897
				5.3	347	743	1672
510031	40	30	8x23	1.5	176	369	820
				3.0	363	737	1711
				5.3	682	1430	3201
510032	40	40	8x23	2.0	149	336	737
				5.0	396	858	1942
				7.0	583	1276	2822



For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

TYPE B

Item number	Dimensions (mm)			Pressure load			
	D	H	Thread	fd	Fv [N]		
			M:GxL	[mm]	40°	55°	70°
510034	50	20	10X28	1	440	895	1830
				2	945	1910	3900
				3	1535	3085	6270
510036	50	30	10X28	1,5	275	600	1260
				3	580	1255	2630
				4,5	915	1980	4145
510038	50	40	10X28	3	350	785	1670
				6	745	1670	3540
				8	1045	2325	4930
510039	50	45	10X28	2,5	240	550	1170
				5	505	1140	2435
				8,8	950	2130	4550
510046	70	45	10X30	2	460	1010	2125
				5	1225	2100	5630
				8	2105	4580	9610
510048	75	40	12X37	2	690	1475	3075
				4	1455	2475	6465
				7	2795	5905	12275
510051	75	55	12X37	1,5	290	645	1370
				4,5	905	2015	4275
				7,5	1585	3520	7435
510055	100	40	16X45	2	1760	3580	7340
				4	3785	7650	15600
				6	6140	12335	25000
510057	100	55	16X45	3	1300	2800	5865
				6	2765	5915	12340
				9	4425	9425	19560
510058	100	60	16X45	3	1100	2340	5045
				6	2315	5020	10540
				10,5	4400	9490	19845
510059	100	75	16X45	6	1550	3460	7340
				12	3335	7410	15680
				16,5	4875	10775	22790
510063	150	55	16X45	3	4145	9150	17135
				6	8920	19695	36595
				9	14520	32045	59025
510064	150	60	16X45	3	3360	7450	14225
				7,5	9250	20465	37715
				10,5	13915	30750	57750
510065	150	75	16X45	4	2825	6345	12595
				10	7710	17260	34010
				14	11520	25735	50425
510068	200	100	20X45	6	5405	12040	25045
				12	11500	25500	53020
				18	18465	40735	84670

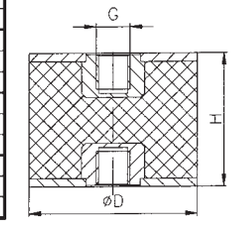
For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

TYPE C

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item number	Dimensions [mm]			Pressure load			
	D	H	Thread	fd	Fv [N]		
			M:G	[mm]	40°	55°	70°
520001	8	8	3	0,1	11	23	46
				0,2	24	48	98
				0,4	56	109	222
520003	10	10	4	0,1	24	46	94
				0,2	52	99	199
				0,4	121	228	458
520007	15	15	4	0,5	18	41	90
				1	38	85	186
				2	83	184	401
520012	20	20	6	1	61	136	294
				2	132	291	629
				3	216	472	1018
520015	25	20	6	1	89	195	420
				2	190	415	892
				3	309	668	1433
520018	30	20	8	0,5	116	240	503
				1,5	391	798	1667
				2,5	745	1503	3124
520020	30	30	8	1,5	112	251	548
				2,5	194	434	946
				3,5	283	632	1375
520023	40	30	8	1	129	285	617
				3	419	920	1984
				5	765	1664	3579
520024	40	40	8	2	155	353	773
				4	323	736	1612
				6	509	1155	2528
520036	70	45	10	2	485	1065	2299
				5	1304	2844	6123
				8	2261	4900	10521
520037	75	40	12	1	374	796	1698
				3	1191	2526	5373
				7	3198	6703	14183
520040	75	55	12	2	405	905	1967
				5	1065	2371	5148
				8	1801	3994	8658
520045	100	40	16	1	1421	2797	5743
				3	4714	9216	18864
				5	8802	17079	34830



TYPE C

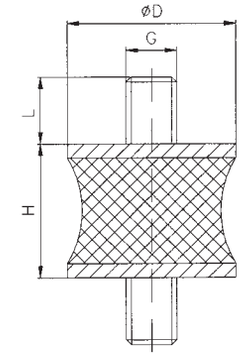
Item number	Dimensions [mm]			Pressure load			
	D	H	Thread	fd	FV [N]		
			M:G	[mm]	40°	55°	70°
520048	100	60	16	3	1361	2924	6255
				6	2904	6204	13239
				9	4678	9933	21141
520049	100	75	16	3	851	1895	4116
				6	1772	3933	8532
				9	2774	6138	13296
520053	150	55	16	3	4976	9966	20644
				6	10855	21602	44609
				9	17940	35450	72954
520054	150	60	16	3	3908	7969	16651
				6	8404	17040	35508
				9	13654	27514	57164
520055	150	75	16	3	2283	4861	10356
				6	4783	10142	21572
				9	7539	15920	33799
520058	200	100	20	5	4809	10281	21947
				10	10170	21642	46104
				15	16213	34325	72954

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

TYPE A/F

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item number	Dimensions [mm]		
	D	H	Thread M:GxL
505 001	10	10	4 x 10
505 002	15	15	4 x 13
505 003	15	20	4 x 13
505 004	20	15	6 x 15
505 005	20	19	6 x 15
505 006	20	20	6 x 15
505 007	20	25	6 x 15
505 008	20	40	6 x 15
505 009	25	20	6 x 18
505 010	25	25	6 x 18
505 053	25	30	6 x 18
505 012	30	20	8 x 20
505 014	30	30	8 x 20
505 015	40	25	8 x 23
505 054	40	40	8 x 23
505 016	40	50	8 x 23
505 018*	45 (40)	53	8 x 23
505 019	50	15	10 x 28
505 020	50	30	10 x 28
505 023	55	35	10 x 28
505 024	55	45	10 x 28
505 027*	60 (50)	45	10 x 28
505 055*	60 (50)	60	10 x 28
505 028	75	40	12 x 37
505 031	100	40	16 x 45
505 056	100	75	16 x 45
505 035	150	60	16 x 45
505 036	160	75	16 x 45
505 037	165	75	16 x 45



* - () diameter of the metals

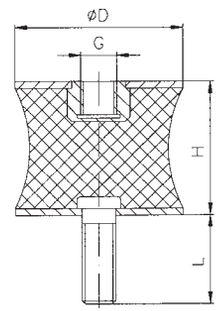
For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

- **Dimensions:**

TYPE B/F

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item number	Dimensions [mm]		
	D	H	Thread M:GxL
515 001	10	10	4 x 10
515 002	15	15	4 x 13
515 003	15	20	4 x 13
515 004	20	15	6 x 15
515 006	20	20	6 x 15
515 007	20	25	6 x 15
515 044	20	30	6 x 18
515 008	20	40	6 x 18
515 009	25	20	6 x 18
515 010	25	25	6 x 18
515 046	25	30	6 x 18
515 012	30	20	8 x 20
515 013	30	25	8 x 20
515 014	30	30	8 x 20
515 015	40	25	8 x 23
515 047	40	40	8 x 23
515 016	40	50	8 x 23
515 019	50	15	10 x 28
515 020	50	30	10 x 28
515 021	50	35	10 x 28
515 024*	55 (50)	45	10 x 28
515 027*	60 (50)	45	10 x 28
515 048*	60 (50)	60	10 x 28
515 028	75	40	12 x 37
515 029	80	70	12 x 37
515 031	100	40	16 x 45
515 032	100	55	16 x 45
515 049	100	75	16 x 45
515 034	130	75	16 x 45
515 035	150	60	16 x 45
515 036	160	75	16 x 45
515 037	165	75	16 x 45



* - () diameter of the metals

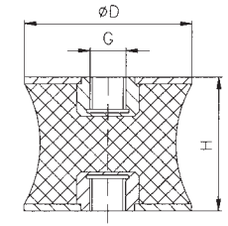
For outer threads >= M12 the following applies: the smooth operation of aproperly functioning standard nut is considered guaranteed.

- **Dimensions:**

TYPE C/F

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item number	Dimensions [mm]		
	D	H	Thread M
525 001	15	20	4
525 004	20	20	6
525 005	20	25	6
525 006	20	40	6
525 007	25	20	6
525 046	25	30	6
525 010	30	25	8
525 013	40	50	8
525 012	40	25	8
525 047	40	40	8
525 014*	45 (40)	44	8
525 016	50	30	10
525 020*	55 (50)	45	10
525 023*	60 (50)	45	10
525 048*	60 (50)	60	10
525 024	75	40	12
525 025*	80 (70)	70	12
525 027	100	40	16
525 028	100	55	16
525 049	100	75	16
525 030	130	75	16
525 031	150	60	16
525 032	160	75	16



* - () diameter of the metals

• Description of parts and functions:

GMT rebound stops and GMT crane stop buffers are used as final stops e.g., for trams and cranes. They can absorb a large part of the effective kinetic energy from impact due to their special construction and their exceptional buffering capacity. This avoids damage from excessive vibration and rebound in machines and installations.

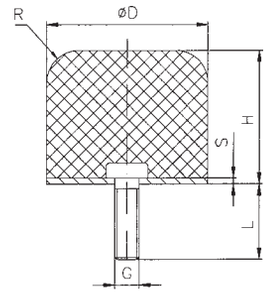
• Dimensions:

- TYPE: Crane stop buffers with outside thread

Elastomer:
- natural rubber (NR)
- age-resistant
- can be used from –30°C to +70°C
- hardness = 70 ± 3 Shore A

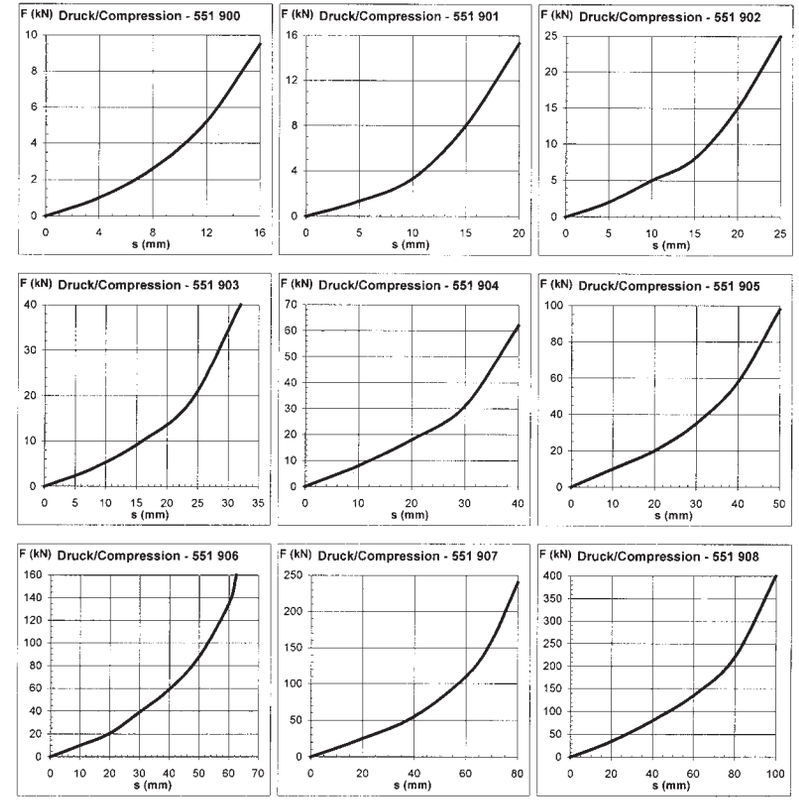
Item Number	D (mm)	H (mm)	G Threads	L (mm)	R (mm)	S (mm)
551900	40	34	M8	28	8	2
551901	50	42	M10	33	10	2
551902	63	53	M10	32	12.5	3
551903	80	66	M12	37	16	3
551904	100	84	M12	36	20	4
551905	125	104	M16	46	25	4
551906	160	131	M16	44	32	6
551907	200	166	M20	49	40	6
551908	250	208	M20	47	50	8

For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.



• Spring characteristics:

Load diagrams at 70 ± 3°Shore A



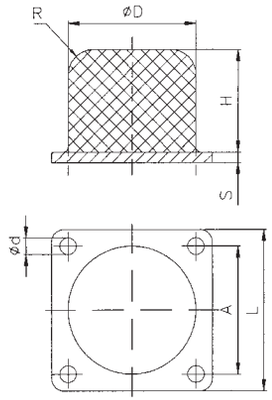
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Dimensions:

- TYPE: Crane stop buffers with base plate

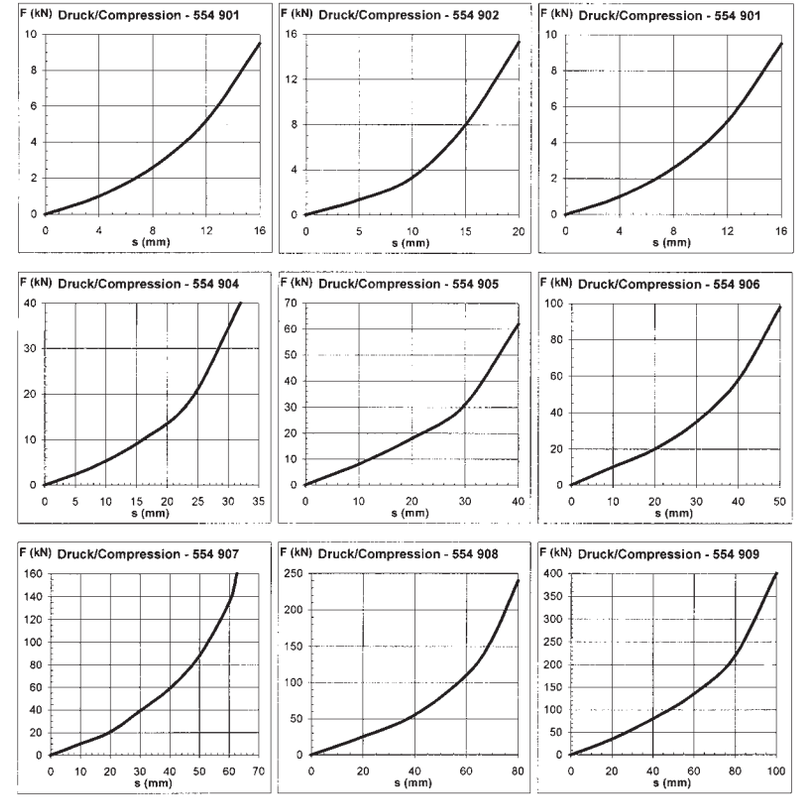
Elastomer:
- natural rubber (NR)
- age-resistant
- can be used from –30°C to +70°C
- hardness = 70 ± 3° Shore A

Item Number	D (mm)	H (mm)	L (mm)	A (mm)	d (mm)	R (mm)	S (mm)
554901	40	34	50	40	5,5	8	2
554902	50	42	63	50	6,5	10	2
554903	63	53	80	63	6,5	13	3
554904	80	66	100	80	9	16	3
554905	100	84	125	100	9	20	4
554906	125	104	160	125	11	25	4
554907	160	131	200	160	11	32	6
554908	200	166	250	200	13	40	6
554909	250	208	315	250	13	50	8



• Spring characteristics:

Load diagrams at 70 ± 3° Shore A



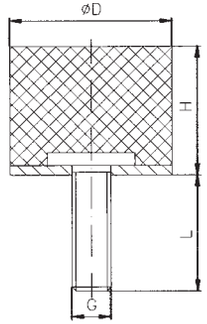
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Dimensions:**

- Type: Stop buffers D

Elastomer: natural rubber (NR)

Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



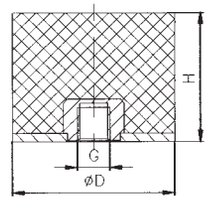
Item Number	D (mm)	H (mm)	G Threads	L (mm)
530005	10	10	M4	10
530017	18	8	M6	16
530021	20	15	M6	15
530030	25	17	M6	18
530037	30	17	M8	20
530038	30	20	M8	20
530040	30	28	M8	20
530050	40	28	M8	23
530051	40	38	M8	23
530055	50	21	M10	28
530056	50	28	M10	28
530058	50	42	M10	28
530060	70	42	M10	30
530063	75	25	M12	37
530065	75	51	M12	37
530068	100	40	M16	45

For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

- Type: Stop buffers E

Elastomer: natural rubber (NR)

Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



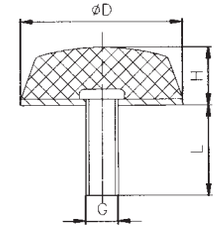
Item Number	D (mm)	H (mm)	G Threads
540027	30	17	M8
540028	30	20	M8
540037	40	28	M8
540042	50	21	M10
540048	70	45	M10
540049	75	25	M12
540051	75	51	M12
540052*	80 (75)	40	M12
540054	100	40	M16

* - () diameter of the metals

- Type: Stop buffers K/D

Elastomer: natural rubber (NR)

Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



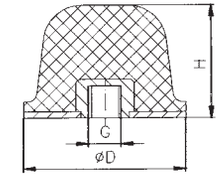
Item Number	D (mm)	H (mm)	G Threads	L (mm)
551001	25	17	M6	18
551004	50	18	M10	28
551009	50	39	M10	28
551013	80 x 80	30	M12	32
551015	125	45	M16	45

For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

- Type: Stop buffers K/E

Elastomer: natural rubber (NR)

Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

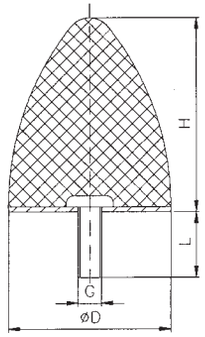


Item Number	D (mm)	H (mm)	G Threads
554008	50	35	M10
554014	80	60	M12
554017	125	90	M16

• Dimensions:

- TYPE: Stop buffers KP/D

Elastomer: natural rubber (NR)



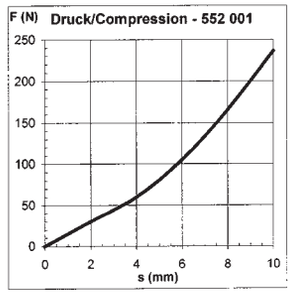
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

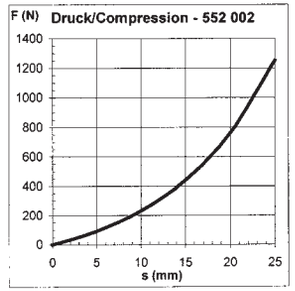
Item Number	D (mm)	H (mm)	G Threads	L (mm)
552001	30	36	M8	20
552002	50	58	M10	28
552004	50	68	M8	36
552006	115	133	M16	45

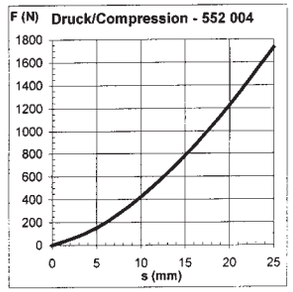
For outer threads >= M12 the following applies: the well smooth operation a properly functioning standard nut is considered guaranteed.

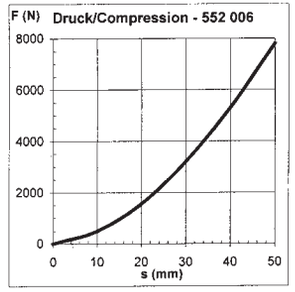
Pressure load curves for 55 Sh-A
Correction factor for 40 Sh-A = 1.9
Correction factor for 70 Sh-A = 0.5

• Spring characteristics:









There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Description of parts and functions:

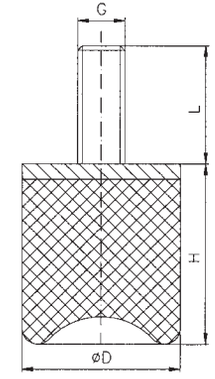
The GMT suction bases primarily serve to bear relatively light aggregates. Due to their special bearing surface, properly borne equipment can be prevented from sliding. The possibility of adjusting their level minimally, for example for measuring devices to be aligned, is yet another of their advantages. Upon request, suction bases with an inner thread are also available.

• Dimensions:

Elastomer: natural rubber (NR)
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item number	D [mm]	H [mm]	G M:GxL [mm]
560001	15	14	4x13
560002	20	23,5	6x15
560003	25	18,5	6x18
560004	30	28,5	8x20
560005	40	28,5	8x23
560006	50	28	10x28
560007	70	43	10x30
560008	75	37	12x37
560009	100	50	16x45

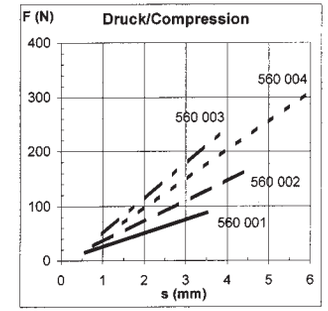
For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

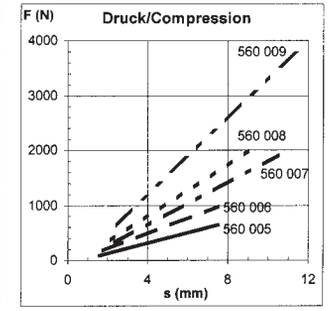


The suction bases are available in the standard colours green (40Sh-A), red (55Sh-A) and beige (70Sh-A).

• Spring characteristics:

Pressure load curves for 40 Sh-A
Correction factor for 55 Sh-A = 1.9
Correction factor for 70 Sh-A = 2,9





There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Description of parts and functions:**

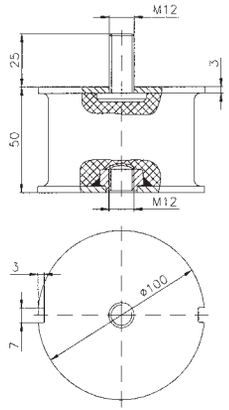
GMT-special buffers are universally ideal for supporting larger and extra-heavy-duty machinery and equipment. They provide, among other things, for vibration damping in rollers, ramming equipment, stampers, vibration generators and drills.

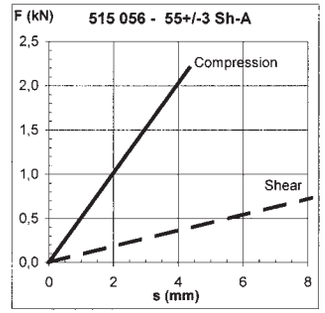
These are just a few examples together with the spring parameters.

For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

- **Dimensions/spring characteristics :**

515 056





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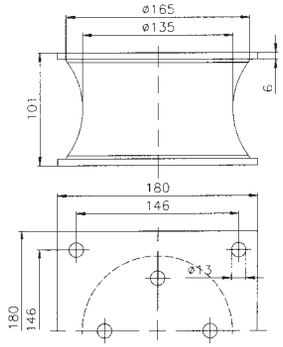

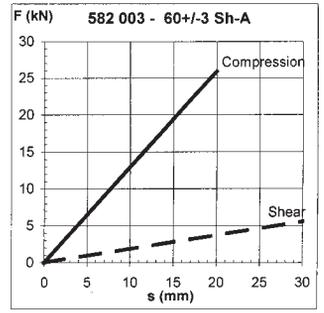

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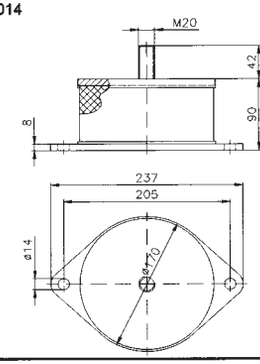

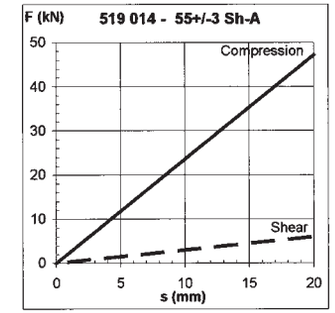

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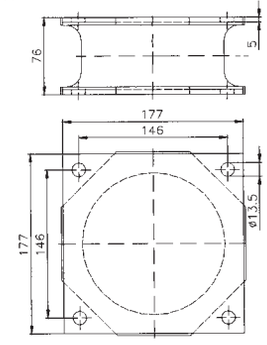

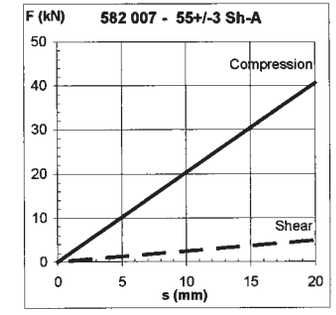

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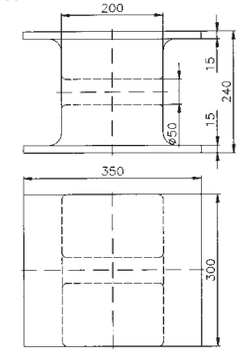

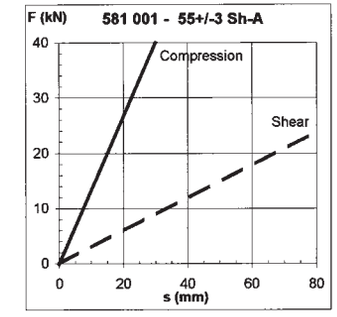

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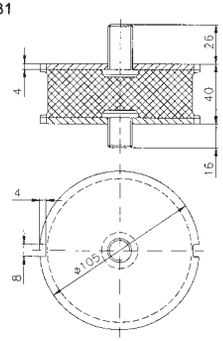

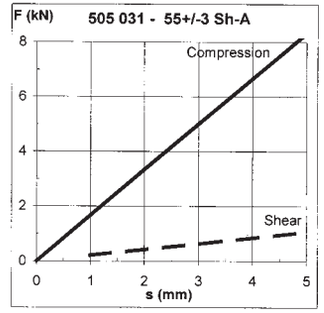

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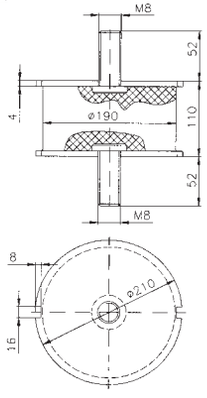

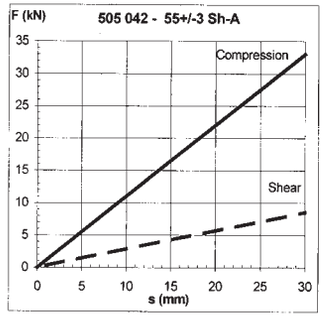

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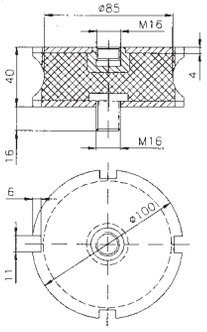

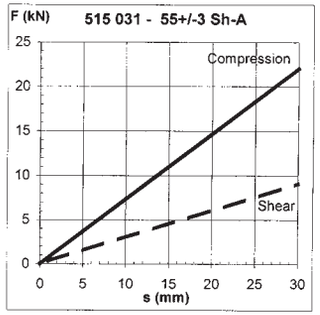

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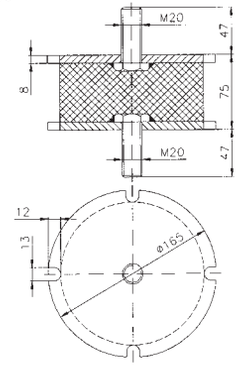

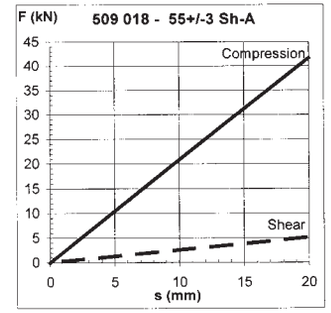

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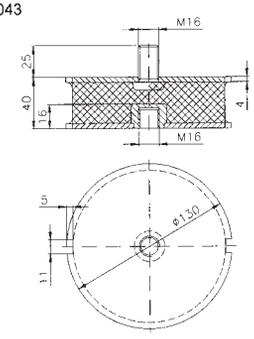

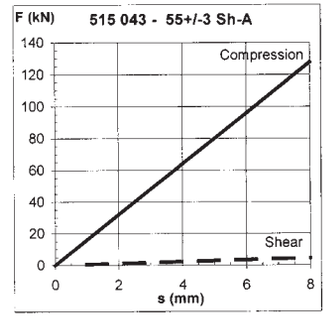

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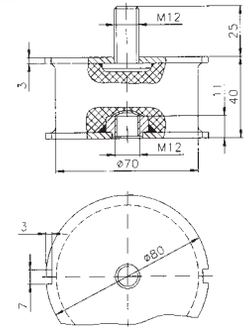

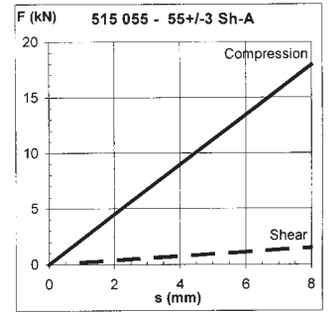

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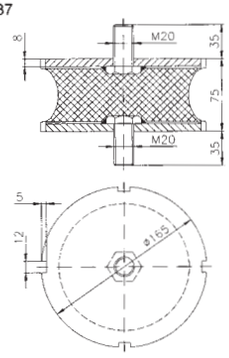

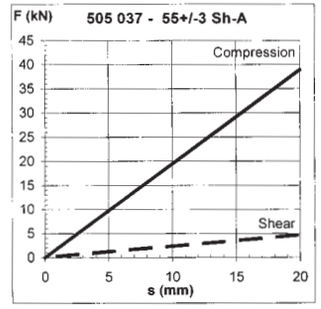

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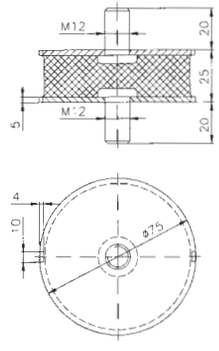

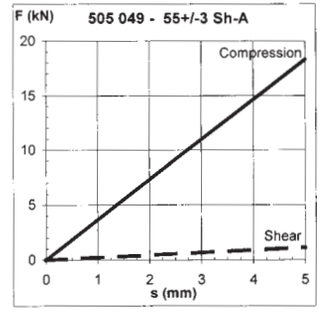

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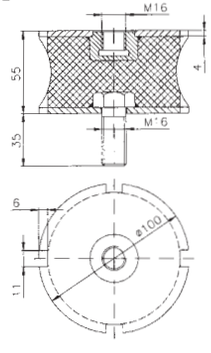

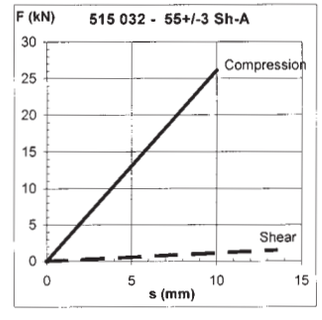

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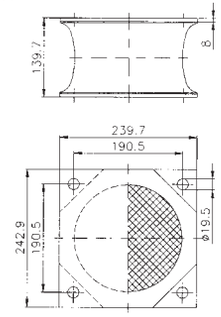

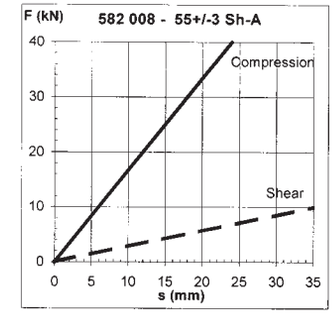

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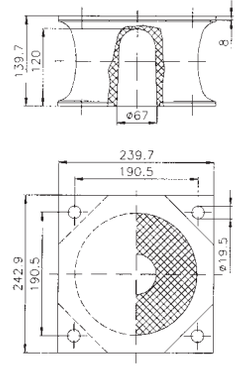

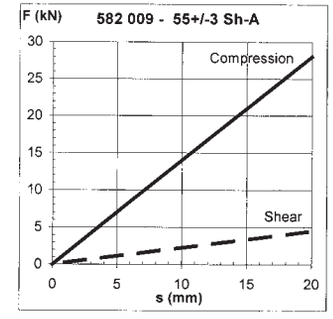

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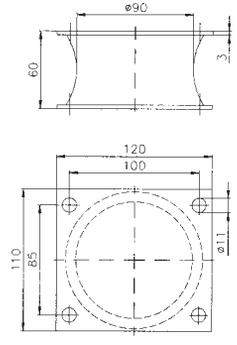

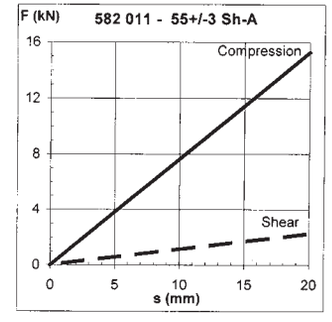

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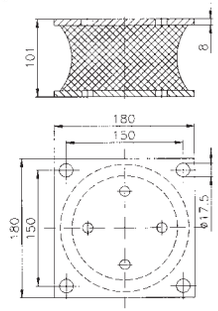

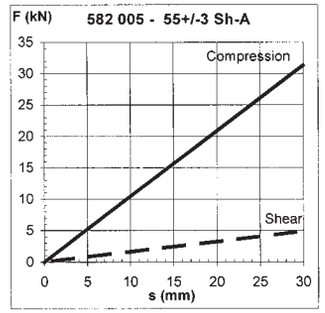

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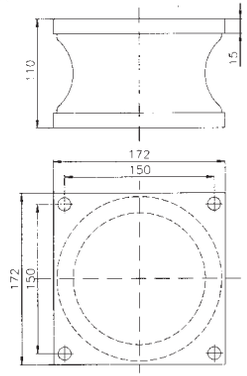

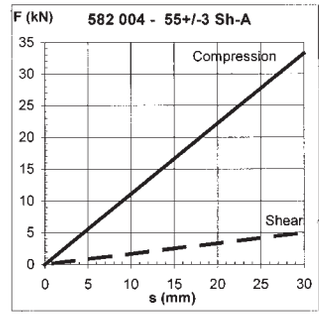

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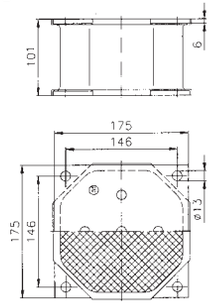

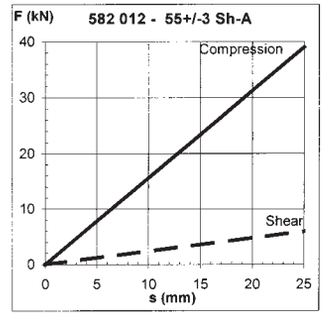

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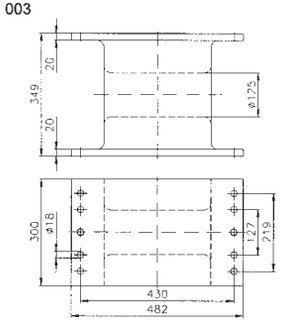

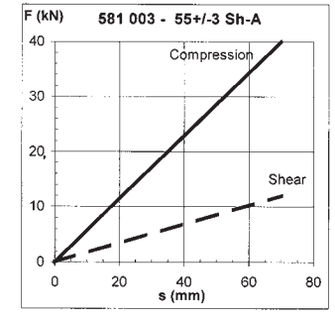

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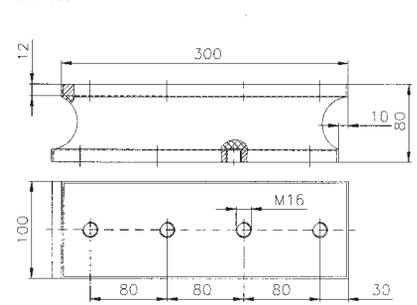

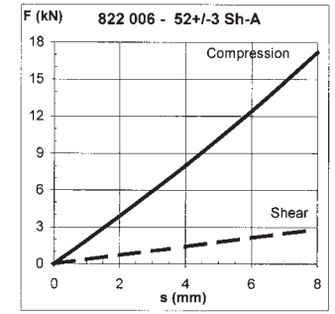

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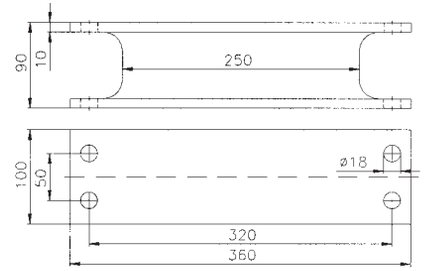
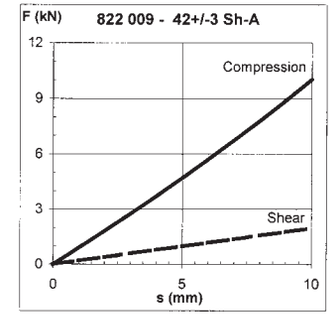
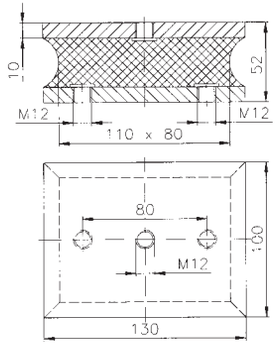
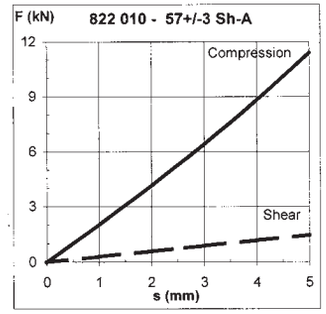


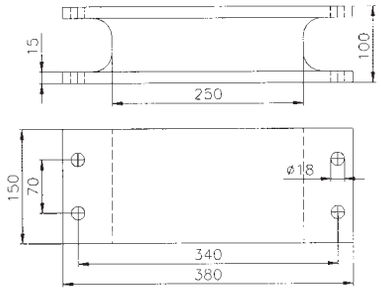


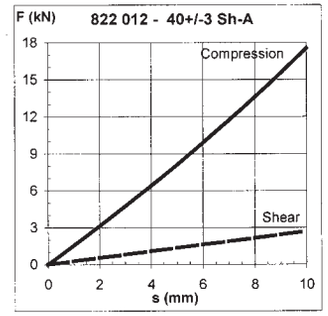
822 010



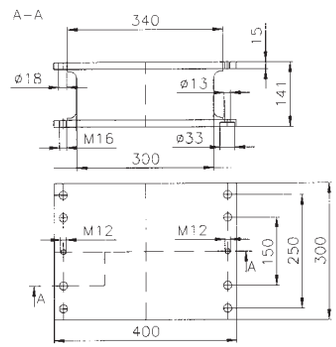


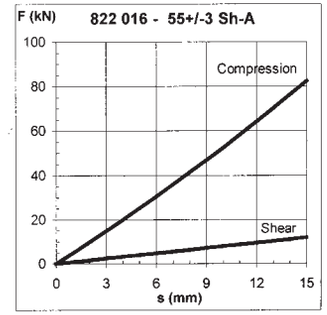
822 012



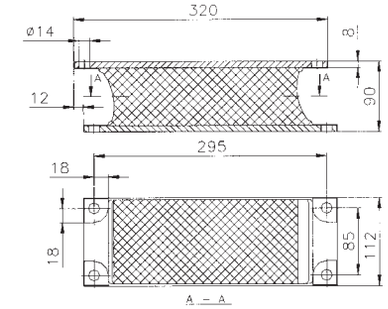


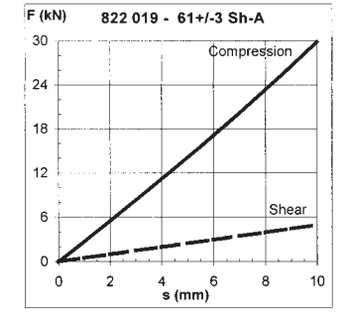
822 016





822 019





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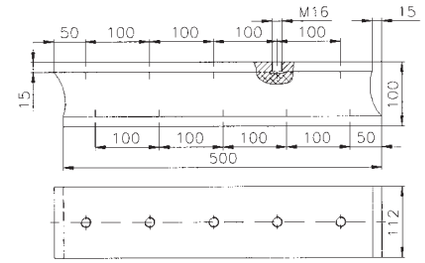

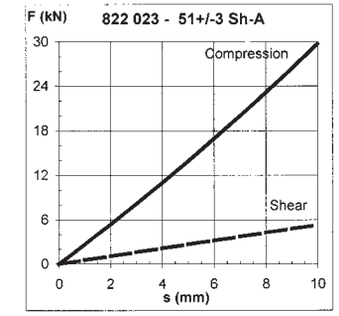

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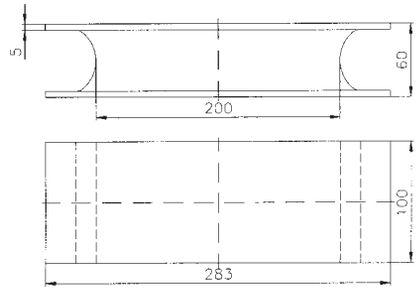

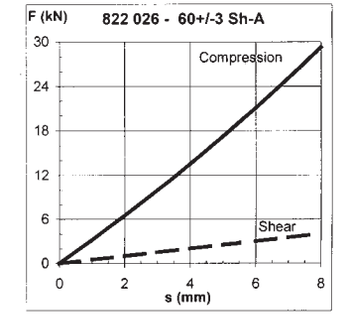

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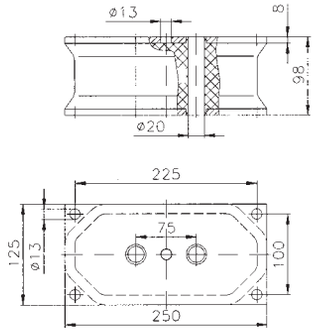

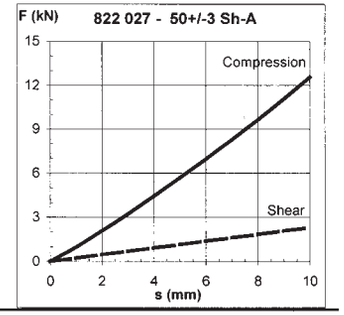

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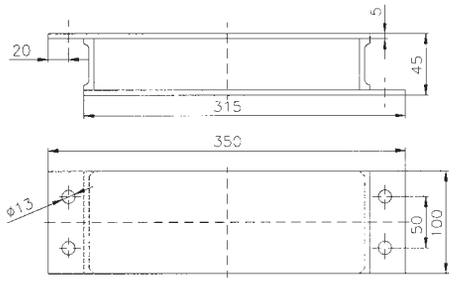

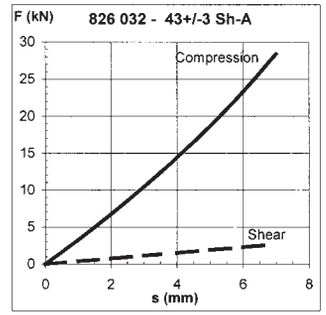

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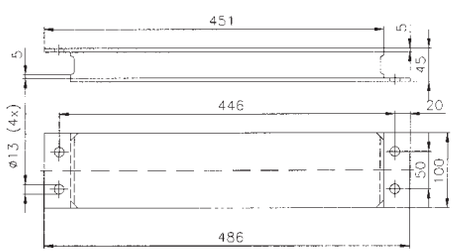
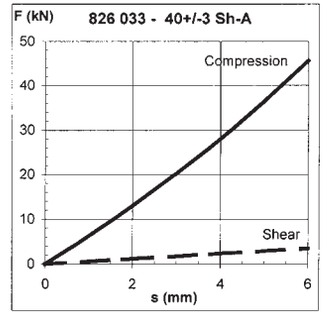
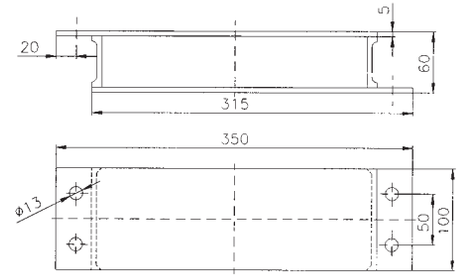
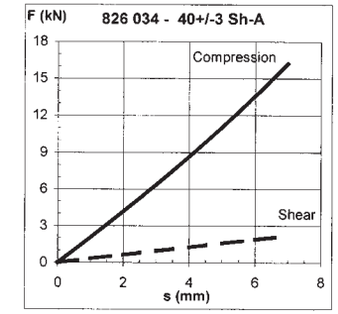


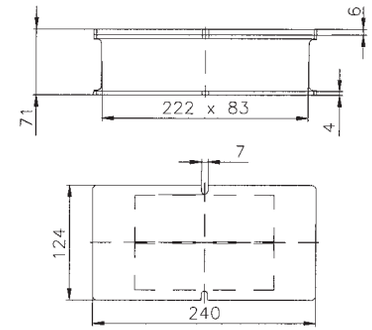


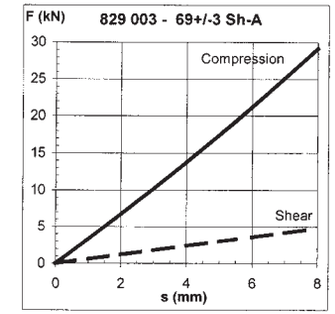
826 034





829 003





There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

For outer threads >= M12 the following applies: the smooth operation of a properly functioning standard nut is considered guaranteed.

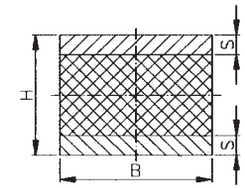
Rails

Type A/I
Type A/II
Type B
Type C
Type D
Type F/I
Type F/II
Type U

- **Description of parts and functions:**

GMT rails are used for the bedding of heavy-duty and extra-heavy-duty machinery and equipment. The vibration-damping bedding of engines, lathes, lifts, but also foundations, can be individually designed. This is made possible by a high degree of flexibility with regard to the available dimensions including prepared bore holes, threads or saw cuts. Designs with a steel plate on one side are used, for example, in gripping/lifting tools and machines and as stop rails.

- **Dimensions/spring parameters:**



TYPE A/I

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

The thickness of the steel can be chosen in other dimensions.

Item number	Dimensions				Pressure Load			
	B	H	L	S	fd [mm]	Fv [N]		
	[mm]	[mm]	[mm]	[mm]	(L=2xB)	40°	55°	70°
800 002	25	25	2000	5	0,75	160	345	740
					1,5	335	720	1.535
					2,25	530	1.125	2.405
800 003	25	30	2000	5	1	135	300	655
					2	280	625	1.360
					3	440	975	2.115
800 004	30	25	2000	5	0,75	265	555	1.180
					1,5	560	1.165	2.465
					2,25	890	1.845	3.880
800 005	30	30	2000	5	1	215	470	1.010
					2	450	975	2.100
					3	705	1.530	3.280
800 006	40	20	2000	5	0,5	1.090	2.065	4.150
					1	2.340	4.405	8.845
					1,5	3.780	7.095	14.210
800 007	40	35	2000	5	1,25	400	860	1.850
					2,5	835	1.795	3.845
					3,75	1.315	2.820	6.025
800 009	40	45	2000	5	1,75	335	750	1.635
					3,5	700	1.555	3.380
					5,25	1.085	2.420	5.260
800 010	50	35	2000	5	1,25	740	1.550	3.275
					2,5	1.555	3.250	6.850
					3,75	2.465	5.120	10.780
800 011	50	40	2000	5	1,5	640	1.375	2.945
					3	1.340	2.870	6.135
					4,5	3.115	4.510	9.620
800 012	50	45	2000	5	1,75	580	1.275	2.750
					3,5	1.210	2.650	5.710
					5,25	1.900	4.145	8.915
800 013	50	50	2000	5	2	542	1.210	2.620
					4	1.130	2.500	5.430
					6	1.770	3.900	8.460
800 014	50	55	2000	5	2,25	515	1.160	2.530
					4,5	1.070	2.400	5.240
					6,75	1.670	3.745	8.150
800 017	60	30	2000	10	0,5	4.785	8.670	17.050
					1	10.315	18.660	36.650
					1,5	16.770	30.270	59.400
800 018	60	35	2000	10	0,75	2.460	4.650	9.340
					1,5	5.270	9.915	19.900
					2,25	8.500	15.960	31.980
800 021	60	60	2000	10	2	860	1.875	4.050
					4	1.800	3.900	8.400
					6	2.825	6.115	13.150

TYPE A/I

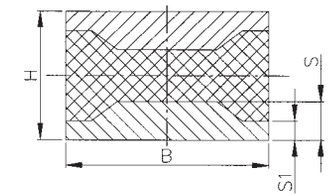
Item number	Dimensions				Pressure Load			
	B	H	L	S	fd in mm	Fv in N		
					(L=2xB)	40°	55°	70°
800 022	60	80	2000	10	3	715	1.625	3.555
					6	1.480	3.360	7.345
					9	2.300	5.200	11.400
800 023	70	30	2000	10	0,5	8.565	15.360	30.050
					1	18.500	33.130	64.700
					1,5	30.150	53.900	105.100
800 025	70	45	2000	10	1,25	2.050	4.100	8.450
					2,5	4.370	8.650	17.800
					3,75	7.000	13.800	28.300
800 026	70	50	2000	10	1,5	1.675	3.450	7.170
					3	3.550	7.200	15.100
					4,5	5.650	11.450	23.850
800 028	70	60	2000	10	2	1.300	2.775	5.920
					4	2.725	5.800	12.350
					6	4.300	9.120	19.380
800 031	80	45	2000	10	1,25	3.180	6.190	12.650
					2,5	6.780	13.150	26.800
					3,75	10.900	21.050	42.800
800 032	80	60	2000	10	2	1.900	4.000	8.375
					4	4.000	8.300	17.500
					6	6.300	13.100	27.600
800 033	80	80	2000	10	3	1.430	3.170	6.850
					6	2.980	6.575	14.200
					9	4.680	10.270	22.200
800 038	100	45	2000	10	1,25	6.830	12.900	25.950
					2,5	14.630	27.550	55.290
					3,75	23.650	44.350	88.850
800 040	100	55	2000	10	1,75	4.300	8.500	17.550
					3,5	9.150	18.000	37.070
					5,25	14.650	28.750	59.000
800 041	100	60	2000	10	2	3.680	7.450	15.500
					4	7.800	15.700	32.615
					6	12.450	25.000	51.700
800 044	100	80	2000	10	3	2.560	5.500	11.800
					6	5.360	11.500	24.550
					9	8.450	18.000	38.450
800 045	120	45	2000	15	0,75	32.150	57.250	111.400
					1,5	69.500	123.600	240.400
					2,25	113.350	201.200	391.100
800 047	120	60	2000	15	1,5	9.850	18.600	37.350
					3	21.100	39.700	79.620
					4,5	34.050	63.800	127.900
800 049	120	80	2000	15	2,5	5.070	10.325	21.560
					5	10.750	21.750	45.350
					7,5	17.100	34.500	71.750
800 051	150	60	2000	15	1,5	21.900	40.350	80.050
					3	47.100	86.550	171.500
					4,5	76.400	140.000	277.000
800 057	200	100	2000	15	3,5	17.200	34.000	70.200
					7	36.550	72.100	148.250
					10,5	58.550	115.000	235.900
800 059	300	100	2000	15	3,5	68.350	128.000	256.300
					7	146.600	273.700	547.200
					10,5	237.100	441.300	880.500
800 060	400	100	2000	15	3,5	195.250	355.350	700.500
					7	420.800	764.000	1.504.300
					10,5	683.850	1.250.000	2.435.700

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Dimensions/spring parameters:**

TYPE A/II

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



Item number	Dimensions [mm]					Pressure Load			
	B	H	L	s	s1	fd [mm]	Fv in [N]		
						L = 2 x B	40 Sh-A	55 Sh-A	70 Sh-A
810 001	50	35	2000	10	5	1	864	1756	3663
						2	1825	3694	7690
						3	2903	5850	12154
810 002	50	40	2000	10	5	1.5	855	1796	3804
						2.5	1483	3104	6566
						3.5	2165	4517	9539
810 003	50	45	2000	10	5	1	406	877	1880
						3	1293	2778	5943
						5	2300	4916	10491
810 004	50	50	2000	10	5	1	317	698	1509
						3	997	2186	4718
						5	1747	3816	8221
810 005	50	55	2000	10	5	2	530	1181	2567
						4	1101	2449	5316
						6	1722	3818	8277
810 006	50	60	2000	10	5	2	448	1009	2204
						4	925	2081	4539
						6	1436	3223	7024
810 007	50	70	2000	10	5	2	343	785	1724
						4.5	795	1817	3989
						7	1276	2913	6392
810 008	60	35	2000	11	5	1	1683	3305	6781
						2	3586	7013	14357
						3	5759	11211	22901
810 009	60	60	2000	11	5	1	352	780	1690
						3	1095	2418	5234
						5	1896	4173	9020
810 010	70	30	2000	12	5	0.5	2983	5523	10991
						1	6258	11566	36155
						2	13871	25536	50654
810 011	70	45	2000	12	5	1	1128	2306	4823
						2.5	2981	6067	12664
						4	5064	10257	21361
810 012	70	55	2000	12	5	2	1322	2821	6016
						4	2776	5899	12557
						6	4388	9282	19721
810 013	70	60	2000	12	5	3	1644	3561	7643
						5	2856	6164	13211
						7	4178	8984	19226
810 014	70	70	2000	12	5	2	779	1731	3757
						5	2034	4507	9767
						8	3412	7532	16299

TYPE A/II

Item number	Dimensions [mm]					fd [mm]	Pressure load [N]		
	B	H	L	s	s1	L = 2 x B	40 Sh-A	55 Sh-A	70 Sh-A
810 015	70	80	2000	12	5	2	611	1380	3015
						6	1918	4319	9424
						10	3357	7536	16422
810 016	100	40	2000	15	5	1	6692	12520	25054
						2	14219	26530	53010
						3	22744	42317	84427
810 017	100	45	2000	15	5	1.5	6221	11925	24170
						2.5	10870	20782	42061
						3.5	15993	30493	61627
810 018	100	50	2000	15	5	1	2739	5387	11060
						3	8850	17320	35474
						5	15998	31142	63613
810 019	100	55	2000	15	5	1	1998	4017	8338
						3	6364	12741	26387
						5	11316	22548	46592
810 020	100	60	2000	15	5	2	3158	6465	13532
						4	6648	13555	28318
						6	10535	21387	44589
810 021	100	70	2000	15	5	3	3203	6764	14362
						5	5542	11669	24740
						7	8073	16942	35867
810 022	100	80	2000	15	5	2	1547	3353	7201
						5	4033	8713	18682
						8	6749	14526	31099

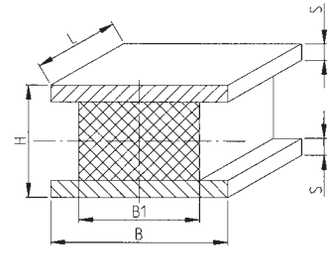
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Dimensions/spring parameters:**

These designs can be created, in modular style, in different dimensions and constellations.

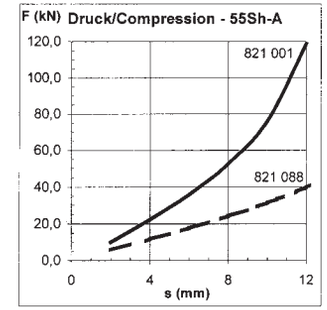
TYPE B

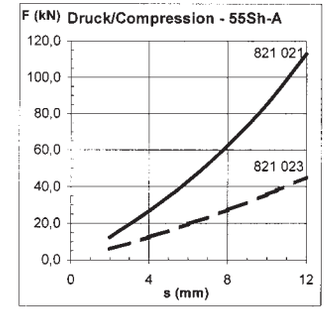
Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



Item number	Dimensions					Pressure load	
	L [mm]	H [mm]	B [mm]	B1 [mm]	s [mm]	fd [mm]	Fv [kN] 55 Sh-A
821001	100	45	283	200	5	4	22,26
						8	52,49
						12	118,80
821088	100	60	283	200	5	4	11,64
						8	24,11
						12	39,69
821021	100	45	350	250	5	4	18,17
						8	41,65
						12	73,83
821023	100	60	350	250	5	4	9,50
						8	20,40
						12	33,20

- **Spring characteristics:**





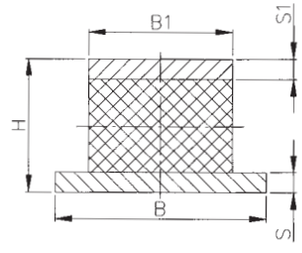
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Dimensions/spring parameters:

These designs can be created, in modular style, in different dimensions and constellations.

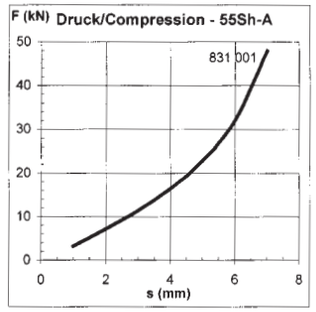
TYPE C

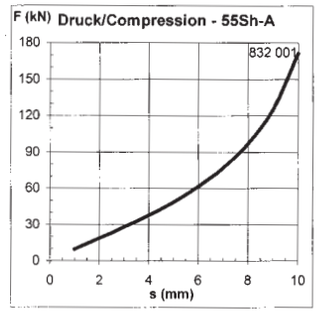
Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



Item number	Dimensions						Pressure load	
	B [mm]	B1 [mm]	H [mm]	L [mm]	s [mm]	s1 [mm]	fd [mm]	Fv [kN] 55 Sh-A
831001	200	150	40	50	8	12	1	3.21
							3	11.43
							5	22.80
							7	47.90
832001	470	230	60	100	15	15	1	9.33
							3	27.85
							5	48.62
							7	76.96

• Spring characteristics:





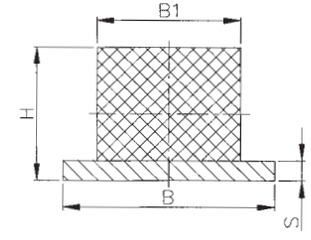
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Dimensions/spring parameters:

These designs can be created, in modular style, in different dimensions and constellations.

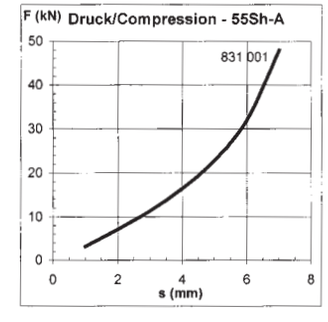
TYPE D

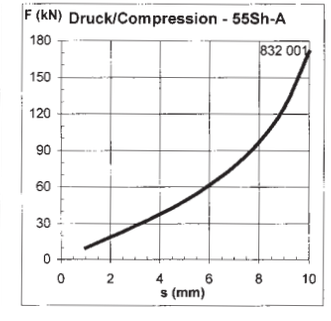
Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



Item number	Dimensions					Pressure load	
	B [mm]	B1 [mm]	H [mm]	L [mm]	s [mm]	fd [mm]	Fv [kN] 55 Sh-A
840001	130	70	35	50	5	2	1.40
						4	2.84
						6	4.41
						8	6.38
						10	9.50
842002	300	200	80	150	15	2	6.81
						6	20.15
						12	42.37
						16	61.58
						20	90.86

• Spring characteristics:





There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

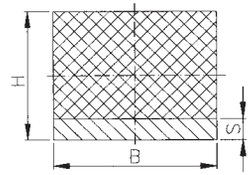
- **Dimensions/spring parameters:**

These designs can be created, in modular style, in different dimensions and constellations.

TYPE F/I

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

The thickness of the steel can be chosen in other dimensions.



Item number	Dimensions				Pressure load			
	B	H	L	S	fd [mm]	Fv [N]		
	[mm]	[mm]	[mm]	[mm]	(L=2xB)	40°	55°	70°
850 002	25	25	2000	5	1	135	300	655
					3	440	980	2115
					5	810	1780	3840
850 003	25	30	2000	5	2	200	460	1010
					4	430	970	2130
					8	1000	2230	4860
850 004	30	25	2000	5	2	450	975	2100
					4	990	2135	4575
					8	2565	5405	11460
850 005	30	30	2000	5	2	315	700	1520
					4	670	1490	3230
					8	1575	3455	7450
850 006	40	20	2000	5	1	860	1720	3565
					3	3070	6060	12470
					5	6350	12360	25235
850 007	40	35	2000	5	3	746	1645	3555
					6	1635	3575	7715
					9	2735	5925	12730
850 009	40	45	2000	5	3	485	1100	2410
					6	1025	2320	5070
					9	1640	3690	8055
850 010	50	35	2000	5	3	1340	2870	6135
					6	2975	6315	13445
					9	5050	10605	22470
850 011	50	40	2000	5	3	1025	2245	4835
					6	2220	4825	10375
					9	3645	7865	16860
850 012	50	45	2000	5	3	830	1840	4000
					6	1765	3905	5430
					9	2840	6250	13510
850 013	50	50	2000	5	4	945	2120	4620
					8	2025	4535	9865
					12	3305	7345	15935
850 014	50	55	2000	5	4	810	1840	4025
					8	1725	3895	8515
					12	2770	6230	13585
850 017	60	30	2000	10	1	1645	3235	6640
					3	5615	10945	22380
					5	10885	21020	42755
850 018	60	35	2000	10	1	1005	2045	4270
					3	3295	6670	13885
					5	6090	12225	25350
850 020	60	50	2000	10	4	1795	3905	8395
					8	3965	8545	18300
					12	6680	14250	30395
850 021	60	60	2000	10	4	1255	2800	6085
					8	2680	5955	12915
					12	4335	9570	20710

TYPE F/I

Item number	Dimensions				Pressure Load			
	B	H	L	S	fd in mm	Fv in N		
					(L=2xB)	40°	55°	70°
850 022	60	80	2000	10	4	785	1800	3960
					8	1635	3740	8220
					12	2555	5840	12815
850 023	70	30	2000	10	1	2750	5290	10740
					3	9470	18065	36525
					5	18515	35020	70475
850 025	70	45	2000	10	2	1665	3485	7375
					4	3535	7365	15545
					8	8105	16695	35040
850 026	70	50	2000	10	2	1300	2775	5920
					4	2725	5795	12350
					8	6065	12790	27130
850 028	70	60	2000	10	4	1845	4050	8740
					8	3965	8650	18635
					12	6455	13990	30040
850 031	80	45	2000	10	2	2470	5060	10600
					4	5260	10735	22435
					8	12180	24565	51055
850 032	80	60	2000	10	4	2615	5650	12105
					8	5660	12130	25925
					12	9270	19725	42020
850 033	80	80	2000	10	4	1530	3440	7495
					8	3205	7170	15605
					12	5040	11245	24435
850 038	100	45	2000	10	2	4955	9810	20205
					4	10635	20955	43060
					8	25005	48730	99600
850 040	100	55	2000	10	4	6035	12400	25995
					8	13415	27320	57050
					12	22730	45850	95305
850 041	100	60	2000	10	4	4870	10180	21505
					8	10635	22065	46465
					12	17630	36275	76095
850 044	100	80	2000	10	4	2670	5850	12625
					8	5605	12245	26385
					12	8875	19305	41510
850 045	120	45	2000	15	2	13405	25295	50845
					4	29490	55385	111055
					8	73640	136890	272980
850 047	120	60	2000	15	4	10605	21170	43780
					8	23795	47100	97020
					12	40770	79945	163905
850 049	120	80	2000	15	4	4950	10485	22285
					8	10535	22195	47070
					12	16915	35435	74960
850 051	150	60	2000	15	4	22075	42610	86665
					8	50065	95920	194350
					12	86815	164955	332795
850 057	200	100	2000	15	4	12945	26445	55305
					8	27275	55500	115840
					12	43265	87660	182585
850 059	300	100	2000	15	4	47960	92135	186935
					8	102045	195345	395625
					12	163565	311930	630520
850 060	400	100	2000	15	4	132135	244995	487875
					8	282665	522670	1039290
					12	455580	840025	1667750

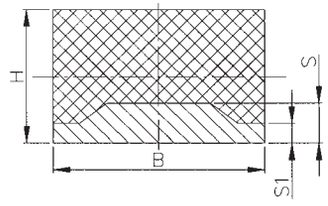
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Dimensions/spring parameters:

These designs can be created, in modular style, in different dimensions and constellations.

TYPE F/II

Elastomer: natural rubber (NR), alternatively other qualities
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



Item number	Dimensions (mm) B	H	L	s	s1	Pressure load fd [mm] L=2 x B	Fv [N] 40 Sh-A	55 Sh-A	70 Sh-A
810 001	50	35	2000	10	5	3,5	2220	4305	8295
810 002	50	40	2000	10	5	4	1865	3610	7000
810 003	50	45	2000	10	5	4,5	1645	3180	6165
810 004	50	50	2000	10	5	5	1490	2885	5600
810 005	50	55	2000	10	5	5,5	1380	2675	5175
810 006	50	60	2000	10	5	6	1300	2515	4870
810 007	50	70	2000	10	5	7	1185	2295	4445
810 008	60	35	2000	11	5	3,5	2915	5635	10920
810 009	60	60	2000	11	5	6	2080	4030	7800
810 010	70	30	2000	12	5	3	9750	18870	36600
810 011	70	45	2000	12	5	4,5	4430	8550	16560
810 012	70	55	2000	12	5	5,5	3455	6710	12925
810 013	70	60	2000	12	5	6	3170	6120	11880
810 014	70	70	2000	12	5	7	2780	5375	10430
810 015	70	80	2000	12	5	8	2530	4890	9440
810 016	100	40	2000	15	5	4	19760	38200	74000
810 017	100	45	2000	15	5	4,5	15075	29160	56250
810 018	100	50	2000	15	5	5	12250	23750	45900
810 019	100	55	2000	15	5	5,5	10450	20185	39050
810 020	100	60	2000	15	5	6	9180	17760	34320
810 021	100	70	2000	15	5	7	7560	14560	28210
810 022	100	80	2000	15	5	8	6560	12720	24560

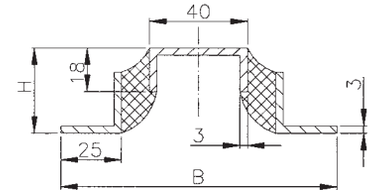
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Dimensions/spring parameters:

TYPE U

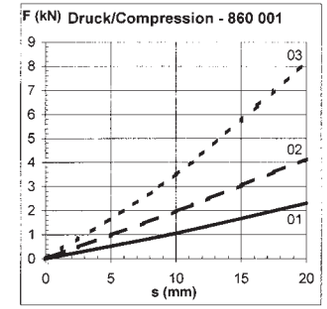
This type of rail offers good lateral stability with especially soft vertical spring ration. The rail can be cut in smaller pieces and equipped with holes or threads acc. to the drawings or requirements.

Elastomer: natural rubber (NR)
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A



Item number	Dimensions (mm) B	H	L	Pressure load for L=100 fd in mm	Fv in N 40°	55°	70°
860 001	113	35	2000	10	1,280	1,970	3,500
				20	1,870	3,450	8,170

• Spring characteristics:



There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Elastomeric mountings

Insulators
Machine feet
Machine feet, height-adjustable
IS-Elements
Triflex
MF-Elements
U-Bearings
Air springs
Cone mountings
Cap elements
Rubber-Cork-Pads
Profiled mats
Core-Slabs

- **Description of parts and functions:**

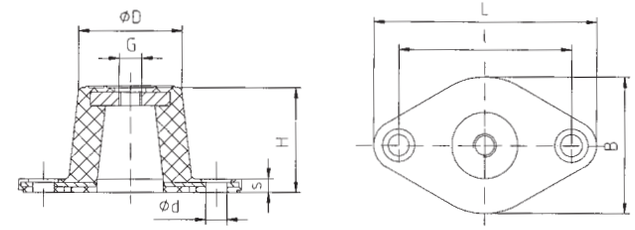
The GMT-insulators, because of their electrically insulating property, are used for the bearing of blasts, air-conditioning units and fans. The fact that they can be anchored and that the different shore hardness factors are distinguished by colour makes it easy to use them appropriately.

- **Dimensions:**

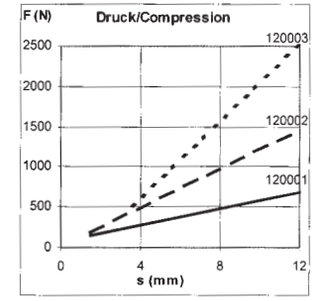
Elastomer: natural rubber (NR)
Soft = 40 ± 5° Shore A
Medium = 55 ± 5° Shore A
Hard = 70 ± 5° Shore A

Item number	D	G		H	L	B	I	d	s
	[mm]	metric	inch	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
120001	32	M8	5/16	32	80	45	60	9	6
120002	45	M10	3/8	45	98	60	76	9	6
120003	63	M12	1/2	73	140	86	105	14	6.5

The insulators are available in the standard colours green (40Sh-A), red (55Sh-A), and beige (70Sh-A).



- **Spring characteristics:**



Pressure load curves for 55 Sh-A
Correction factor for 40 Sh-A = 1.9
Correction factor for 70 Sh-A = 0,5

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Description of parts and functions:

GMT machine feet are the preferred choice when it comes to the vibration and sound insulated bedding for engines, blasts, tool machine, printing and textile machinery. They have a favourable thrust-spring-constant/pressure-spring-constant ratio. Because of the higher degree of horizontal stiffness their mechanical movements can be largely compensated.
All these products are maintenance-free. The manufacturing of these machine feet is done on the basis of natural rubber.

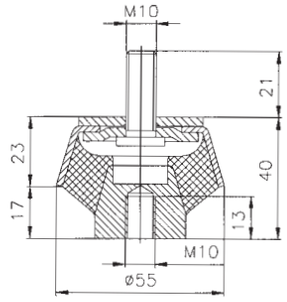
• Dimensions/spring parameters:

Standard design

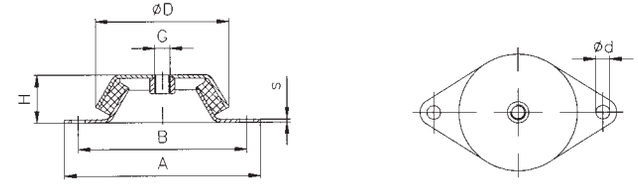
Item number	A [mm]	B [mm]	D [mm]	d [mm]	G [mm]	H [mm]	s [mm]	allowed Fv with Shore [Sh-A] : 45	60	70
100 001	-	-	55	-	M10	40	-	0,4	0,7	1,1
100 002	170	140	106	13,0	M12	39	3	1,8	3,5	4,8
100 003	168	132	150	12,5	M16	51,5	4	4,0	5,0	7,0
100 004	220	180	150	16,5	M20	51,5	4	4,0	5,0	7,0
100 005	184	150	177	13,0	M20	63	4	10,0	15,0	21,0

Tear-proof design

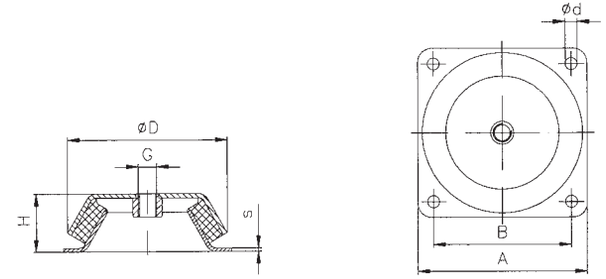
Item number	A [mm]	B [mm]	D [mm]	d [mm]	G [mm]	H [mm]	s [mm]	allowed Fv with Shore [Sh-A] : 38	45	60	70
104 001	128	110	77	9,0	M10	30	2	1,4	1,7	2,1	3,1
104 002	128	104	77	9,0	M10	30	2	1,4	1,7	2,1	3,1
104 003	144	124	94	10,0	M10	35	2,5	1,6	2,1	2,6	4,0
104 004	172	144	108	13,5	M16	38	3	2,1	2,8	4,2	6,0
104 005	186	158	121	13,5	M16	42	3	-	6,1	9,3	16,3
104 006	212	182	144	13,5	M16	48	3	-	12,3	22,7	30,4



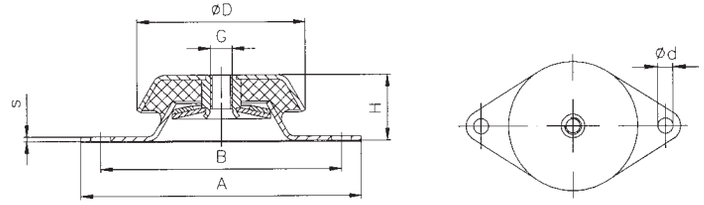
100001



100002, 100004

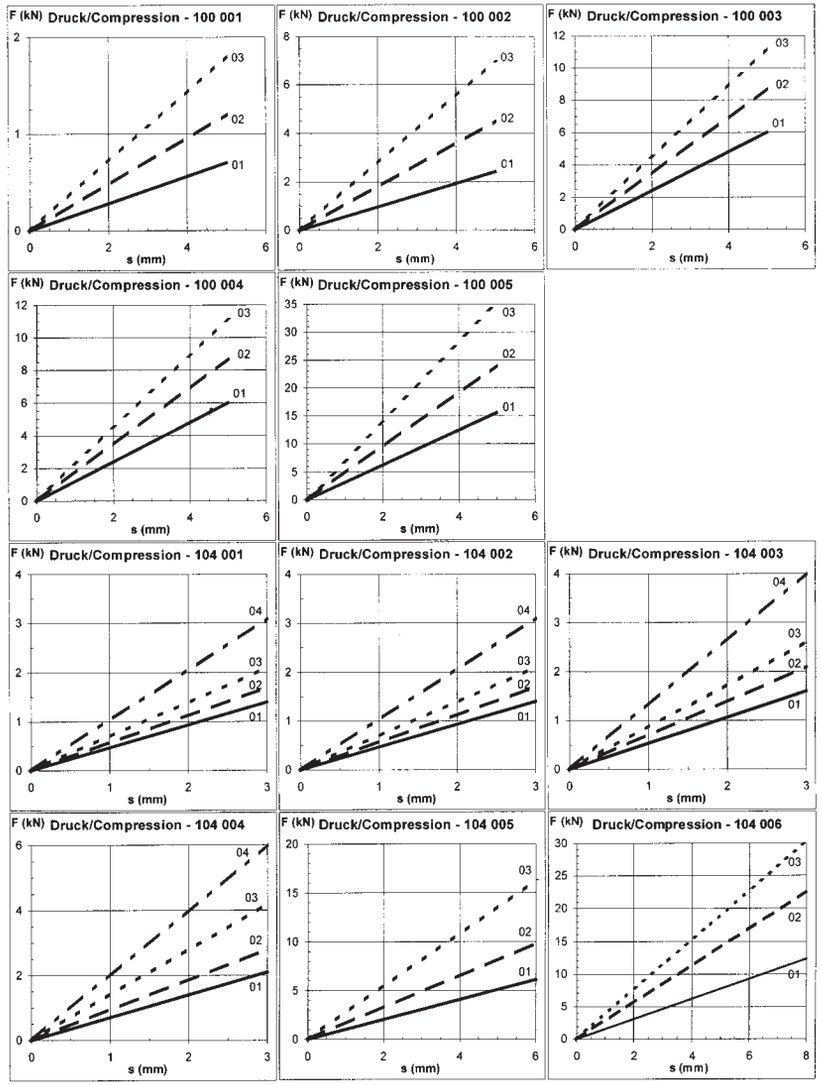


100 003, 100 005



104 001 – 104 006

- **Spring characteristics:**



There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Description of parts and functions:**

The height-adjustable GMT machine feet facilitate the bearing of machinery and they offer the following advantages :

- with/without floor mounting (optional)
- height-adjustable
- skid-proof
- vibration insulation
- shock-absorbing
- structure-borne noise insulation
- easy assembly
- 7 sizes
- loads of up to 6500 kg

- **Dimensions/Assembly :**

Item number	Dimensions [mm]									Adjust. range [mm]
	D	d	H	h	L	l	B	b	Fine thread G	
110001	30	18	15	-	-	-	-	-	M 6x0,5	3-4
110002	50	36	21	-	-	-	-	-	M 10X1,0	4-5
110003	75	52	25	29	100	65	60	8	M 12x1,5	5-6
110004	100	72	35	43	160	140	75	12	M 16x1,5	6-8
110005	150	115	45	53	220	190	120	14	M 20x1,5	7-10
110006	208	160	45	55	290	215	160	18	M 20x1,5	8-12
110007	258	202	50	65	340	265	200	18	M 24x1,5	8-12

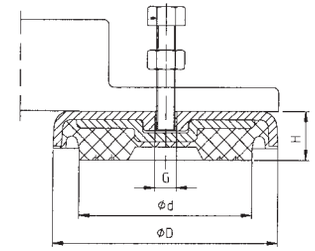


Figure 1

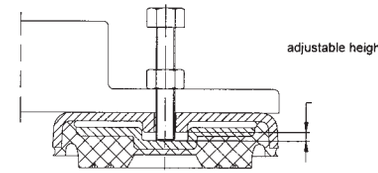
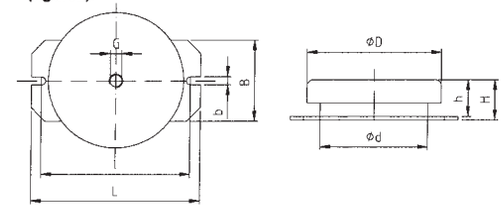


Figure 2

For using :

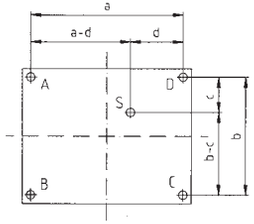
- For assembly, raise the locknut and screw in the adjusting screw to bring it into a bearing position **(figure1)**.
- You can adjust the level by raising the adjusting screw on the machine side that is too low. Fasten the locknut **(figure2)**.



Special design with mounting plate

Figure 3

An uneven load distribution can impair the effectiveness of the bases. In such a case, the individual loads will have to be calculated.



Total weight m=A+B+C+D [kg]
a, b, c, d [mm]; centre of gravity S
Bearing-load distribution [kg]:

$$A = m \frac{(b-c)\,d}{a\,b} \qquad B = m \frac{c\,d}{a\,b}$$

$$C = m \frac{(a-d)\,c}{a\,b} \qquad D = m \frac{(b-c)\,(a-d)}{a\,b}$$

- **Load diagram/spring characteristics :**

Load diagram (in kg per base)

for GMT machine feet, in order to determine the proper elements:

Item number	Shore-A	Surface grinders and lathes [kg]	Milling machines [kg]	Cylindrical grinding machines [kg]	General machinery max. [kg]	stat.+dyn. max. [kg]
11000301	55	63	95	126	190	250
11000302	70	83	125	160	250	335
11000303	80	157	250	335	500	670
11000401	55	90	135	180	270	360
11000402	70	130	200	260	400	530
11000403	80	250	375	500	700	900
11000501	55	180	270	360	540	720
11000502	70	220	330	440	660	880
11000503	80	400	600	800	1200	1600
11000601	55	500	800	1000	1600	2200
11000602	70	800	1200	1700	2500	3500
11000603	80	1700	2400	3000	4700	6000
11000701	55	900	1300	1750	2700	3700
11000702	70	1200	1800	2500	3800	4800
11000703	80	2300	3200	4200	6500	7200

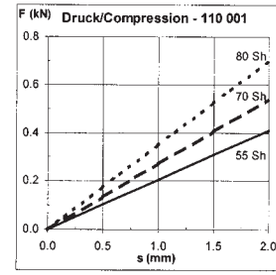
Overloads often lead to a «soft» setup of the machine. The loads mentioned here, according to our engineers, are the best parameters to be chosen with as much stability as possible while maintaining good vibration insulation and shock-absorption.

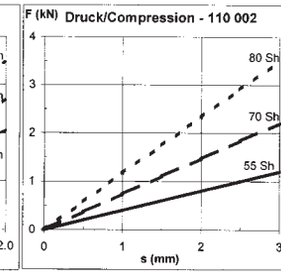
Underloads lead to a «hard» setup of the machine, only little utilization of the elasticity, and may result in the machine skidding.

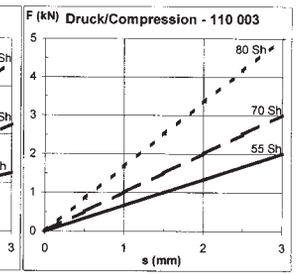
Structure-borne noise insulation is at all times guaranteed because of the reflection and transformation of acoustic vibrations. The noise reduction becomes especially apparent in neighbouring rooms.

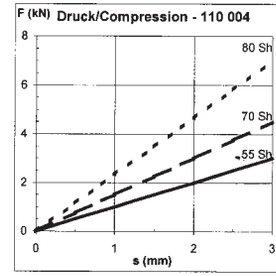
Please note :
Larger machine feet have a softer reaction with less damping; they are used for better insulation.
Smaller stabilizers have a harder reaction with higher damping; they are used for less insulation.

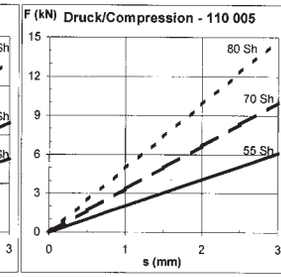
- **Spring characteristics:**

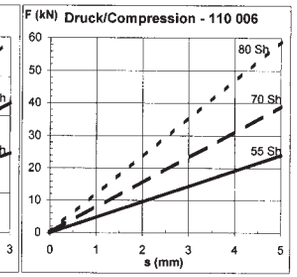


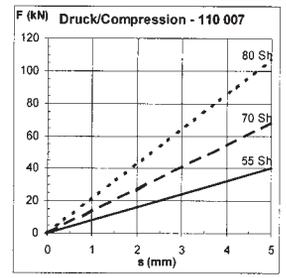












There is a possible deviation of approx.+/-20% in the above values due to production and hardness tolerances

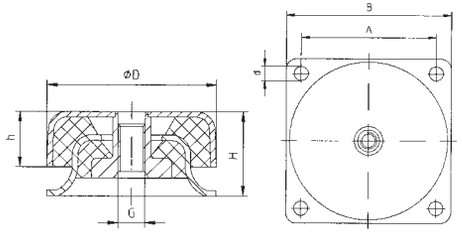
• Description of parts and functions:

GMT IS-elements are used for bedding of equipment and aggregates as well as for stationary applications. The positive structure makes these elements tear-proof. The elastomer is age- and oil-resistant and is not attached to the metal parts by vulcanisation. Highly damping elastomers may also be used. The nearly identical allround elasticity is a further advantage for the application as vibration-insulating element or shock absorber.
- Standard elastomer : -25°C to + 80°C;
- Hi-damp elastomer : -50°C to +180°C;
- optionally 40, 50,60 or 70 Sh-A

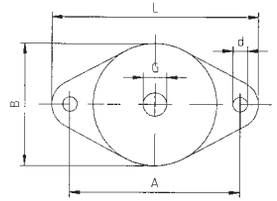
• Dimensions:

Item Number	Shape	A [mm]	B [mm]	L [mm]	D [mm]	d [mm]	G metrisch	G UNC	t [mm]	H [mm]	h [mm]
151001	□	49,5	60	-	58	5,2	M 6		20	28	18
151002								1/4-20			
151003	□	61	77	-	58	9	M 8		20	28	18
151004								5/16-18			
151005	□	63,5	76	-	76	6,4	M 10		30	38	25
151006								3/8-16			
151007	□	74	90	-	76	9	M 12		30	38	25
151008								1/2-13			
151009	□	108	133	-	124	11,9	M 16		19	63	38
151010								5/8-18			
151011	□	143	175	-	168	13,5	M 16		65	90	59
151012								5/8-11			
151013	⬭	86	70	106	58	9	M 8		20	28	18
151014								5/16-18			

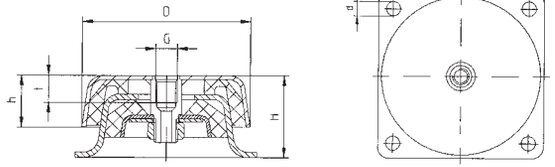
151 001 – 151 008



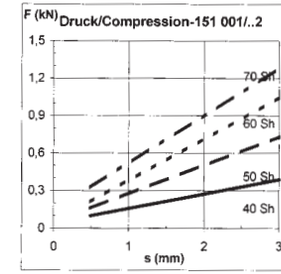
151 013/ 151 014

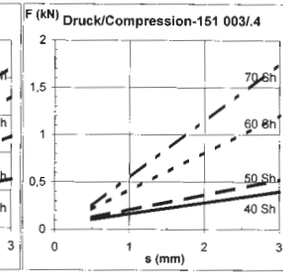


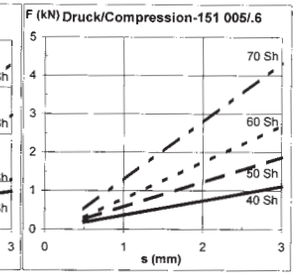
151 009 – 151 012

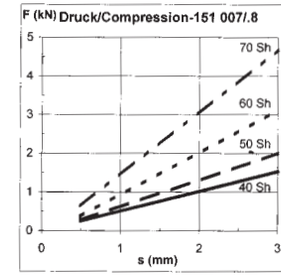


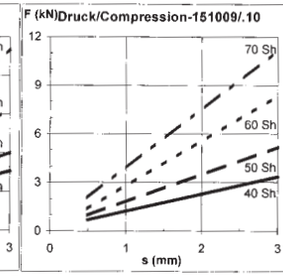
• Spring characteristics:

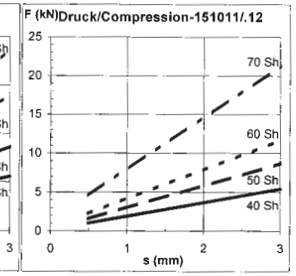


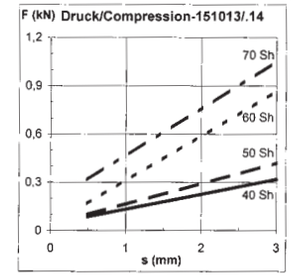












There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Description of parts and functions:

Type *TRIFLEX 1*

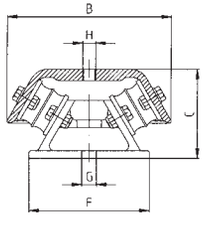
The GMT-TRIFLEX 1 bearing was developed for the vibration insulation of medium to heavy-duty machinery and for the protection of precision machinery as well as electronic installations from vibration. The special design of the bearing provides for different degrees of stiffness in the three main axis. TRIFLEX 1 has been designed for loads from 300 kg to 1,900 kg per bearing, and it stands out for its high spring deflection, carrying power and long life span.
The sturdy cover protects the interchangeable vibrating rubber bodies from oil and damage.

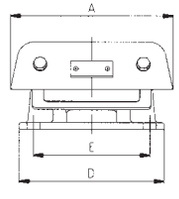
• Dimensions:

Item number	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H	Weight [kg]
719 002 N	230	204	110	205	165	148	18	M16	9.5
719 004 H	230	204	125	205	165	148	18	M16	9.5

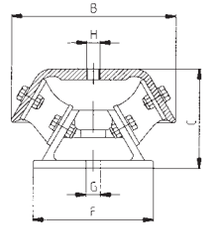
• N – normal spring deflection
• H – high spring deflection

719002





719004



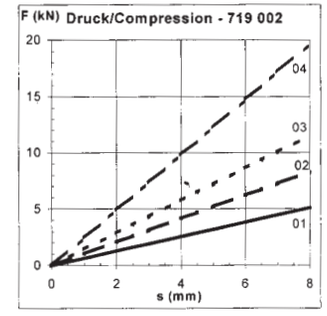
• Spring characteristics:

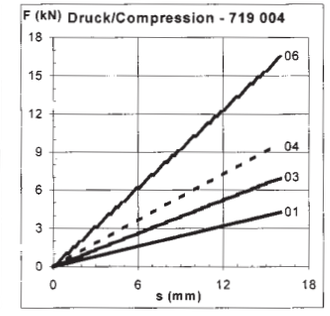
- ***TRIFLEX 1 N***

TRIFLEX 1 N (normal spring deflection) allows for a deflection of up to 8 mm. For machines of 500 rpm an insulation of 70 % can be achieved. At 1,500 rpm an insulation of up to 95% is reached (diagram 1).

- ***TRIFLEX 1 H***

TRIFLEX 1 H (high spring deflection) allows for a deflection of up to 16 mm. At 500 rpm an insulation of 70% can be reached. By way of a double arrangement of the TRIFLEX 1 bearings a deflection of 25 mm is achieved and machines with less than 500 rpm can, thus, be successfully insulated (diagram 2).



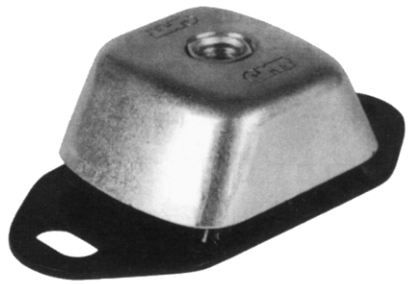


There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Description of parts and functions:

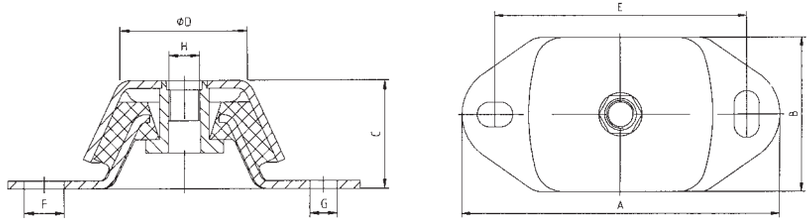
Type *TRIFLEX 2*

The GMT-TRIFLEX 2 bearing was developed for the insulation of static and mobile machines and engines.
The compact bearing is easy to install and allows to control vibrations in three directions. The special design of TRIFLEX 2 guarantees different degrees of stiffness in the three main axis, high spring deflection, carrying power and a long-lasting bearing.
The bearing has been designed for loads from 10 kg to 720 kg per bearing and allows for a spring deflection of up to 6 mm. The TRIFLEX 2 bearings are available in three sizes, and each size comes with different degrees of hardness for the rubber.



• Dimensions:

Item number	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H	Weight [kg]
100 020	120	60	40	60	100	11 x 14	11 x 14	M12	0.35
100 021	183	75	50	75	140	20 x 13	13 x 30	M16	0.88
100 022	230	112	70	80	182	26 x 18	18 x 34	M20	2.4

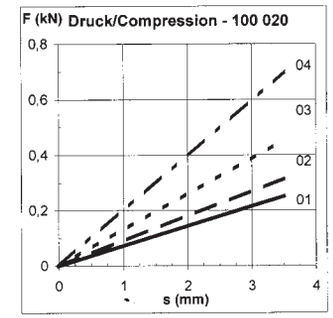


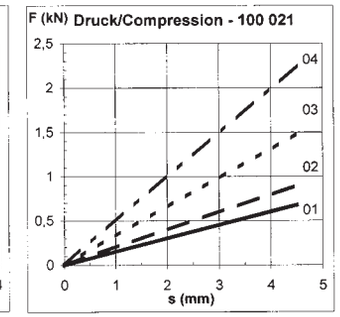
• Spring characteristics:

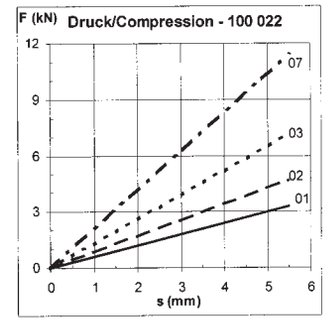
The diagrams show the actual deflection during static loads for each TRIFLEX 2. The end points of the lines are the maximum values of static loads and deflection.

TRIFLEX 2 has been fitted with spring stops in order to avoid any excessive movement during thrust loads.
Upon request, the bearings can be made height-adjustable.

All information provide here serves to give you a general understanding of our product line. If you want to know more about specific applications, please contact us, and we will send you additional technical information.







There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Description of parts and functions:

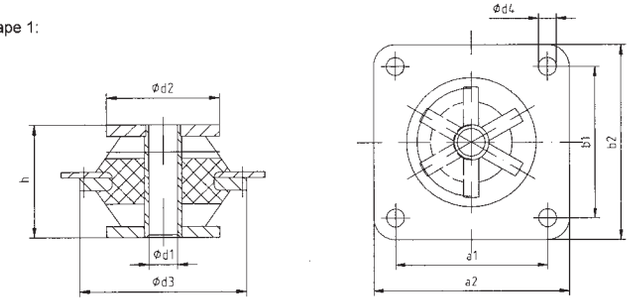
GMT-MF elements are used for the bedding and structure-borne noise insulation of equipment and aggregates in mobile or stationary applications, for example in vehicles, ships or airplanes. Thanks to their form-fitting design they are tear-proof. The elastomer and metal parts are not bonded.
The MF elements can withstand any load resulting from pressure, tension or thrust. However, their polydirectional elasticity also allows for a combination of loads. Their vibration-insulating and shock-absorbing properties are effective in a temperature range from **– 25°C to + 80°C** when a standard elastomer is used; with a highly damping elastomer that range would even be **– 50°C to + 180°C**.

Standard material: -zinc-coated metal parts
-age and oil-resistant elastomer

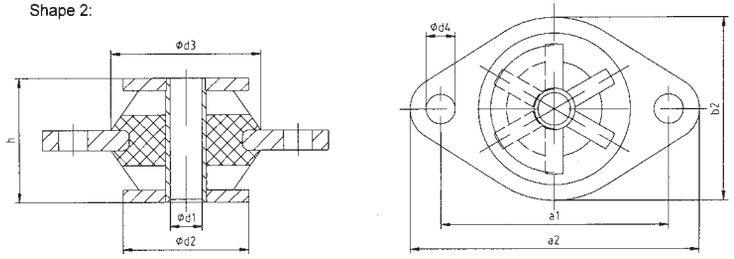
• Dimensions:

Item Number	a1 [mm]	a2 [mm]	b1 [mm]	b2 [mm]	d1 [mm]	d2 [mm]	d3 [mm]	d4 [mm]	h [mm]	Shape	Diagram
155003	28	36	28	36	5,1	20	29	3,3	19,8		1
155004	28	36	28	36	M5	20	29	3,3	19,8		1
155005	35,8	45,5	-	28,8	5,1	20	-	4,6	19,8		1
155006	35,8	45,5	-	28,8	M5	20	-	4,6	19,8		1
155007	35,8	45,5	-	28,8	5,1	20	-	4,6	19,8		1
155008	35,8	45,5	-	28,8	M4	20	-	4,6	19,8		1
155011	35	44,8	35	44,8	6,6	34,6	38	4,3	26		2
155012	35	44,8	35	44,8	M8	34,6	38	4,3	26		2
155013	35	44,8	35	44,8	6,6	29	38	4,3	26		2
155014	35	44,8	35	44,8	M8	29	38	4,3	26		2
155018	35	44,8	35	44,8	6,6	29	38	4,8	26		2

Shape 1:



Shape 2:



• Spring characteristics:

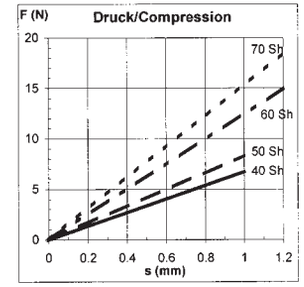


Diagram 1

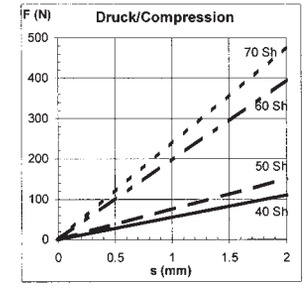


Diagram 2

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

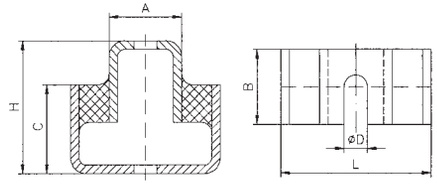
• Description of parts and functions:

GMT-U-bearings lend themselves ideally to the task of vibration and sound insulation for sensitive equipment or electronic devices because of their potentially considerable rate of spring excursion. Smaller machines, installations, compressors or jolters can also be fitted with U-bearings.

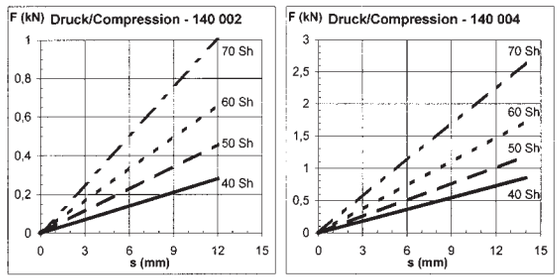
Elastomer: - Natural rubber
- alternatively oil-resistant perbunan rubber
- either 40, 50, 60 or 70 Sh-A

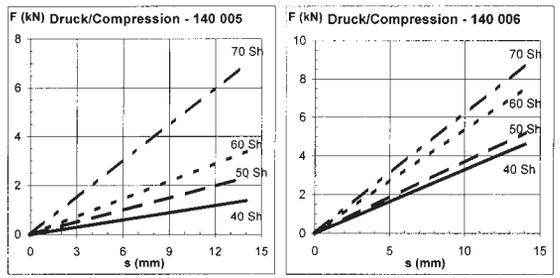
• Dimensions:

Item number	B [mm]	H [mm]	L [mm]	A [mm]	C [mm]	D [mm]
140002	25	62	71	34.4	41.5	11
140004	50	78	79	42.5	56	13.5
140005	65	108	87	48.4	83	17.5
140006	80	130	100	60	100	17.5



• Spring characteristics:





There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Description of parts and functions:

GMT air springs provide for a low-frequency elastic set-up of machinery, aggregates, conveyors, vibration generators, and high-speed presses thanks to their **vibration insulation, shock absorption, and structure-borne noise insulation**.

• Technical data:

- natural frequency, depending on load, about 3-5 Hz
- assembly by way of screw connection at the base of the part on bearings
- levelling by way of compressed air +/- 10mm of installed height through a standard tire valve

• Dimensions:

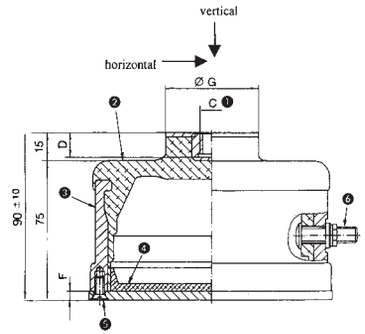
Item number	A [mm]	B [mm]	C Thread	D [mm]	E [mm]	F [mm]	G [mm]	Weight [kg]
106001	130	108	M 12	12	7	5	50	2.4
106002	255	215	M 16	16	14	6	125	9.8
106003	470	406	M24 x 1,5	24	20	8	300	37.5
106005	170	150	M12	12	7	6	90	4.6
106006	330	280	M16	16	14	8	216	18.8

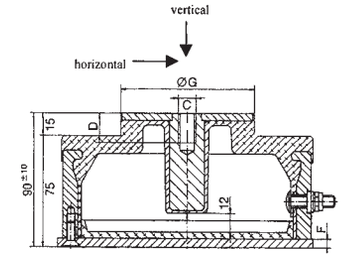
• Standard design:

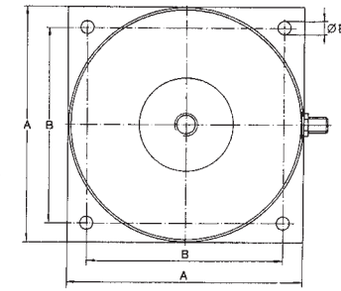
Item no.: 106001, 106002, 106003

• Special design: with central auxiliary support to facilitate assembly

Item no.: 106005, 106006







• Construction:

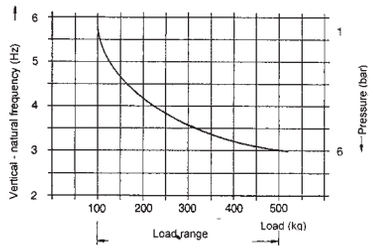
❶ – Fastening thread
❷ – Elastomer vulcanized
❸ – Metal pipe, compression-proof
❹ – Bottom seal, interior
❺ – Fastening plate, screwed down
❻ – Compressed-air valve, removeable

- **Anti-corrosive coating:** - zinc-coated metal parts, yellow-chromized, or painted bronze

- **Safety tips:**
  - for safety reasons: depressurized assembly
  - inflate only after static load
  - do not exceed maximum height of 100mm
  - air springs are compression-proof up to a maximum of 6 bar

• Spring characteristics:

Natural frequency/ load diagram



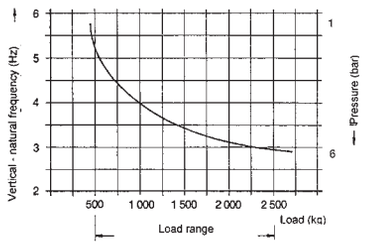
Item no.: 106005

Vertical load:
minimum (recommended): 100 kg
maximum allowance: 500 kg

Stiffness [N/mm]:

vertical	horizontal	Pressure
-	~200	0 bar
130		1 bar
150		3 bar
180		6 bar

Natural frequency/ load diagram



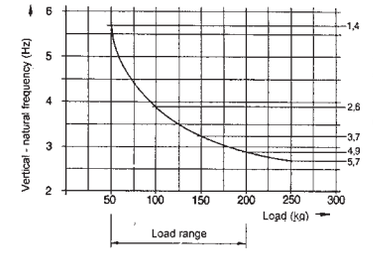
Item no.: 106006

Vertical load:
minimum (recommended): 500 kg
maximum allowance: 2500 kg

Stiffness [N/mm]:

vertical	horizontal	Pressure
-	~900	0 bar
580		~1 bar
680		3 bar
830		6 bar

Natural frequency/ load diagram



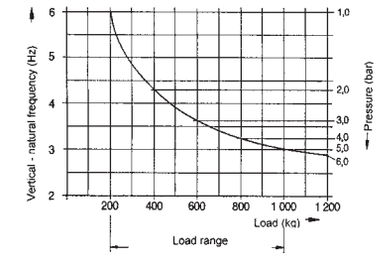
Item no.: 106001

Vertical load:
minimum (recommended): 50 kg
maximum allowance: 200 kg

Stiffness [N/mm]:

vertical	horizontal	Pressure
-	90	0 bar
50		1,4 bar
60		2,6 bar
70		5,7 bar

Natural frequency/ load diagram



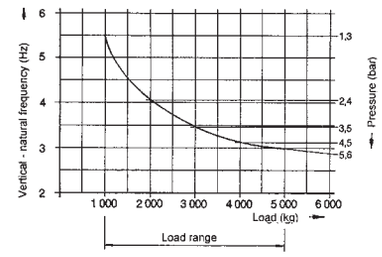
Item no.: 106002

Vertical load:
minimum (recommended): 200 kg
maximum allowance: 1000 kg

Stiffness [N/mm]:

vertical	horizontal	Pressure
-	~425	0 bar
290		1,1 bar
310		3,1 bar
400		6 bar

Natural frequency/ load diagram



Item no.: 106003

Vertical load:
minimum (recommended): 1000 kg
maximum allowance: 5000 kg

Stiffness [N/mm]:

vertical	horizontal	Pressure
-	2000	0 bar
1200		1,3 bar
1420		3,5 bar
1800		5,6 bar

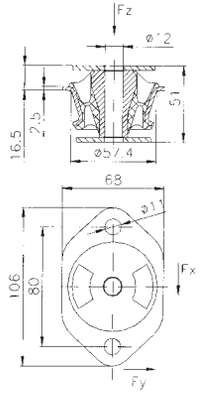
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

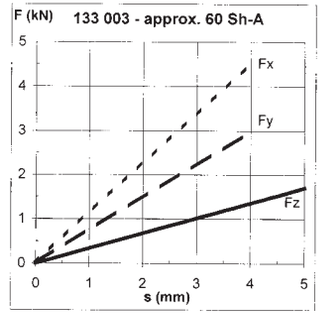
- **Description of parts and functions:**

GMT cone mountings are used, among other things, in body manufacturing for the bedding and suspension of the engine in the chassis frame. As vibration insulators and dampers, cone mountings allow for relatively considerable spring excursion and have a progressive characteristic curve. Buffers also help to absorb shock loads without causing irreparable damage to the part. If different degrees of stiffness are required in X and Y directions, use models with kidney-shaped recesses.

- **Dimensions/spring characteristics :**

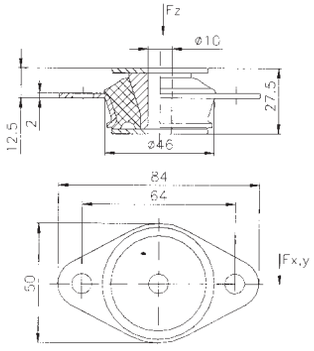
133 003

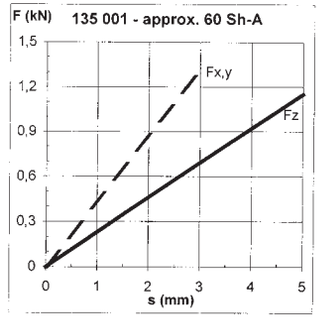




Maximum static permanent-load Fz
hard 1700N; medium 1100N; soft 600N

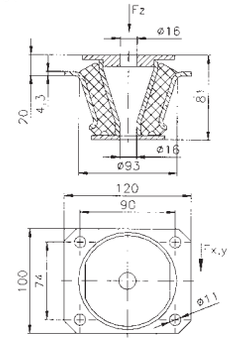
135 001

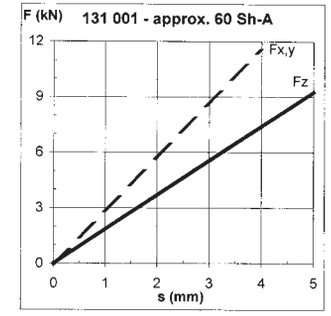




Maximum static permanent-load Fz
hard 1100N; medium 700N; soft 400N

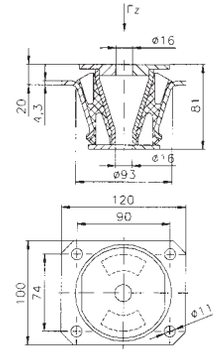
131 001

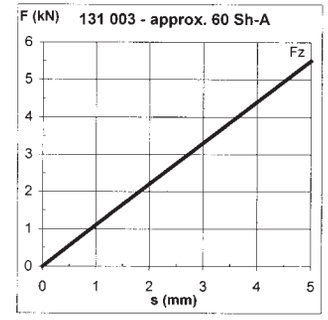




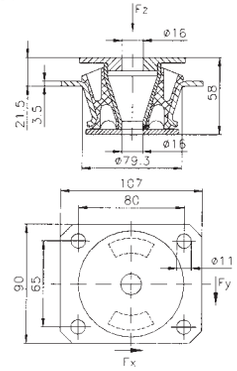
Maximum static permanent-load Fz
hard 9300N; medium 6000N; soft 3000N

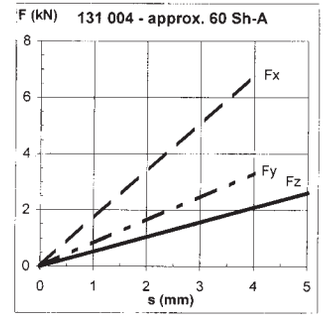
131 003





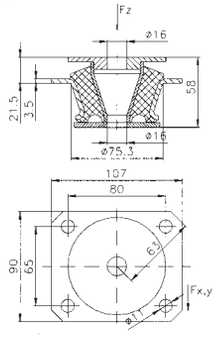
131 004

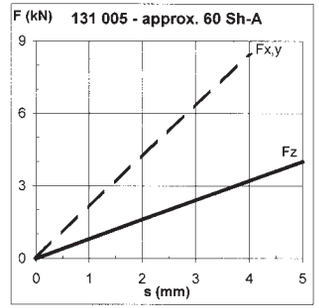




Maximum static permanent-load Fz
hard 3000N; medium 1800N; soft 1000N

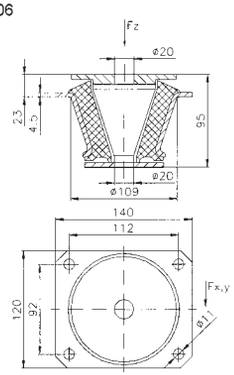
131 005

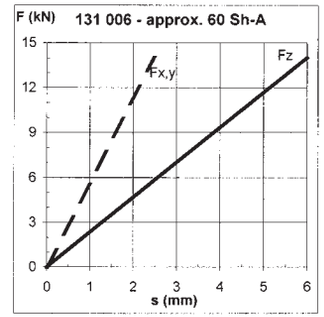




Maximum static permanent-load Fz
hard 4100N; medium 2800N; soft 1500N

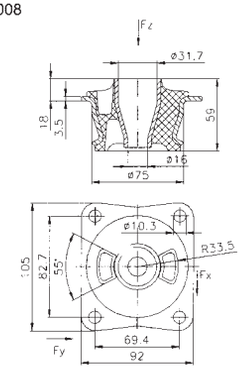
131 006

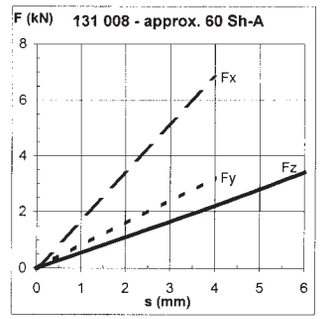




Maximum static permanent-load Fz
hard 16680N; medium 12000N; soft 6500N

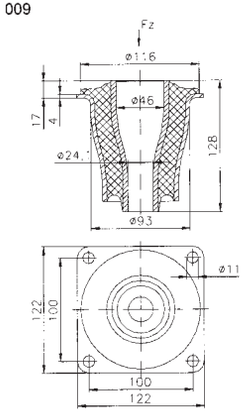
131 008

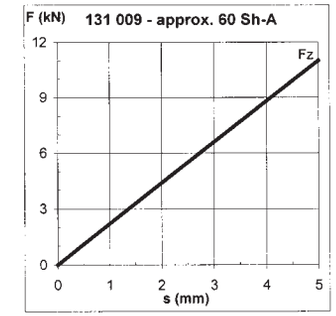




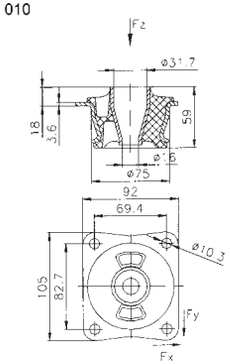
Maximum static permanent-load Fz
hard 3000N; medium 1800N; soft 1000N

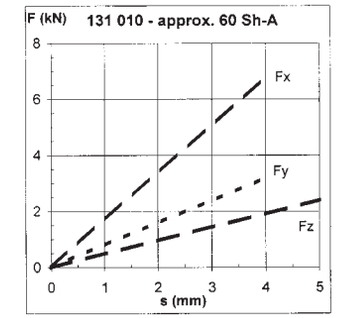
131 009



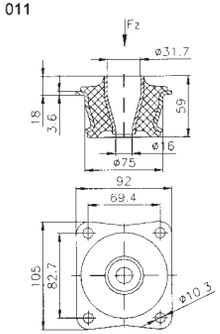


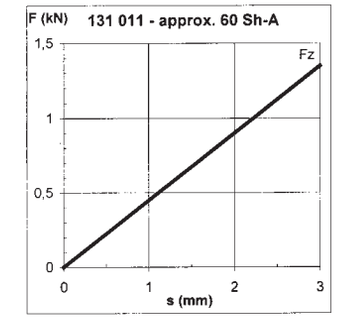
131 010



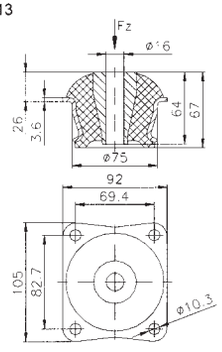


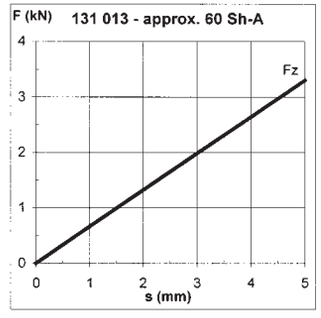
131 011



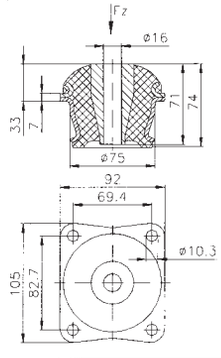


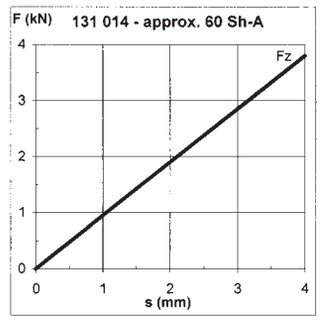
131 013



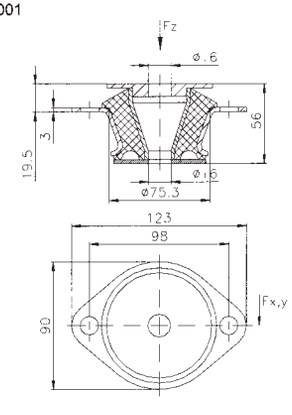


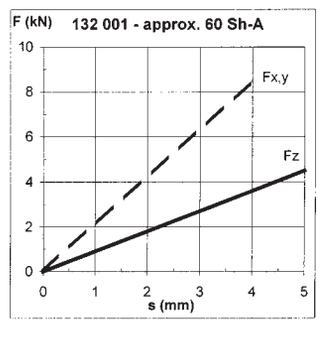
131 014



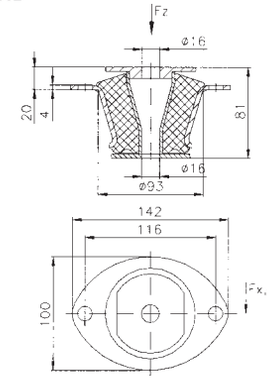


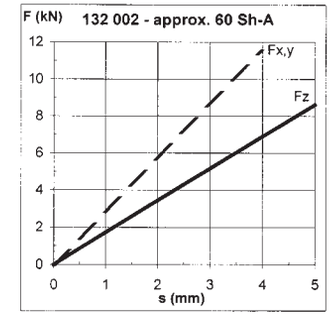
132 001





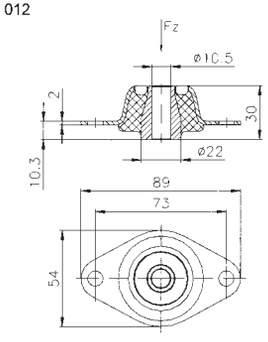
132 002

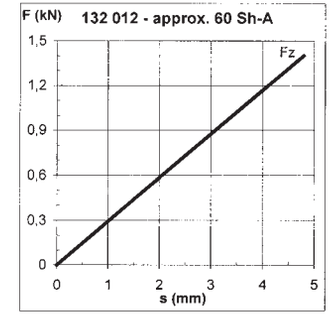




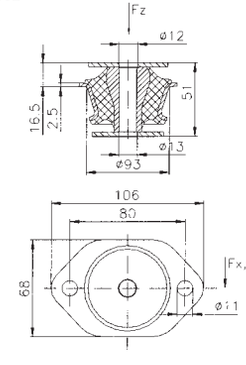
Maximum static permanent-load Fz
hard 9300N; medium 6000N; soft 3000N

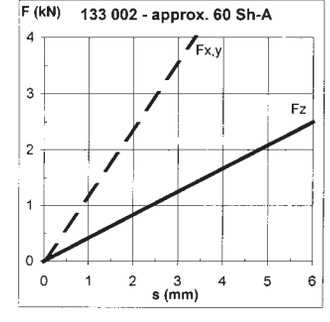
132 012





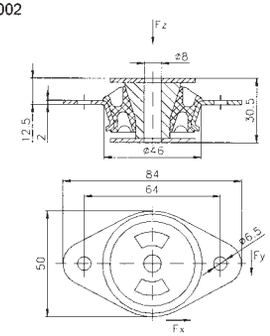
133 002

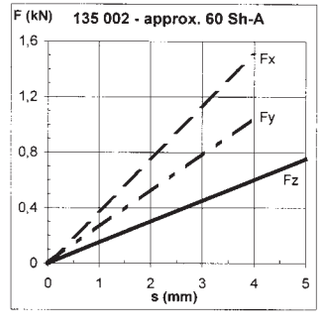




Maximum static permanent-load Fz
hard 2200N; medium 1400N; soft 800N

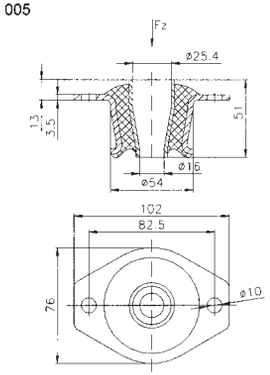
135 002

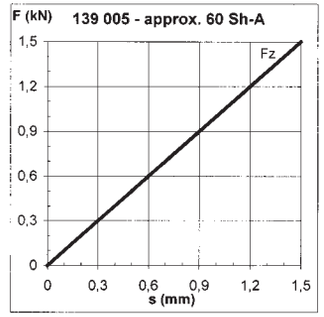




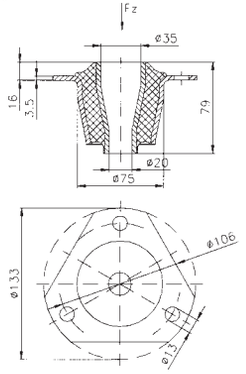
Maximum static permanent-load Fz
hard 750N; medium 500N; soft 250N

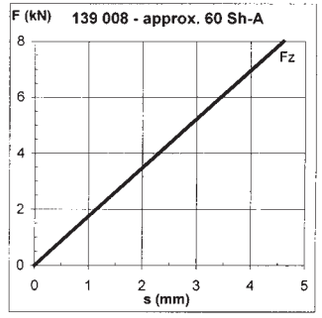
139 005





139 008





- **Description of parts and functions:**

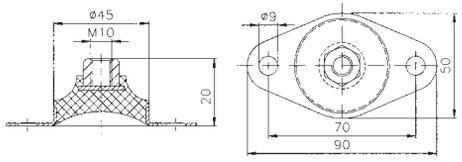
GMT cap elements are multi-directional buffers, characterized in particular by extremely long spring excursions and excellent shock insulation.
The special shape of the cap elements facilitates sound and vibration insulation of machines and aggregates with a low excitation frequency. The components are suitable for active and passive insulation of machines and aggregates as well as for the bedding of containers on ships and vehicles.
The identical stiffness properties in x- and y- directions prevent lateral sliding under stress.

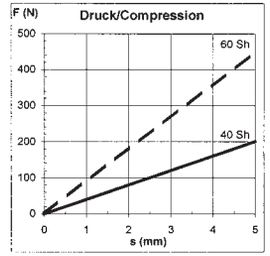
The GMT cap elements are generally made from natural rubber. If required, special elastomers can be used to ensure the optimal and problem-oriented application of the high-capacity bearing.

- **Dimensions/spring characteristics :**

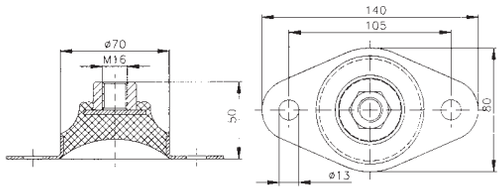
Artikelnummer	Shore-Härte [Sh-A]	F max. [N]	s max. [mm]	C rad. [N/mm]
731 001	40	200	5	40
	60	450	5	90
731 002	40	425	5	85
	60	1000	5	200
731 003	40	5500	50	110
	60	11000	50	220
731 004	40	11300	50	230
	60	27500	50	550
731 008	40	125	5	25
	60	274	5	55
732 001	40	3800	3	1300
	60	8400	3	2800
733 001	40	360	3	120
	60	780	3	260
734 001	40	1500	15	100
	60	3600	15	240
734 002	40	7000	35	200
	60	16800	35	480
734 003	40	11400	30	380
	60	24600	30	820
734 004	40	180	4	45
	60	420	4	100
734 005	40	11400	30	380
	60	24100	30	800
734 006	40	640	7,5	85
	60	1600	7,5	213
734 007	40	1260	9	140
	60	2520	9	280
734 008	40	4000	25	160
	60	7100	25	290
734 013	40	8200	50	160
	60	15400	50	300
734 019	40	10500	30	350
	60	18000	30	600
736 001	40	20	3	6,6
	60	43	3	14,3

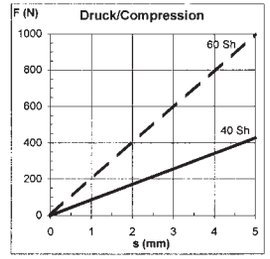
731 001



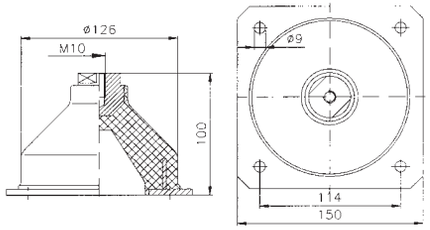


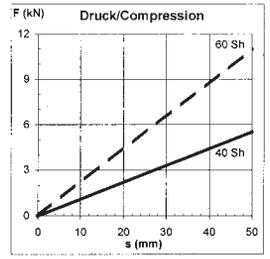
731 002



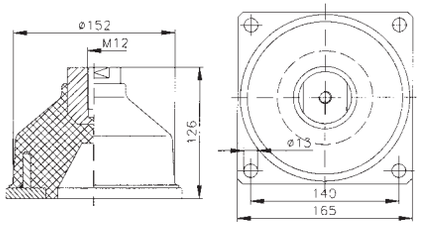


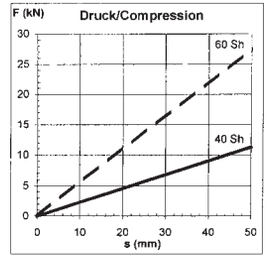
731 003



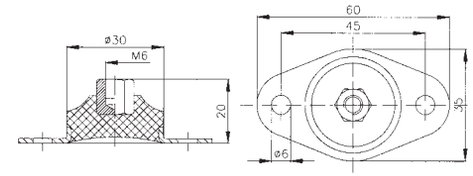


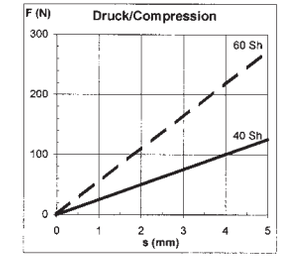
731 004



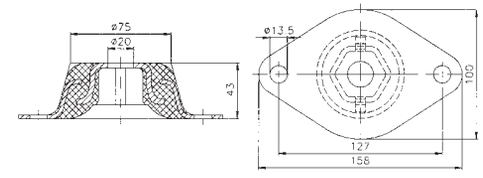


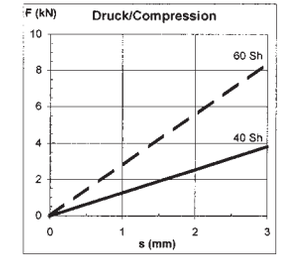
731 008





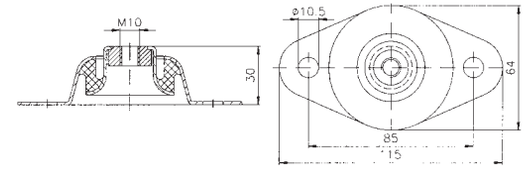
732 001

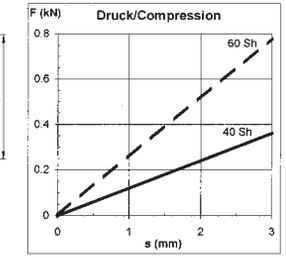




This cap element is characterized by it's tear-proof design.

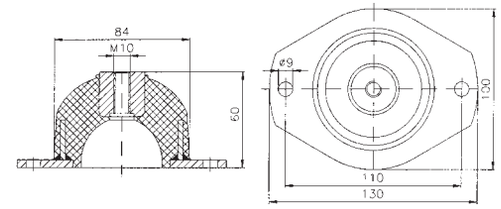
733 001

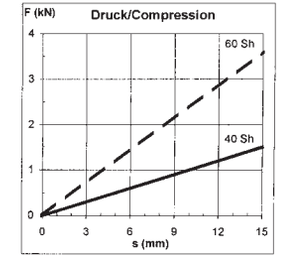




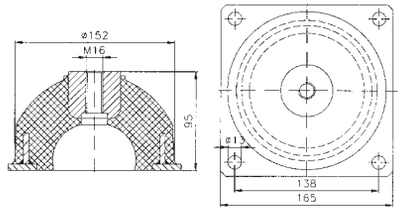
This cap element is characterized by it's tear-proof design.

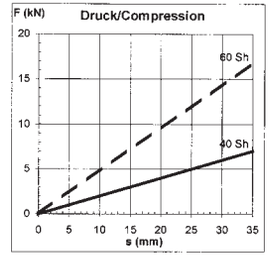
734 001



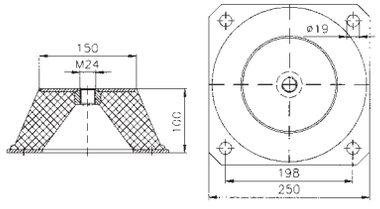


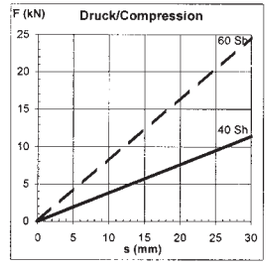
734 002





734 003





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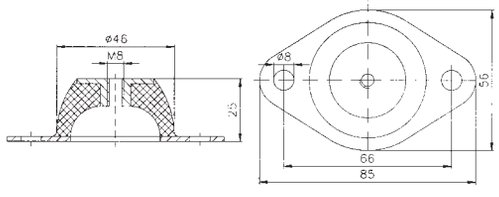
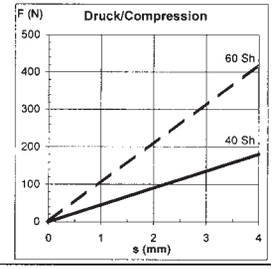
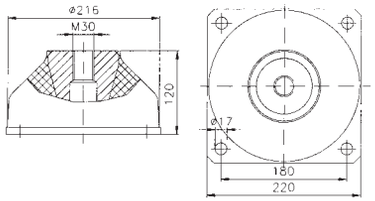
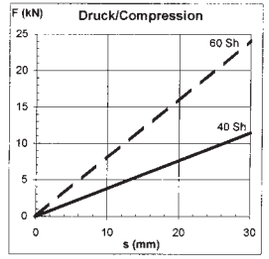


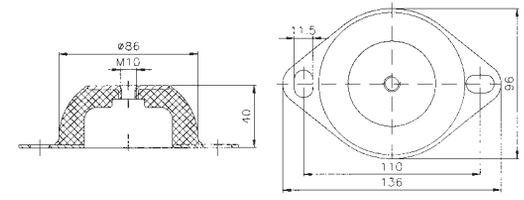


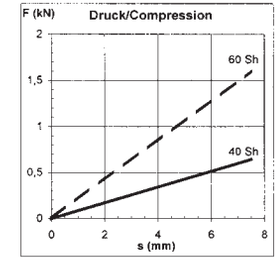
734 005



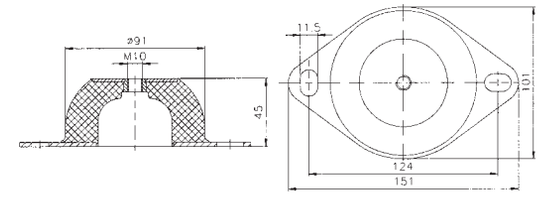


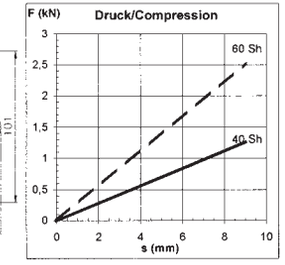
734 006



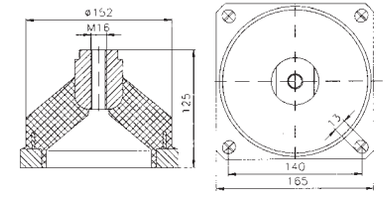


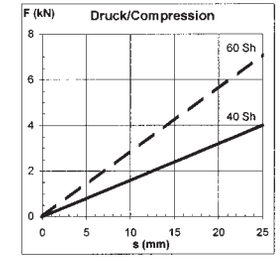
734 007



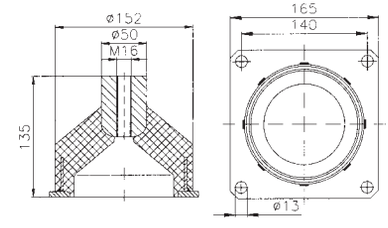


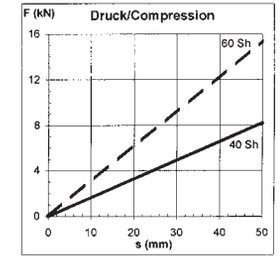
734 008



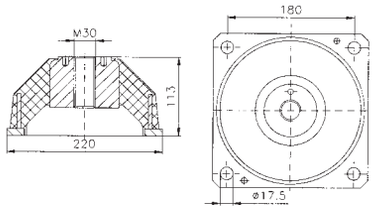


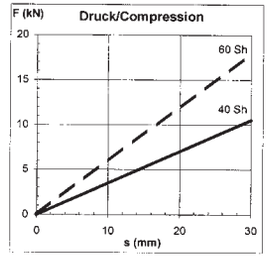
734 013



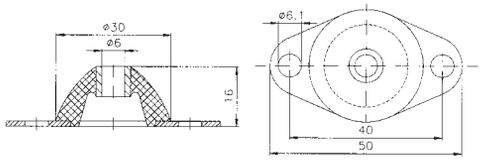


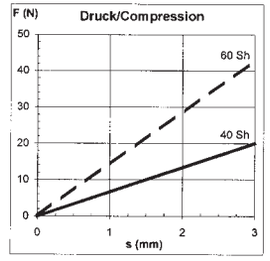
734 019





736 001





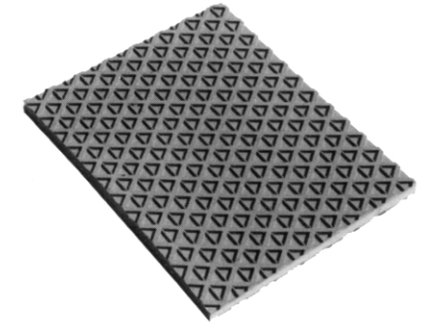
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Description of parts and functions:**

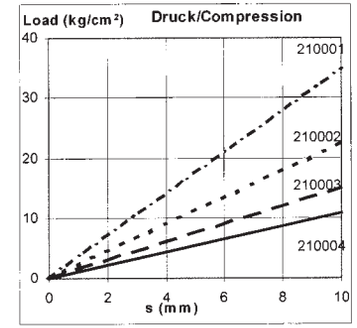
GMT rubber-cork pads are used for insulating purposes in a variety of industrial applications. The GMT insulating pads consist of a high-grade compound of nitrile rubber and cork particles. This composite allows for excellent sound and vibration insulation.
It should be noted that these insulating pads have a minimum setting behavior and an almost unlimited life span. Machinery can be insulated in a geometrically exact and stable manner for many years. Another advantage of these rubber-cork pads is their high resistance to lubricants and cooling emulsions. The pads can be cut to any size easily and quickly, so they can be used for a clean and non-anchored bedding.

- **Dimensions:**

Item number	Height [mm]	Width x Length [mm]	In stock (L) On request (A)
210001	18	1000 x 1000	L
210002	22	1000 x 1000	A
210003	27	1000 x 1000	A
210004	32	1000 x 1000	A
210005	55	1000 x 1000	A



- **Spring characteristics:**



There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Profiled mats

• Description of parts and functions:

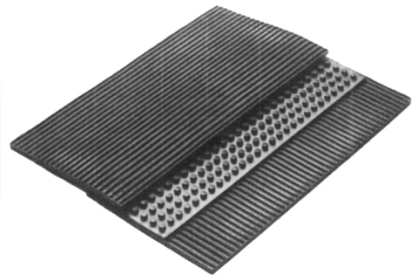
GMT profiled mats provide effective protection from vibration and sound. In manufacturing the mats, nitrile rubber is used. This way, a high degree of resistance to lubricants and solvents can be achieved. The GMT profiled mats guarantee a clean, skid-proof, and non-anchored setup of machinery and aggregates.
The insulating plates are available in the following designs:

Nap-type form: on one side or both, with or without steel reinforcement

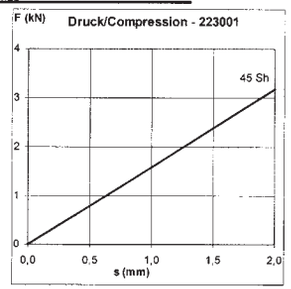
Rib-type form: Lengthwise ribs and transverse ribs, on one side or both in various combinations, with or without steel reinforcement

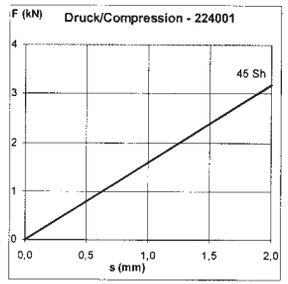
• Dimensions:

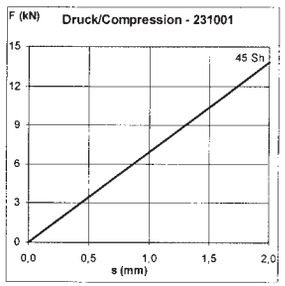
Item number	Width [mm]	Length [mm]	Height [mm]	In stock (L) On request (A)	Profile
221001	250	500	10	L	Ribs, lengthwise, trans.
223001	250	500	5	L	Lengthw. ribs, one side
224001	250	500	5	L	Transv. Ribs, one side
231001	250	500	10	L	Naps, one side
233001	600	600	10	A	Naps, both sides



• Spring characteristics:







There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Core-Slabs

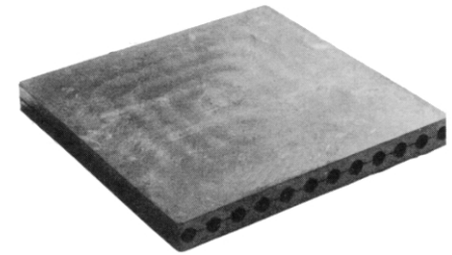
• Description of parts and functions:

GMT-core-slabs allow for excellent sound and vibration insulation with a variety of industrial applications. Only high-grade natural rubber is used to manufacture these plates. This design results in a very high and constant sound and vibration insulation over many years. The insulating plates can be adapted easily and quickly to individual requirements. They can be laid for full-area purposes, or just at certain points, using one or multiple layers – or any combination thereof. This way, a perfect bedding can be achieved. The GMT core-slabs also come as solid plates for specific types of surface compression.

• Dimensions:

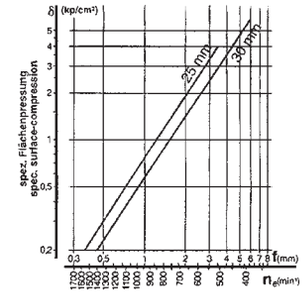
Item number	A [mm]	B [mm]	H [mm]	In stock (L) On request (A)
200001	50	72	30	A
200002	150	150	30	A
200003	160	160	25	L
200004	180	180	25	L
200005	200	200	25	L
200006*	200	200	50	A
200007	220	220	25	L
200008	220	250	25	L
200009	250	500	25	L1
200010	250	300	25	A
200011	300	300	30	L1
200012	400	600	23	A

- Other dimensions available;
- L – natural rubber, about 45+/-5Sh-A,
- L1 – natural rubber, about 50+/-5Sh-A
* holes lengthwise and laterally



• Spring characteristics:

These curves show the mean values with a rubber hardness of 50 Shore A .



There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Bushes & Ball joints

Bushes Type 410
Bushes Type 420
Bushes / Special design
Ball joints

- **Description of parts and functions:**

GMT bushes are structural elements, in which an outer and an inner precision sleeve are firmly held together with a layer of vulcanized elastomer. As a standard, a natural rubber is used as a damping material. Alternatively, however, other elastomers in different shore hardnesses can also be used.

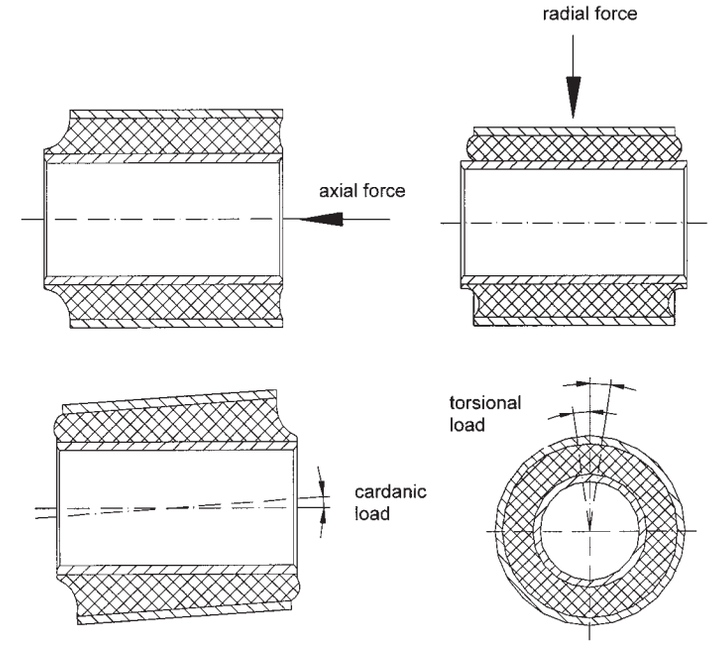
The cylindrical liners dampen axial as well as radial movements and are able to absorb torsional movements as well as cardanic deflections.

Beside the most important dimensions, the general tables also include the maximum values for the static load. For a dynamic application, the values must be reduced to approx. 50%. For cardanic applications, it must be noted that the elastomer layer between the liners may be pressed together by 1/6 of the rubber's thickness.

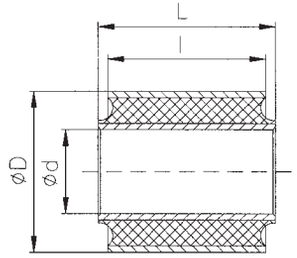
The application temperatures for natural rubber are between – 30°C and + 70°C (for brief exposure up to + 90°C).

During installation, it must be ensured that the joining forces are not conducted through the elastomer. To ensure a flawless installation, the drill holes should show a burr-free chamfer of approx. 15°.

- **Dimensions:**



Type 410

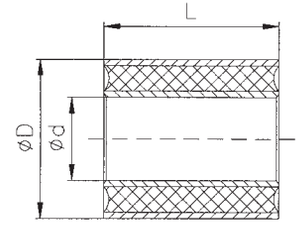


According to the standard we use the following tolerances: D u10, d h9, L +/-0,3, l +/-0,5.
If you need other tolerances please don't hesitate to ask for.

Item Number	D (mm)	d (mm)	L (mm)	l (mm)	Shore-hardness	Radial F max. (N)	Radial s max. (mm)	Axial F max. (N)	Axial s max. (mm)	Torsional max: Moment (Nm)	Torsional max: Angle (°)
410001	22	10	16	15	60	1580	0,2	300	0,7	4,2	8,8
410027	22	12	28	24	60	3445	0,2	510	0,6	7,6	7,8
410058	24	10	23,5	20,5	60	1830	0,4	380	1,1	4,9	12,8
410108	24	10	33	22	60	2000	0,4	327	1,0	4,8	12,0
410002	25	12	28	24	60	3340	0,3	540	0,8	8,7	8,7
410051	25	13	25	16	60	2130	0,3	410	0,8	7,3	8,0
410061	25,4	8	12	9	60	300	0,6	140	1,4	1,5	15,5
410004	28	12	46	40	60	5450	0,4	910	1,3	14,5	12,2
410028	30	12	40	36	60	4350	0,6	810	1,5	13	13,4
410029	32	12	59	55	60	7000	0,6	1250	1,9	19,5	12,0
410063	32	16	21	19	60	2560	0,4	540	1,2	10,7	10,1
410006	40	22	45	40	60	9900	0,4	1580	1,3	44,3	8,2
410080	41,3	12	64	51	60	9340	0,6	1510	1,6	31,8	11,8
410085	44	16	57	54	60	30900	0,3	2670	0,8	93,5	4,8
410030	45	20	70	64	60	13100	0,8	2260	2,2	57	13,0
410150	48	24	93	85	60	19500	0,7	3000	1,9	101	11,0
410045	50	24	99	86	60	23350	0,9	3630	2,4	109	12,3
410093	50	25	85	80	60	17900	0,8	2800	2,1	95,4	12,0
410076	55	30	94	89,5	60	30500	0,8	4420	2,3	155	10,6
410148	55	32	68	60	60	18000	0,5	2700	1,48	124	7,5
410056	57	28,6	88,9	85,7	60	28450	0,8	4300	2,3	153	10,7
410039	58,8	24,1	107	100	60	51100	0,5	6100	1,7	261	7,5
410009	60	35	40	36	60	12400	0,5	2290	1,6	103	6,8
410038	63	38	76	70	60	30400	0,6	4550	1,9	209,4	7,7
410011	63	39	57	50	60	20450	0,5	3350	1,7	155,6	6,9
410084	65	30	122	117	60	47050	0,9	6620	2,8	265	11,0
410089	65	30,3	102	97	60	35650	0,9	5490	2,8	219,4	11,0
410091	65	35	110	100	60	39100	0,9	5940	2,8	249,4	10,7
410141	75	40	88	80	60	30000	1,0	4580	2,8	250	10,5
410033	75	45	100	90	60	41650	0,9	6600	2,8	340	9,3
410147	76	44	79	70	60	23400	1,0	5340	3,7	254	11,0
410048	76	44	133	127	60	8140	0,9	9340	2,8	485,5	9,3
410013	76,2	44,5	79,6	76,4	60	30910	0,9	5720	2,9	303	9,5
410014	78	50	66	60	60	31340	0,6	5090	2,0	305	6,3
410049	78,6	44,5	134	129,7	60	95450	0,6	11000	2,1	660	6,7
410016	118	60	135	125	60	99350	1,1	15400	3,7	1338	7,8
410083	125	70	74	65	60	36900	1,4	7610	4,4	663,9	9,0
410017	125	70	120	111	60	76050	1,4	13340	4,4	1134	9,0
410072	125	70	160	151	60	111090	1,4	18145	4,4	1540	9,0
410077	126	70	100	92	60	49750	1,9	10410	5,6	832	11,2
410018	127	44,5	105	102	60	36300	3,0	8650	7,5	519	15,5
410074	140	80	182	170	60	167200	1,1	26900	3,5	3000	6,1
410019	140	100	120	110	60	103550	1,1	17100	3,8	1881	6,5
410052	145	100	100	89,4	60	81650	1,1	1447	3,6	1664	6,1
410020	160	100	180	172	60	190100	1,5	29200	5,0	3502	7,6

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Type 420



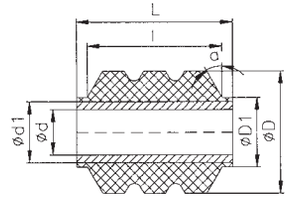
According to the standard we use the following tolerances: D u10, d h9, L +/-0,3, l +/-0,5.
If you need other tolerances please don't hesitate to ask for.

Item number	D [mm]	d [mm]	L [mm]	Shore-hardness	Axial F max. [N]	Axial s max. [mm]	Radial F max. [N]	Radial s max. [mm]	Torsional max: Moment [Nm]	Torsional max: Angle [°]
420029	32	18	20	60	622	1.0	2610	0.3	13.7	7.9
420001	40	22	40	60	1580	1.3	9890	0.4	44.3	8.2
420015	45	20	24	60	850	2.2	1910	0.8	21.2	13.0
420033	45	20	30	60	1060	2.2	4650	0.8	26.5	13.0
420003	48	24	80	60	3170	2.3	20290	0.8	88.7	12.3
420031	55	30	66	60	3360	2.1	20650	0.7	120.9	10.0
420019	65	40	15	60	950	2.3	2000	0.8	42.9	9.1
420032	68	36	67	60	4830	1.5	35550	0.4	246.4	5.7
420035	77	40	65	60	5330	1.5	38500	0.4	309	5.2
420018	82	48	82	60	7540	1.8	2320	0.6	490	5.6
420010	109	48.8	82	60	10200	1.9	96000	0.6	900	4.3
420009	109	48.8	104	60	12940	1.9	153600	0.6	1140	4.3
420014	127.4	78	90	60	13490	1.9	138000	0.6	1430	3.7
420016	130	54	117	60	18195	1.9	240600	0.6	2000	3.6
420007	130	78	117	60	18195	1.9	240600	0.6	2000	3.6
420006	158.8	95.1	12.7	60	1080	6.3	1105	2.1	118	9.8
420017	291.5	150	75	60	24390	7.0	54390	2.1	5610	5.9

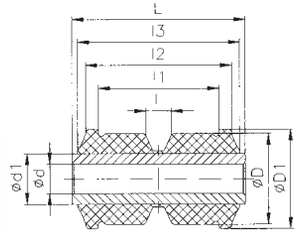
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

Special designs

Item Number	D (mm)	L (mm)	D1 (mm)	l (mm)	d (mm)	d1 (mm)	a (°)
474002	58,2	80	32	72	25	30	30,0
474001	28,1	36	16	31	10,4	14	30,0
479004	40	60	22	56	16,4	20	30,0
479003	27,5	36	16	32	10,4	14	25,0



Item Number	D (mm)	D1 (mm)	d (mm)	d1 (mm)	L (mm)	l (mm)	l1 (mm)	l2 (mm)	l3 (mm)
476001	50,2	55	16,2	28	95	15	66	80	89
476002	58	68	36	42	96	19	64	80	76
473001	32,6	36	12	20	52	-	21	-	47



Item Number	D (mm)	D1 (mm)	d (mm)	d1 (mm)	L (mm)	l (mm)	l1 (mm)	l2 (mm)	a (°)	Figure
472001	43	-	14,1	20,1	65	65	40	-	-	1
472002	60	-	30	35,2	68	60	-	-	35	1
472003	100	-	50	-	130	-	50	-	-	1
472005	20	-	7,5	10	16	14	-	-	30	1
472010	66	-	30	48	100	87	64	-	-	1
472004	66	72	17	40	70	60	34	10	-	2

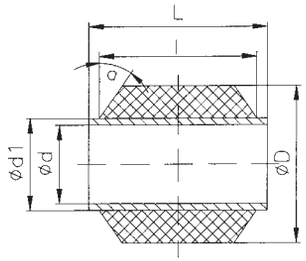


Figure 1

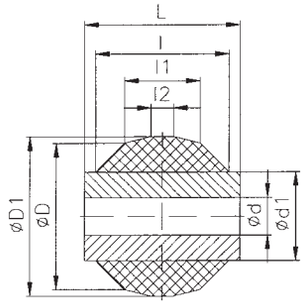


Figure 2

- **Description of parts and functions:**

GMT ball joints are structural elements whose inner ball is firmly connected to the outer metal by means of a vulcanized elastomer layer. Such joints are designed for multi-directional torsional loads and, thus, ideal as vibration-technological components for joints and connecting rods. One advantage is the fact that all movements can be achieved without any lubricants. GMT ball joints can be made up of an inner pin / through hole as well as of an outer socket consisting of one or several segments.

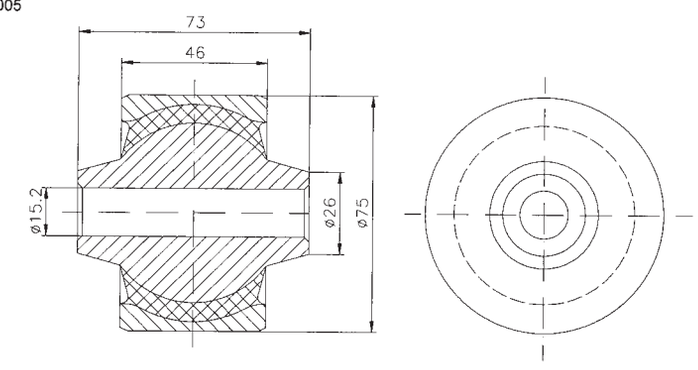
- **Spring parameters:**

Item number	approx. hardness value [Sh-A]	C_{ax} [kN/mm]	$S_{ax\,max}$ [mm]	C_{rad} [kN/mm]	$S_{rad\,max}$ [mm]	C_{tors} [Nm/°]	$\measuredangle_{tors\,max}$ [°]	C_{card} [Nm/°]	$\measuredangle_{card\,max}$ [°]
641 005	70	1,5	2,4	8,1	0,9	20	3,4	11	1,4
641 019	70	1,8	2,4	10,4	0,9	22	3,4	12	1,4
642 010	45	0,9	1,6	6,2	0,6	7	2,7	4	1,1
642 002	65	2,3	1,6	15,9	0,6	18	2,7	10	1,1
641 012	75	1,7	3,4	7,9	1,3	49	3,5	25	1,4
641 017	65	0,8	2,8	3,6	1,1	6	4,4	3	1,8
641 006	75	3,8	2,4	24,1	0,9	59	3,0	32	1,2
643 020	75	3,9	1,8	29,5	0,7	54	2,5	29	1,0
643 029	60	2,1	2,0	15,7	0,8	36	2,5	19	1,0
641 009	60	1,3	3,0	7,2	1,1	30	3,2	16	1,3
643 004	60	1,5	3,0	8,8	1,1	27	3,4	15	1,4
642 005	60	2,3	2,4	15,4	0,9	32	2,9	18	1,2
641 025	50	1,9	2,4	12,5	0,9	24	2,9	14	1,2
642 009	60	2,9	2,4	19,2	0,9	35	2,9	20	1,2
641 023	55	2,2	2,4	14,3	0,9	27	2,9	15	1,2
643 001	70	3,5	2,4	23,2	0,9	48	2,9	27	1,2
641 029	70	2,0	5,4	8,8	2,0	113	3,7	60	1,5
646 001	60	2,5	2,8	16,8	1,1	53	2,9	29	1,2
641 002	60	2,0	3,4	12,0	1,3	51	9,0	28	4,0
643 005	65	11,6	2,4	97,0	0,9	706	2,1	394	0,8
642 004	60	1,1	6,4	4,6	2,4	37	4,7	20	1,9
641 030	65	4,4	4,2	30,2	1,6	280	2,7	151	1,1
644 002	75	6,2	4,2	38,7	1,6	213	3,2	120	1,3

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Dimensions:**

641005



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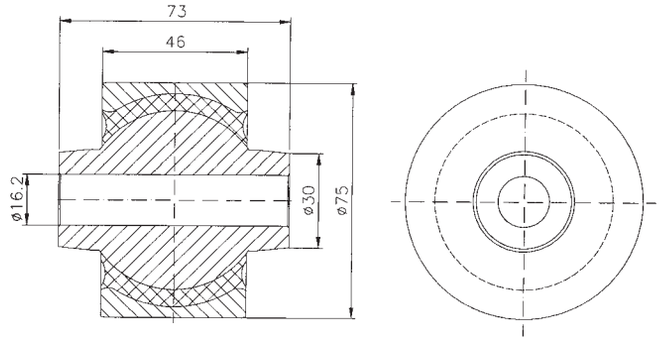

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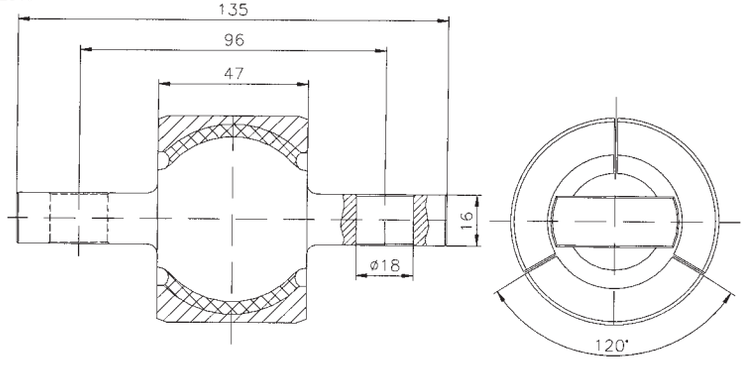

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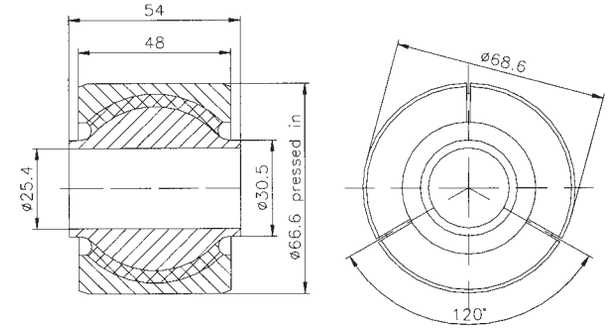

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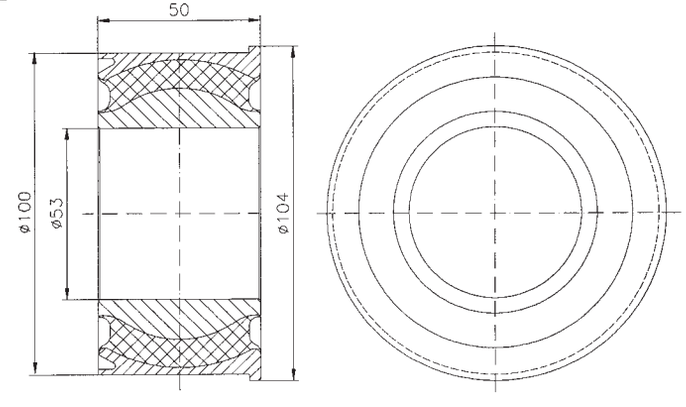

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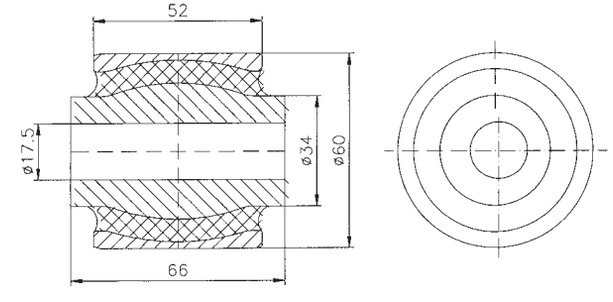

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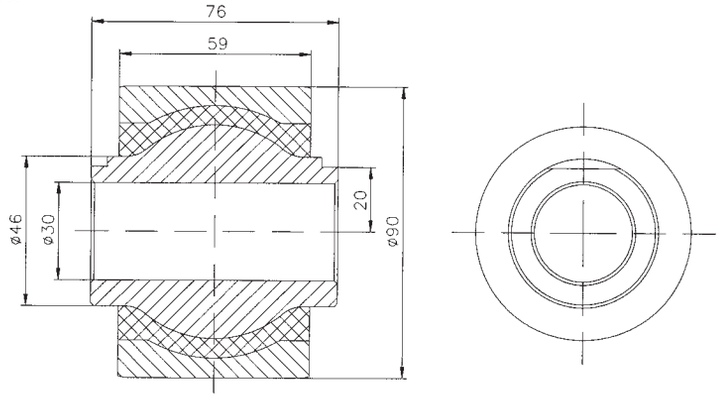

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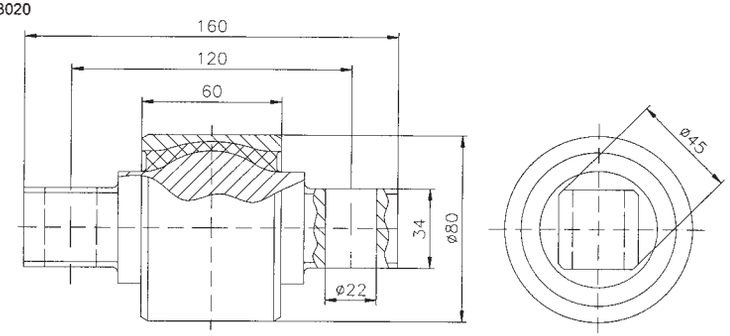

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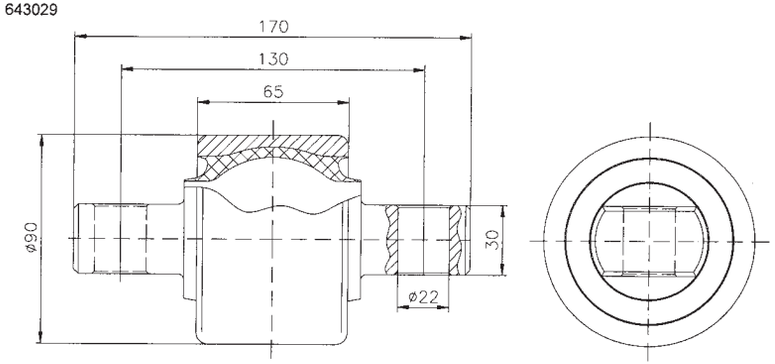

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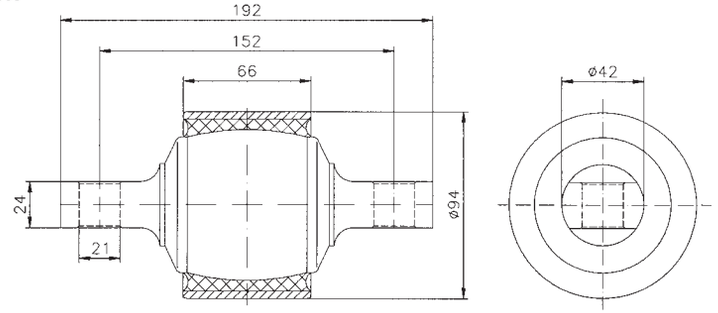

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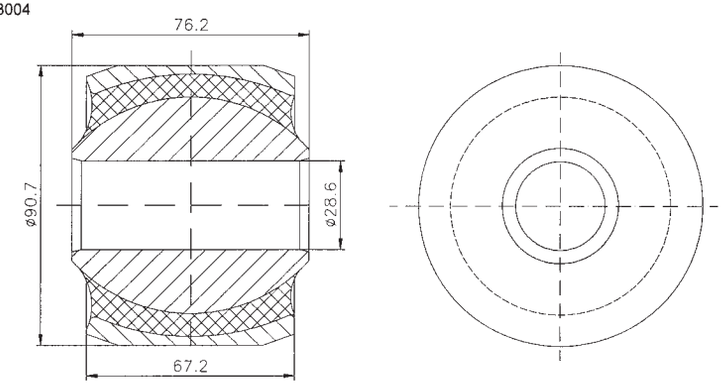

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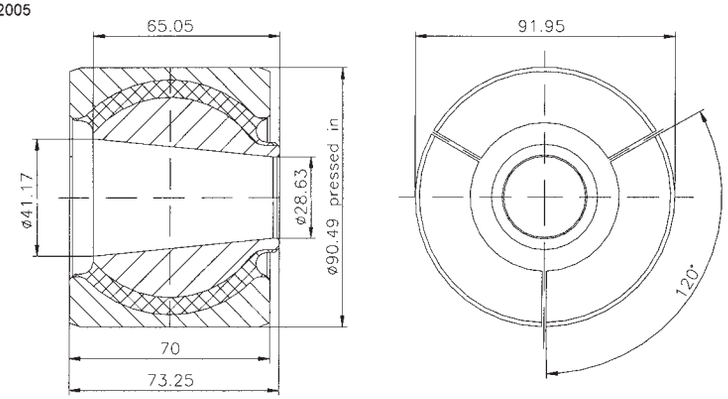

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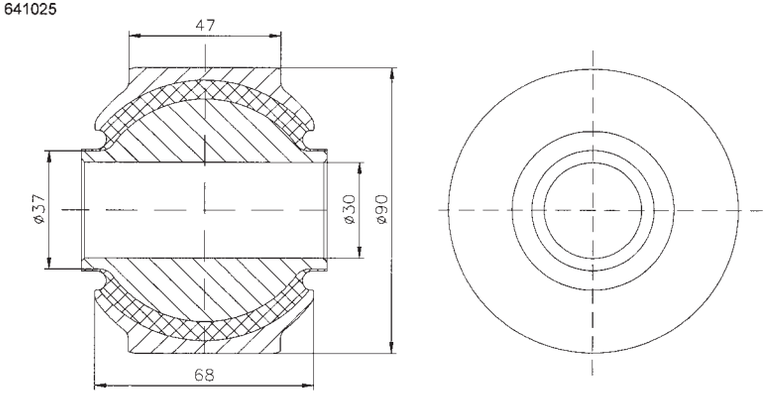

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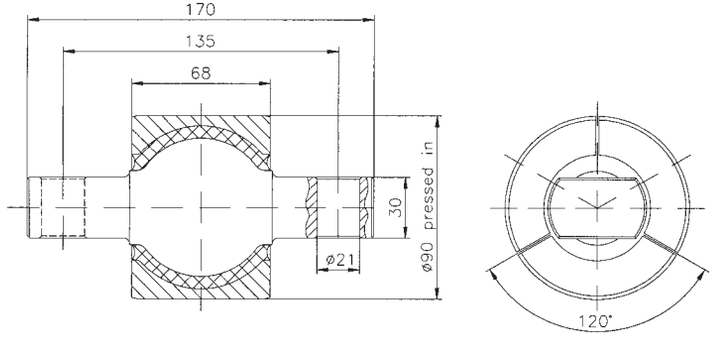

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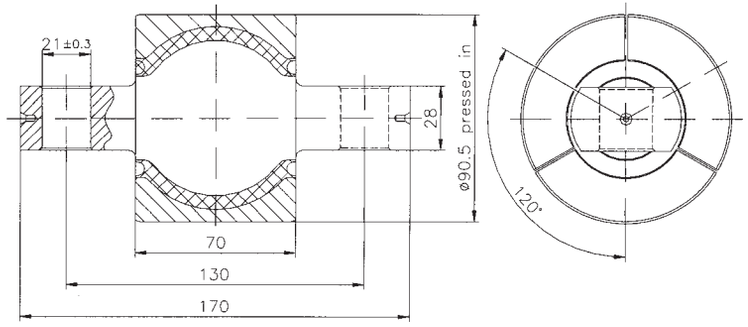

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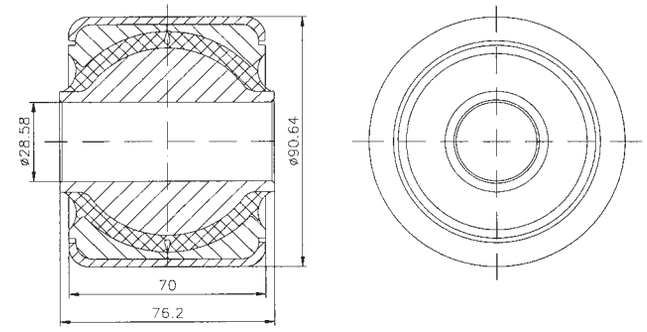

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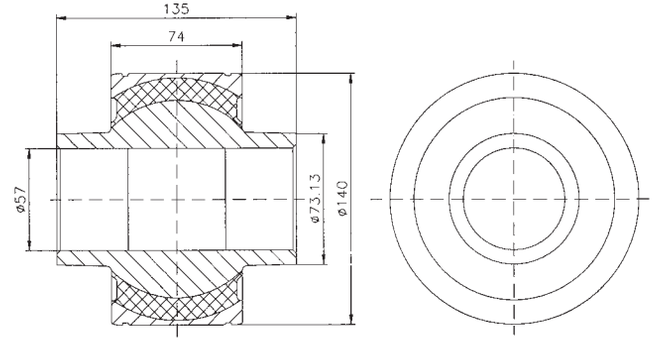

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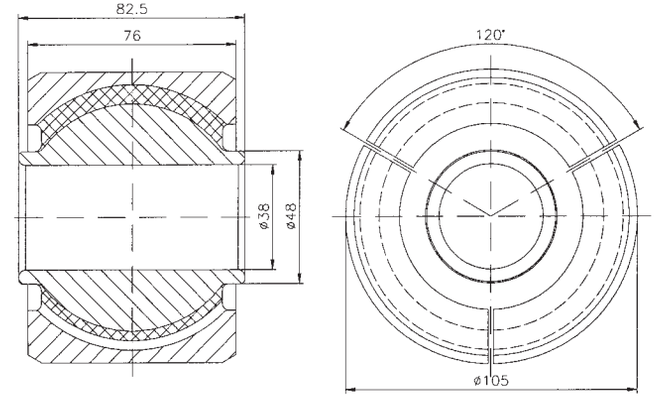

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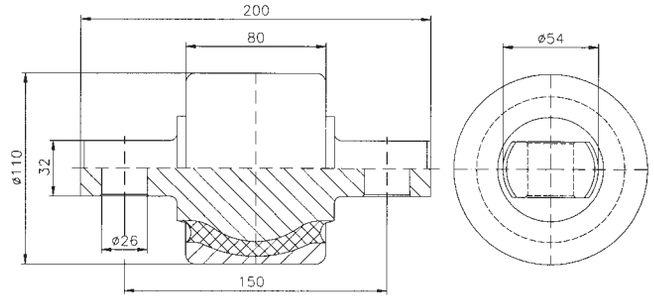

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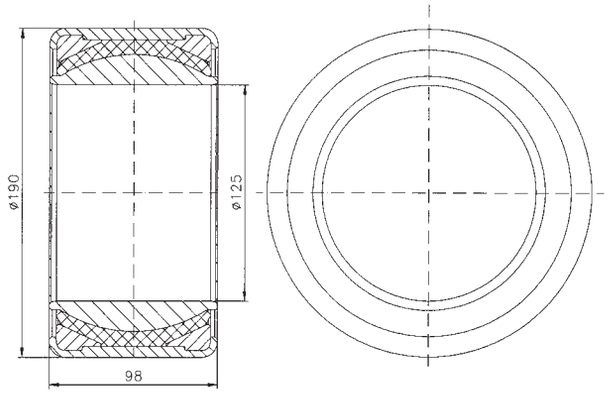

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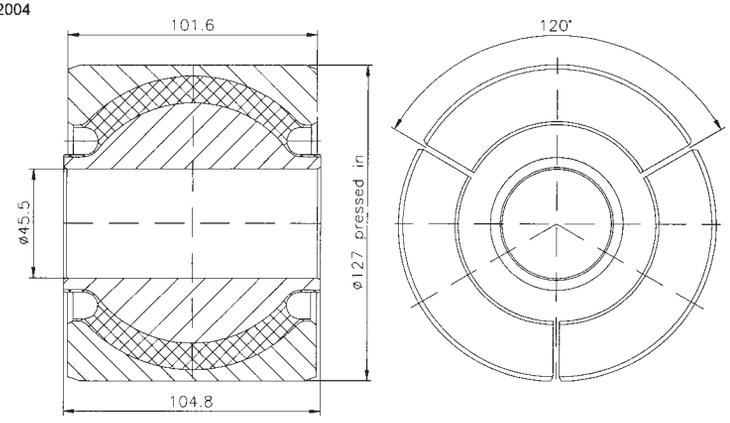
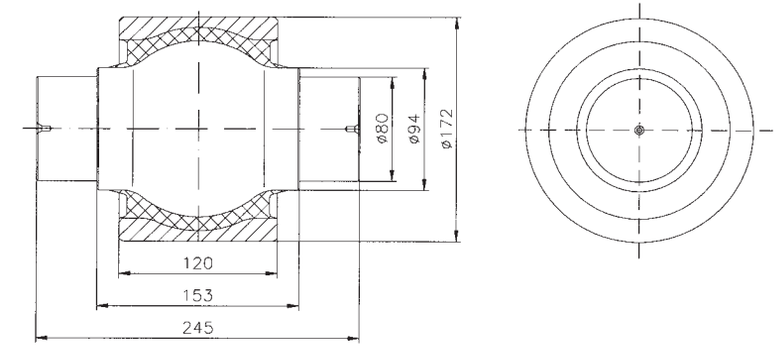


Ball joints

641030



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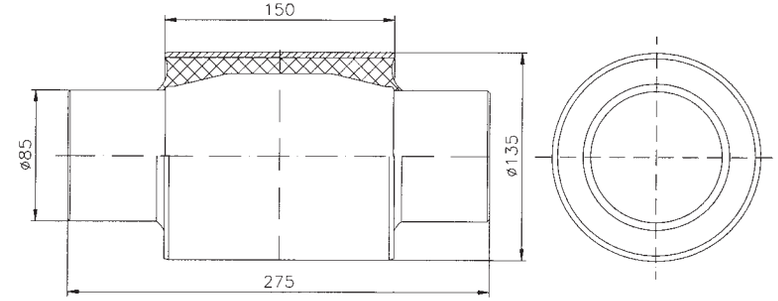


Special elements

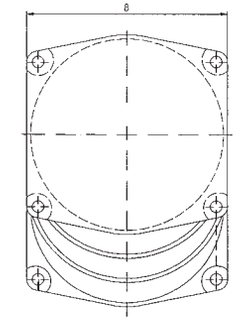
Bolster springs
Hollow springs
Compound springs
Multi layer springs
Spring washers
Rubber blocks
Axle springs
Cone springs
Roller springs

- **Description of parts and functions:**

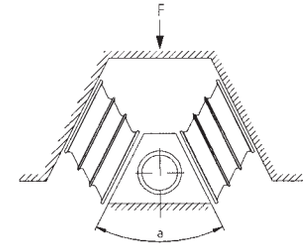
GMT bolster springs are used for high pressure loads. Therefore, they are especially ideal for the bedding of stone crushers, tandem axles, and dollies. For these purposes, oil and age-resistant elastomers are used. As a rule, these bearings are built in in pairs, as you can see from the assembly diagram below.

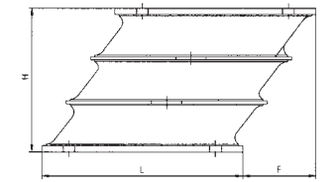
- **Dimensions:**

Item number	B [mm]	H [mm]	L [mm]	F [mm]
633002	197	140	197	72
633003	216	148	216	79
633004	197	141	197	68,5



Possible assembly of bolster springs:

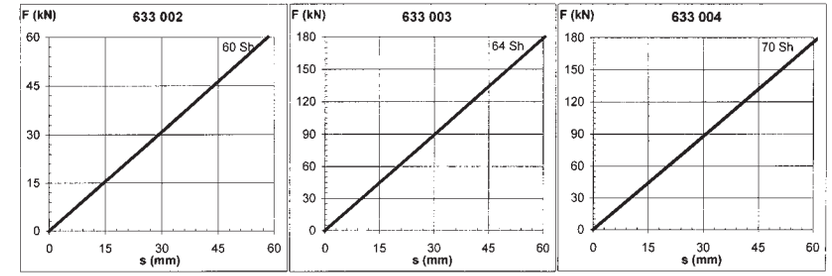




- **Spring characteristics:** *valid for pair of bolster springs according to the diagram; combined load of pressure and thrust*

Assembly angle of :

34° 53° 53°



There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Description of parts and functions:**

GMT hollow springs are among other things used for bearing and structure-borne noise insulation in equipment manufacture and terotechnology. They have vibration-insulating as well as shock-absorbing characteristics, which are also used in many different ways in the fields of vehicle construction and mechanical engineering. The range of application for these spring elements are, for example, skid or landing gear springing in aircraft construction, in whirlers and jolters, for the seperation of vibrating masses, as a shock protector in vehicle construction or as an ejector in blanking coining and punching dies.
The elements are attached and secured with liner and/or flanges.

- **Dimensions:**

Item Number	D (mm)	d (mm)	d1 (mm)	L (mm)	Figure
590003	130	40	42	220	1
590004	125	22	36	140	2
590005	130	22	30	90	4
590008	200	72	72	170	1
590012	85	20	30	92	3
590013	75	15	25	94	3
590014	120	44	44	100	5
590016	140	39	39	120	6
590017	155	39	39	150	6
590018	188	39	39	180	6
590019	110	20	30	132	7
590021	140	30	30	110	1
590023	85	20	30	92	3

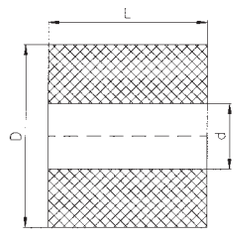


Figure 1

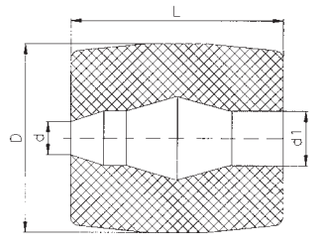


Figure 2

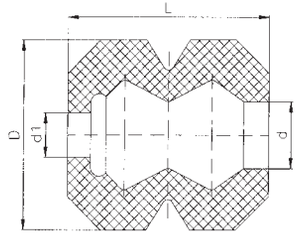


Figure 3

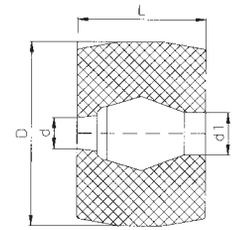


Figure 4

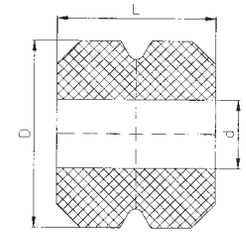


Figure 5

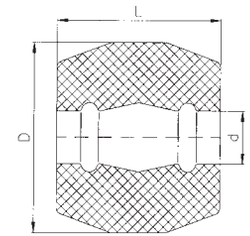


Figure 6

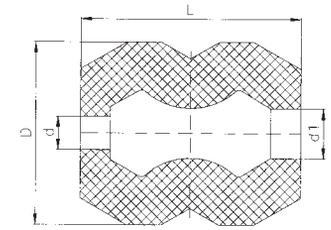
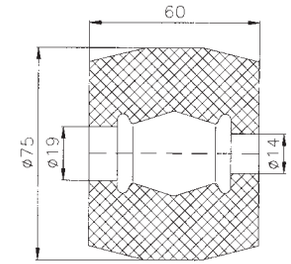
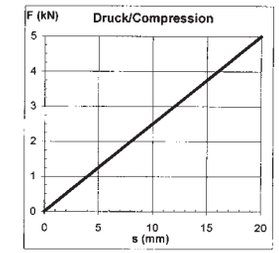


Figure 7

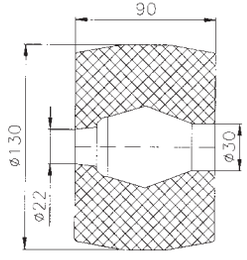
- **Spring characteristics :**

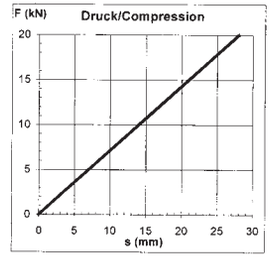
590 084



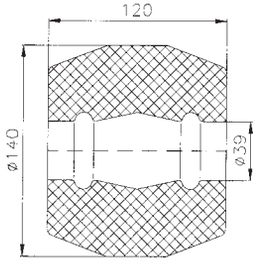


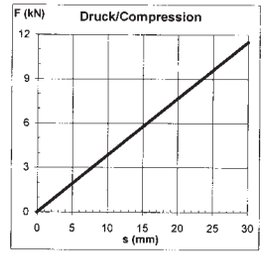
590 005



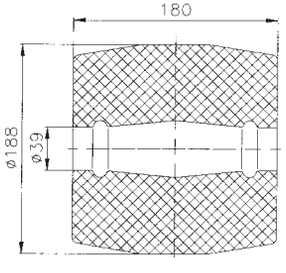


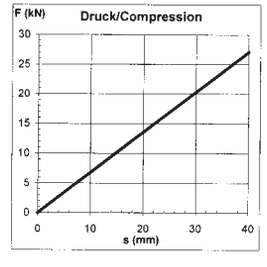
590 016



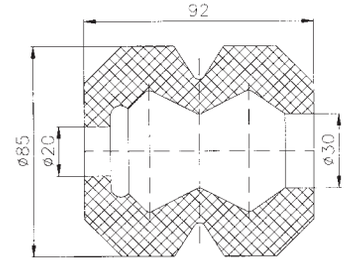


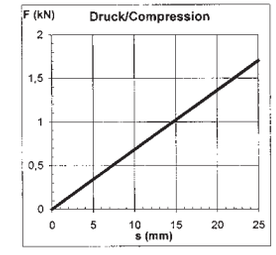
590 018



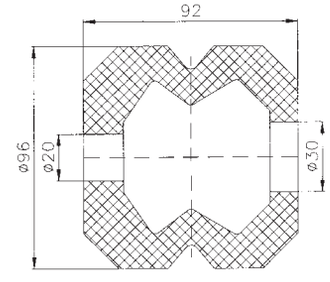


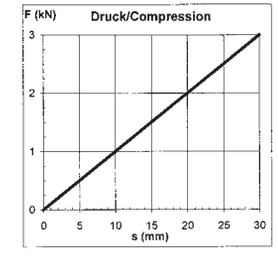
590 012



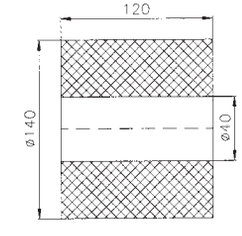


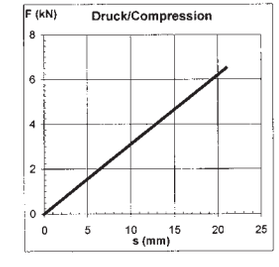
590 029





590 085





There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Description of parts and functions:**

GMT compound springs can be used in many different ways for the purpose of active and passive structure-borne noise and vibration insulation. These parts can withstand high pressure loads. They can be used, for example, as centre bearings or as bearings for jolters and sifting machinery.

- **Dimensions:**

Item number	H [mm]	D [mm]	d1 [mm]	d2 [mm]	d3 [mm]	h1 [mm]	h2 [mm]	b [mm]	Figure
629002	180	169	92	104	118	10	10	15	1
629003	195	204	111	122	147	15	10	15	1
629004	193	169,5	90,5	104	122	10	10	15	1
629006	429	260	120	-	-	-	-	-	2
629009	112	119	61	70	85	10	5	5	1

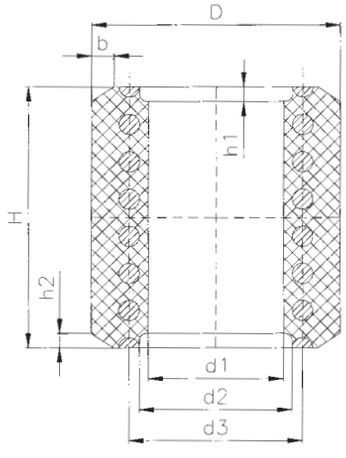


Figure 1

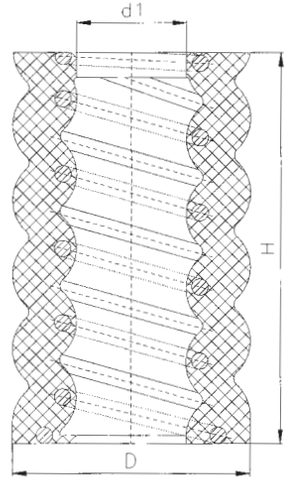
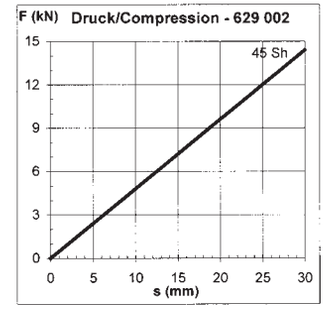
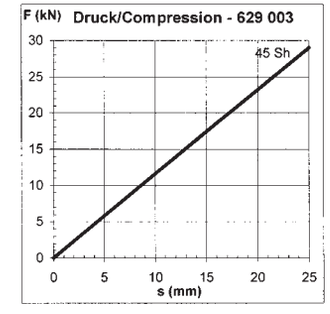
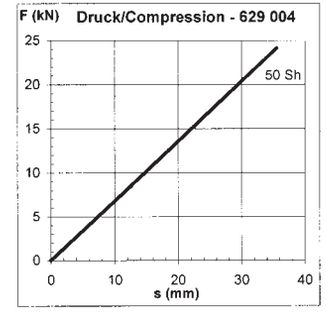


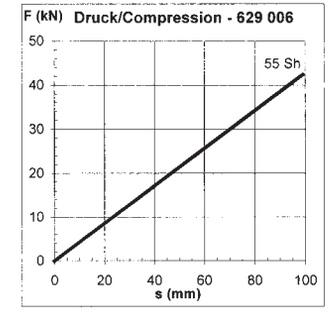
Figure 2

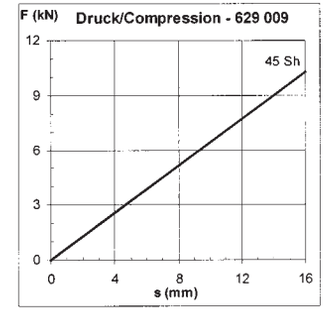
- **Spring characteristics:**











There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Description of parts and functions:**

GMT multi layer springs are damping elements for many different applications. Their different metals have been firmly bonded by way of vulcanized elastomer layers.
Multi layer springs are especially ideal for absorbing large pressure loads. These springs are e.g. used in lorries, trucks, buses, railway vehicles, coal, mining and concrete machines. It is possible to protect multi layer springs against sudden tensile loads by making them tear-proof – by fitting them with chain links, firmly integrated by means of vulcanization.

- **Dimensions:**

Item number	H [mm]	a [mm]	b [mm]	d [mm]	D [mm]	G	L [mm]	i [mm]	Figure
611001	150	140	170	14	165	-	-	32	1
611002	150	140	170	14	165	-	-	32	1
611003	175	175	210	17	app.190	-	-	40	1
612001	157	140	170	14,5	160	-	-	-	2
612002	180	150	185	18	180	-	-	-	2
612003	190	165	200	17,5	200	-	-	-	2
613001	196	-	-	61	260	-	-	-	3
613002	162	-	-	-	90	-	-	-	5
613003	186	-	-	52	150	-	-	-	4
613004	107	-	-	51	115	-	-	-	3
613006	25	-	-	20	57,5	-	-	-	7
613007	95	-	-	-	100	M16	45	-	6

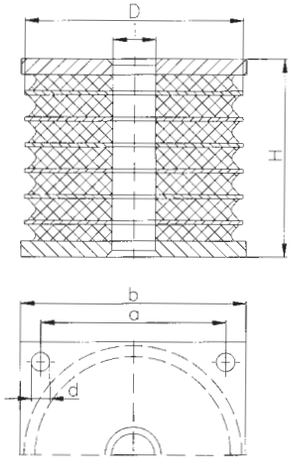


Figure 1

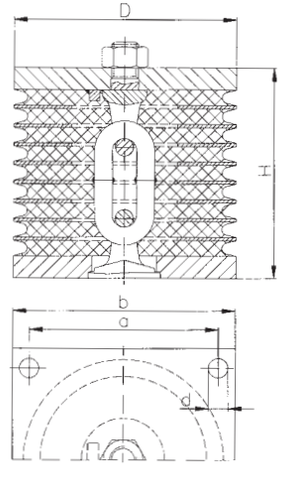


Figure 2

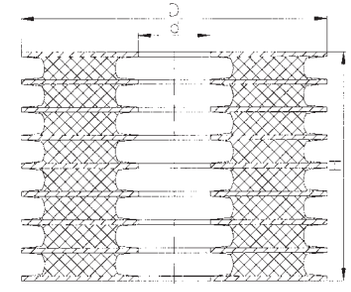


Figure 3

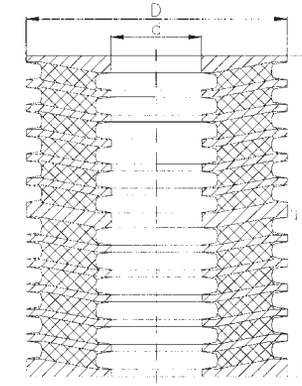


Figure 4

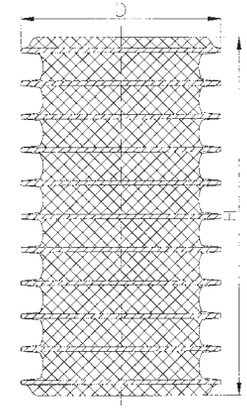


Figure 5

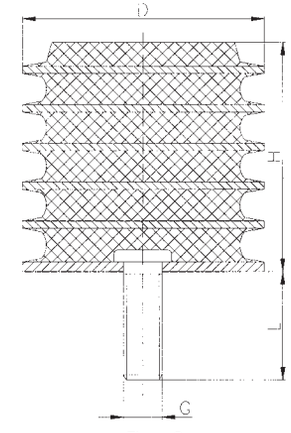


Figure 6

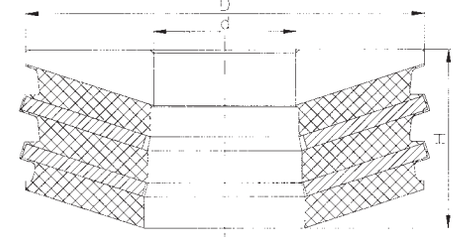


Figure 7

- **Description of parts and functions:**

GMT spring washers consist of an inner and an outer metal ring, which are held together by means of a layer of elastomer firmly vulcanized into the gap. They are suitable for use in torque converter bearings, for buffering pendulum supports, leaf spring ends as well as for tension and shock devices.

- **Dimensions:**

Item Number	H (mm)	Da (mm)	Di (mm)	Ds (mm)	W (mm)	Figure
623 002	38	260	62	-	-	1B
623 005	16	210/164	56	-	140	A
623 032	30	240	67	-	-	2B
624 001	10	95	45	70	-	3B
624 002	27,5	100	35	64	44	3C
624 003	50	170	60	115	-	4B
624 004	52,5	190	50	120	90	3C
624 005	49	230	105	154	120,5	5C
624 006	50	247	70	160	-	4B
624 007	27,8	265	78	166	-	3B
624 008	60	350	125	240	-	4B

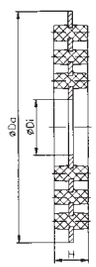


Figure 1

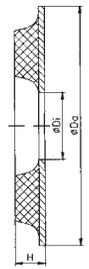


Figure 2

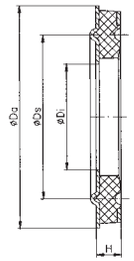


Figure 3

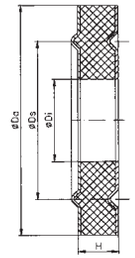


Figure 4

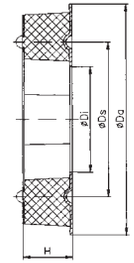


Figure 5

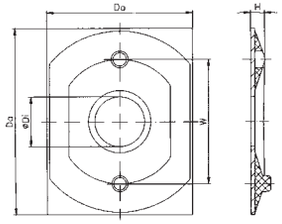


Figure A

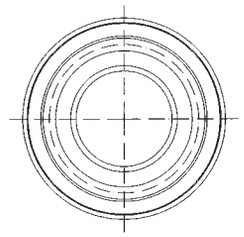


Figure B

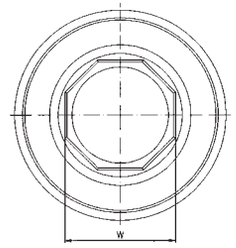
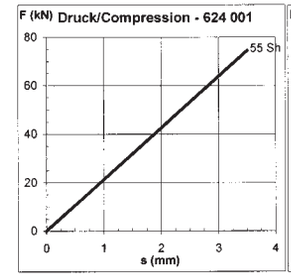
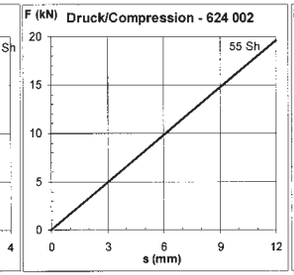
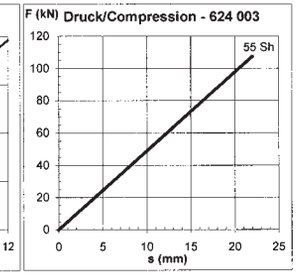


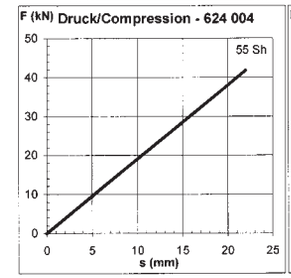
Figure C

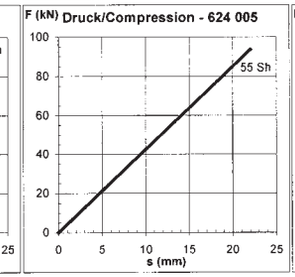
- **Spring characteristics:**

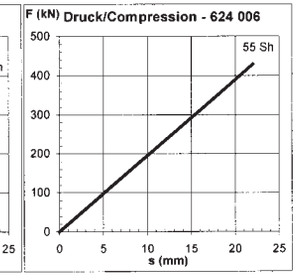


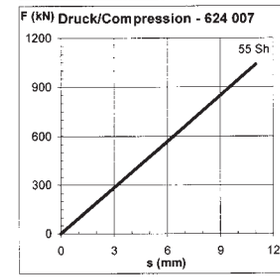


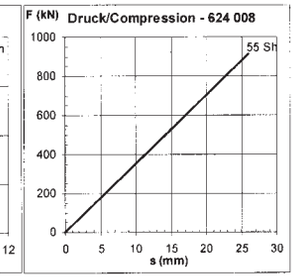












There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

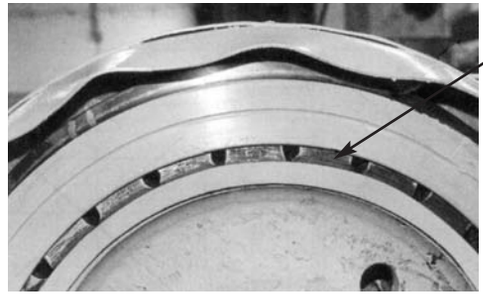
- **Description of parts and functions:**

Rubber blocks are used for structure-borne noise insulation, for example in wheels of rail vehicles, funicular railways or bearings of roller tables. They have vibration-insulating as well as shock-absorbing characteristics, which, referring to use in LRV-wheels, lead to a decrease in the level of noise and an improvement in passenger comfort. A further advantage of using rubber blocks lies in the increased life span of the chassis, since, compared to rigid bearings, there is a reduction of shock loads and a decrease in abrasive wear and tear.

A 100% control of the restoring forces takes place. Based on the results, a division into different categories is carried out. By doing so, it is possible to use rubber blocks of the same category, so that there are no deviations between the different bearing points.

- **Dimensions:**

Item number	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	Radius (mm)	H (mm)	J (mm)	Figure No.	with/without current bridge
984071	71,8	44	10	-	-	-	15	53	47	1	without
984078	71,8	44	10	10	18	18	15	53	47	2	with
984101	101,8	44	10	-	-	-	15	66	60	1	without
984102	101,8	44	10	13	27	27	15	66	60	2	with
984103	81,8	44	10	-	-	-	15	53	47	1	without
984104	81,8	44	10	10	20	20	15	53	47	2	with
984107	71,8	44	-	-	-	-	-	47	47	3	without
984108	71,8	44	-	10	20	20	-	47	47	4	with
984127	81,8	44	10	10	20	18	15	53	47	6	with
984128	96,8	44	10	-	-	-	15	56	50	1	without
984132	96,8	44	10	13	27	27	15	56	50	2	with
984134	81	34,87	39	-	26	-	35	41,67	49	5	without
984135	81	34,87	39	-	26	-	35	42,36	49	7	with



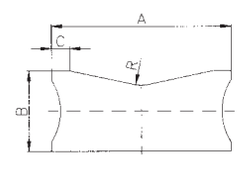


Figure 1

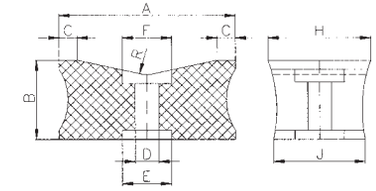


Figure 2

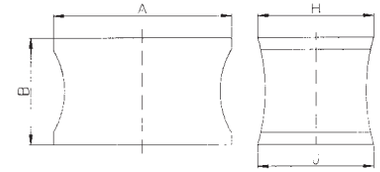


Figure 3

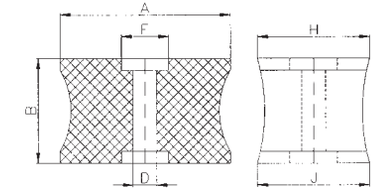


Figure 4

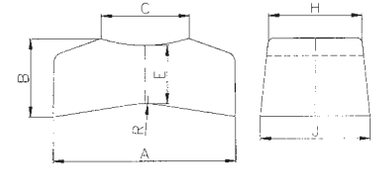


Figure 5

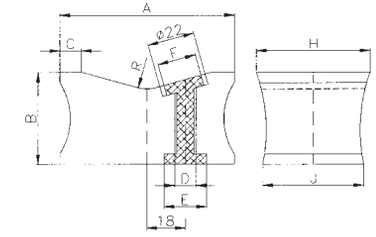


Figure 6

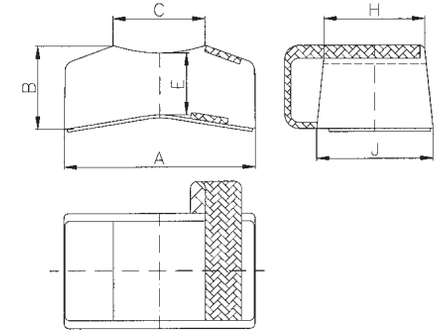


Figure 7

- **Description of parts and functions:**

GMT axle springs are multi-purpose vibration-reducing elements, the individual metals are firmly held together with vulcanized layers of elastomer.
Due to their simple installation and long lifespan, axle springs are ideal for use in all types of rail vehicles.
By selecting the angles and the number of intermediate spring links as well as the angles of the axle bearings to each other, three different spring stiffnesses can be produced, depending on the direction. Furthermore, the degree of stiffness can also be varied by selecting the geometric dimensions of the individual layers and the corresponding rubber quality.

- **Dimensions:**

Item Number	B [mm]	B1 [mm]	H [mm]	L [mm]	L1 [mm]	L2 [mm]	Number of steel layers	Figure
601001	100	100	54	205	186	186	3	1
601002	80	80	43,5	208	176	176	3	1
601003	100	100	54	250	216	216	3	1
601004	100	100	57,5	340	310	310	3	1
601005	186,5	146	60	197	177	152	3	4
601008	158	-	55	232	209	181	3	5
602001	62,5	62,5	49,5	152	125	125	4	1
602002	80	80	77	214	182	152	4	3
602003	120	120	94,5	263	213	213	4	1
602004	145	145	93	307	246	246	4	1
602005	125	125	94,5	329	248	248	4	1
602007	252	169	133	340	308	216	4	2
602008	252	167	133	340	308	216	4	4
602009	231	160	88,75	282,3	235,5	197,5	4	4
603002	220	220	150	370	296	296	5	-
603004	176	137	115	286	248	194	5	-
604001	230	192	150	365	303	258	6	-
604002	270	184	179	331	292	203	6	-
605001	260	160	193	363	268	234	7	-

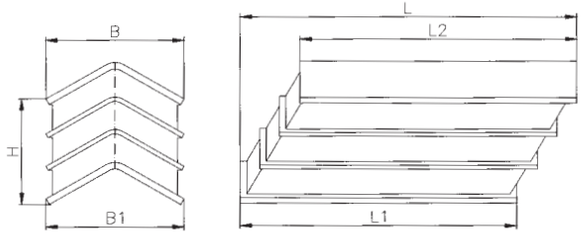
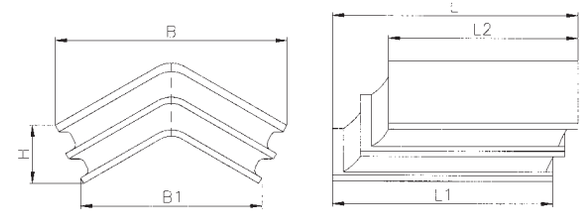


Figure 1



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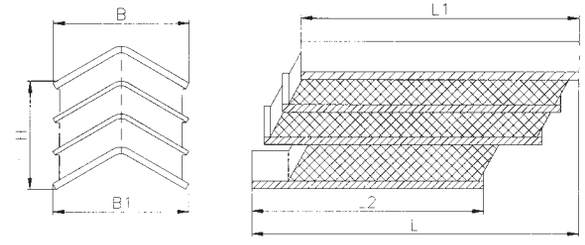


Figure 3

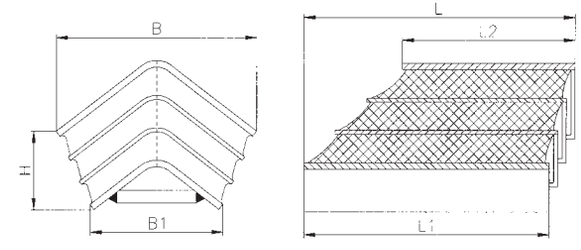


Figure 4

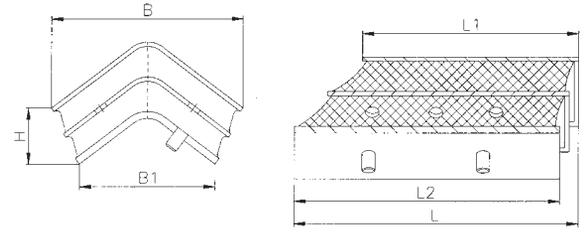


Figure 5

• Spring parameters:

Values for a pair of axle bearings for an angle of installation of 10°, 12°, 14° and 16° vertically

Item Number	Angle	Values					
		40 Sh-A		50 Sh-A		60 Sh-A	
	[°]	Cv [kN/mm]	Fv [kN]	Cv [kN/mm]	Fv [kN]	Cv [kN/mm]	Fv [kN]
601001	10	0.849	14.72	1.138	19.62	1.422	21.47
	12	0.976	15.45	1.305	20.60	1.638	22.66
	14	1.113	16.19	1.491	21.58	1.864	23.74
	16	1.275	16.92	1.707	22.56	2.139	24.81
601002	10	0.759	10.79	1.045	14.22	1.189	15.70
	12	0.917	11.28	1.236	15.21	1.502	16.68
	14	1.070	11.77	1.395	16.19	1.731	17.66
	16	1.203	12.75	1.612	17.17	2.026	18.64
601003	10	0.981	16.19	1.319	22.07	1.687	24.53
	12	1.118	17.17	1.501	23.05	1.884	25.50
	14	1.290	18.15	1.727	24.03	2.168	26.49
	16	1.319	19.13	1.991	25.51	2.497	27.96
601004	10	1.570	26.49	2.099	35.32	2.634	39.24
	12	1.805	27.96	2.418	37.28	3.026	41.20
	14	2.080	29.43	2.786	39.24	3.492	43.16
	16	2.399	30.90	3.213	41.20	4.022	45.13
602001	10	0.310	5.15	0.410	6.85	0.515	7.55
	12	0.345	5.35	0.460	7.15	0.580	7.85
	14	0.390	5.55	0.530	7.45	0.660	8.20
	16	0.445	5.80	0.600	7.75	0.750	8.55
602002	10	0.360	4.00	0.533	5.90	0.794	7.35
	12	0.407	4.40	0.603	6.55	0.898	8.15
	14	0.461	4.95	0.683	7.30	1.018	9.10
	16	0.523	5.55	0.774	8.20	1.154	10.20
602003	10	0.680	21.10	0.910	27.95	1.135	30.90
	12	0.775	22.10	1.035	29.45	1.295	32.35
	14	0.895	23.05	1.185	30.90	1.485	33.85
	16	1.010	24.55	1.345	32.35	1.680	35.80
602004	10	1.120	32.85	1.495	44.15	1.875	48.55
	12	1.325	35.80	1.765	47.60	2.210	52.50
	14	1.560	38.75	2.080	52.00	2.600	57.40
	16	1.825	42.20	2.430	56.40	3.050	62.30
602005	10	0.790	24.05	1.050	31.90	1.315	35.30
	12	0.925	25.50	1.235	34.35	1.545	37.75
	14	1.080	27.45	1.440	36.80	1.805	40.20
	16	1.265	29.45	1.685	39.25	2.110	43.15
603001	10	0.427	4.70	0.628	6.90	0.940	8.60
	12	0.500	5.55	0.735	8.10	1.100	10.15
	14	0.584	6.55	0.861	9.60	1.288	11.95
	16	0.680	7.65	1.005	11.30	1.501	14.05
603002	10	1.120	56.50	1.500	75.50	1.875	83.00
	12	1.330	61.00	1.780	81.50	2.225	89.50
	14	1.570	65.50	2.100	87.50	2.625	96.00
	16	1.850	70.00	2.475	94.00	3.095	103.50
603004	10	0.980	41.00	1.300	54.00	1.625	59.50
	12	1.120	42.50	1.490	57.50	1.860	63.30
	14	1.280	45.00	1.700	60.20	2.130	66.50
	16	1.450	48.00	1.940	64.00	2.420	70.50
604001	10	1.214	68.00	1.636	90.00	2.302	99.00
	12	1.440	72.00	1.892	96.50	2.523	106.00
	14	1.681	76.50	2.241	102.00	3.055	110.00
	16	1.849	79.50	2.650	106.00	3.594	115.00

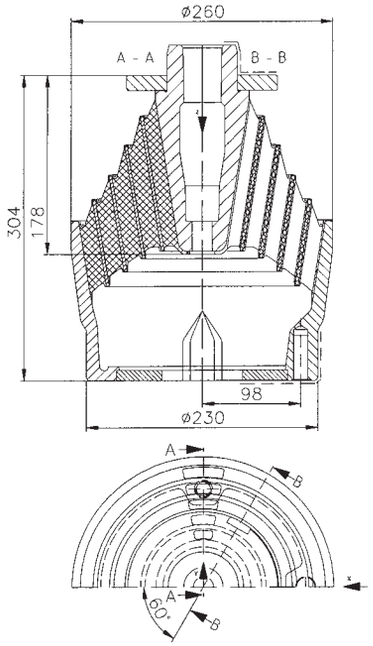
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

• Description of parts and functions:

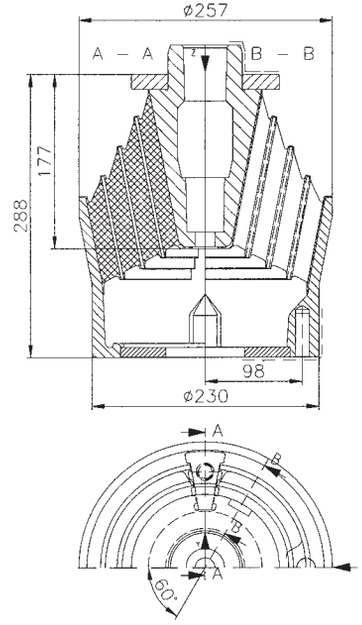
GMT cone springs are used, among other things, in body manufacturing for the bedding and suspension of the engine in the chassis frame. Being vibration insulators and dampers, cone springs allow for relatively considerable spring excursion and have a progressive characteristic curve. Buffers also help to absorb shock loads without causing irreparable damage to the part. If different degrees of stiffness are required in X and Y directions, use models with kidney-shaped recesses.

• Dimensions :

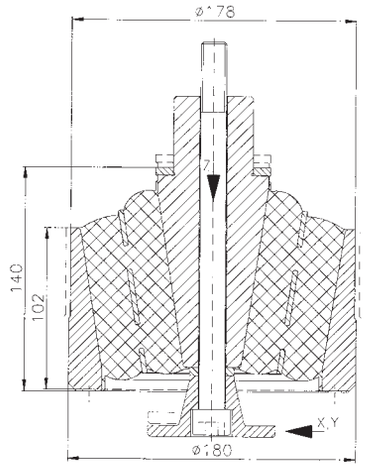
139 017



139 018



636 021 (under regular load)



- **Spring characteristics :**

Item number	Shore hardness [Sh-A]	Force Fz empty [kN]	Path Fz empty [mm]	Force Fz buffer [kN]	Path Fz buffer [mm]	Stiffness [N/mm] Fz empty/buffer Cz	with Fz empty Cx	Cy
139017	45	31	50,6	44	82,1	550	4700	2500
139018	45	40	34,9	56	67,4	850	5300	2800
636021	50	21,1	23,3	26,4	43,9	656	2600	2600

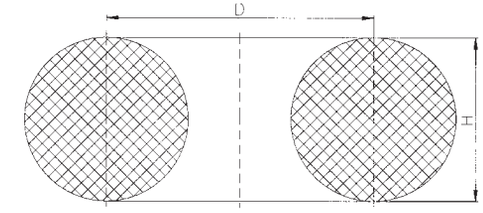
There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

- **Description of parts and functions:**

GMT-roller-springs are vibration damping elements consisting of a rubber ring, a tapering metal pin and a metal housing. Their metal parts and the rubber ring are not bonded together by vulcanisation.
roller-springs are used for damping vibrations in rail vehicles. The characteristics of roller-springs can be varied as required within their permissible capacity.

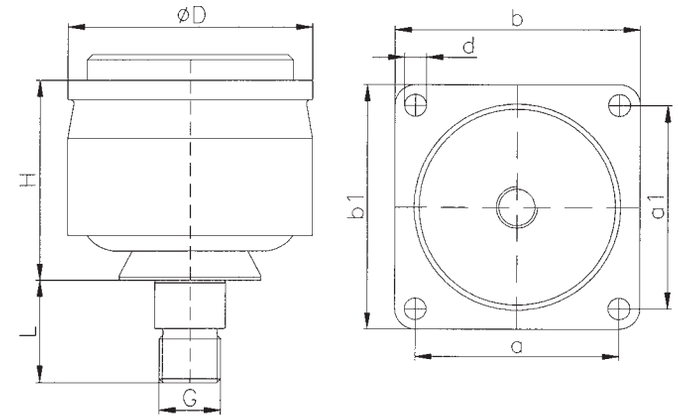
- **Dimensions:** only rubber-rings

Height [mm]	Diameter [mm]
80	130
95	135
110	150
120	190
120	220
130	185
150	230
150	300



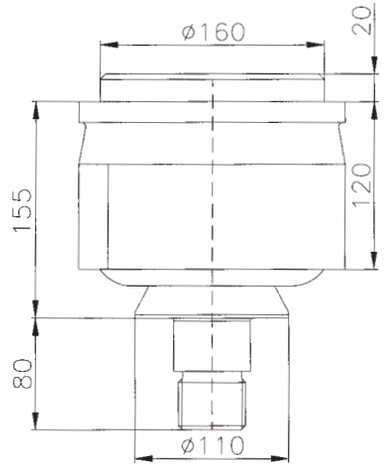
- **Dimensions:** roller-springs

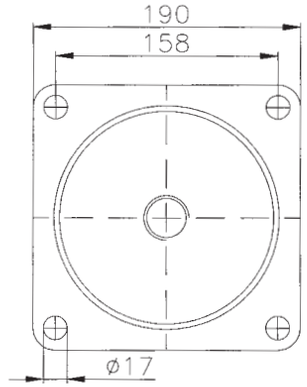
Item number	H [mm] before setting	D [mm]	d [mm]	G [mm]	L [mm]	a [mm]	b [mm]	a1 [mm]	b1 [mm]
991 001	ca. 155	ca. 190	17	M48x2	80	158	190	158	190
991 002	ca. 158	225	18	75	78	200	245	200	245
991 003	ca. 246	199	17	60	65,4	150	182	150	182
991 005	ca. 266	225	-	124	23	-	-	-	-
991 006	ca. 205	210	18	M24	95	155	190	175	210
991 007	ca. 220	220	18	M24	100	155	200	175	220
991 008	ca. 260	225	18	70	20	160	200	160	200
991 009	ca. 152	225	15	M48x2	128	158	188	158	188
991 010	ca. 275	228,5	17	M42	150	160	200	160	200

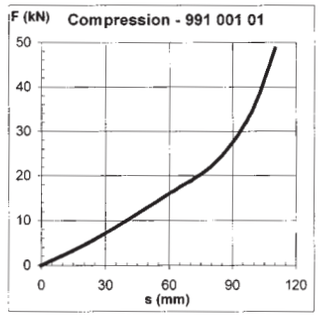


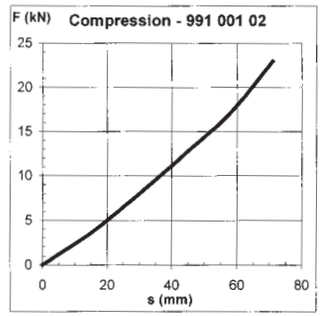
- **Dimensions/Spring characteristics :**

991 001









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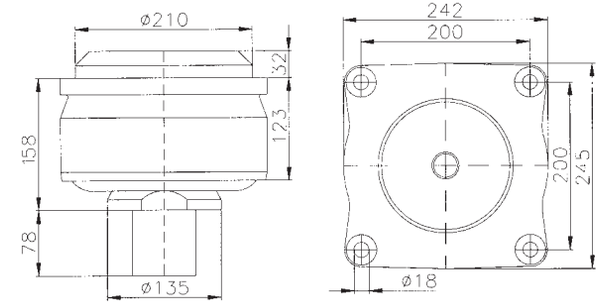

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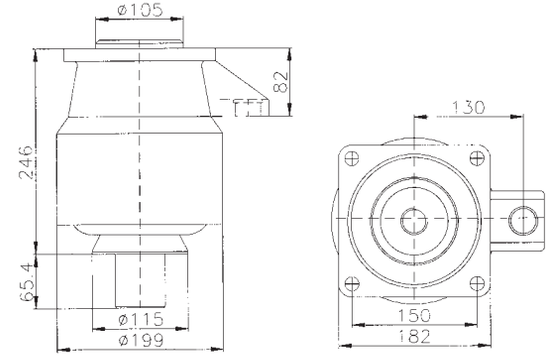

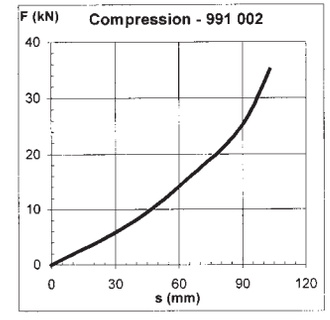

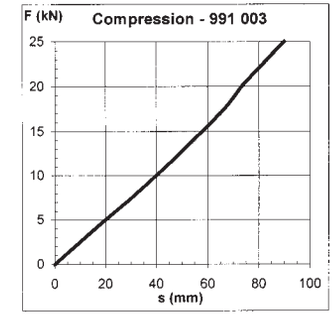

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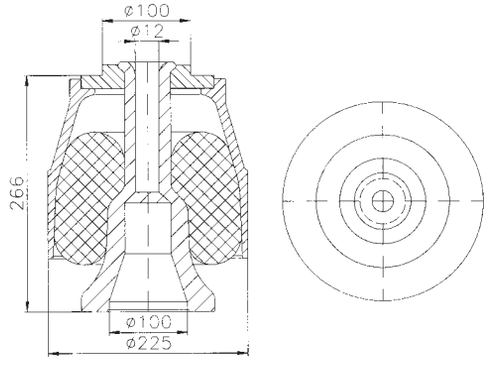

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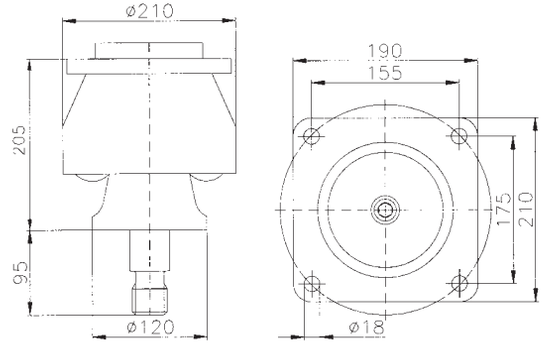

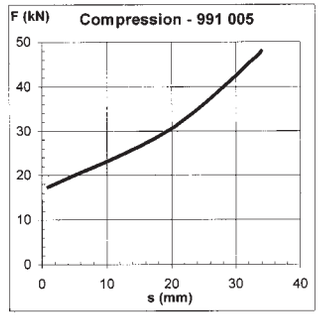

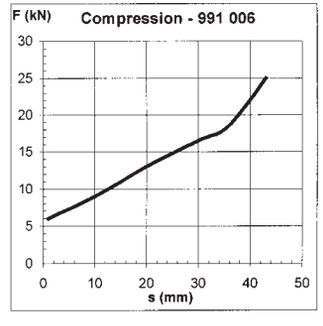

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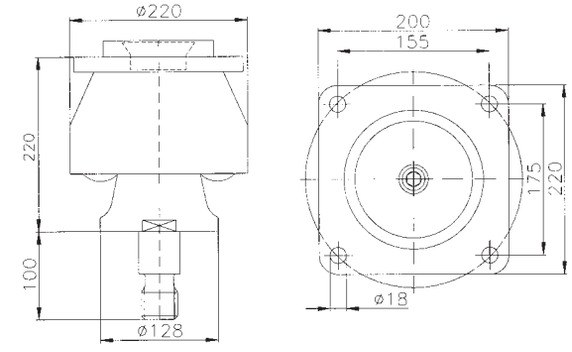

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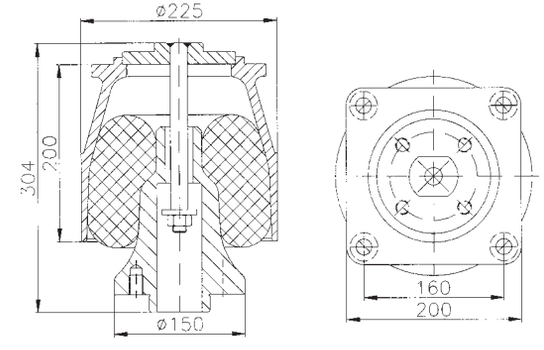

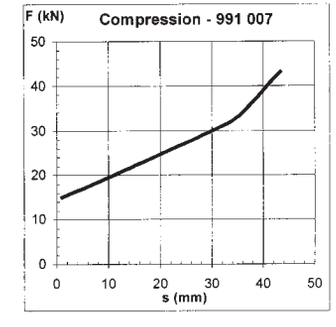

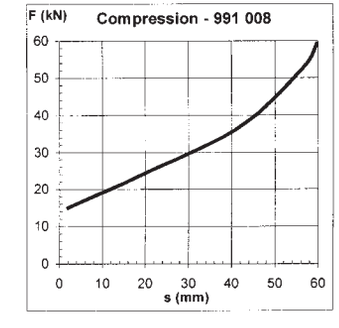

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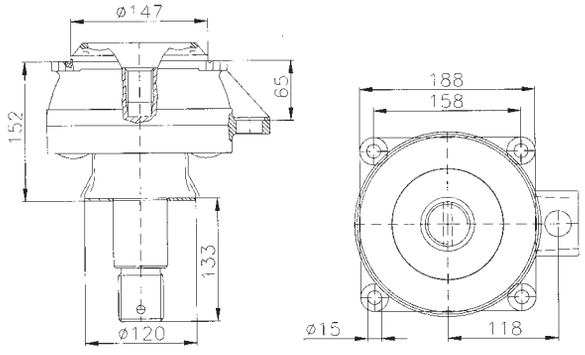

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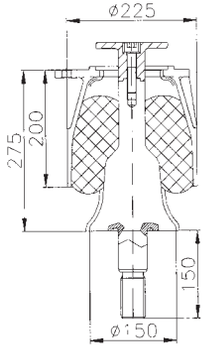

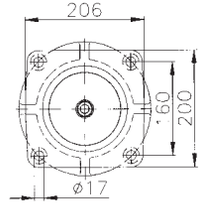

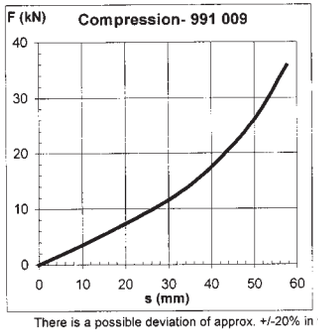

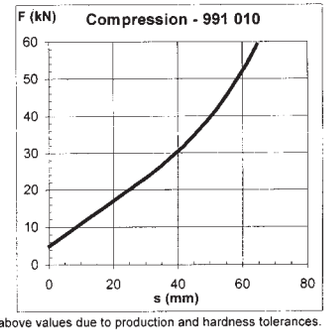

There is a possible deviation of approx. +/-20% in the above values due to production and hardness tolerances.

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