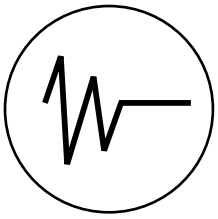
VIBRATION DAMPERS

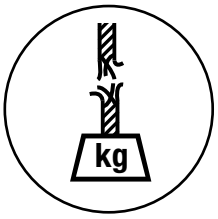
Highly elastic and tearproof mounts for passive and active vibration dampening

– Vibration-free mounting of motor test stands, emergency generators, compressors, etc.
– Tearproof mounting of suspended loads such as crane tracks and cable car cabins
– Anti-vibration machine leveling feet with balancing ball joints
– Impact-resistant vibration dampers for energy dissipation at belt transfer stations
– Standardised product range for high load capacities

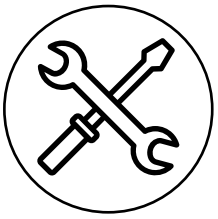
Product advantages:



high degree of isolation



tearproof



maintenance-free

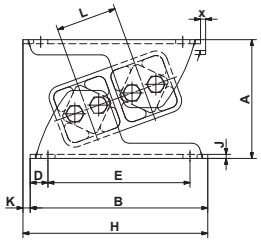
Selection table vibration dampers

	Illustration	Type	Description	Page
Vibration dampers basic types		**ESL**	Vibration dampers for the absorption of tensile, pressure and shear load. Also ideal for wall and ceiling installations. 8 element sizes from 200 N to 19 000 N. Natural frequency between 3.5 – 8 Hz. Mounts are mainly used for overcritical machine installations (machine frequency > mount frequency).	4.3
		**AWI**	Vibration dampers for to absorb tensile and pressure loads. 7 element sizes from 180 N to 16 000 N. Natural frequency between 3 – 7 Hz. Mounts are mainly used for overcritical machine installations (machine frequency > mount frequency).	4.4
		**V**	Vibration dampers for the absorption of tensile, pressure and shear load. Also ideal for wall and ceiling installations. 6 element sizes from 300 N to 12 000 N. Natural frequency between 10 – 30 Hz. Mounts can be used for subcritical machine installations (machine frequency < mount frequency).	4.5
Vibration dampers additional types		**N**	Mounting feets consisting of insulating plate, top cover with built-in levelling jack-screw with spherical joint for compensation of up to 10° of floor unevenness. Insulating plate oil- and acid-proof. FDA approved. 3 element sizes from 3 500 N to 20 000 N. Natural frequency between 19 – 27 Hz.	4.6
		**NOX**	Mounting feets consisting of insulating plate, stainless steel top cover with built-in stainless levelling jackscrew with spherical joint to compensate of up to 10° of floor unevenness. Insulating plate oil- and acid-proof. FDA approved. 2 element sizes from 5 000 N to 20 000 N. Natural frequency between 19 – 24 Hz.	
		**Base plate P**	Accessories for N and NOX for high shear forces or for assembling on a base or frame. The base plate must be bolted to the floor.	4.7
		**M**	Mounting feets consisting of metallic insulating cusion. Cusion resistant against corrosion, greases and solvents. 6 element sizes from 300 N to 35 000 N. Natural frequency between 14 – 26 Hz.	4.8
		**NE**	Adhesive cushioning plates made of closed-cell polyether urethane, no water absorption and good oil resistance. 3 element sizes from 500 N to 130 000 N. Natural frequency between 14 – 25 Hz.	4.9

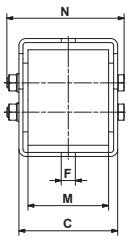
4

Vibration damper

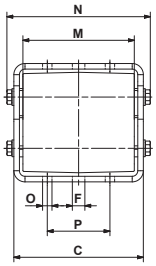
ESL



sizes 15 to 45



from size 50



Part no.	Type	Load $G_{min.}-G_{max.}$ [N] on Z-axis	A unloaded	A* max. load	B	C	D	E	ø F
05 021 001	**ESL 15**	200–550	54	43	85	49	10	65	7
05 021 002	**ESL 18**	450–1250	65	51	105	60	12.5	80	9.5
05 021 003	**ESL 27**	700–2000	88	68	140	71	15	110	11.5
05 021 004	**ESL 38**	1300–3800	117	91	175	98	17.5	140	14
05 021 005	**ESL 45**	2200–6000	143	110	220	120	25	170	18
05 021 016	**ESL 50**	4000–11000	170	138	235	142	25	185	18
05 021 017	**ESL 50-1.6**	5500–15000	170	138	235	186	25	185	18
05 021 018	**ESL 50-2**	7000–19000	170	138	235	226	25	185	18

Part no.	Type	H	J	K	L	M	N	O	P	x max.	Weight [kg]	Natural frequency $G_{min.}-G_{max.}$ [Hz]	Material structure
05 021 001	**ESL 15**	91	2	5.5	25.5	40	58.5	–	–	1.5	0.3	8.2–5.8	Aluminium profiles, steel brackets, painted blue, zinc-plated couplings
05 021 002	**ESL 18**	111	2.5	5.5	31	50	69	–	–	1.9	0.6	7.5–5.0	
05 021 003	**ESL 27**	148	3	8	44	60	85.3	–	–	2.7	1.3	6.2–4.5	
05 021 004	**ESL 38**	182	4	7	60	80	117	–	–	3.6	3.1	5.5–4.0	
05 021 005	**ESL 45**	235	5	15	73	100	138	–	–	4.4	5.9	5.0–3.5	
05 021 016	**ESL 50**	244	6	9	78	120	162	13.5	90	10	8.4	5.0–3.5	
05 021 017	**ESL 50-1.6**	244	8	9	78	160	206	13.5	90	10	10.4	5.0–3.5	
05 021 018	**ESL 50-2**	244	8	9	78	200	246	13.5	90	10	14.0	5.0–3.5	

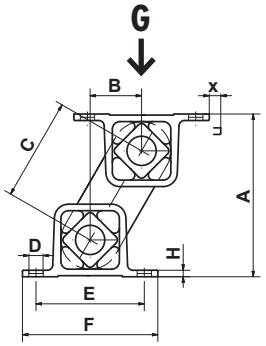
* compression load $G_{max.}$ and cold flow compensation (after approx. 1 year).

If no other units are specified, the numbers given are in mm.
The sizes 50 to 50-2 can be combined with one another (identical heights and operation behaviour).
The max. load on X-axis should not exceed 200 % of the Z-axis capacity.
The max. load on Y-axis should not exceed 20 % of the Z-axis capacity.
Applicable on tensile, pressure and shear load.

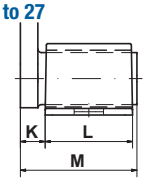
Vibration damper

AWI

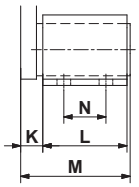
AWI R



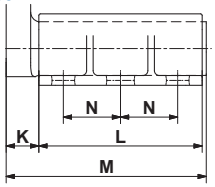
sizes 15 to 27



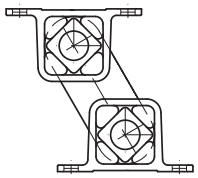
sizes 38 to 50



size 50-2



AWI L



Part no.	Type	Load $G_{min.}-G_{max.}$ [N]	A unloaded	A* max. load	B	C	D	E	F
05 111 101	**AWI 15R**	180–400	68	55	22.5	45	7×10	50	65
05 121 101	**AWI 15L**	180–400	68	55	22.5	45	7×10	50	65
05 111 102	**AWI 18R**	350–850	88	70	30	60	9×15	60	80
05 121 102	**AWI 18L**	350–850	88	70	30	60	9×15	60	80
05 111 103	**AWI 27R**	650–1500	111	91	35	70	11×20	80	105
05 121 103	**AWI 27L**	650–1500	111	91	35	70	11×20	80	105
05 111 104	**AWI 38R**	1200–3000	150	122	47.5	95	13×20	100	125
05 121 104	**AWI 38L**	1200–3000	150	122	47.5	95	13×20	100	125
05 111 105	**AWI 45R**	2000–4800	177	145	55	110	13×26	115	145
05 121 105	**AWI 45L**	2000–4800	177	145	55	110	13×26	115	145
05 111 106	**AWI 50R**	4000–9600	194	159	60	120	17×27	130	170
05 121 106	**AWI 50L**	4000–9600	194	159	60	120	17×27	130	170
05 111 108	**AWI 50-2R**	6600–16000	194	159	60	120	17×27	130	170
05 121 108	**AWI 50-2L**	6600–16000	194	159	60	120	17×27	130	170

Part no.	Type	H	K	L	M	N	x max.	Weight [kg]	Natural frequency $G_{min.}-G_{max.}$ [Hz]	Material structure
05 111 101	**AWI 15R**	3	10	40	52	–	14	0.5	7.2–4.5	Stainless steel casting GX5CrNi19-10 (1.4308)
05 121 101	**AWI 15L**	3	10	40	52	–	14	0.5	7.2–4.5	
05 111 102	**AWI 18R**	3.5	14	50	67	–	19	0.9	6.5–3.7	
05 121 102	**AWI 18L**	3.5	14	50	67	–	19	0.9	6.5–3.7	
05 111 103	**AWI 27R**	4.5	17	60	80	–	22	1.9	6.0–3.7	
05 121 103	**AWI 27L**	4.5	17	60	80	–	22	1.9	6.0–3.7	
05 111 104	**AWI 38R**	6	21	80	104	40	31	4.5	5.2–3.2	
05 121 104	**AWI 38L**	6	21	80	104	40	31	4.5	5.2–3.2	
05 111 105	**AWI 45R**	8	28	100	132	58	35	7.8	5.0–2.8	
05 121 105	**AWI 45L**	8	28	100	132	58	35	7.8	5.0–2.8	
05 111 106	**AWI 50R**	12	40	120	165	60	38	12.8	4.8–2.8	
05 121 106	**AWI 50L**	12	40	120	165	60	38	12.8	4.8–2.8	
05 111 108	**AWI 50-2R**	12	45	200	250	70	38	20.3	4.8–2.8	
05 121 108	**AWI 50-2L**	12	45	200	250	70	38	20.3	4.8–2.8	

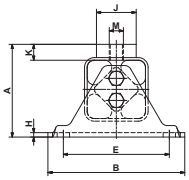
* compression load $G_{max.}$ and cold flow compensation (after approx. 1 year).

If no other units are specified, the numbers given are in mm.
The sizes 50 and 50-2 can be combined with one another (identical heights and operation behaviour).

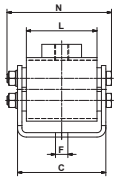
Vibration damper

V

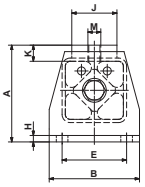
sizes 15 to 45



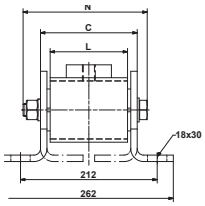
sizes 15 to 45



size 50



size 50



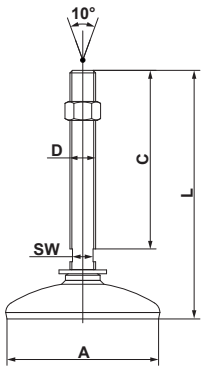
Part no.	Type	Load $G_{min.}-G_{max.}$ [N] on X- and Z-axis	A	B	C	E	øF	H	øJ
05 011 001	**V 15**	300–800	49	80	51	55	9.5	3	20
05 011 002	**V 18**	600–1600	66	100	62	75	9.5	3.5	30
05 011 003	**V 27**	1300–3000	84	130	73	100	11.5	4	40
05 011 024	**V 38**	2600–5000	105	155	100	120	14	5	45
05 011 005	**V 45**	4500–8000	127	190	122	140	18	6	60
05 011 006	**V 50**	6000–12000	150	140	150	100	–	10	70

Part no.	Type	K	L	M	N	Weight [kg]	Natural frequency $G_{min.}-G_{max.}$ [Hz]	Material structure
05 011 001	**V 15**	10	40	M10	59	0.3	30–23	Aluminium profile, welded steel housings, painted blue, zinc-plated couplings
05 011 002	**V 18**	13	50	M10	74	0.6	25–15	
05 011 003	**V 27**	14.5	60	M12	85	1.2	28–20	
05 011 024	**V 38**	17.5	80	M16	117	2.5	14–12	
05 011 005	**V 45**	22.5	100	M20	143	4.5	15–12	
05 011 006	**V 50**	25	120	M20	193	7.5	12–10	

If no other units are specified, the numbers given are in mm.
The max. load on Y-axis should not exceed 20 % of the X- resp. Z-axis capacity.
Momentary shock loads of 2.5 g in X- and Z-axis admissible.
Applicable on tensile, pressure and shear load.
V 50: Alternativ mounting position 180° turned.

Vibration damper

N / NOX

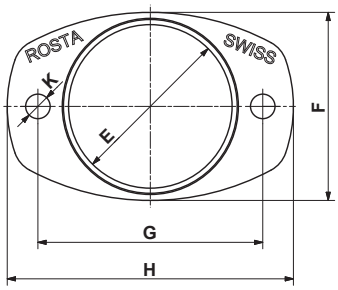


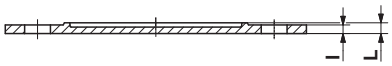
Part no.	Type	Load $G_{min.}-G_{max.}$ [N]	Natural frequency $G_{min.}-G_{max.}$ [Hz]	øA	C	D	L	SW	Weight [kg]	Material structure (rubber pad NBR with 50 ShA)
05 058 021	**N 80 M12**	3500–8000	27–22	80	60	M12	94	14	0.3	galvanised, base painted blue
05 058 022	**N 80 M16**	5000–12000	24–20	80	150	M16	188	13	0.5	galvanised, base painted blue
05 058 122	**NOX 80 M16**	5000–12000	24–20	80	150	M16	188	13	0.5	stainless steel 1.4301 and 1.4305
05 058 024	**N 120 M20**	8000–20000	22–19	120	150	M20	194	17	0.9	galvanised, base painted blue
05 058 124	**NOX 120 M20**	8000–20000	22–19	120	150	M20	194	17	0.9	stainless steel 1.4301 and 1.4305

If no other units are specified, the numbers given are in mm.
N / NOX are FDA approved.

Vibration damper

P



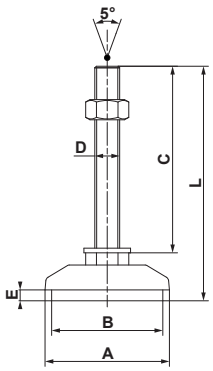


Part no.	**Type**	Accessory to	øE	F	G	H	I	øK	L	Weight [kg]	Material structure
05 060 101	**P 80**	N/NOX 80	80	92	110	140	4	12	5	0.1	Aluminium cast
05 060 102	**P 120**	N/NOX 120	120	135	170	210	5	16	7	0.3	

If no other units are specified, the numbers given are in mm.

Vibration damper

M



Part no.	Type	Load $G_{min.}$ – $G_{max.}$ [N]	Max. dynamic load [N]	Deflection with $G_{max.}$ approx. [mm]	Natural frequency [Hz]	øA	øB	C	D	E	L	Weight [kg]
05 158 001	**M 43 M16**	300 – 2500	12500	3.0	20 – 26	80	61	120	M16	7	151	0.7
05 158 002	**M 44 M16**	2000 – 27000	70000	3.0	20 – 26	80	72	120	M16	7	151	0.7
05 158 003	**M 45 M20**	5000 – 35000	75000	3.0	20 – 26	128	119	120	M20	8	157	1.8
05 158 011	**M 43W M16**	300 – 2500	12500	6.0	14 – 19	80	63	120	M16	11	155	0.6
05 158 012	**M 44W M16**	1000 – 13000	45000	6.0	14 – 19	80	71	120	M16	18	162	0.7
05 158 013	**M 45W M20**	2000 – 25000	60000	6.0	14 – 19	128	120	120	M20	18	168	1.9

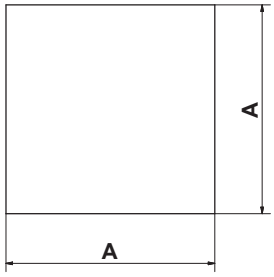
If no other units are specified, the numbers given are in mm.

Insulates structure-borne noise.
Chrome-steel cushion temperature resistant – 40 °C to + 250 °C.
Resistant against corrosion, greases and solvents.
Up to 3 g dynamic shock loading permissible.
Unlimited lifetime.

On request available stainless steel anti-slip soles with granules on the underside:
– Part no. 04 020 451 for M 43 M16 and M 43W M16
– Part no. 04 020 452 for M 44 M16 and M 44W M16
– Part no. 04 020 453 for M 45 M20 and M 45W M20

Vibration damper

NE



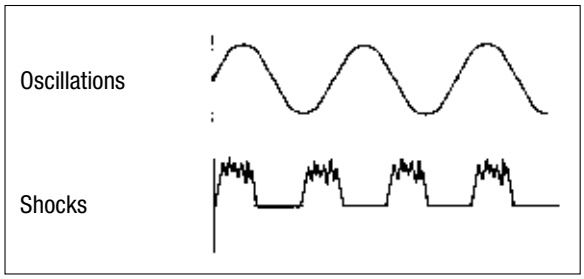
Part no.	Type	Load $G_{min.}-G_{max.}$ [N]	Deflection $G_{min.}-G_{max.}$ [mm]	Natural frequency $G_{min.}-G_{max.}$ [Hz]	A	B	Weight [kg]	Material structure
05 100 901	**NE 50-12**	500–1 500	0.5–1.4	25–14	50	12.5	0.02	– Polyether-Urethane closed-cell – No water absorption – Working temperature –30 to +70 °C – Good oil-resistance
05 100 902	**NE 80-12**	1 500–4 500	0.5–1.4	25–14	80	12.5	0.06	
05 100 903	**NE 400-12**	44 000–130 000	0.5–1.4	25–14	400	12.5	1.54	

If no other units are specified, the numbers given are in mm.
Tolerances according to ISO3302-1:1999 class L3 and EC3. The deflection of the cushions by the mentioned max. catalogue load capacities is 1.4 mm.

VIBRATION DAMPERS

Vibration dampers

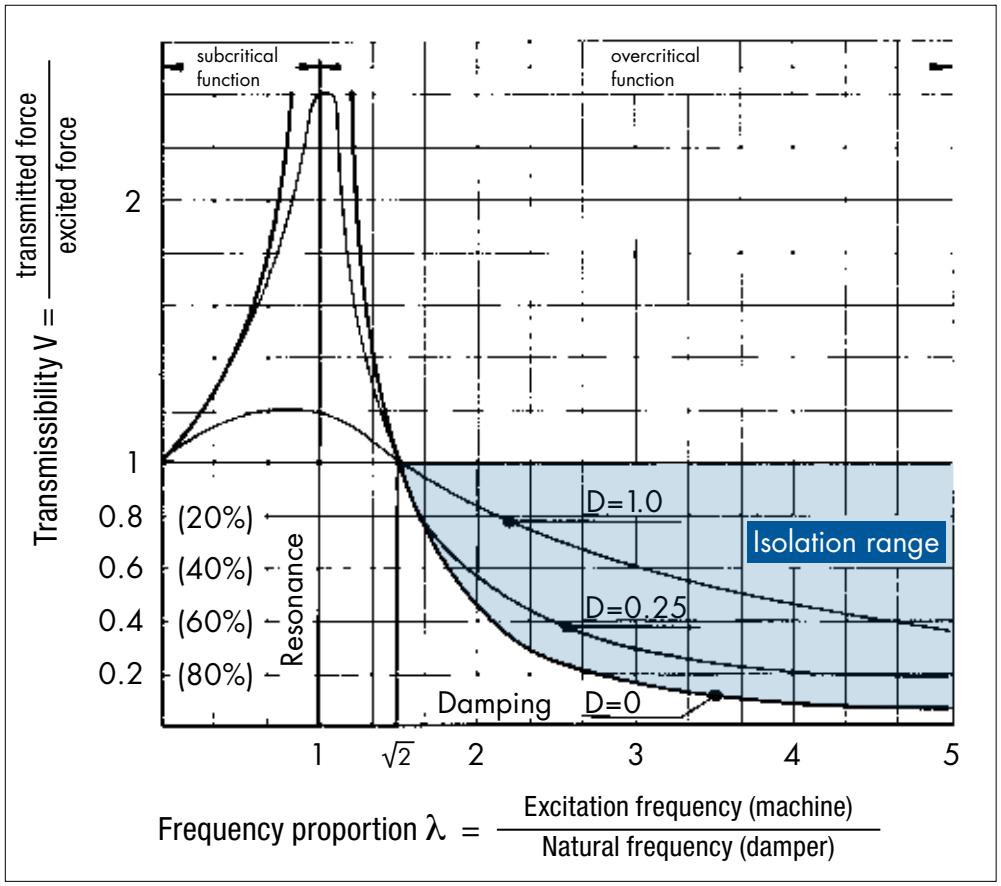
Isolation of oscillations and shocks



Manufacturers of vibration dampers usually offer different designs of machine mounts with varying natural frequencies, to meet the required detuning between the excitation frequency of the machine to be mounted and the natural frequency of the damper.

The vibration technology basically differentiates between two different oscillation patterns. Oscillations are usually eradicated with supercritical designed machine mounts, while shocks are eradicated with subcritical ones.

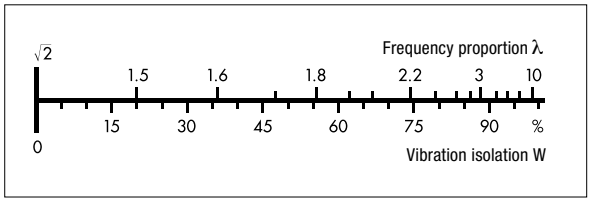
Frequency proportion λ



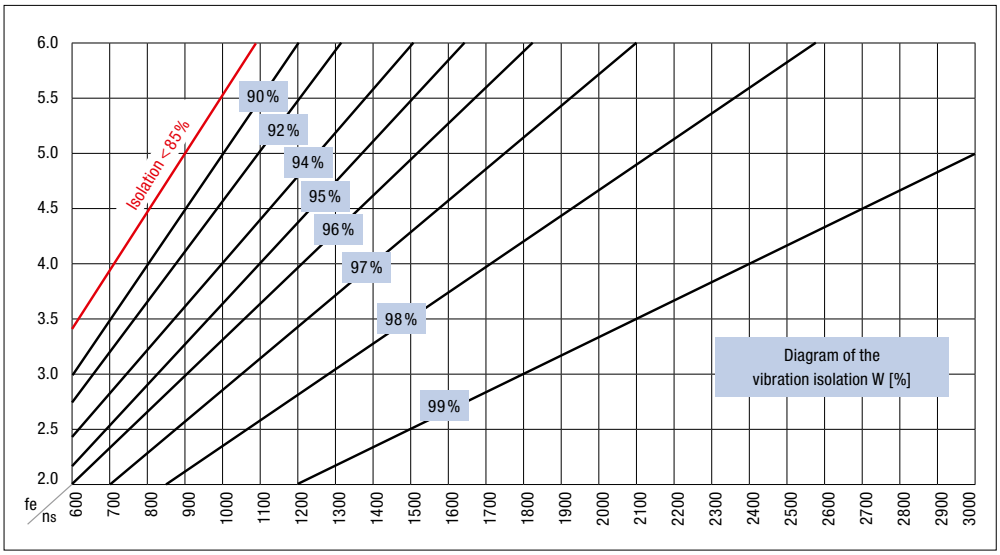
λ > √2: Overcritical: vibration isolation, definable effectiveness W, and efficient structure-borne sound insulation
λ = 1: Resonance range: amplified resonance, maximum values depend on the internal insulation D within the resonance range
λ < 1: Subcritical: no definable vibration isolation and lower structure-borne sound insulation

Vibration dampers

Overcritical installations (λ > √2)



For overcritical mounts, the natural frequency values of the mounts must be at least √2 below the excitation frequencies of the machine or unit. As a rule, a damper with a relatively large spring deflection performance under load is selected. Most units, compressors, motors, blowers and generators are mounted overcritical making them relatively «soft». The resulting frequency ratio provides information about the expected isolation effectiveness of the mount. The line scale opposite and the calculation give the expected insolation W as a %.



$$W = 100 - \frac{100}{\left(\frac{n_s}{60 \cdot fe}\right)^2 - 1} [\%]$$

n_s =
Revolution exciter
(machine) [rpm]

fe =
Natural frequency damper
[Hz]

Subcritical installations (λ < 1) and resonance range (λ = 1)

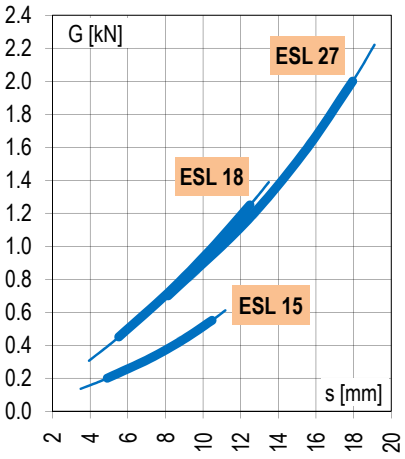
Subcritical installations
A damper with high mechanical strength and low deflection behaviour (high mounting stability) is usually used on subcritical mounts. With this type of mounting, it is possible to damp impacts and shocks from relatively slow-moving machines such as mixers, crushers (cone crushers), punching presses, shears, etc. On machines with subcritical mounts, the resulting efficacy of the isolation insulation cannot be calculated – it can only be determined by comparing the values before and after.

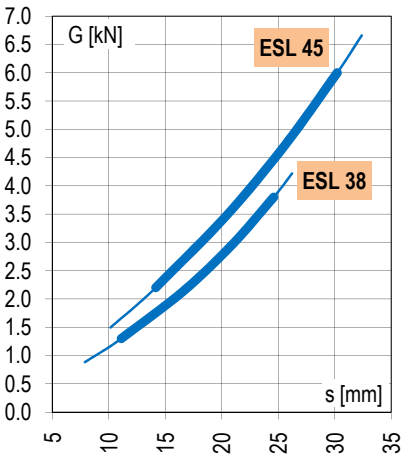
Resonance range
Any coincidence between the exciter frequency and the natural frequency of the damper lead to an undesired, uncontrollable swinging up of the machine to be stored.

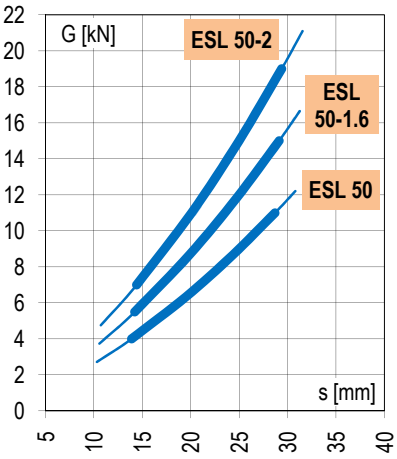
Vibration dampers

ESL: Deflection curves and setting behaviour

The deflection graphs already contain an initial cold flow that occurs after the first hours of operation. The final cold flow is approx. s × 1.09.
These deflection values are based on our catalogue data and are to be taken as guidelines. Please also refer to our tolerance data in chapter 7 «Technology – ROSTA Basics».



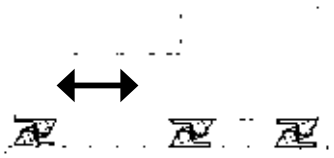




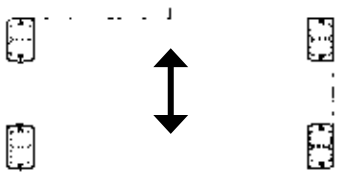
ESL: Installation guidelines

The ESL elements must generally be installed in the same direction.

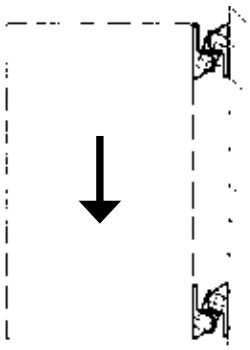
Dynamic forces longitudinal



Dynamic forces lateral



Wall mounting
(Please follow mounting direction)



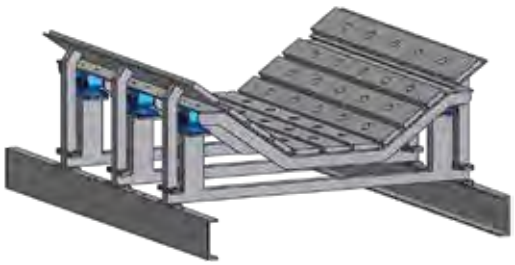
Vibration dampers

ESL: Transfer stations in belt conveyor systems

Size and quantity of ESL for the absorption of the occurring kinetic energy

Weight biggest lump [kg]	Drop height [m]																		
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
10	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
20	4	4	4	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6
30	4	4	4	4	4	6	6	6	6	6	6	6	6	6	8	8	8	8	8
40	4	4	4	4	6	6	6	6	6	6	8	8	8	8	6	6	6	6	6
50	4	4	4	6	6	6	6	6	8	8	8	6	6	6	6	6	6	8	8
60	4	4	6	6	6	6	8	8	8	6	6	6	6	6	8	8	8	8	8
70	4	6	6	6	6	8	8	6	6	6	6	6	8	8	8	8	8	8	8
80	4	6	6	6	8	8	6	6	6	6	8	8	8	8	8	8	8	8	8
90	4	6	6	6	8	6	6	6	6	8	8	8	8	8	8	8	8	8	8
100	4	6	6	8	8	6	6	6	8	8	8	8	8	8	8	8	8	8	8
110	6	6	6	8	6	6	6	8	8	8	8	8	8	8	8	8	8	10	10
120	6	6	8	8	6	6	8	8	8	8	8	8	8	8	8	10	10	10	10
130	6	6	8	6	6	6	8	8	8	8	8	8	8	8	10	10	10	10	12
140	6	6	8	6	6	8	8	8	8	8	8	8	8	10	10	10	10	12	12
150	6	6	8	6	6	8	8	8	8	8	8	8	10	10	10	12	12	12	12
200	6	8	6	8	8	8	8	8	8	10	10	12	12	12	14	14	16	16	16
300	8	6	8	8	8	10	10	12	12	14	16	16							
400	6	8	8	8	10	12	14	16	16										
500	8	8	8	10	12	14	16												

Type	Max. absorption of energy per ESL
ESL 38	250 Nm
ESL 45	375 Nm
ESL 50	750 Nm
ESL 50-1.6	1 000 Nm
ESL 50-2	1 250 Nm

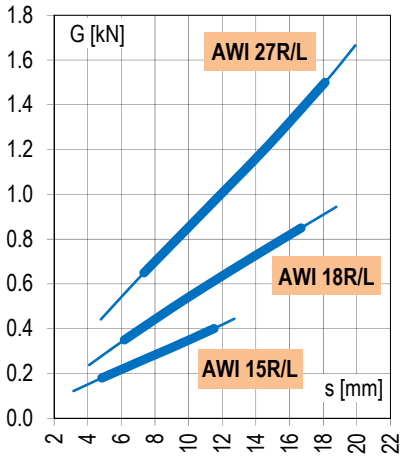


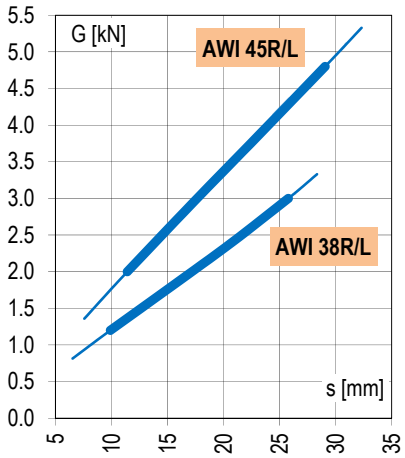
Transfer stations equipped with ROSTA Type ESL vibration dampers offer a progressive deflection characteristic that effectively dampens the kinetic energy created when the falling material makes impact. This protects the surface of the belt's coating from cracking, dramatically reduces the level of continuous material wear and protects the substructure from premature failure.

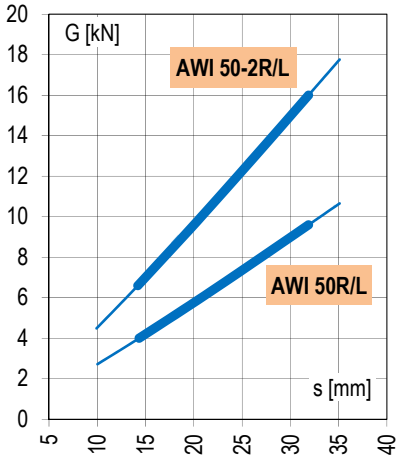
Vibration dampers

AWI: Deflection curves and setting behaviour

The deflection graphs already contain an initial cold flow that occurs after the first hours of operation. The final cold flow is approx. s × 1.09.
These deflection values are based on our catalogue data and are to be taken as guidelines. Please also refer to our tolerance data in chapter 7 «Technology – ROSTA Basics».



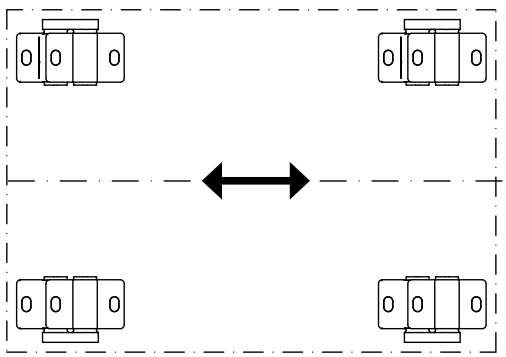




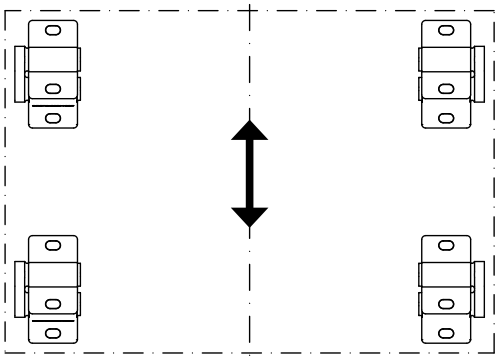
AWI: Installation guidelines

The AWI elements must generally be installed in the same direction.

Dynamic forces longitudinal



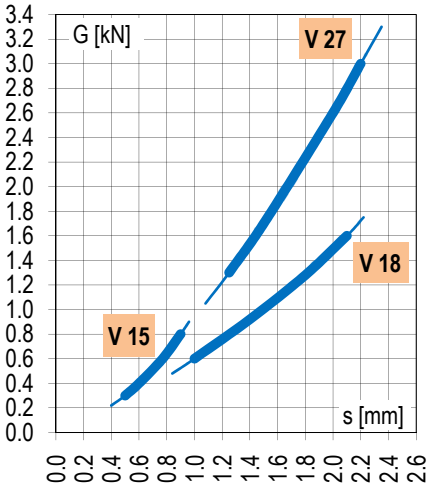
Dynamic forces lateral

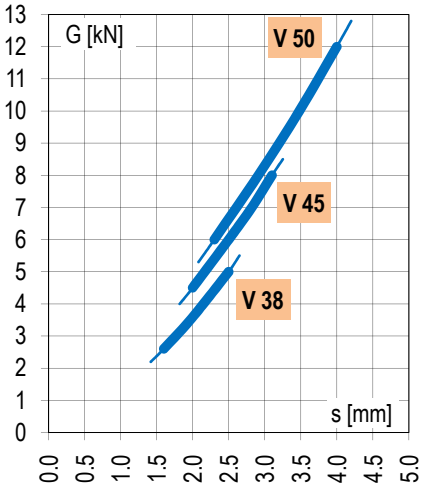


Vibration dampers

V: Deflection curves and cold flow behaviour

These deflection values are based on our catalogue data and are to be taken as guidelines.
Please also refer to our tolerance data in chapter 7 «Technology – ROSTA Basics».

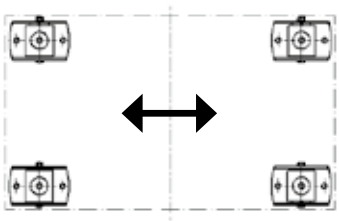




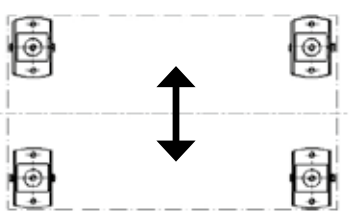
V: Installation guidelines

The V elements installed in the same direction hold load to G_{max} in X- and Z-direction.

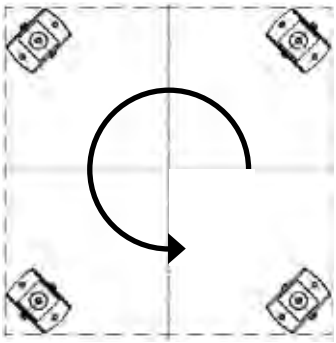
Dynamic forces longitudinal



Dynamic forces lateral



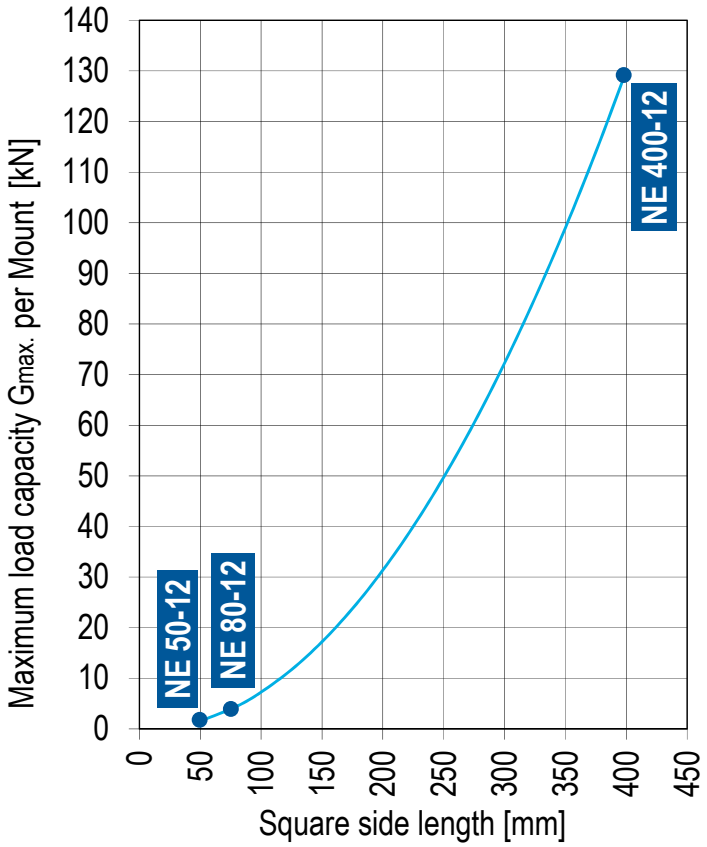
45° diagonal configuration by rotary motions. Reduced load capacities.



Vibration dampers

NE: Maximum load and options

Maximum load sizes NE 50-12 to 400-12:



Options on request:
– Adhesive layer
– Different length and width, maximum dimensions are 1.5 × 5 m.
– Material thickness of 8, 12.5 and 25 mm; multiple thickness 37.5 and 50 mm.