

Dampening of Structure Borne Noise

Dampening of Structure Borne Noise by use of Dampening Bars

An optimum effect is reached by double uncoupling of the hydraulic pump by means of the dampening ring and of the elastic footstep bearings of the electric motor by means of the dampening bars (fig. 1). The structure-borne noise of the hydraulic pump already reduced by the elastic dampening flange is thus further reduced. The vibrations coming from the electric motor are also dampened. One further advantage of the double bearings is the fact that any interruptions of the dampening, which might occur due to bulging undulations in the rubber coating are compensated, as the two bearings hold different natural frequencies and thus complement one another with reference to efficiency.

In order to determine the effect of various elastic footstep bearings on airborne noise dispelling from a power unit, comparative measurements were performed. The dampening bars were examined as well as some bearing variants produced from

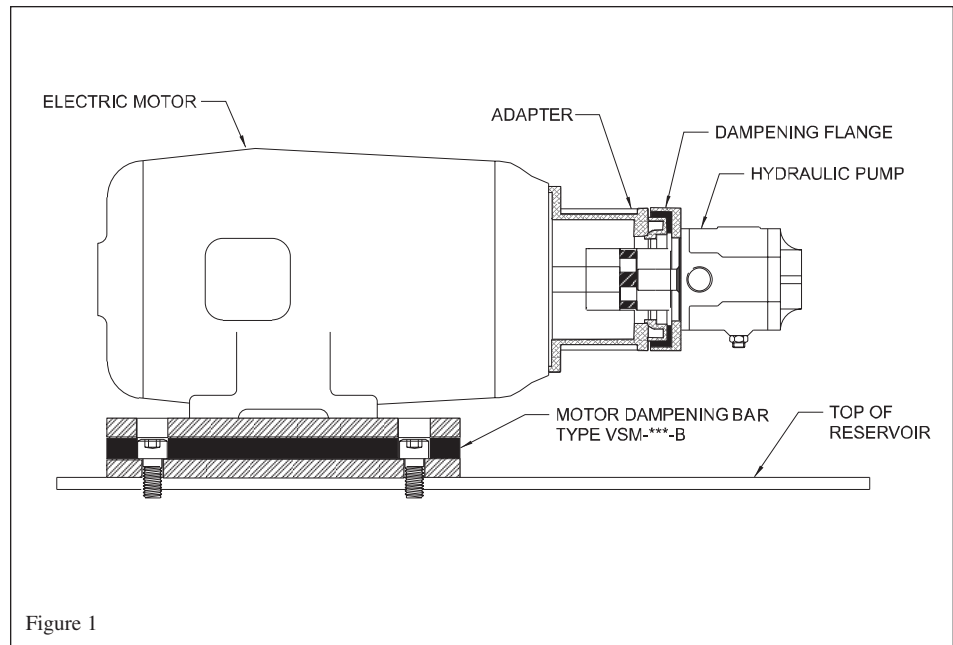


Figure 1

dampening bars, which were stressed with reference to pressure on thrust, with natural frequencies between 5 and 50 Hz. Figure 2 and 3 give an overall view of the examined elastic bearings and of the test parameters.

Result:

All elastic bearings variants reached an excellent average reduction of airborne noise between 2.8 and 3.8 dB(A).

No.	ELASTIC BEARINGS	RUBBER STRESS	NATURAL FREQUENCY f_0 [Hz]
A		PRESSURE	50
B		PRESSURE	45
C		THRUST	5
D		THRUST	8
E		PRESSURE	10
F		PRESSURE	45/50
G		PRESSURE/THRUST	5/50
H		PRESSURE/THRUST	5/8
I		PRESSURE/THRUST	8/50

Figure 2

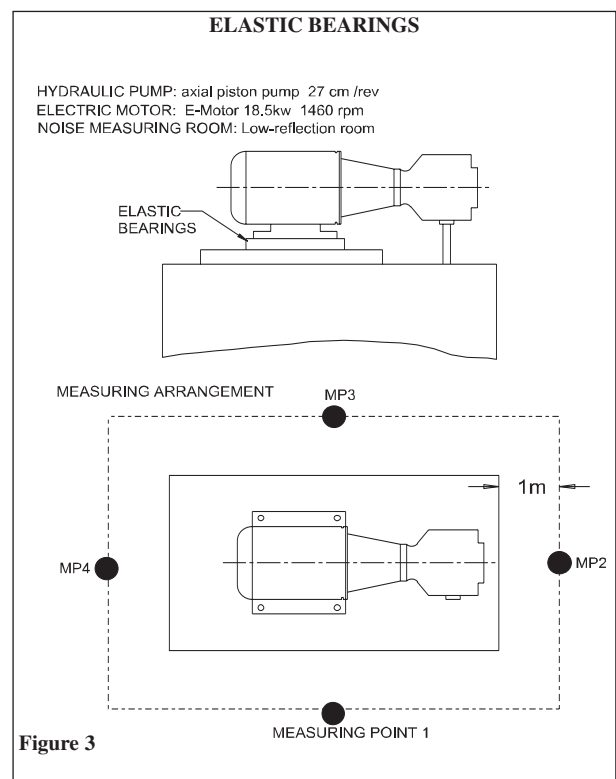


Figure 3



Dampening of Structure Borne Noise

From the great number of examined bearings four types were compared, which especially vary due to the extent of the natural frequency and due to the rubber stress.

1. Rigid fixation,
2. Bearing A: dampening bar VSM 286B, with compressive stress, natural frequency = 35 to 50 Hz
3. Bearing C: bar segment, with shearing stress, natural frequency = 5 to 8 Hz
4. Bearing G: double bearings of A and C, dampening bar + dampening bar segment, natural frequency = 5/50 Hz.

Figure 4 shows nearly the same average results for the three different elastic bearings, despite the substantial differences in rigidity. The frequency spectrum of the airborne noise (fig. 5) measured at point 3 opposite the hydraulic power unit also shows only small differences of the various bearings. A clear reduction of airborne noise coming to 3.2 to 3.3 dB(A) is reached in the fre-

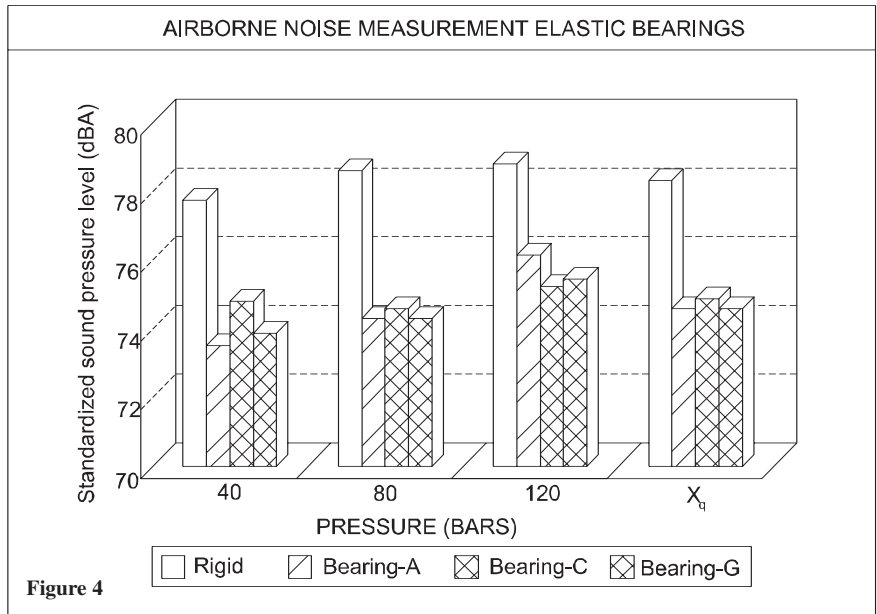


Figure 4

quency range of the 2nd and 3rd piston frequency (400 to 630 Hz) as well as for higher frequencies between 2000 and 8000 Hz, reaching up to 8 db.

There are small excesses in the frequency range of the 1st, 4th and 5th piston frequency, and at this the various bearing types only deviate slightly. The softer syntonized bearings C and G hold small advantages

in the lower frequency range between 200 and 500 Hz, but the harder dampening bar (bearing A) is more favorable in the frequency range 800 to 1250 Hz.

It is thus obvious that all bearings which have been syntonized relatively hard still reach good results in the reduction of noise, despite a relatively high natural frequency.

Furthermore, besides a sufficient structure-borne noise reducing effect the dampening bars hold additional advantages:

- fast and cost-saving assembly, as no subconstruction is required,
- design without any problems, as an exact calculation of the gravity center and supporting forces will not be required in normal cases,
- solid assembly with good lateral stability, thus protection for pipes and compensators,
- high safety against mechanical-overload due to the large molded-on rubber surface, long service life due to this.

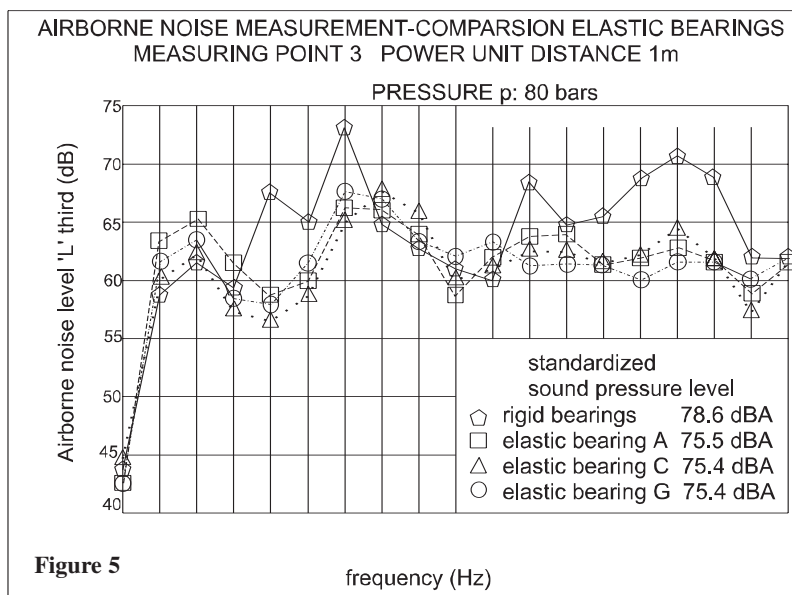


Figure 5



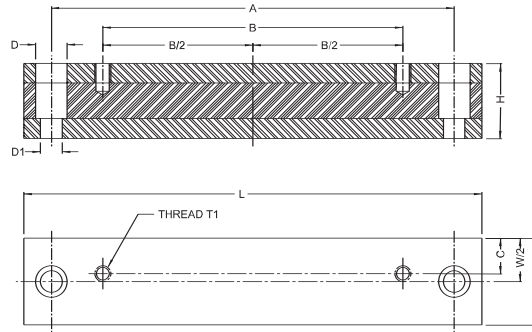
MOTOR DAMPENING BARS

Bolt Down Type



Benefits and Features

- Reduces both noise level and vibrations
- Fully machined for NEMA motors
- Bolt down design for easy installation
- Vulcanized bonding - not bolted together
- Available from stock
- 2 required per motor
- Metric sizes also available, consult factory

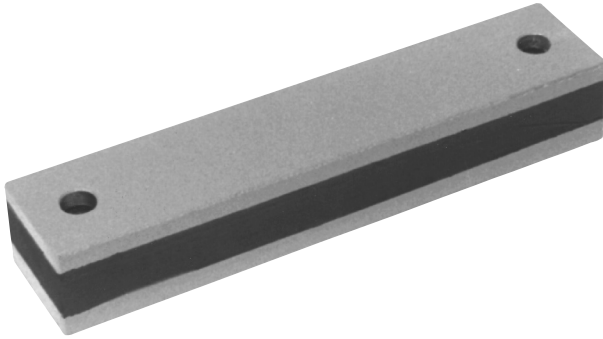


Vescor Part Number	Motor Size	Dimensions								
		L	W	H	A	B	C	D	D1	T1
VSM-56-B	56C	7 ¹ / ₄ "	2"	1 ⁹ / ₁₆ "	5 ³ / ₄ "	3"	7 ⁷ / ₈ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	5 ¹ / ₁₆ -18NC
VSM-143-B	143TC	7 ³ / ₄ "	2"	1 ⁹ / ₁₆ "	6 ¹ / ₄ "	4"	1 ³ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	5 ¹ / ₁₆ -18NC
VSM-145-B	145TC	8 ³ / ₄ "	2"	1 ⁹ / ₁₆ "	7 ¹ / ₄ "	5"	1 ³ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	5 ¹ / ₁₆ -18NC
VSM-182-B	182TC	8 ³ / ₄ "	2"	1 ⁹ / ₁₆ "	7 ¹ / ₄ "	4 ¹ / ₂ "	1 ⁵ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	3 ⁷ / ₈ -16NC
VSM-184-B	184TC	9 ³ / ₄ "	2"	1 ⁹ / ₁₆ "	8 ¹ / ₄ "	5 ¹ / ₂ "	1 ⁵ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	3 ⁷ / ₈ -16NC
VSM-213-B	213TC	10"	2"	1 ⁹ / ₁₆ "	8 ¹ / ₂ "	5 ¹ / ₂ "	1 ⁵ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	3 ⁷ / ₈ -16NC
VSM-215-B	215TC	11 ¹ / ₂ "	2"	1 ⁹ / ₁₆ "	10"	7"	1 ⁵ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	3 ⁷ / ₈ -16NC
VSM-254-B	254TC	13"	2"	1 ³ / ₄ "	11 ¹ / ₂ "	8 ¹ / ₄ "	1 ⁵ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	1 ¹ / ₂ -13NC
VSM-256-B	256TC	14 ³ / ₄ "	2"	1 ³ / ₄ "	13 ¹ / ₄ "	10"	1 ⁵ / ₁₆ "	1 ³ / ₁₆ "	9 ¹ / ₁₆ "	1 ¹ / ₂ -13NC
VSM-284-B	284TC/TSC	14 ¹ / ₂ "	2 ³ / ₄ "	2 ³ / ₈ "	12 ³ / ₄ "	9 ¹ / ₂ "	1 ¹ / ₈ "	1"	1 ¹ / ₁₆ "	1 ¹ / ₂ -13NC
VSM-286-B	286TC/TSC	16"	2 ³ / ₄ "	2 ³ / ₈ "	14 ¹ / ₄ "	11"	1 ¹ / ₈ "	1"	1 ¹ / ₁₆ "	1 ¹ / ₂ -13NC
VSM-324-B	324TC/TSC	16"	3 ³ / ₁₆ "	2 ³ / ₈ "	14"	10 ¹ / ₂ "	1 ⁹ / ₁₆ "	1 ¹ / ₄ "	1 ³ / ₁₆ "	5 ⁷ / ₈ -11NC
VSM-326-B	326TC/TSC	17 ¹ / ₂ "	3 ³ / ₁₆ "	2 ³ / ₈ "	15 ¹ / ₂ "	12"	1 ⁹ / ₁₆ "	1 ¹ / ₄ "	1 ³ / ₁₆ "	5 ⁷ / ₈ -11NC
VSM-364-B	364TC/TSC	17"	3 ³ / ₁₆ "	2 ³ / ₈ "	15"	11 ¹ / ₄ "	1 ⁹ / ₁₆ "	1 ¹ / ₄ "	1 ³ / ₁₆ "	5 ⁷ / ₈ -11NC
VSM-365-B	365TC/TSC	18"	3 ³ / ₁₆ "	2 ³ / ₈ "	16"	12 ¹ / ₄ "	1 ⁹ / ₁₆ "	1 ¹ / ₄ "	1 ³ / ₁₆ "	5 ⁷ / ₈ -11NC
VSM-404-B	404TC/TSC	19 ¹ / ₂ "	4"	2 ³ / ₈ "	17 ¹ / ₄ "	12 ¹ / ₄ "	2"	1 ⁹ / ₁₆ "	1 ¹ / ₁₆ "	3 ³ / ₄ -10NC
VSM-405-B	405TC/TSC	21"	4"	2 ³ / ₈ "	18 ³ / ₄ "	13 ³ / ₄ "	2"	1 ⁹ / ₁₆ "	1 ¹ / ₁₆ "	3 ³ / ₄ -10NC
VSM-444-B	444TC/TSC	23"	4 ³ / ₄ "	2 ³ / ₈ "	20 ³ / ₄ "	14 ¹ / ₂ "	2 ³ / ₈ "	1 ⁹ / ₁₆ "	1 ¹ / ₁₆ "	3 ³ / ₄ -10NC
VSM-445-B	445TC/TSC	26"	4 ³ / ₄ "	2 ³ / ₈ "	23 ³ / ₄ "	16 ¹ / ₂ "	2 ³ / ₈ "	1 ⁹ / ₁₆ "	1 ¹ / ₁₆ "	3 ³ / ₄ -10NC



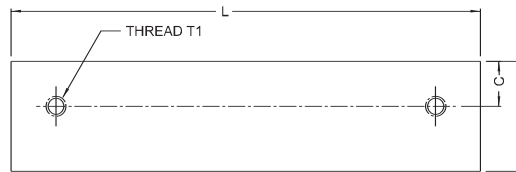
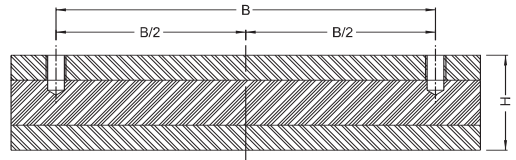
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Weldable Type



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- Reduces both noise level and vibrations
- Fully machined for NEMA motors
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VSM-145-W	145TC	6 ¹ / ₂ "	2"	1 ⁹ / ₁₆ "	5"	1 ³ / ₁₆ "	5 ⁵ / ₁₆ -18NC
VSM-182-W	182TC	6"	2"	1 ⁹ / ₁₆ "	4 ¹ / ₂ "	1 ⁵ / ₁₆ "	3 ³ / ₈ -16NC
VSM-184-W	184TC	7"	2"	1 ⁹ / ₁₆ "	5 ¹ / ₂ "	1 ⁵ / ₁₆ "	3 ³ / ₈ -16NC
VSM-213-W	213TC	7 ³ / ₄ "	2"	1 ⁹ / ₁₆ "	5 ¹ / ₂ "	1 ⁵ / ₁₆ "	3 ³ / ₈ -16NC
VSM-215-W	215TC	9"	2"	1 ⁹ / ₁₆ "	7"	1 ⁵ / ₁₆ "	3 ³ / ₈ -16NC
VSM-254-W	254TC	10 ¹ / ₂ "	2"	1 ³ / ₄ "	8 ¹ / ₄ "	1 ⁵ / ₁₆ "	1 ¹ / ₂ -13NC
VSM-256-W	256TC	12 ¹ / ₄ "	2"	1 ³ / ₄ "	10"	1 ⁵ / ₁₆ "	1 ¹ / ₂ -13NC
VSM-284-W	284TC/TSC	12"	2 ³ / ₄ "	2 ³ / ₈ "	9 ¹ / ₂ "	1 ¹ / ₈ "	1 ¹ / ₂ -13NC
VSM-286-W	286TC/TSC	13 ¹ / ₄ "	2 ³ / ₄ "	2 ³ / ₈ "	11"	1 ¹ / ₈ "	1 ¹ / ₂ -13NC
VSM-324-W	324TC/TSC	12 ¹ / ₂ "	3 ³ / ₁₆ "	2 ³ / ₈ "	10 ¹ / ₂ "	1 ⁹ / ₁₆ "	5 ⁵ / ₈ -11NC
VSM-326-W	326TC/TSC	14"	3 ³ / ₁₆ "	2 ³ / ₈ "	12"	1 ⁹ / ₁₆ "	5 ⁵ / ₈ -11NC
VSM-364-W	364TC/TSC	13 ¹ / ₂ "	3 ³ / ₁₆ "	2 ³ / ₈ "	11 ¹ / ₄ "	1 ⁹ / ₁₆ "	5 ⁵ / ₈ -11NC
VSM-365-W	365TC/TSC	14 ¹ / ₂ "	3 ³ / ₁₆ "	2 ³ / ₈ "	12 ¹ / ₄ "	1 ⁹ / ₁₆ "	5 ⁵ / ₈ -11NC
VSM-404-W	404TC/TSC	15 ¹ / ₂ "	4"	2 ³ / ₈ "	12 ¹ / ₄ "	2"	3 ³ / ₄ -10NC
VSM-405-W	405TC/TSC	17"	4"	2 ³ / ₈ "	13 ³ / ₄ "	2"	3 ³ / ₄ -10NC
VSM-444-W	444TC/TSC	19 ¹ / ₂ "	4 ³ / ₄ "	2 ³ / ₈ "	14 ¹ / ₂ "	2 ³ / ₈ "	3 ³ / ₄ -10NC
VSM-445-W	445TC/TSC	21"	4 ³ / ₄ "	2 ³ / ₈ "	16 ¹ / ₂ "	2 ³ / ₈ "	3 ³ / ₄ -10NC

NOTE: WITH VESCORS' POLICY OF CONSTANTLY IMPROVING ITS PRODUCTS, SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.