MÜLLER-BBM
Accredited Test Laboratory
according to ISO/IEC 17025
Deutscher Akkreditierungs Rat
DAP-PL-2465.10

Address of the testing facility:
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Test certificate

for the determination of the structure-borne sound insulation of elastic mounting elements according to the dual resonator method by means of the methods stated in DIN EN ISO 10846-4

Type of test:	Measurement of vibration transmission factors in the form of velocity level differences of elastic mounting elements
Client:	Hilti Aktiengesellschaft Feldkircherstrasse 100 9494 Schaan Liechtenstein
Date of the test:	2007-08-23 and -24 **Test report No.** M68 276/6 of 2007-11-30

Test object:

Name:	Ventilation pipe ring	Manufacturer:	Hilti
Type:	MV-PI/ MV-PIF 80 to 450	Year of construction:	2007
Product No.:	39767, 39774, 39775, 39782	State:	new

Technical data :

Nominal clamping diameter:	DN 80, DN 200, DN 224, DN 450	Elastic element:	Rubber MVI-PI 20x1,5 mm and 25 x 2.0 mm
Material:	Pipe ring profile 20 x 1.5 mm and 25 x 2.0 mm	Material:	EPDM 55 ± 5 Shore A

Test method: **Dual resonator method by means of the methods stated in DIN EN ISO 10846-4**
"Laboratory measurement of the vibro-acoustic transfer properties of resilient elements", February 2004
Fixing and coupling of accelerometers according to DIN ISO 5348 "Mechanical mounting of accelerometers".

Vibration excitation signal:	sine sweep signal
Frequency range:	20 Hz up to 2000 Hz

Calibration: According to DIN EN ISO 16063-21 within the scope of Müller-BBM's quality management system
Environmental conditions: Temperature: 19°C, relative humidity: 58 %

Test set-up:

Test object: Installation according to practical use, fixing at exciting mass and isolating mass so that a good contact is guaranteed. Coupling of the vibration exciter via a tappet.

Vibration-exciting equipment:	Brüel & Kjaer 4801	Exciting mass:	30 kg + adapter mass
Vibration initiation:	axial	Isolating mass:	30 kg + correction mass

Preload: torque of the clamp screws of all ventilation pipe rings = 0.6 Nm

Test result:

Ventilation pipe ring MV-PI/ MV-PIF 80 up to 450

- The effectiveness of structure-borne sound insulation of the ventilation pipe ring MV-PI starts at different frequencies: ventilation pipe ring "without" elastic element: 160 Hz, ventilation pipe ring "with" elastic element: 40 Hz up to 100 Hz, depending on the diameter
- Compared with the ventilation pipe rings "without" elastic element, the ventilation pipe rings "with" elastic element achieve an improvement of approx. 11 up to 21 dB depending on the size.
- Above 40 up to 100 Hz, a distinct increase of structure-borne sound insulation is achieved by the ventilation pipe rings "with" elastic element.
- If the ventilation pipe rings "with" elastic element are used in a professional way, an improvement of structure-borne sound insulation as defined in DIN 4109, „Sound insulation in buildings" of November 1989 can be achieved.

Place and date: Planegg near Munich, 2007-11-30
Test carried out by: Dr. M. Schmidt

Signature:

Anhang

Ergebnisse der Schwingungsmessungen
Terzspektren der Schnellepegeldifferenzen

Ermittlung der Körperschalldämmung nach dem Tonpilzverfahren und der DIN EN ISO 10846-4

Lüftungsrohrschelle

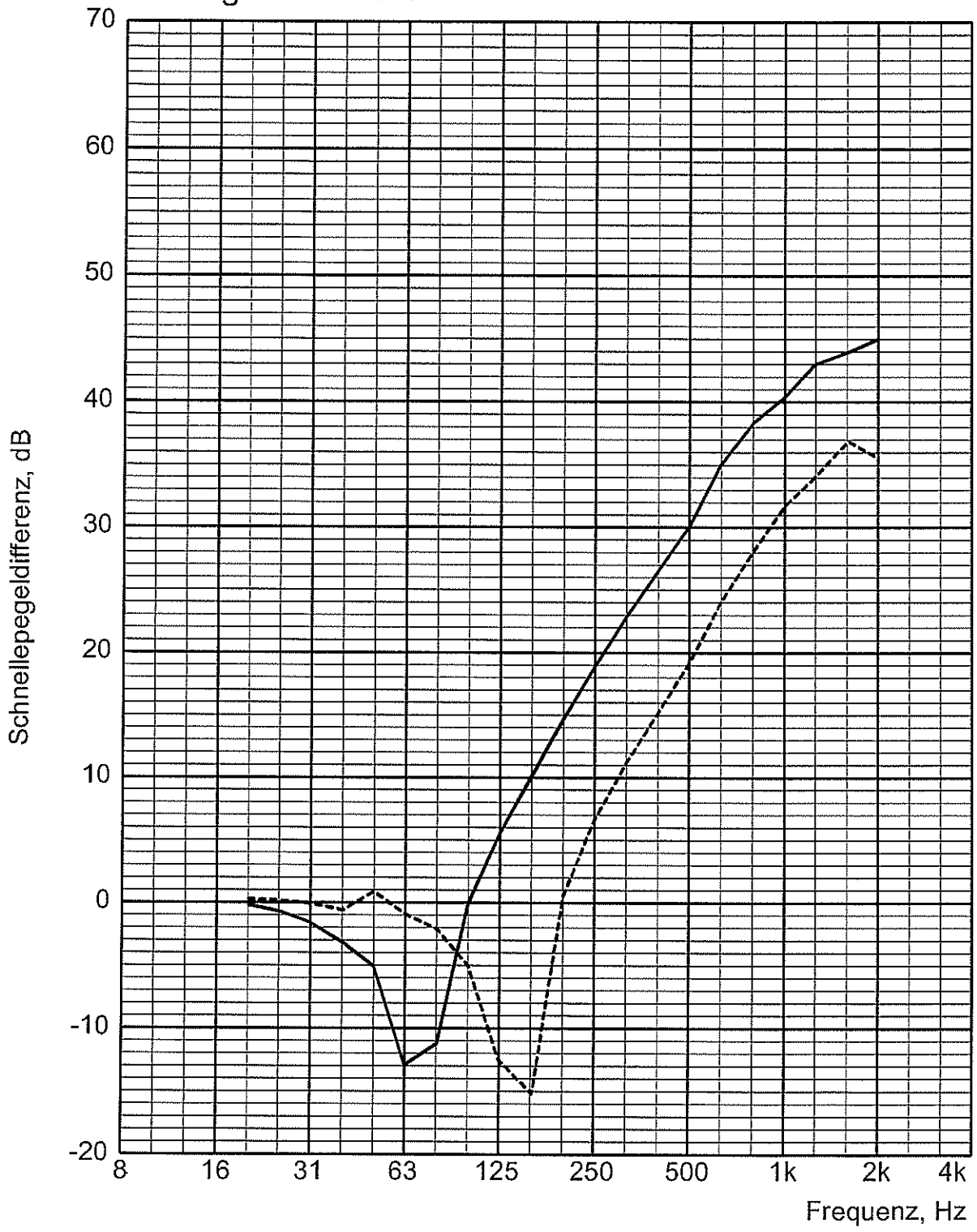

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Abbildung 1

Ermittlung der Körperschalldämmung nach dem Tonpilzverfahren und der DIN EN ISO 10846-4

Lüftungsrohrschelle

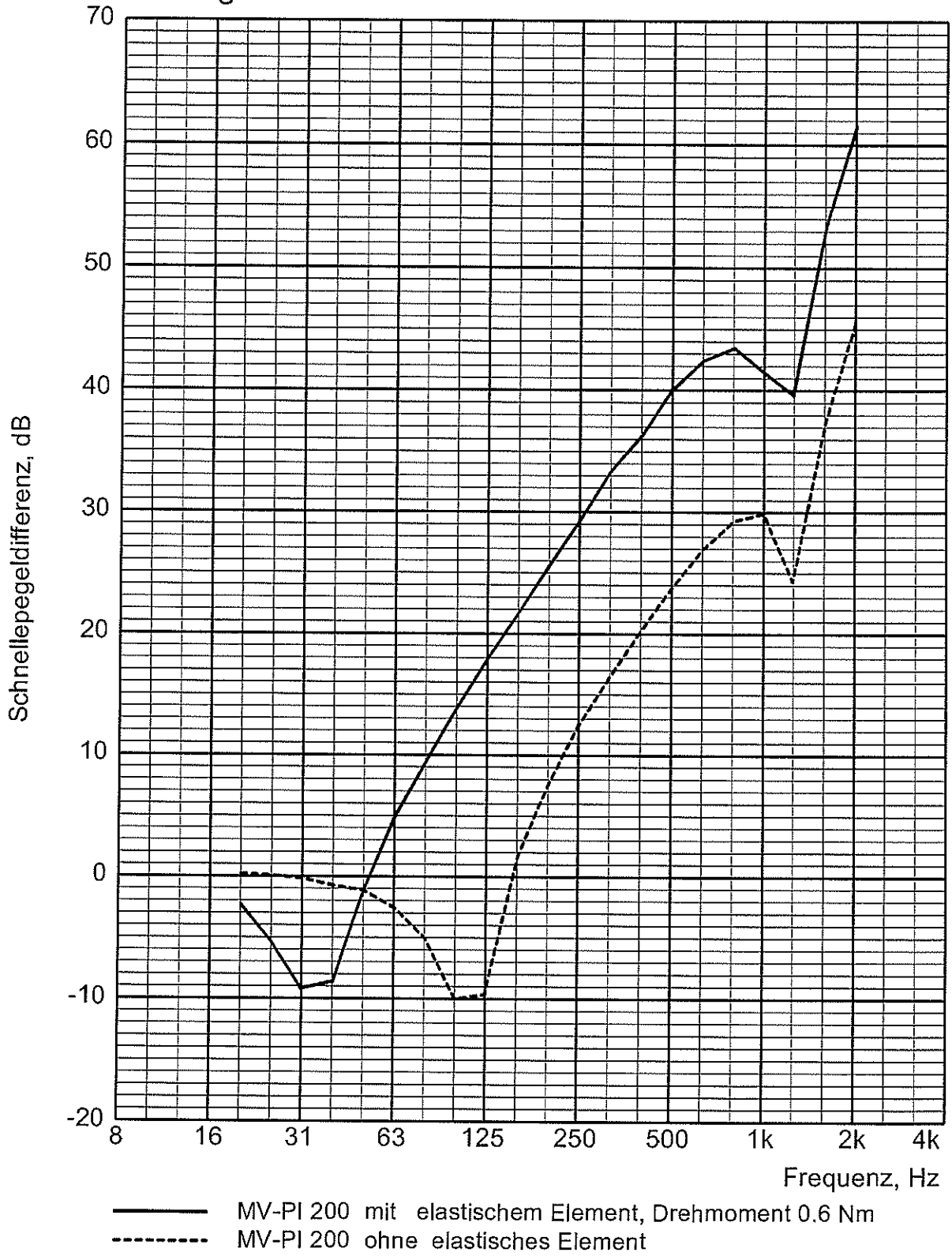

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Abbildung 2

Ermittlung der Körperschalldämmung nach dem Tonpilzverfahren und der DIN EN ISO 10846-4

Lüftungsrohrschelle

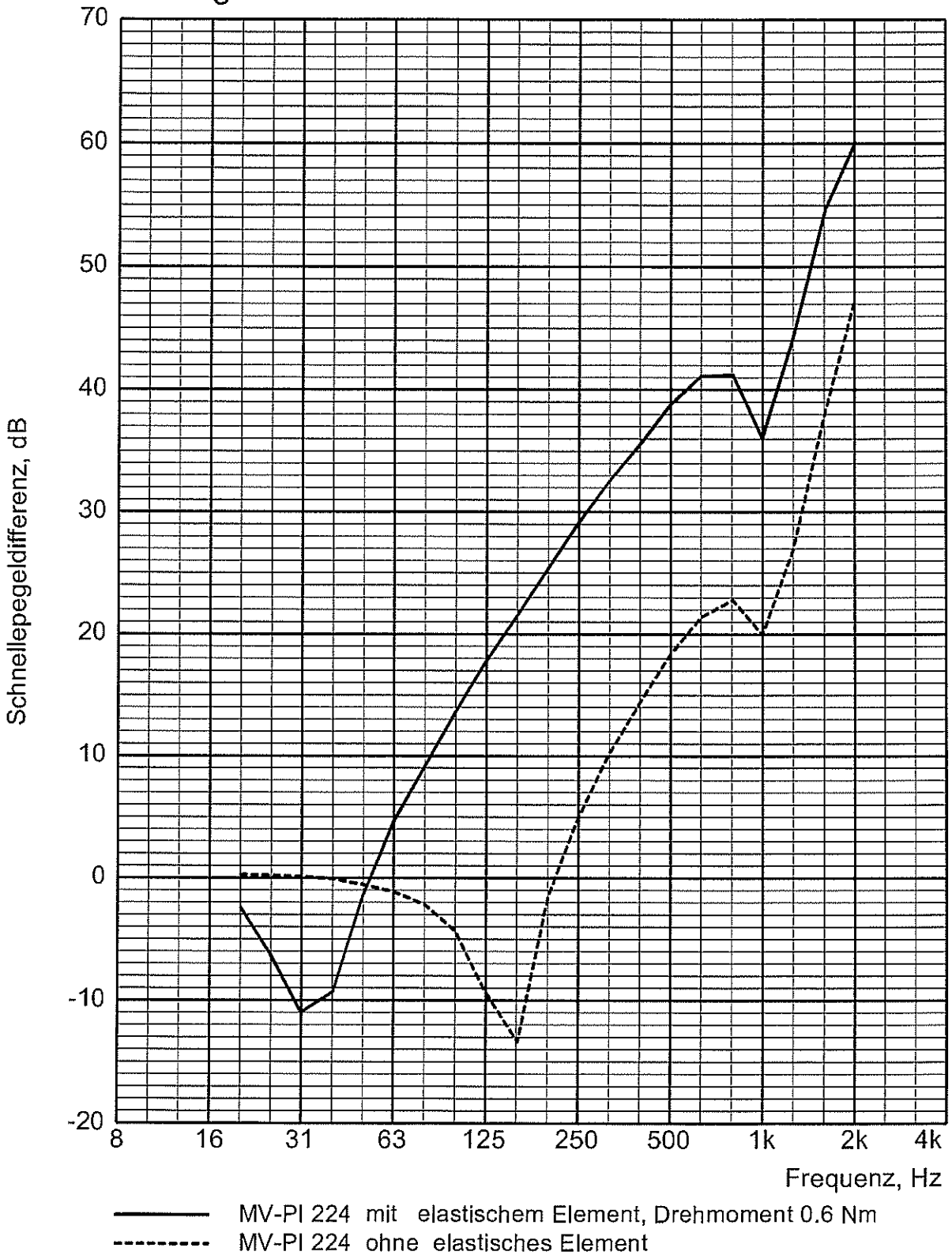

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Abbildung 3

Ermittlung der Körperschalldämmung nach dem Tonpilzverfahren und der DIN EN ISO 10846-4

Lüftungsrohrschelle

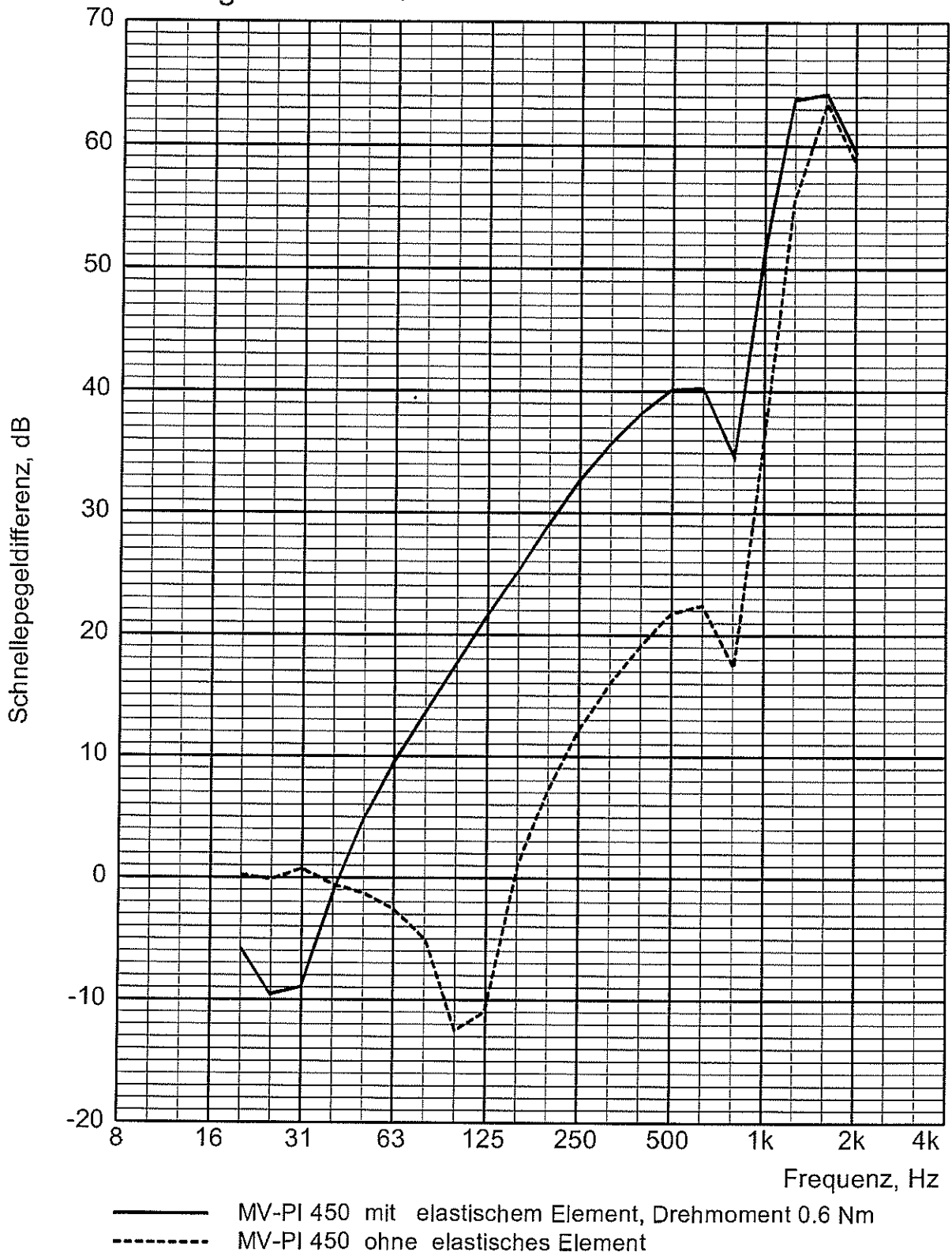

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Abbildung 4