

SERVICEFORCE.COM	SC-Test Report Measurement of vibration of grinding machines	Service Center No.: 081_08 Q Date: 2008-06-26
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Test Report

Measurement of vibration of grinding machines

Service Center

Nr.:DAT-P-136/03-00	Accredited Test Laboratory according to DIN EN ISO/IEC 17025

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		Test location:	
Job number:			
Test description:	Measurement of vibration at 4 different grinding machines with different brush-belts	Reference:	EN ISO 8662-1; EN ISO 8662-4
		Standard deviations:	
Summary:			
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	signature		Signature
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1 Introduction

Serviceforce.Com GmbH was commissioned to perform vibration measurements at the handles of four different grinding machines. Two of the machines were operated by compressed air, another two by electric drives.

The machines were equipped with different brushes. During the measurements three different persons held the machines.

2 Apparatus and Procedures

Measure equipment	Manufacturer	Type	User-ID
Vibration analyser + rev counter	Brüel & Kjær Vibro	Vibrotest 60	W002290K0
Acceleration sensor 1	Brüel & Kjær Vibro	AS-065	0022FUUO
Acceleration sensor 2	Brüel & Kjær Vibro	AS-065	0022FUTL
Dynamometer	Chatillon	DFG-50	611150-607

3 Results

3.1 Samples

Sample	Type	Serial-Number
1	MBX® Blaster Pneumatik 3500X	004378
2	MBX® Blaster Elektrik 3200X	03144
3	MBX® Pneumatik 3500HD	10232
4	MBX® Elektrik 3200	04544

3.2 Brush-Belts

Name	Width	Colour-Code	Used with Sample
MBX® Bristle Blaster	11 mm	Red	1, 2
MBX® Bristle Blaster	23 mm	Red	1, 2
MBX® coarse	11 mm	Black	3, 4
MBX® coarse	23 mm	Black	3, 4
MBX® medium	11 mm	Ochre	3, 4
MBX® medium	23 mm	Ochre	3, 4
MBX® fine	11 mm	Green	3, 4
MBX® fine	23 mm	Green	3, 4
MBX® Stainless Steel straight	11 mm	Blue	3, 4
MBX® Stainless Steel straight	23 mm	Blue	3, 4
MBX® Stainless Steel angled	11 mm	Blue	3, 4
MBX® Stainless Steel angled	23 mm	Blue	3, 4
MBX® Vinyl Zapper	23 mm		3, 4

3.3 Operation of the samples

The samples No. 1 and 3 were operated by oiled compressed air. The air pressure was reduced until the machines had a speed of about 1,750 rpm, 50% of the idle speed.

In a preliminary test with the samples No. 2 and 4 the load speed of 2,000 rpm was determined.

During the measurements, this speed was adjusted, using a dimmer module: "POWER CONTROL 230V ~ 600VA".

During the measurement a force of 40 N was exerted to the samples. Therefore the machine was connected to a rope with a counter-weight of 40 N + net weight of the machine on its other end (Figure 2 / 3), so that the operator had to exert the force of 40 N to the machine.

3.4 Measurement

Two acceleration sensors were attached to the tested machine. Measuring points were the main handle (machine housing, sensor 1) and the auxiliary handle (sensor 2, figure 1).

The accelerations were measured in m/s^2 . The frequencies were divided in third bands. For each third band one acceleration value was measured.

For each machine-brush combination three different persons held the machines. Four measurements per person were done.

Finally, each machine was measured per person without a brush.

3.5 Utilisation

The third band values of each measurement have been converted to a frequency rated acceleration value a_{hw} .

It was calculated as follows:

$$a_{hw} = \sqrt{\sum (W_{hi} a_{hi})^2}$$

Where is:

W_{hi} The evaluation factor for the i^{th} third band (see ISO 5349-1:2001, Table A.2)

a_{hi} The acceleration value in m/s^2 measured in the i^{th} third band.

The calculated values of the acceleration of the four measurements per person for each machine-brush combination and each sensor were averaged separately. The results of the three persons were then averaged too. The result for each machine-brush combination are two characteristic acceleration values (one value per measuring point).

The results are tabulated in chapter 3.5.

The results of individual measurements are annexed to this protocol in electronic form (CD).

3.6 Table of results

Machine No.:	Brush-belt	Width	Sensor 1 $a_{hw} / m/s^2$	Sensor 2 $a_{hw} / m/s^2$
1	MBX® Bristle Blaster	11 mm	0,77	0,99
1	MBX® Bristle Blaster	23 mm	2,03	1,93
1	<i>without brush-belt</i>		0,15	0,17
2	MBX® Bristle Blaster	11 mm	0,96	1,08
2	MBX® Bristle Blaster	23 mm	1,47	3,09
2	<i>without brush-belt</i>		0,49	0,30
3	MBX® coarse	11 mm	0,28	0,46
3	MBX® coarse	23 mm	0,33	0,63
3	MBX® medium	11 mm	0,25	0,45
3	MBX® medium	23 mm	0,37	0,69
3	MBX® fine	11 mm	0,30	0,54
3	MBX® fine	23 mm	0,27	0,50
3	MBX® Stainless Steel straight	11 mm	0,24	0,52
3	MBX® Stainless Steel straight	23 mm	0,30	0,67
3	MBX® Stainless Steel angled	11 mm	0,28	0,57
3	MBX® Stainless Steel angled	23 mm	0,23	0,49
3	MBX® Vinyl Zapper	23 mm	0,27	0,55
3	<i>without brush-belt</i>		0,22	0,26
4	MBX® coarse	11 mm	0,41	0,32
4	MBX® coarse	23 mm	0,57	0,79
4	MBX® medium	11 mm	0,30	0,34
4	MBX® medium	23 mm	0,39	0,76
4	MBX® fine	11 mm	0,31	0,35
4	MBX® fine	23 mm	0,34	0,53
4	MBX® Stainless Steel straight	11 mm	0,29	0,29
4	MBX® Stainless Steel straight	23 mm	0,34	0,41
4	MBX® Stainless Steel angled	11 mm	0,28	0,35
4	MBX® Stainless Steel angled	23 mm	0,32	0,44
4	MBX® Vinyl Zapper	23 mm	0,29	0,41
4	<i>without brush-belt</i>		0,31	0,31

4 Documentation

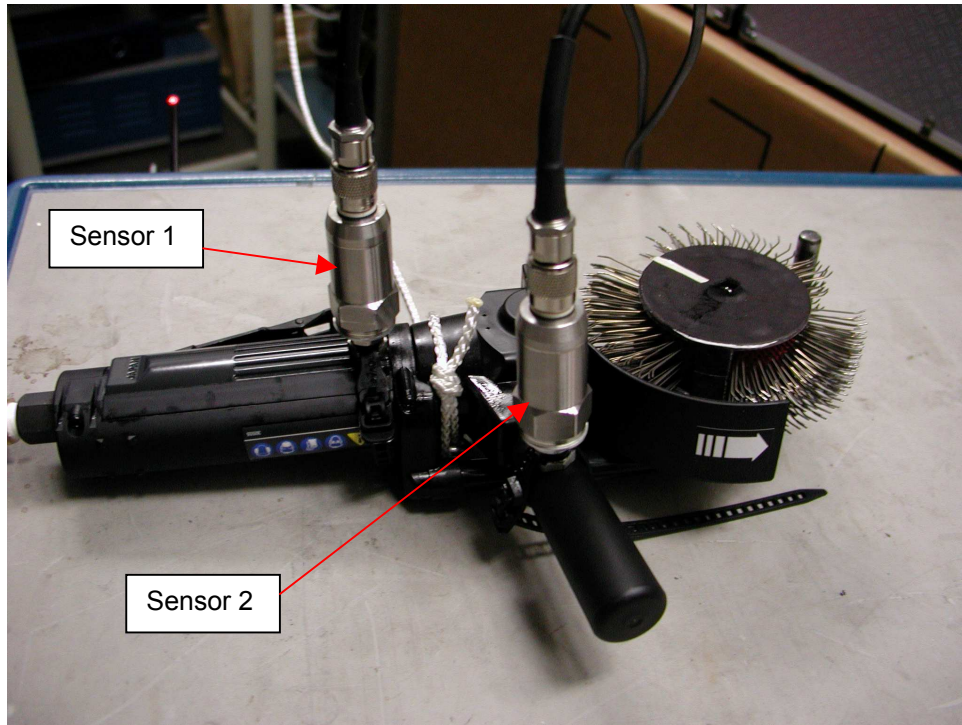


Figure 1: Sample with acceleration sensors

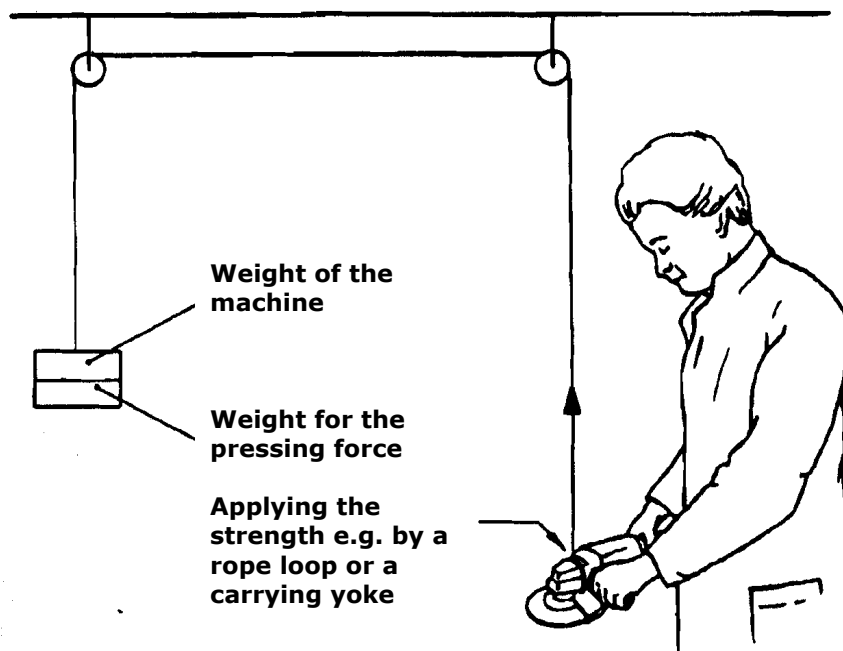


Figure 2: Test equipment

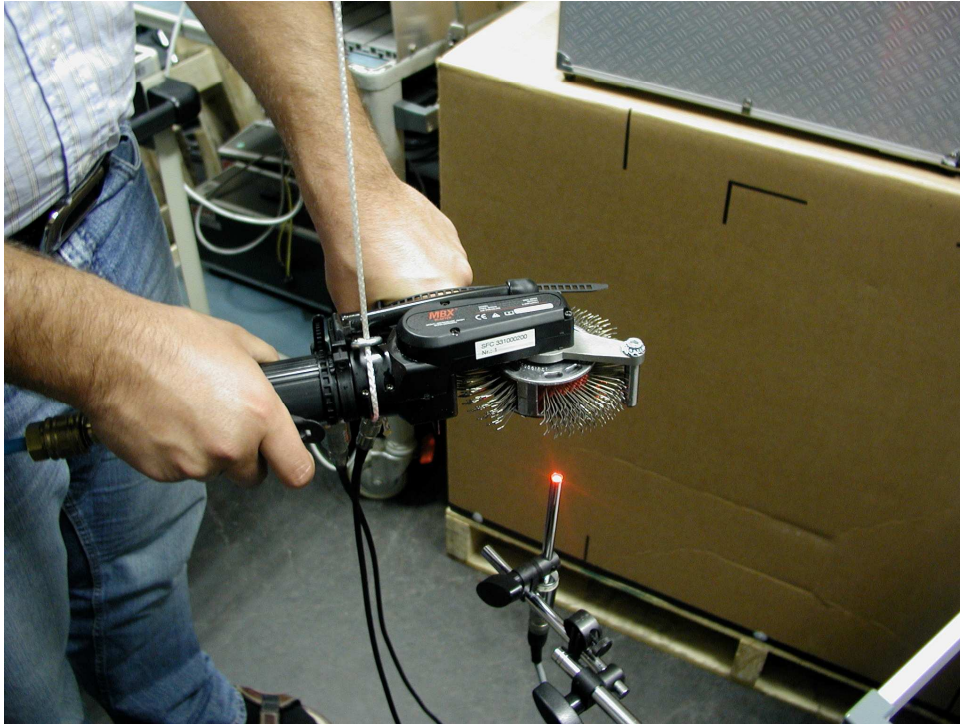




Figure 3: Performing the examination

5 Annex – Inspection Certificate of the vibration analyser

 <p>Brüel & Kjær Vibro</p>	<p>Brüel & Kjær Vibro GmbH Layheckerstraße 10 D-64293 Darmstadt Tel.: (0 61 51) 428 - 1100 Fax.: (0 61 51) 428 - 1200 E-Mail: info@bkvibro.de</p>
<p>MANAGEMENT SYSTEM</p>  <p>DQS-zertifiziert nach certified by DQS according to ISO 9001:2000 Reg.-No. 057186 QM</p>	
<p>Abnahmeprüfzeugnis 3.1 nach EN 10204 Inspection Certificate 3.1 according to EN 10204</p>	
<p>Produkt / Product: Schwingungsmessgerät / Measuring Instrument Typ / Type: VIBROTEST 60 Material-Nr. / Mat. No. (M/N): C005578.99 Serial-Nr. / Serial No. (S/N): 002290K0</p>	<p>Auftragsnr. / Order No. Vibro 9100134017</p>
<p>Hiermit wird bescheinigt, dass das oben genannte Produkt unter Beachtung des Qualitätsmanagementsystems entsprechend DIN EN ISO 9001 gefertigt, justiert und geprüft wurde.</p> <p>Das Produkt ist herstellernormgemäß gefertigt und entspricht den geltenden technischen Spezifikationen.</p> <p>Die verwendeten qualitätsrelevanten Messeinrichtungen sind auf nationale Normale (DKD/PTB) rückführbar. Damit ist die Darstellung der Einheiten in Übereinstimmung mit dem internationalen Einheitensystem (SI) gewährleistet.</p> <p>Das empfohlene Prüfintervall beträgt: 2 Jahre</p>	
<p><i>It is confirmed that the above specified product has been manufactured, adjusted and tested with regards to the Total Quality Management System certified by DIN EN ISO 9001.</i></p> <p>The product is manufactured according to the applicable technical specifications.</p> <p><i>All measuring instrumentation used are traceable to national standards (DKD/PTB). Therefore, representation of the units of measurement according to the International System of Units (SI) is ensured.</i></p> <p><i>The recommended test interval is 2 years</i></p>	
<p>Bestandteil dieser Bescheinigung sind folgende Anlagen: <i>This certificate includes following enclosures</i></p>	<p>keine none</p>
<p>Anzahl der Seiten der Anlagen: <i>Number of pages:</i></p>	<p>keine none</p>
<p>Datum / Date</p>	<p>Unterschrift Ersteller <i>Signature of Inspector</i></p>
<p>08.08.2007</p>	<p>i.A. Dreher</p>
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<p>Seite/Page 1 von/of 1</p>	