

# Focus on IFA's work

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## Hand-arm vibration: risk assessment of brush cutters

### Problem

Work with hand-held brush cutters may give rise to vibration exposure presenting a hazard to human health. The required risk assessment can be performed in accordance with the German Ordinance on noise and vibration protection either by means of measurement, or by reference to other sources of information, such as the manufacturers' data.

Vibration values determined by the manufacturer under laboratory conditions are emission values, and may differ from the exposure values measured at the workplace. In order to prevent incorrect estimates, manufacturers' data must be corrected by means of a factor specific to the equipment concerned, in accordance with draft standard CEN/TR 15350 (DIN V 45694). Since the manufacturers' data for certain types of brush-cutter were not consistent with the subjective impressions of users working with them, the generic validity and reliability of the correction factor, which had been determined empirically, had to be examined.

### Activities

Vibration measurements were conducted to EN ISO 5349 under realistic field conditions on four brush cutters fitted with a special mowing head which prevented mowed debris and stones from being kicked up dangerously.

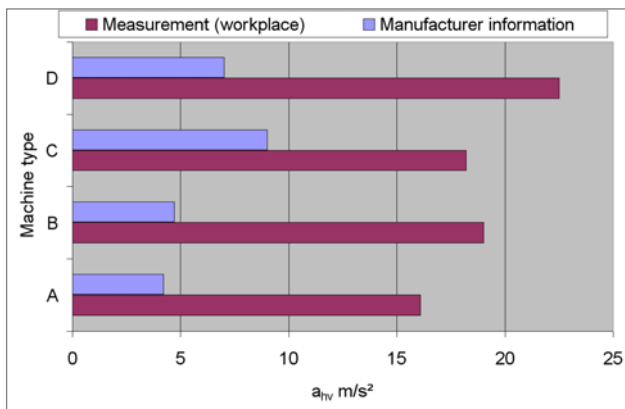


Use of a special brush cutter to remove unchecked growth

### Results and application

The vibration total value  $a_{hv}$  of the brush cutters studied lay between 16.1 and 22.5  $m/s^2$ . When the vibration values obtained during the field measurements were compared with those stated by the manufacturer, the correction value of 1 (also in accordance with TRLV Part 1, Annex 1) was shown to be wholly inadequate.

The studies revealed that for the particular design of brush cutter in question, the measurement standards were unsuitable for determining the emission values, since the resulting measured values led to considerable underestimation of the hazard (see image).



Comparison of the manufacturer's data with the values measured in the field

Depending upon the product, the limit value as defined in the German Ordinance on noise and vibration protection was exceeded at daily exposure durations of between 24 minutes and approximately 46 minutes. The IFA recommends use of the IFA parameter calculator and the BG expert committee's information sheets Nos 17 and 052 for determining the hazard to an individual.

### Area of Application

Municipal cleaning departments; gardening and landscaping

### Additional Information

- Exposure calculator for hand-arm vibration. [www.dguv.de/ifa](http://www.dguv.de/ifa), Webcode **d3245**
- Gefährdungsbeurteilung „Vibrationen“ bei handgeführten und -gehaltenen Arbeitsmaschinen: Hinweise zur Nutzung von Hersteller-

angaben aus Bedienungsanleitungen. Fachausschuss-Informationsblatt Nr. 17 (07.06).

Hand-Arm-Vibrationen. Checkliste zur Gefährdungsbeurteilung. Fachausschuss-Informationsblatt Nr. 52 (12.10). Published by: Fachausschuss Maschinenbau, Fertigungssysteme, Stahlbau, Mainz, [www.bghm.de](http://www.bghm.de), Webcode **796**

- DIN V 45694: Mechanical vibration – Guideline for the assessment of exposure to hand-transmitted vibration using available information including that provided by manufacturers of machinery (07.06). Beuth, Berlin 2006
- EN ISO 20643: Mechanical vibration – Hand-held and hand-guided machinery – Principles for evaluation of vibration emission (03.05). Beuth, Berlin 2005
- EN ISO 5349: Mechanical vibration – Measurement and evaluation of human exposure to hand-transmitted vibration – Part 1: General requirements (12.01). Part 2: Practical guidance for measurement at the workplace (12.01). Beuth, Berlin 20011
- Lärm- und Vibrations-Arbeitsschutzverordnung (Lärm-VibrationsArbSchV – *German Ordinance on noise and vibration protection*), 6 March 2007. BGBl. I (2007), pp. 261-277
- Technische Regel zur Lärm- und Vibrations-Arbeitsschutzverordnung (TRLV Vibrationen). GMBI. (2010), Nos 14-15, p. 271 ff.

### Expert Assistance

IFA, Division 4: Ergonomics – Physical environmental factors

### Literature Requests

IFA, Central Division

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