# JAR_16 Hand Arm Vibration Syndrome

**Legislation & Guidance**

Statutory Instrument 2005 No.1093 Health & Safety - The Control of Vibration at Work Regulations 2005
HSE Hand Arm Vibration – A guide for employees – INDG296 (rev2)
HSE L40 - Hand-arm vibration - The Control of Vibration at Work Regulations 2005 - Guidance on Regulations

**What is hand-arm vibration?**

Hand-arm vibration is vibration transmitted from work processes into workers' hands and arms. It can be caused by operating hand-held power tools, such as road breakers, and hand-guided equipment, such as powered lawnmowers, or by holding materials being processed by machines, such as pedestal grinders.

**What health effects can it cause?**

Hand-arm vibration can cause a range of conditions collectively known as hand-arm vibration syndrome (HAVS), as well as specific diseases such as carpal tunnel syndrome.

**What are the early symptoms?**

Identifying signs and symptoms at an early stage is important. It will allow you, as the employer, to take action to prevent the health effects from becoming serious for your employee. The symptoms include any combination of:

- Tingling and numbness in the fingers;
- Not being able to feel things properly;
- Loss of strength in the hands;
- Fingers going white (blanching) and becoming red and painful on recovery (particularly in the cold and wet, and probably only in the tips at first).

Employers have a duty to reduce work place risk to as low as is reasonably practicable
Employees have duty to report any hazards, injuries or ill health
If you think that you may be experiencing the effects of HAVs you must inform your supervisor
If you are using equipment and it is not fit for purpose or has degraded you must inform your supervisor, do not leave it or put it back.
The equipment should be quarantined serviced, maintained, repaired or replaced.

| ***The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 Extracts from Schedule 3, Part I: Occupational diseases*** | |
|---|---|
| ***Column 1*** | ***Column 2*** |
| ***Diseases*** | ***Activities*** |
| 13. Carpal tunnel syndrome | Work involving the use of hand-held vibrating tools. |
| 14. Hand-arm vibration syndrome | Work involving:<br>the use of chain saws, brush cutters or hand-held or hand-fed circular saws in forestry or woodworking;<br>the use of hand-held rotary tools in grinding material or in sanding or polishing metal;<br>the holding of material being ground, or metal being sanded or polished by rotary tools;<br>the use of hand-held percussive metal-working tools or the holding of metal being worked upon by percussive tools in connection with riveting, caulking, chipping, hammering, fettling or swaging;<br>the use of hand-held powered percussive drills or hand-held powered percussive hammers in mining, quarrying or demolition, or on roads or footpaths (including road construction); or<br>the holding of material being worked upon by pounding machines in shoe manufacture. |

Appendix 1
Have you been using hand-held vibrating tools, machines or hand-fed processes in your job, or if this is a review, since your last assessment? (detail work history overleaf)
If NO or more than 2 years since last exposure, please return the form - there is no need to answer further questions.
If YES:
1 Do you have any numbness or tingling of the fingers lasting more than 20 minutes after using vibrating equipment?
2 Do you have numbness or tingling of the fingers at any other time?
3 Do you wake at night with pain, tingling, or numbness in your hand or wrist?
4 Have any of your fingers gone white* on cold exposure?
* Whiteness means a clear discoloration of the fingers with a sharp edge, usually followed by a red flush.
**If you experience any of these symptoms you must inform your line manager**

**Evaluation of daily vibration exposure**

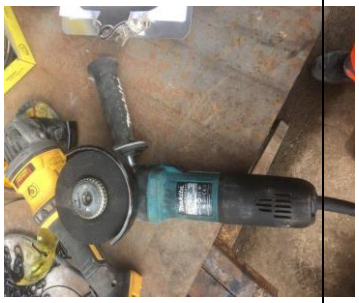
253 Exposure to hand-arm vibration should be evaluated in accordance with BS EN ISO 5349-1:2001.17 Additional, more detailed, guidance on vibration exposure evaluation (including practical information on the measurement of vibration) is given in BS EN ISO 5349-2:2002.19

254 A person's daily vibration exposure depends on the vibration magnitudes to which they are exposed and on how long the exposures last. The Vibration Regulations (Schedule 1) use the definition of daily vibration exposure given in BS EN ISO 5349-1:2001. Daily exposures are expressed as 'eight-hour energy-equivalent' vibration magnitudes (*A*(8) values). Exposures expressed in this way can be compared with one another and with the exposure action value and the exposure limit value in the Vibration Regulations. The *A*(8) value is the vibration magnitude (frequency-weighted root-mean-square (rms) acceleration in m/s2) which, if maintained constant for a period of eight hours, would be equivalent, in energy terms, to the actual vibration for the actual exposure time.

JAR HAVs Assessment Results 23.08.18 – Raw data

| **Hand-Arm vibration values in m/s² (only interval RMS - no VDV):** | | | | | | | **A (8) calculation results: 1-hour exposure over an 8-hour period** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Test No. | IRMS values X/Y/Z | | | Vector sum | Max. RMS | Comment | Date | Person | **A (8)** | | **Evaluation** |
| | awx | awy | awz | aw(Vec) | MTVV | (as entered in CV:31A) | | | | | |
| 00002: | 0.76 | 0.63 | 0.70 | 1.21 | 5.59 | Dewalt AG 3mm plate | 23.08.18 | 1 | **0.43** | **m/s²** | **Below limits.** |
| 00003: | 1.14 | 1.16 | 0.84 | 1.83 | 3.96 | Makita AG 3mm plate | 23.08.18 | 2 | **0.65** | **m/s²** | **Below limits.** |
| 00004: | 4.85 | 11.92 | 5.58 | 14.03 | 6.44 | Bosch AG 3mm plate | 23.08.18 | 3 | **4.96** | **m/s²** | **Near exposure limit!** |
| 00005: | 1.53 | 1.25 | 1.77 | 2.66 | 4.59 | Dewalt Drill - 8holes 6mm bit | 23.08.18 | 4 | **0.94** | **m/s²** | **Below limits.** |
| 00006: | 1.81 | 1.57 | 1.51 | 2.83 | 5.34 | Milwaulkee Drill - 8holes 6mm bit | 23.08.18 | 5 | **1.00** | **m/s²** | **Below limits.** |
| 00007: | 8.68 | 8.39 | 4.15 | 12.77 | 9.71 | Milwaulkee Impact Driver 1/2" | 23.08.18 | 6 | **4.51** | **m/s²** | **Near exposure limit!** |

| | |
|---|---|
| **Exposure limit value** | **5.0 m/s²** |
| **Exposure action value** | **2.5 m/s²** |

| | | JAR Workshop equipment HAVs test | | | | | | Reference |
|---|---|---|---|---|---|---|---|---|
| Image | Equipment | Description of operation | Test Material | Below Action Limit | Max Exposure | Below Exposure Limit | Max Exposure | |
| | Dewalt DCG405 | Angle Grinder | 3mm Plate | 1.21 m/s² | 8hrs | 1.21 m/s² | 8hrs | |
|  | Makita | Angle Grinder 4” disc | 3mm Plate | 1.83 m/s² | 8hrs | 1.83 m/s² | 8hrs | |
| | Bosch | Angle Grinder 9” disc | 3mm Plate | 2.48 m/s² | 15min | 4.96 m/s² | 1hr | |

**HAND ARM VIBRATION SAFETY CHART**

| Vibration Value (m/s²) | | Max Usage period In 8 Hrs (Mins) | |
|---|---|---|---|
| LOW | 2.5 | 480 mins | in 8 Hours |
| LOW | 3.0 | 333 mins | in 8 Hours |
| LOW | 3.5 | 245 mins | in 8 Hours |
| LOW | 4.0 | 188 mins | in 8 Hours |
| LOW | 4.5 | 148 mins | in 8 Hours |
| MEDIUM | 5.0 | 120 mins | in 8 Hours |
| MEDIUM | 5.5 | 99 mins | in 8 Hours |
| MEDIUM | 6.0 | 83 mins | in 8 Hours |
| MEDIUM | 6.5 | 71 mins | in 8 Hours |
| MEDIUM | 7.0 | 61 mins | in 8 Hours |
| MEDIUM | 7.5 | 53 mins | in 8 Hours |
| MEDIUM | 8.0 | 47 mins | in 8 Hours |
| MEDIUM | 8.5 | 42 mins | in 8 Hours |
| MEDIUM | 9.0 | 37 mins | in 8 Hours |
| MEDIUM | 9.5 | 33 mins | in 8 Hours |
| HIGH | 10.0 | 30 mins | in 8 Hours |
| HIGH | 10.5 | 27 mins | in 8 Hours |
| HIGH | 11.0 | 25 mins | in 8 Hours |
| HIGH | 11.5 | 23 mins | in 8 Hours |
| HIGH | 12.0 | 21 mins | in 8 Hours |

**PLEASE NOTE:**

Makes and Models may differ, in these cases the highest value is given. The figures are for guidance and comparison of equipment only.

* Trigger time measured in minutes

The information provided on this chart superceeds any previous given information.

| | | JAR Workshop equipment HAVs test | | | | | |
|---|---|---|---|---|---|---|---|
| Image | Equipment | Description of operation | Test Material | Below Action Limit | Max Exposure | Below Exposure Limit | Max Exposure |
| | Dewalt | Drill | 6mm Plate 8 holes | 2.49 m/s² | 7hrs | 2.66 m/s² | 8hrs |
| | Milwaulkee | Drill | 6mm plate 8 holes | 2.50 m/s² | 6hrs 14mins | 2.83 m/s² | 8hrs |
| | Milwaulkee | Impact driver | 19mm socket | 2.47 m/s² | 18min | 4.98 m/s² | 1hr 13 min |

**Reference**

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General guidance

As with many work place activities the effect on one person may not be the same as on another.
A work place activity such as drilling a hole in a steel plate may be affected by the type or make of drill.
This can also be said regarding associated equipment, in this case the drill bit used.

It is always necessary to use the right tool for the job in hand.
The equipment should always be checked before use;

- Visually check for wear, cracks, visible damage,
- Check the plug and wiring is intact
- Check the cleanliness and remove any debris/contamination
- Plug the appliance in and check that it is working, free from vibration and excessive noise.
- Check any tools/equipment to be used with the item is fit for use, drill bits are sharp, grinding disks are suitable for task etc.

From the recent tests undertaken the following basic assumptions can be made;
Worst case scenario – General guidance

| | | Exposure Action Value | | Exposure limit Value | |
|---|---|---|---|---|---|
| **Description of operation** | **Test Material** | **Below Action Limit** | **Max Exposure Time** | **Below Exposure Limit** | **Max Exposure Time** |
| **Cutting, grinding Angle Grinder 4" disc** | **3mm Plate** | **1.21 m/s²** | **8hrs** | **1.21 m/s²** | **8hrs** |
| **Cutting grinding Angle Grinder 9" disc** | **3mm Plate** | **2.48 m/s²** | **15min** | **4.96 m/s²** | **1hr** |
| **Drilling** | **6mm plate 8 holes** | **2.50 m/s²** | **6hrs 14mins** | **2.83 m/s²** | **8hrs** |
| **Impact driver** | **19mm socket** | **2.47 m/s²** | **18min** | **4.98 m/s²** | **1hr 13 min** |

| | |
|---|---|
| **Exposure limit value** | **5.0 m/s²** |
| **Exposure action value** | **2.5 m/s²** |

The above table shows both the exposure action limits and exposure limit values for three standard operations.

As a “rule of thumb” the values as expressed in the Exposure Action Values, Max Exposure Time column should be adhered to.
If the time required to undertake a job breeches the Exposure Action Value limits the following actions, as a minimum, should be taken;

- Take regular breaks
- Job share to reduce exposure time
- Automate the job
- Keep body/hands warm to maintain good circulation
- If in doubt, ask for a job specific or equipment specific vibration test to be undertaken.

It is worth noting that although some of the exposure times seem low, the likelihood of actually using an impact driver for 18 mins is very low.

PPE is not an appropriate form of protection to reduce exposure to vibration.
Studies into this issue are inconclusive.
Specialist “Gel” gloves are available, but it is argued that the loss of dexterity and “feel” often make the wearer tighten their grip increasing the vibration effect.
Gloves have very little effect in reducing exposure to low frequency vibration.