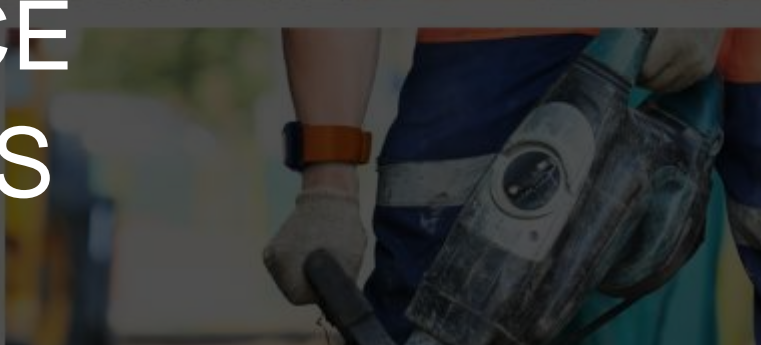
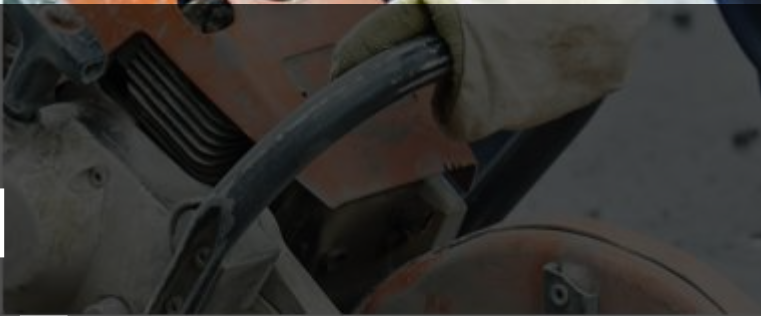




Hand-Arm Vibration

CLARIFICATION OF COMPLIANCE REQUIREMENTS



Index

1. Key points of consideration

A number of organisations are uncertain of their legal obligations to manage their employees' risk from exposure to Hand Arm Vibration (HAV) due to the technical language surrounding the topic and confusing information from unregulated commercial organisations. Reactec seek to clarify obligations through some key points of consideration which are referenced to the HSE guidance to give credence to the points made.

2. Summary of The Control of Vibration at Work Regulations 2005 and related HSE guidance - Hand-Arm Vibration

This paper summarises the requirements of The Control of Vibration at Work Regulations 2005 (Regulations) and related HSE guidance, with respect to assessing daily exposure to Hand-Arm Vibration (HAV).

3. Legal basis for using HAVwear

It is vital to employers they comply with legislation and regulatory guidance when carrying out a risk assessment for exposure to vibration. This paper considers the relevant requirements and sets out the legal basis for using HAVwear as an aid to hand arm vibration risk assessment.

4. Related documents

Download related documents that can provide further insight and understanding to help you manage your organisational HAVS risk in relation to the Reactec system.

Hand-Arm Vibration

CLARIFICATION OF COMPLIANCE REQUIREMENTS

An ISO5349 compliant tool measurement is not mandatory to meet The Control of Vibration at Work Regulations 2005 as explained in the HSE L140 guidance.

A grip mounted vibration magnitude measurement which can be compliant to ISO5349...



... will not be suitable for monitoring HAV exposure all day from multiple tool use.



What is an ISO standard compliant tool vibration measurement?

1. Measurement sensor to be within **10mm of the grip point**
2. A precise measurement which requires a trained technician to validate measurement data.
3. A specific measurement protocol which requires a **calibrated instrument** compliant to ISO8041.



* Even if a HAV monitor contains an accelerometer, it is not compliant to ISO5349 if the accelerometer is not directly and firmly attached within 10mm of the grip point of a tool.

Can be suitable for monitoring HAV exposure all day from multiple tool use and assess exposure as required by the "The Control of Vibrations at Work Regulations 2005"



A wrist or tool mounted HAV monitor* does not measure in full compliance to ISO5349...



1. Key points of consideration

A number of organisations are uncertain of their legal obligations to manage their employees' risk from exposure to Hand Arm Vibration (HAV) due to the technical language surrounding the topic and confusing information from unregulated commercial organisations. Reactec seek to clarify obligations through some key points of consideration which are referenced to legislation and HSE guidance to give credence to the points made.

Obligations of the employer:

The employer shall assess, and if necessary measure the levels of exposure to mechanical vibration.

The legislation is quite clear in distinguishing assessment of exposure to HAV from measurement of exposure to HAV and establishing that measurement is NOT necessary. Assessment of exposure to vibration requires the time of exposure to vibration and the **probable magnitude of the vibration** corresponding to the equipment or the types of equipment used in the particular conditions of use. See the regulations.

<http://www.legislation.gov.uk/uksi/2005/1093/contents/made>

What does measurement of exposure to HAV involve?

Measurement of exposure to HAV is defined by ISO5349 and requires a measurement instrument which complies with ISO8041. It is a test process which requires instrumentation from companies such as Larson Davis and Svantek which are regularly calibrated and operated by a trained technician. The process typically involves taking a measurement for 1 minute's use of a tool, repeated three times, to create an average vibration of the three measurements. Despite the accuracy of this process there remains a risk that the test conditions may not reflect your future use of the tool by your varied work force. See HSE L140 Appendix 2, section 5.

<http://www.hse.gov.uk/pubns/books/l140.htm>

The HSE L140 guidance does NOT mandate that a measurement of a tool's vibration needs to be taken in order to carry out a suitable and sufficient assessment of exposure to HAV. See HSE L140 para 29, 31, 100, Appendix 1 section 1, Appendix 2 section 1.

<http://www.hse.gov.uk/pubns/books/l140.htm>

What does monitoring of exposure to HAV involve?

Monitoring of HAV exposure is a term which has been adopted to describe the process of collecting records of an individual's exposure to HAV through the course of a working day i.e. a daily assessment of exposure to HAV. A daily assessment of exposure to HAV will meet legal obligations if it follows the requirements of ISO5349 to combine the time of exposure to vibration with a vibration magnitude that has been assessed to be a magnitude which is probably that experienced during the activity being assessed. See HSE L140 Guidance 5(1) paragraph 24 and Part 2 paragraph 148.

<https://www.hse.gov.uk/pubns/priced/l140.pdf>

What daily exposure monitoring devices are compliant to the standards for HAV exposure measurement?

It is not possible for any device aimed at all day HAV exposure monitoring to fully comply with the requirements of the vibration measurement standards whether mounted on the wrist or on the tool. The standards for vibration magnitude measurement require the instrument to be calibrated, the measurement sensors to be within 10mm of the hand and specific instrumentation parameters that require a skilled technician to use the instrument. See HSE L140 Appendix 2, section 9.

<https://www.hse.gov.uk/pubns/priced/l140.pdf>

Can Reactec's technology be used?

Reactec's HAVwear is a monitor of HAV daily exposure. It does not measure vibration magnitude in compliance with the measurement standards. It is intended to capture the data needed to understand an operator's exposure through their entire working day.

The HSE have inspected Reactec and reviewed the capabilities of the HAVwear device and Reactec's supporting guidance material. No issues have been reported.

HAVwear is a tool which monitors daily exposure to HAV and collects exposure data in an automatic efficient manner that allows effective action to be taken on that data. HAVwear helps companies follow the principals of Plan Do Check Act. Once an initial risk assessment has been made which has led to the implementation of a series of controls (the PLAN), the DO is exposure monitoring to essentially CHECK the risk assessment appropriateness and CHECK the effectiveness of controls. Scrutinising the monitored data against the PLAN allows the user to ACT intelligently and improve the controls to reduce risk even further.

<https://www.hse.gov.uk/managing/delivering/index.htm>

The HSE have conducted numerous inspections of organizations using Reactec's HAVwear. The HSE have given positive feedback to organizations who have used the Reactec monitoring data to design control measures against their employee's risk.

Why do the regulations require a probable vibration magnitude and how can a duty holder determine a suitable vibration magnitude for assessment?

A tool can emit a broad range of vibration magnitudes depending on the condition of the tool and its accessories, the nature of the materials the tool is used with and the technique of the specific operator using the tool. See HSE L14, Appendix 3 section 6.

<http://www.hse.gov.uk/pubns/books/l140.htm>

The HSE advise that the upper 75th percentile of the range of use of a tool may be used to inform a suitable risk assessment or that a number of data sources may be used. One data source includes the manufacturers declared vibration magnitude, although the HSE also point out the risk in using solely manufacturers data. See HSE L140 Appendix Table 6.

<http://www.hse.gov.uk/pubns/books/l140.htm>

Pragmatically the HSE are looking for duty holders to make a considered selection and to make reference to more than one source. See Appendix 3, section 2 of the HSE L140 document -

<https://www.hse.gov.uk/pubns/priced/l140.pdf>

HAVwear monitors daily exposure data using two concurrent methods.

1. One method utilizes a fixed vibration magnitude which can be derived from an ISO5349-compliant measurement and is therefore in full compliance with the needs of the regulations and HSE guidance. The HSE confirm in their FAQ on HAV exposure monitoring within Q8 that off tool trigger timers can monitor HAV exposure.

<https://www.hse.gov.uk/vibration/hav/advicetoemployers/vibration-exposure-monitoring-ga.pdf>

2. HAVwear uniquely, simultaneously collects a second assessment of exposure based on real-time sensed vibration magnitudes during the actual tool use. This second assessment data is available to be compared with the assessment developed from the tool timer mode and the assumed vibration magnitude for the tool. This comparison brings added value to the CHECK cycle as it is possible to identify tools giving inconsistent performance perhaps due to tool or accessory condition, operator competence or tool application.

An independent report by the IOM which carried out extensive tests to compare Reactec's real-use vibration magnitude data with a fully compliant measurement concluded that the correlation was so strong that the HAVwear data could inform a suitable and sufficient risk assessment. Also, that there were real benefits from having full day real use data. https://www.reactec.com/iom_report.

Anyone considering HAVwear to support their management of HAV exposure and their legal obligations can be assured that the HSE have investigated the HAVwear for its intended use and accept that in its trigger timer mode their guidance is met. Equally the HSE have given positive feedback to users of HAVwear using the real-use data to go further in their development of control measures.

Is HAV monitoring necessary?

It could be argued that for legal compliance keeping records of exposure data is not necessary however such evidence is valuable in civil litigation defence.

Case studies have shown that when it comes to the real world of manual tool use the wide range of variables that are at play mean that the risk level across a work force is not even. For even modest risk tasks Reactec have data which shows that when individuals are carrying out the same task with the same tool type the risk profile range can be such that the highest risk individual was six times that of his lowest risk colleague.

Anyone considering implementing HAV monitoring should consider not only the reasons of compliance, but also how do they know all of their employees are working at adequately safe levels of exposure. See case study -

https://www.reactec.com/article/utility_company_case_study

Legal precedence

There is legal precedence where Reactec's data has been used to defend civil litigation risk cases. The key to a successful defence is evidence of the management and reduction of the risk as low as reasonably practicable.

To help clarify the apparent nuances of the bulleted list above, consider the role of a wrist-worn activity/heart rate monitor such as a Fitbit. You would not go to your GP and expect him to use such a device to measure your heart rate. You are aware that both the heart rate monitor and the counting of steps is a good estimate only. You use it to assess your overall level of activity day to day and your heart rate whilst you are doing higher risk activities such as long distance running, because you would not expect your GP to be available on a daily basis to check your health status. Do you have to wear one? No. Then why are they popular? Because they inform individuals in a way that allows them to make better decisions on how to manage their day to day fitness and health.

2. Summary of The Control of Vibration at Work Regulations 2005 and related HSE guidance.

This paper summarises the requirements of The Control of Vibration at Work Regulations 2005 (**Regulations**) and related HSE guidance, with respect to assessing daily exposure to Hand-Arm Vibration (**HAV**).

Of greatest importance, due to some market confusion, is to highlight that the HSE's response to Q7 of the Q&A on vibration exposure monitoring should not be considered in isolation. The response is only in reference to the measurement of vibration magnitude, which the HSE advise is not a legal requirement for employers when assessing HAV exposure risk if other suitable data is available.

Introduction

An employer's duties when assessing HAV exposure risk, are set out in the Regulations and related HSE guidance, excerpts from which are repeated below on the topic of assessing daily exposure to HAV.

To summarise:

- An employer who is liable to expose employees to vibration risk shall make a **suitable and sufficient assessment of the risk**. This is so vibration is either eliminated at source or, where not reasonably practicable, reduced to as low a level as is reasonably practicable (ref 1).
- To assess exposure to HAV at or above an exposure action value or above an exposure limit value (ref 2), an evaluation of time "on tool" and hand transmitted **vibration magnitude** is required to calculate HAV daily exposure (ref 7).
- Determination of vibration magnitude for an assessment of HAV exposure does NOT under the Regulation, require the measurement of a tool's vibration in compliance to specific standards (ref 1, 5, 9 & 10).
- The Regulation requires the employer to assess vibration risk by reference to relevant information on the **probable magnitude of the vibration** corresponding to the equipment used in the particular working conditions (ref 2, 4, 6).
- Obtaining data for vibration magnitude in compliance with standards does NOT mean that it is suitable for a risk assessment unless it is also ensured that it is **representative** of the task being assessed (ref 3, 4, 10).
- The HSE FAQ guidance does NOT advise that wrist worn devices are unsuitable as an aid to allow an employer to assess risk to comply with Regulations but that they are unsuitable for on-tool measurements.
- Various tool-timing devices can help a risk assessment with a period of monitoring to understand how long employees use a particular machine in a typical day or week (ref 8).

How can HAVwear help address an employer's obligations?

HAVwear calculates daily HAV exposure simultaneously by two methods of points calculation:

1. **Tool Exposure Points (TEP)** – based on a static vibration magnitude programmed into a tool tag and duration of tool usage. If the static vibration magnitude is determined as representative for the tool usage as part of a risk assessment, TEP complies with the Regulations and HSE guidance.
2. **Sensed Exposure Points (SEP)**– based on a real-time determination of vibration magnitude during all use of the tool, which if assessed to be representative, will comply with the regulations and HSE guidance. An independent assessment by the IOM concluded that the HAVwear sensed vibration magnitude data would inform a suitable and sufficient risk assessment, carried out by an employer in accordance with Regulation 5.

Concerns have been raised on the suitability of HAVwear due to the HSE FAQ on HAV monitoring question 7. Within the answer to Q7 the following statement is made “There is currently no wrist or glove mounted device which measures vibration suitable for use in a risk assessment”. However, Regulation 5(c) only requires measurement of vibration magnitude if necessary. On-tool measurement is required when there is **no other source of determining the probable vibration magnitude** for a tool (ref 5 & 10). In these circumstances it is appropriate to use both ISO5349 and ISO8041 in the hands of a skilled technician, eliminating the impact of the tool users influence in determining a vibration magnitude. Practically and economically this would not be for the majority of tools or for every use of even the minority of tools due to the range of tool vibration behaviour.

In the calculation of SEP daily HAV exposure, HAVwear determines probable vibration magnitude suitable for use in a risk assessment as it does not simply measure vibration magnitude on the tool user's wrist. HAVwear uses algorithms to compensate for the transmissibility through the hand to the wrist and determines a vibration magnitude equivalent to the hand arm vibration transmitted to the tool user at the grip point. The Institute of Occupational Medicine year-long evaluation of HAVwear with extensive simultaneous tool testing to all appropriate standards found the HAVwear data to be comparable to the simultaneous measurements and potentially more suitable for a HAV exposure assessment as the HAVwear could capture the full use of the tool, rather than a point in time assessment.

The Regulations state that vibration data used for the purposes of risk assessment must be credible and representative of the work being undertaken. Therefore, real time monitoring of vibration to assist in the selection of credible vibration magnitude data is supportive of these Regulations. Both TEP and SEP data are acquired concurrently and can be compared to identify specific areas of concern and the drivers to static data not being representative such as tool

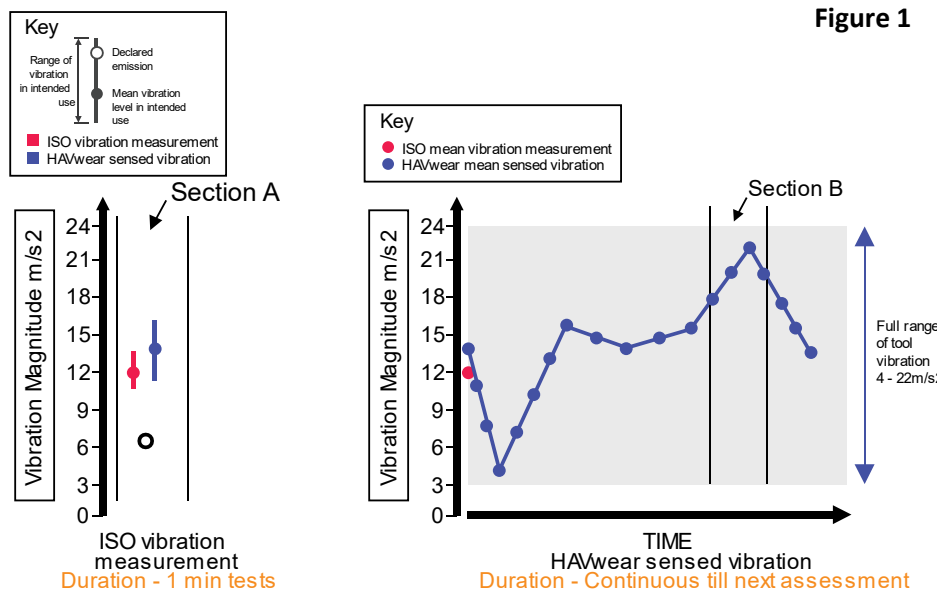
wear or operator skill. An enhanced understanding of risk drivers will improve control measure refinement after initial risk assessments.

Put simply, HAVwear's SEP data is suitable for daily risk assessment of HAV exposure which is representative of the risk being assessed allowing an employer to meet the requirements of Regulations. The HSE have not said a wrist worn device is not suitable as an aid to risk assessment in accordance with Regulation 5.

To explain the benefits of SEP consider Figure 1

A point-in-time measurement to ISO5349 and other standards can yield the results as illustrated in Section A, Figure 1. However, through the course of use of the tool the vibration magnitude can range as highlighted by the grey area in Figure 1.

A simultaneous HAVwear result for the point in time of section A in Figure 1, may have a greater range and may be slightly higher. However, as the tool is used through its differing purposes the HAVwear tracks the range of use. If you require to assess a task which covers Section B of the graphic which is more likely to be more relevant to the tool's use - the static measurement in section A or the HAVwear determination in section B in Figure 1.



The Reactec HAVwear device was designed to determine vibration magnitude corresponding to the equipment used in the particular working conditions over a period of time.

HAVwear supports employers carrying out a risk assessment in accordance with Regulation 5 due to its ability to combine real-time information on the probable magnitude of the vibration corresponding to the equipment used in the particular working conditions.

Sections from the Regulation

5. Assessment of the risk to health created by vibration at the workplace

Ref 1

(1) An employer who carries out work which is liable to expose any of his employees to risk from vibration shall make *a suitable and sufficient assessment of the risk* created by that work to the health and safety of those employees and the risk assessment shall identify the measures that need to be taken to meet the requirements of these Regulations.

(2) In conducting the risk assessment, the employer shall assess daily exposure to vibration by means of;

(a) observation of specific working practices;

(b) reference to relevant information on the *probable magnitude of the vibration corresponding to the equipment used in the particular working conditions*; and

(c) *if necessary, measurement of the magnitude of vibration* to which his employees are liable to be exposed,

Ref 2

And the employer shall assess whether any employees are likely to be exposed to vibration at or above an exposure action value or above an exposure limit value.

6. Elimination or control of exposure to vibration at the workplace

(2) Where it is not reasonably practicable to eliminate risk at source ...and an exposure action value is likely to be reached or exceeded, the employer shall reduce exposure to as low a level as is reasonably practicable by establishing and implementing a programme of organisational and technical measures which is appropriate to the activity.

Sections from HSE Guidance

The Control of Vibration at Work Regulations 2005 Guidance on Regulations L140

The Guidance is created by the HSE to provide clarification on the Regulation in Part 1 and HSE supporting information in Part 2.

Part 1 - Legal duties of employers to control the risks to health and safety from hand-arm vibration

Suitable and sufficient risk assessment (Section 25)

Ref 3

Your exposure estimate will only be soundly based if it uses *data which can be judged to be reasonably representative of your work process.*

Ref 4

Section 29 - “Relevant information on the probable magnitude of the vibration”

To be relevant, *the vibration magnitude you use for your assessment must be representative of the equipment you plan to use and the way in which you plan to use it.* There are several possible sources of suitable information on vibration magnitudes.

These include:

- (a) vibration emission values declared in the equipment handbook;
- (b) additional information from the equipment supplier;
- (c) internet databases;
- (d) research organisations;
- (e) vibration consultancies;
- (f) HSE’s website;
- (g) trade associations;
- (h) measurements made in your own workplace

Ref 5

Section 31 - “If necessary, measurement of the magnitude of vibration”

This makes clear that *Measurement of vibration magnitude will not usually be required but may be necessary if suitable vibration data are not readily available from sources such as Appendix 3 (also available on HSE’s website), from machine manufacturers, or other reliable sources.*

Section 36 - “Magnitude, type and duration of exposure”

The factors which govern a person’s daily vibration exposure are the magnitude (level) of vibration and the length of time the person is exposed to it.

.....

Part 2 - Management and control of risk from hand-arm vibration

What information is needed to assess daily exposure?

Ref 6

100. *Representative vibration magnitudes* (see Appendix 3) and observed exposure durations are usually adequate to assess vibration exposure with sufficient precision for comparison with the EAV and ELV of the Vibration Regulations

110. To estimate a worker’s daily vibration exposure depends on:

Ref 7

- *the vibration magnitude at the surface in contact with the hand, in units of m/s² (where both hands are in contact with vibration the daily vibration exposure is based on the higher vibration magnitude);*
- *(b) the duration of exposure (the time for which an employee’s hand is actually in contact with that vibration, ie trigger time), usually in minutes or hours.*

Ref 8

148. Various tool-timing devices are available which log the duration of machine use. These include in-line electrical and pneumatic timers or more sophisticated electronic and vibration-sensitive timers. If it helps you to do your risk assessment, *a period of monitoring with these devices to understand how long employees use a particular machine in a typical day or week may be useful.* However, once you have enough information on likely exposure, your focus should move to taking practical steps to reduce the exposure and risks.

Appendix 1 - Estimation of daily vibration exposure?

Ref 9

1. It is not important to obtain a precise daily exposure (*it will probably vary from day to day anyway*). Enough information will be needed to establish whether it is likely that the EAV will be reached or exceeded and ensure that the ELV is not exceeded. *It will usually be possible to do this without having to make vibration measurements in a workplace.*

Appendix 2 - Vibration measurement and instrumentation

Ref 10

1. *Although you are not automatically expected to make vibration measurements*, the Vibration Regulations do require measurements where it is not otherwise possible to adequately assess the exposure and establish whether the exposure action or limit value is likely to be exceeded.

Ref 11

10. *A single measurement for a machine, an operator and a task provides limited information on vibration risk*. This is because vibration magnitudes vary due to factors such as changes in forces, posture and techniques adopted by the operator as well as variation in materials and product. When making measurements you should plan to measure several operators, each working across a range of common operating conditions.

3. Legal basis for using HAVwear

LEGAL BASIS FOR USING HAVWEAR

1. Purpose

- 1.1 It is vital to employers they comply with legislation and regulatory guidance when carrying out a risk assessment for exposure to vibration. This paper considers the relevant requirements and sets out the legal basis for using HAVwear as an aid to hand arm vibration risk assessment.

2. What does U.K. law require an employer to do?

- 2.1 The Control of Vibration at Work Regulations 2005 (the "Regs") were drafted to protect persons against risk to their health and safety arising from vibration exposure at work.
- 2.2 Specifically, Reg 5(1) requires an employer who carries out work liable to expose employees to vibration risk to make a suitable and sufficient assessment of the risk. Employers are to ensure employees vibration exposure is eliminated at source or, where not reasonably practicable, reduced to as low a level as is reasonably practicable (Reg 6).
- 2.3 In conducting the risk assessment, Reg 5(2) requires an employer to assess daily vibration exposure by means of:

"(a) observation of specific working practices;

(b) reference to relevant information on the probable magnitude of the vibration corresponding to the equipment used in the particular working conditions; and

(c) if necessary, measurement of the magnitude of vibration to which his employees are liable to be exposed,

and the employer shall assess whether any employees are likely to be exposed to vibration at or above an exposure action value or above an exposure limit value".

Employers must risk assess vibration exposure through parts (a) and (b) above. Crucially, measurement of vibration magnitude is only required if necessary.

- 2.4 For completeness, it should be noted the Regs implement EU Directive 2002/44/EC on Vibration (the "Directive"). The Directive requires that apparatus used to obtain a measurement for hand-arm vibration is in accordance with ISO 5349-2 (2001) standards. There is nothing to stop HAVwear, which does not for all data sets gathered measure in accordance with ISO 5349-2 (2001), being used as part of an assessment carried out by an employer under Regs 5(2)(a) and (b). So far as carrying out a measurement of the vibration magnitude under Reg 5(2)(c) is concerned, the Regs (unlike the Directive) do not specify any minimum standard of equipment. An employer has discretion as to how he goes about

measuring vibration magnitude under Reg 5(2)(c) albeit it may well be appropriate to use ISO 5349 standards. It is up to the employer to select such equipment for doing so as is necessary to obtain a probable magnitude for the task being assessed.

3. What does HSE guidance say?

3.1 L140 is a document produced by the Health and Safety Executive ("HSE") providing guidance on the Regs (the "Guidance"). Whilst the Guidance advises vibration measurements should accord to the requirements of ISO5349, paragraphs 35 and 36 of the Guidance make clear vibration measurements may not be necessary if suitable vibration data is available. Further, paragraphs 122-124 outline that employers are not automatically expected to make vibration measurements which are difficult, highly variable and not a legal requirement.

3.2 Whilst at the time of writing, the HSE FAQ on HAV Monitoring states "there is currently no wrist or glove mounted device which measures vibration suitable for use in a risk assessment", it would be wrong to view this response in isolation. The statement appears to refer to vibration measurement in accordance with Reg 5(2)(c) which the HSE confirm in its Guidance is only required where it is not otherwise possible to determine a probable vibration magnitude.

4 Conclusion

4.1 Law requires employers to make a suitable and sufficient assessment of employees vibration exposure risk and reduce it to as low as reasonably practicable. Such an assessment should be done by reference to working practices, relevant information on probable vibration magnitude, and if necessary vibration measurement. Under the Regs, vibration magnitude data does not need to conform to a particular standard.

4.2 Whilst the HSE are currently of the view wrist worn devices cannot sufficiently measure vibration, vibration measurement is not a legal requirement and the HSE make clear such a measurement will be unnecessary if suitable vibration data is available.

4.3 HAVwear's advanced monitoring technology provides relevant information on probable vibration magnitude, via its sensed exposure assessment, which employers can use as an aid to risk assessment in accordance with the Regs and HSE guidance.

General Counsel, Reactec Limited

September 2018

4. Related documents

Download related documents that can provide further insight and understanding to help you manage your organisational HAVS risk.

Download these papers and more at - www.reactec.com/why_choose_reactec/scientific_papers

Determination of hand-transmitted vibration risk on the human (International Journal of Industrial Ergonomics)

The proposed measurement method of hand-transmitted vibration on the subject captures at least some of the effects of factors relating to the human interaction with the tool identified within Annex D of the ISO 5349-1 standard. The effectiveness of the proposed hand-transmitted vibration measurement consideration on the human for improved understanding of tool vibration exposure has been shown.



Could deviation from static and declared vibration dosage assumptions in the real use by workers of power tools be preventing further progress on reducing HAVS in affected populations?

The investigation shows that significant variances exist between HAV exposure calculated from assuming a static vibration dose and that determined from real use monitoring, indicating a potential for an increased risk of developing HAVS for exposed workers than expected (presented at the UKHRV 2018).



An independent report by the IOM on the validity of the data produced by Reactec's HAVwear to inform a suitable and sufficient risk assessment

The Institute of Occupational Medicine (IOM) was requested by Reactec to conduct an independent review of data collected using the HAVwear system and subsequently provided a report in January 2018.



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