Vibration Ready-Reckoner and Calculator

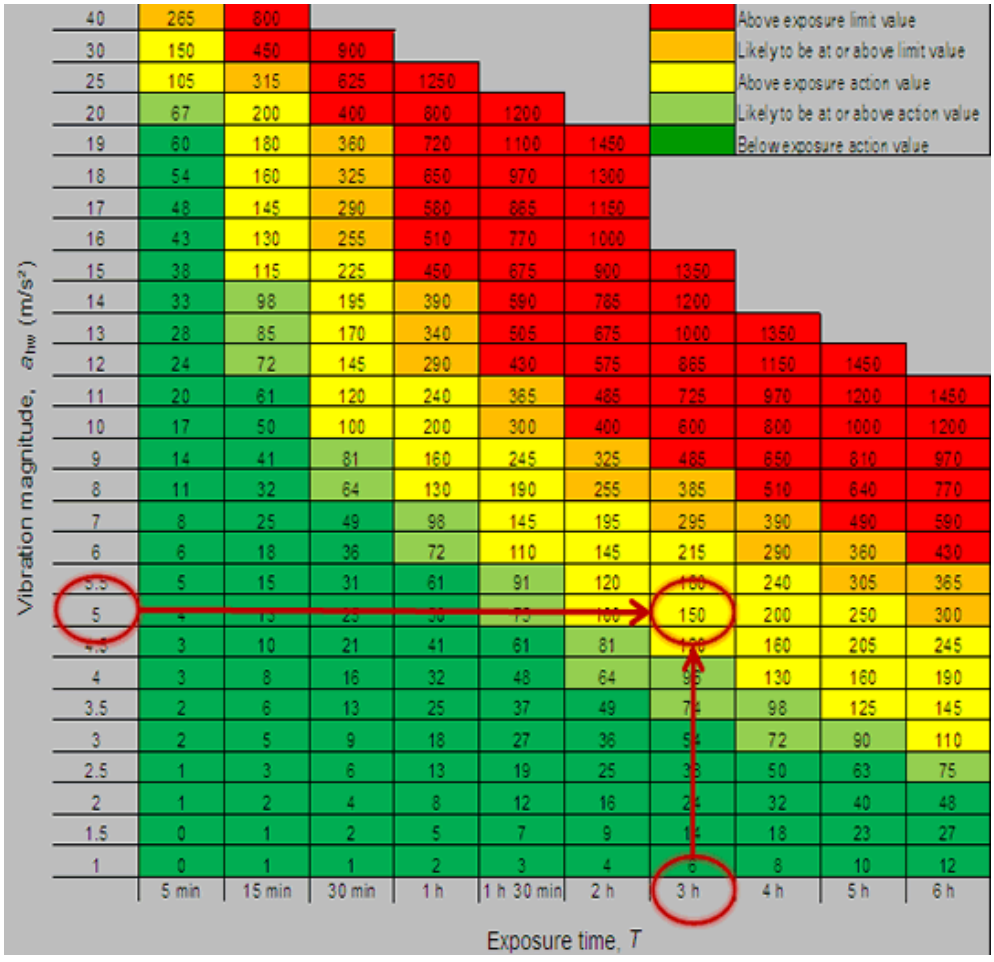
Procedure for exposure points system and ready-reckoner:

1. Establish the vibration magnitude (level) using the tool manufacturer's specifications;
2. Establish the exposure time;
3. Use the ready reckoner to calculate the exposure level.

The ready-reckoner covers a range of vibration magnitudes up to 40 m/s2 and a range of exposure times up to 10 hours.

The exposures for different combinations of vibration magnitude and exposure time are given in exposure points instead of values in m/s2 A(8. Exposure points being easier to work with than the A(8) values:

- Exposure points change simply with time: twice the exposure time, twice the number of points;
- Exposure points can be added together, for example where a worker is exposed to two or more different sources of vibration in a day;
- The exposure action value (2.5 m/s2 A(8)) is equal to 100 points;
- The exposure limit value (5 m/s2 A(8)) is equal to 400 points;



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Using the ready reckoner

1. Find the vibration magnitude (level) for the tool or process (or the nearest value) on the grey scale on the left of the table.

2. Find the exposure time (or the nearest value) on the grey scale across the bottom of the table.

3. Find the value in the table that lines up with the magnitude and time. The illustration shows how it works for a magnitude of 5 m/s2 and an exposure time of 3 hours: in this case the exposure corresponds to 150 points.

4. Compare the points value with the exposure action and limit values (100 and 400 points respectively). In this example the score of 150 points lies above the exposure action value.

The colour of the square containing the exposure points value tells you whether the exposure exceeds, or is likely to exceed, the exposure action or limit value:

	Above limit value
	Likely to be above limit value
	Above action value
	Likely to be above action value
	Below action value

5. If a worker is exposed to more than one tool or process during the day, repeat steps 1 – 3 for each one, add the points, and compare the total with the exposure action value (100) and the exposure limit value (400).

Procedure for the HAVS Calculator

For more accurate figures the HSE HAVS calculator can be used:
https://www.hse.gov.uk/vibration/hav/vibrationcalc.htm

Using the HAVS calculator

1. The calculator is a spreadsheet file (Microsoft Excel) which may be downloaded and saved on your computer.

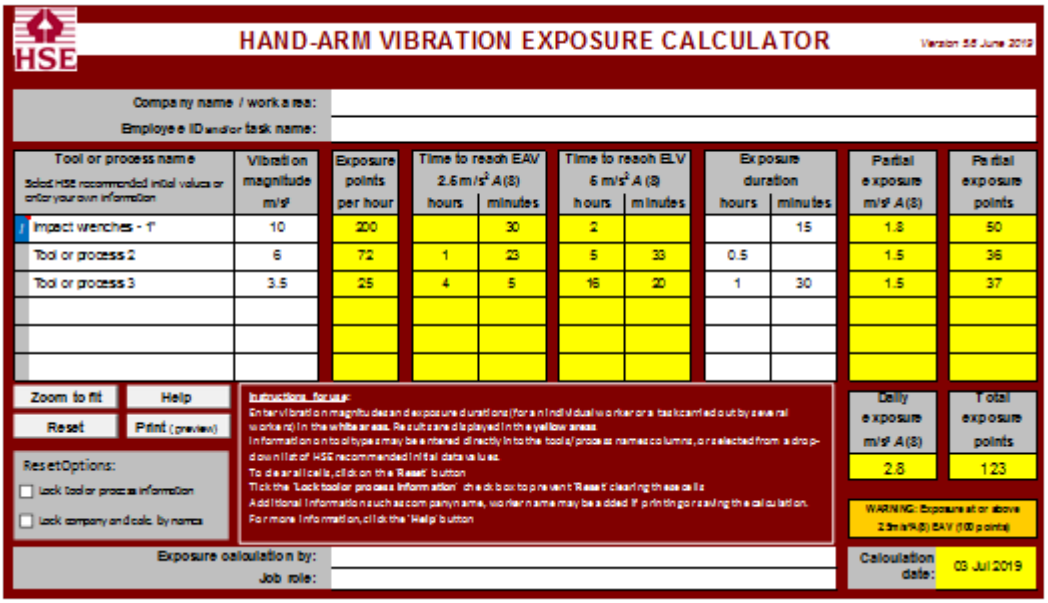
2. Click on the white areas and enter a representative vibration magnitude (in m/s2) and an exposure duration (in hours and/or minutes). You can do this for up to six different machines or processes. Information on tool types may be entered directly into the tools/process names columns, or selected from a drop-down list of common tools with HSE's recommended initial value.

3. When you have entered all the numbers, press the ENTER key, or click on a different cell. The following values will then be calculated and displayed in the yellow cells on the right:
   - Partial exposure (shown in both m/s2 *A*(8) and exposure points) for each tool or process, as calculated from the vibration magnitude and the exposure duration.
   - Daily exposure, also in m/s2 *A*(8) and exposure points, as calculated from the partial exposures.

4. In addition to the partial and total exposure values, the calculator also uses the vibration magnitudes to produce the following values:

- Exposure points per hour. The number of exposure points for every hour of exposure time for the individual machine or process.
- Time to reach EAV (exposure action value). This is the total exposure time required for the individual machine or process, before the EAV (2.5 m/s2 *A*(8) or 100 points) is reached.
- Time to reach ELV (exposure limit value). This is the total exposure time required for the individual machine or process, before the ELV (5 m/s2 *A*(8) or 400 points) is reached.

5. The illustration below shows the calculator in use. In this example, an operator uses three machines during a working day. The vibration magnitudes are 10, 6 and 3.5 m/s2 and the total exposure times are 15, 30 and 90 minutes respectively. For the first tool (a 1" impact wrench), the tool has been selected from the drop-down list, this automatically enters a vibration value of 10 m/s², which is the "recommended initial value" for that tool from the HSE table "summary of vibration magnitudes of some common machines (PDF) ". For the other tools the values have been typed into the white cells. When entering exposure duration information, you can use hours, minutes or a combination of the two. The results (in the yellow cells) show the partial exposure values for the three machines and the total exposure which is 2.8 m/s2 *A*(8) or 123 points. Since the result is above the exposure action value a warning is displayed below the daily vibration exposure values.



6. The cells can be cleared for another calculation by clicking on the Reset Options in the bottom left-hand corner.

Note: When you open the spreadsheet you may see a Microsoft Excel message asking you to decide whether to enable or disable macros. If your system settings allow it, you should enable macros. If not, the Reset button will not work. However, the white cells can still be cleared by deleting the contents manually.