VIBRATION GLOVES

Content
Vibration Intro .........................2
Vibration basics .......................3
Legislation ..........................4
Standards & measurements ...........5
Glove Solutions .......................6-8

Vibration Intro

"10-20% of workforces in OECD countries are exposed to hand held vibrations for more than 4 hours per day”

"Hand Arm Vibration damage is IRREVERSABLE and accumulates over the years”

"Hand Arm Vibration causes damage to nerves, blood circulation and muscles”

"AV Gloves can be very beneficial but in some cases harmful if the wrong glove is used”
1. Vibration "Strength"
Vibration "Strength" is measured in average acceleration m/s² (meter per second square measured in all 3 directions).

2. Frequency of Vibration
The frequency of vibration of a tool is measured in Hz (oscillations per second)! Machine rotation is usually measured in Rotations Per Minute (rpm).
100 Hz → 6000 rpm, 500 Hz = 30 000 rpm!

3. Different Frequencies
Different Frequencies effect the body differently! Blue and orange fields below show their potential hazard to humans!

a) Traditionally all tool and measurements are weighted according to blue curve below, good fit for arm and wrist problems!

b) Fingers absorb more energy and are probably most exposed between ~50-300Hz (25-500Hz?), area in orange below.

4. High frequencies and acceleration peaks
High frequencies and acceleration peaks with short duration (impact wrenches and similar) are more dangerous than average exposure indicate!
1. Vibrations
Vibrations are regulated by EU directive 2002/44/EC and measured according to ISO 5349-1

2. Details of EU legal framework
   a) an average exposure to a weighted acceleration value $2.5 \text{m/s}^2$ as Action value where the employer must engage!
   b) an average exposure to a weighted acceleration value of $5 \text{m/s}^2$ as absolute legal limit.

3. Measurement & Glove standard
The measurement and glove standard as well as the directive warn about the need to consider other factors than the average weighted acceleration only!

"Eureka has taken action on the instructions in the EU directive!"
1. ISO 10819:2013

The vibration glove standard ISO 10819:2013 measure vibration reduction
Vibration transmission through safety gloves, in palm ONLY while gripping a 40 mm
diameter pipe with pushing force of 50N and grip force of 30N.
The test is divided into to frequency ranges, "TRM" =31.5-200Hz and "TRH" 200-1000Hz.
- **TRM average Transmission** to hand should be below 0.9 (90%) and 100% (no effect) for
  2013 and 1996 respectively.
- **TRH average Transmission** to hand should be below 0.6 (60%) for both 2013 and 1996
  version of the standard.

NOTE! THERE CAN BE MANY HARMFUL PEAKS WITHIN THESE FREQUENCIES THAT THE STANDRAD DOES NOT ACCOUNT FOR!

2. The Eureka Method

The Eureka method has used a modified version of the ISO 10819 standard to assess the vibration
reduction at the most sensitive part of the hand, the ring finger tip (measured at nail by use of laser).

"Eureka is using complementary measurements on the finger tips in ADDITION to the ISO 10819 test"
1. Every glove has a hellhole and a paradise

2. The fingers are almost always the limiting factor

3. Correct glove must be used with correct tool type

4. Worst glove-tool combination must be avoided

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GLOVE GUIDE

Crude estimation of typical tools into the normal working condition

<table>
<thead>
<tr>
<th>TOOL TYPE</th>
<th>IMPACT VIBRATION FLEXI</th>
<th>IMPACT VIBRATION AMPLITUDE</th>
<th>IMPACT VIBRATION WINTER</th>
<th>15-1 TRANSIENT VIBRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivet guns, Impact wrenches, Impact hammers</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>High speed multi tools</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
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<tr>
<td>Angle grinders</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Sanders &amp; Grinders</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
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<tr>
<td>Circular &amp; Jig saws</td>
<td>⬤</td>
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</tbody>
</table>
EUREKA SOLUTION FOR AV GLOVES - 1

**15-1 Transient Vibration**
Vibration reduction for impacting tools

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**Impact Vibration**
Allround vibration glove

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</table>
EUREKA SOLUTION FOR AV GLOVES - 2

**Extrapolated Transmission of Impact Vibration Flexi**

- **Impact Vibration Flexi**
  - Palm vibration protection
  - **Tool Type**
    - Angle grinders
    - Sanders & Grinders
    - Circular & Jig saws
    - High speed multi tools
    - Rivet guns
    - Impact wrenches
    - Impact hammers

**Transmission of Impact Vibration Amplitude**

- **Impact Vibration Amplitude**
  - Highest vibration protection
  - **Tool Type**
    - Angle grinders
    - Sanders & Grinders
    - High speed multi tools
    - Rivet guns
    - Impact wrenches
    - Impact hammers
    - Circular & Jig saws
1. Tool measurement
Power tools are measured on-site at customer.

2. Calculation and recommendation
After taking a measurement, the results are sent to our headquarters for processing. From the data we are able to determine the best suited glove model for a specific task/tool to maximize protection.