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VIBRATION GLOVES

Content

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”

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VIBRATION BASICS!

1. Vibration ”Strength”

Vibration ”Strength” is measured in average acceleration m/s^2 (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 → 6 000 rpm, 500 Hz = 30 000rpm!

3. Different Frequencies

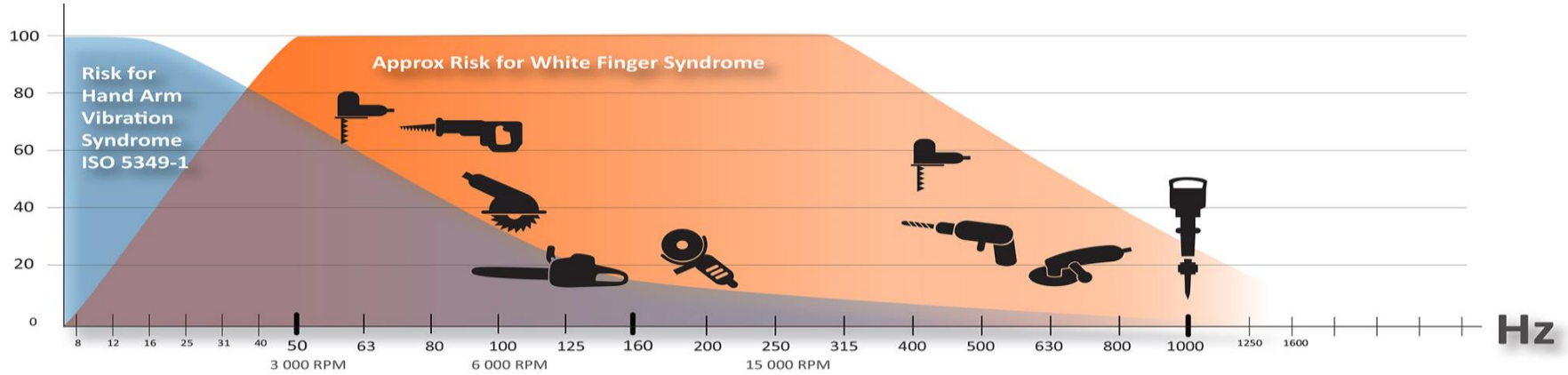
Different Frequencies effect the body differently! Blue and orange fields below show their potential hazard to humans!

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!



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LEGISLATION

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 2,5m/s^2 as Action value where the employer must engage!

b) an average exposure to a weighted acceleration value of 5 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!"

Max exposure time according to directive and weighted average acceleration

Acceleration [m/s^2]	5 min	15 min	30 min	1h	2h	3h	4h	5h	6h	8h	10h
40	267	800	1600	3200	6400	9600	12800	16000	19200	25600	32000
30	150	450	900	1800	3600	5400	7200	9000	10800	14400	18000
25	104	313	625	1250	2500	3750	5000	6250	7500	10000	12500
20	67	200	400	800	1600	2400	3200	4000	4800	6400	8000
19	60	181	361	722	1444	2166	2888	3610	4332	5776	7220
18	54	162	324	648	1296	1944	2592	3240	3888	5184	6480
17	48	145	289	578	1156	1734	2312	2890	3468	4624	5780
16	43	128	256	512	1024	1536	2048	2560	3072	4096	5120
15	38	113	225	450	900	1350	1800	2250	2700	3600	4500
14	33	98	196	392	784	1176	1568	1960	2352	3136	3920
13	28	85	169	338	676	1014	1352	1690	2028	2704	3380
12	24	72	144	288	576	864	1152	1440	1728	2304	2880
11	20	61	121	242	484	726	968	1210	1452	1936	2420
10	17	50	100	200	400	600	800	1000	1200	1600	2000
9	14	41	81	162	324	486	648	810	972	1296	1620
8	11	32	64	128	256	384	512	640	768	1024	1280
7	8	25	49	98	196	294	392	490	588	784	980
6	6	18	36	72	144	216	288	360	432	576	720
5,5	5	15	30	61	121	182	242	303	363	484	605
5	4	13	25	50	100	150	200	250	300	400	500
4,5	3	10	20	41	81	122	162	203	243	324	405
4	3	8	16	32	64	96	128	160	192	256	320
3,5	2	6	12	25	49	74	98	123	147	196	245
3	2	5	9	18	36	54	72	90	108	144	180
2,5	1	3	6	13	25	38	50	63	75	100	125
2	1	2	4	8	16	24	32	40	48	64	80

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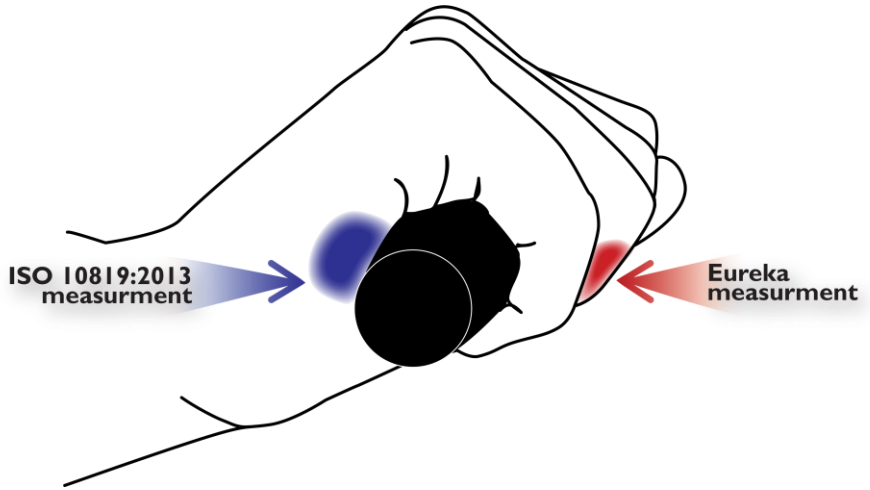
STANDARDS & MEASURMENTS

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”

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GLOVE CONCLUSIONS

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**

GLOVE GUIDE

Crude estimation of typical tools into the normal working condition

TOOL TYPE	IMPACT VIBRATION FLEXI	IMPACT VIBRATION AMPLITUDE	IMPACT VIBRATION+ WINTER	15-1 TRANSIENT VIBRATION
Rivet guns, Impact wrenches, Impact hammers		>10 000 rpm	>24 000 rpm	>36 000 rpm
High speed multi tools		>10 000 rpm	>24 000 rpm	
Angle grinders	2 500-25 000 rpm	>10 000 rpm		
Sanders & Grinders	2 500-25 000 rpm	>10 000 rpm		
Circular & Jig saws	2 500-25 000 rpm			

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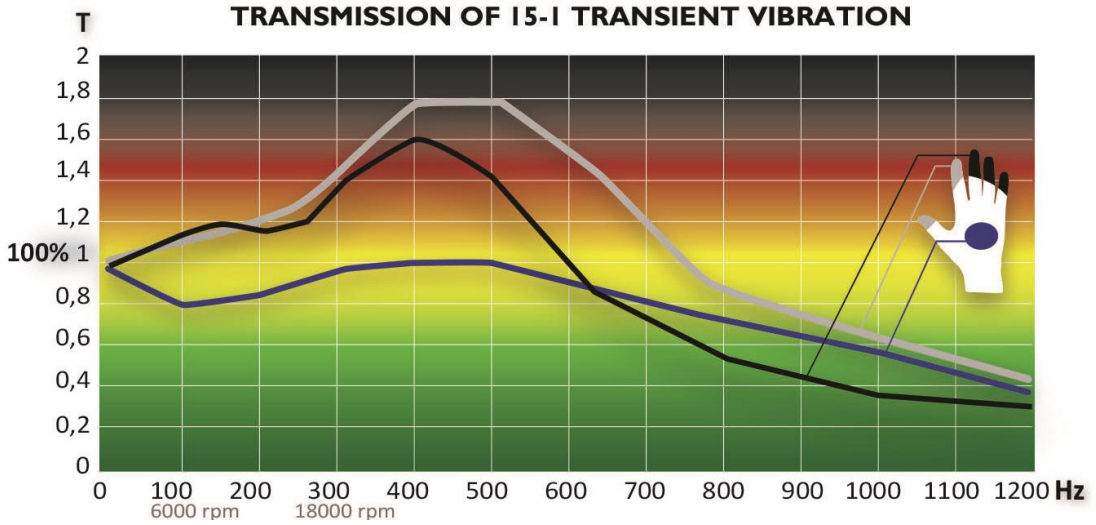
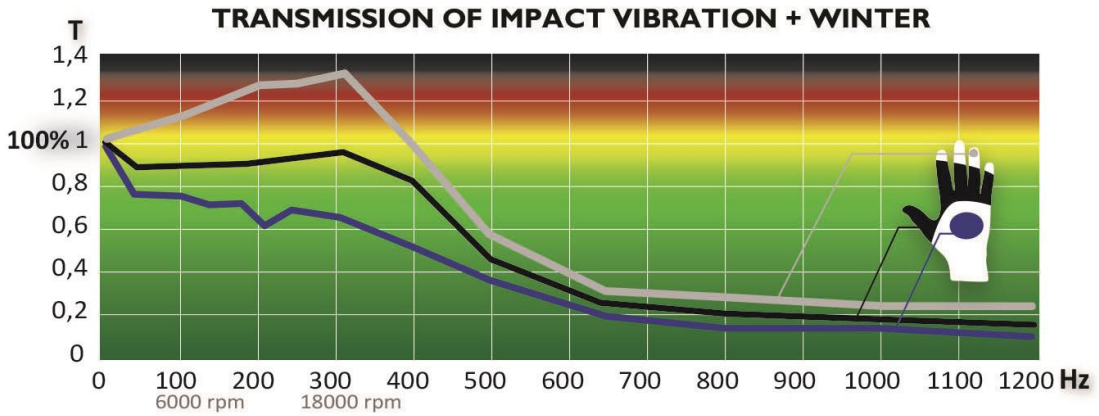
EUREKA SOLUTION FOR AV GLOVES - I





15-1 Transient Vibration

Vibration reduction for Impacting tools

	TOOL TYPE
●	**Rivet guns** Impact wrenches Impact hammers
●	**High speed multi tools** Angle grinders Sanders & Grinders Circular & Jig saws

Impact Vibration

Allround vibration glove

	TOOL TYPE
●	**Rivet guns** Impact wrenches Impact hammers High speed multi tools
●	**Angle grinders** Sanders & Grinders
●	**Circular & Jig saws**

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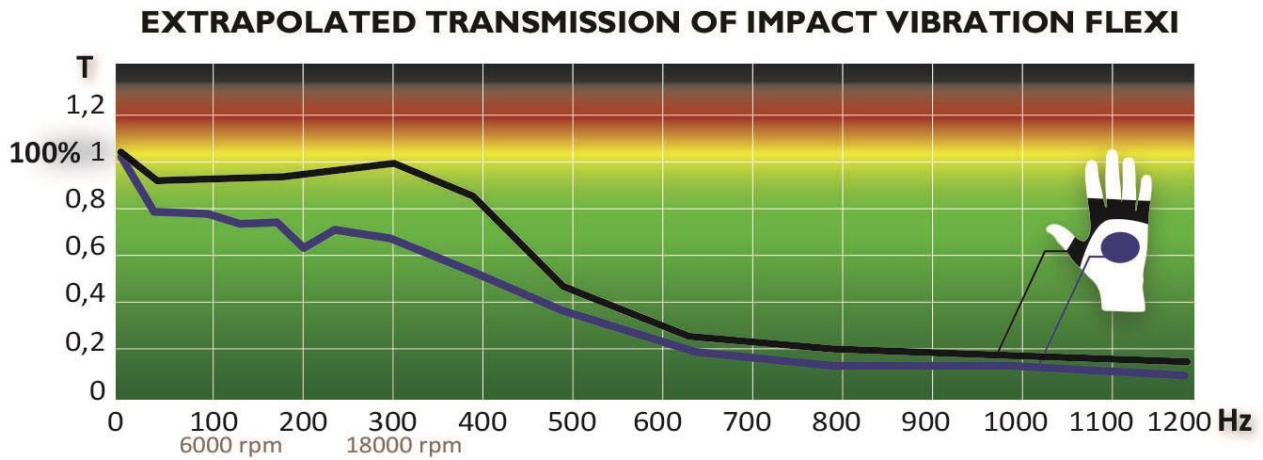
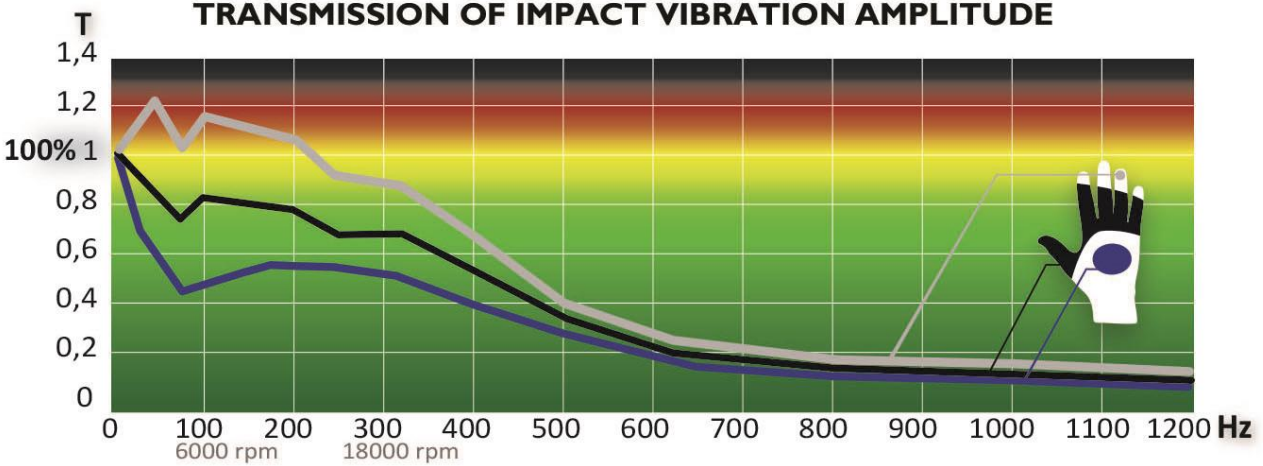
EUREKA SOLUTION FOR AV GLOVES - 2



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



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

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