



Including facts about new Noise Directive 2003/10/EC

**Hear it.**

[ Facts and figures about your hearing  
and how to protect it. ]

**MSA SORDIN**

## [ Hearing ]

The hearing is our most important organ of communication, but hardly anyone thinks consciously about their ears. Yet they are high-performance precision instruments. When likened to a pair of scales, their possible measuring range is from 1 milligramme to 1000 tons! But this organ was not designed for our loud civilization. The main problem: hearing damage once suffered is usually irreparable.

### Our ears perform different, important tasks:

#### Communication

Apart from the pure facts we grasp by hearing, we also get the emotion behind a message and are able to react appropriately. The perceived movement of the lips is normally insufficient for complete understanding of a message.



#### Warning and alarm function

Our sense of hearing warns and alarms us. Warning cries, an approaching car, the ringing of the telephone, a siren or a call from a doctor - everything passes through the ear.

#### Orientation

Good hearing helps us in spatial orientation. From the volume and time differences of the signals arriving at our two ears we can perceive the direction a noise is coming.



## [ Partial deafness ]

### There are different types of partial deafness:

#### Conductive deafness

With conductive deafness, the sound is no longer passed to the inner ear. Conductive deafness can be eliminated or reduced in many cases.

#### Sound-sensitive deafness

More common than conductive deafness is sound-sensitive, or inner ear deafness. This results from a malfunction in the inner ear. The most frequent cause of this is noise. Inner ear deafness and sound-sensitive deafness cannot as a rule be repaired by operations or with medication. Hearing damage is irreparable! Hearing aids can only partly compensate for it!

#### Deafness with old age

Deafness at old age is probably above all a disease of civilization. Native peoples can hear almost as well as in their youth. The aging process of our hearing might be the result of all harmful influences such as continuous noise pollution, illnesses and also medicine.



#### Sound deafness is untreatable

The extent of the damage depends both on the intensity of the noise and on the length of time of its effect. Long-term exposure to noise of more than 85 decibels can cause permanent deafness. In the beginning the damage occurs in the frequency range in which our speech is located. The consequences are communication problems. So far neither medicine nor operations can help against noise damage: it is incurable.

However, hearing aids can help sufferers adjust to the damage.

[ Permissible weekly sound exposure ]

Sound Level



Recommended Exposure Time

The hearing can withstand a sound level of 80 dB[A] for up to 40 hours per week, without sustaining damage.

With 104 dB[A] only 9.3 minutes per week!

With 92 dB[A], the exposure time is reduced to only 2.5 hours per week.

85 dB[A]:  
Ear protection required!

80 dB[A]:  
Ear protection recommended!

[ Noise on the job ]

Noise deafness still ranks high in occupational diseases. Many employees assume the employer alone is responsible for the protection of the employee's hearing. This is however only partially correct: The employer is responsible primarily for the reduction of sources of noise on the job, e.g. by the installation of sound-insulating windows.



Starting from a prolonged-noise level of 80 dB – which corresponds approximately to the noise from a truck driving past 7.5 metres away – they are additionally obligated to make available appropriate hearing protection. However, the individual employee is responsible for actually using the ear protectors. Studies reveal that two out of three employees do not wear ear protection. The reasons: comfort or simply unawareness of the consequences.



[ Noise in leisure time ]

Hearing damage caused by noise is not only caused at work, noise exposure during leisure time is unfortunately also important. Not everything that is loud is felt as noise; for example the roar of racing car engines is not considered to be bad by their fans. And with music everyone knows that their favourite tracks are best heard loud. This leisure-time noise is particularly dangerous since we feel it as pleasant even though it is loud enough to damage our hearing.

[ Impulse noise ]

Apart from continuous noise, short, loud bangs are particularly dangerous. Since this noise is heard only briefly, the actual volume is not so strongly felt at all. But a single, over-loud bang can damage the hearing for a whole lifetime. Without hearing protection, an acoustic trauma results from this impulse noise.



## [ The Loudometer. How loud – how damaging? ]

### Acoustic pressure

### Source of sound/result

180 dB[A]

Starting pistol fired at the ear

160 dB[A]

Airbag expanding close to the ear

120 dB[A]

**Pain threshold.**  
**Hearing damage already possible from brief exposure**

110 dB[A]

Siren from 10 metres distant, typical noise level at a disco

100 dB[A]

Pneumatic hammer 10 metres distant, typical earphone music level

85 dB[A]

**Hearing damage possible from exposure of 40 hours per week**

80 dB[A]

Passing truck 7.5 metres distant, Busy motorway

70 dB[A]

Continuous noise level at a busy main road during the day

65 dB[A]

**Increased risk of cardiovascular diseases from long-term exposure**  
 Continuous noise level at a busy main road at night

40 dB[A]

**Learning and concentration problems possible**  
 Low traffic levels through double-glazing at 1 metre distance

35 dB[A]

A very quiet room fan at slow speed

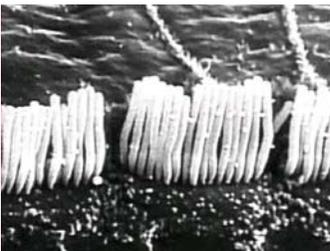
25 dB[A]

Sound of breathing at 1 metre distance

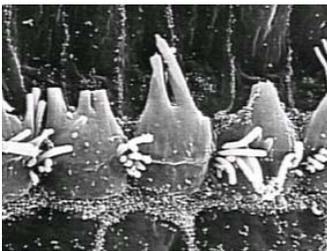
0 dB[A]

Auditory threshold

## [ “Noise” makes you ill ]



Undamaged hearing cells under the microscope.



Visible hearing damage: damaged hearing cells under the microscope.

What we hear is sound. If this sound is felt to be unpleasant, we speak of noise. Noise is frequently a waste product of our civilized society: We use machines which are nearly never noiseless, and indeed often very loud.

## [ Noise Directive 2003/10/EC ]

The European Parliament and the Council issued in February 2003 a directive on minimum regulations for the protection of employees from the endangerment by noise: Directive 2003/10/EC about minimum regulations for protecting the safety and health of employees from the endangerment by physical effects [noise]. This directive will be implemented before February 2006 in national employee protection regulations.

The Noise Directive regulates the responsibilities of employers for ascertaining and evaluating noise exposure as well as the procedures for avoiding or reducing this exposure. Exposure means the level of danger for an organism, depending on the frequency and the intensity of the circumstances affecting this organism.

## [ The most important values ]

Taking account of technical progress and of the availability of measures to control the risk at source, the risks arising from exposure to noise shall be eliminated at their source or reduced to a minimum. The reduction of these risks can be based on:

- Different working methods
- The choice of appropriate work equipment
- The design and layout of workplaces and work stations
- Adequate information and training to instruct workers
- Reducing air-borne noise and structure-borne noise

If there is a noise exposure requiring appropriate actions, the Noise Directive 2003/10/EC shows the following exposure levels:

### Lower Exposure Action Level 80 dB[A] / 135 dB[C]

Where noise exposure exceeds the lower exposure action values, the employer shall make individual hearing protectors available to workers.

### Upper Exposure Action Level 85 dB[A] / 137 dB[C]

Where noise exposure matches or exceeds the upper exposure action values, individual hearing protectors shall be used!

### Exposure Limit Values 87 dB[A] / 140 dB[C]

Under no circumstances shall the exposure of the worker exceed the exposure limit values! At work in circumstances with more noise exposure the individual hearing protectors shall be so selected as to limit the exposure at the exposure limit values.

Preventive audiometric testing shall also be available for workers whose exposure exceeds the lower exposure action values. A worker whose exposure exceeds the upper exposure action values shall have the right to have his/her hearing checked by a doctor or by another suitably qualified person under the responsibility of a doctor, in accordance with national law and/or practice.

Furthermore the employer shall ensure that workers who are exposed to noise at work at or above the lower exposure action values receive information and training relating to the risks resulting from exposure to noise, concerning in particular the nature of such risks and the correct use of hearing protectors.



## [ How does hearing protection work? ]

Basically there are two types of hearing protectors:

**Passive ear muffs** damp the sound, which means that all noises are reduced as they pass through the ear muffs. It is important that the hearing protection used provides enough attenuation to protect the hearing. But it is also important that it doesn't give attenuation so high that you are overprotected. Overprotection can prevent you from hearing your workmates, alarms and other important signals. The recommended sound level under the hearing protector is between 70 – 80 dB.

**Active [electronic] ear muffs** with a built-in electronic circuit limit noise but let you hold normal conversation with other people – without having to remove your hearing protector. Built-in level dependent amplification amplifies speech and other harmless sounds while protecting against harmful sound levels. To prevent harmful noise levels, the internal speaker output is limited to 82 dB.

## [ Choose your hearing protection ]

The choice of the correct hearing protection depends on the kind of noise arising and also on working conditions. The more comfortable and problem-free protection of the ears is, the longer it can exercise its function. The following factors play a role in the selection of correct protection for the ears:

### **Exactness of fit:**

The ear must be completely sealed.

### **Effectiveness:**

The noise must be absorbed effectively.

### **Comfort:**

Since the hearing protection must be worn all the time that a high noise level prevails, it must be as light and comfortable as possible. It should not distract or irritate.

### **Easy handling:**

The hearing protection must be practical and easy to use.

### **Compatibility:**

Other safety devices must also be able to be worn at the same time, such as helmets, eye protectors, face shields or respirators.



## [ MSA SORDIN – competence in hearing protection ]

With over 15 years of experience, MSA SORDIN offers a wide range of hearing protectors with built-in electronics – from basic functions to high-specification communication devices. You have the choice between headband and helmet-mounted version. All products are comfortable hearing protectors, designed to prevent you from feeling isolated, thereby encouraging you to use them and so protecting your hearing for the rest of your life.

[ Electronic ear muffs ]



**BasicLine**

The BasicLine features standard electronics and offers all basic functions at a great value-for-money price. Optional integrated features such as FM Radio and Level Dependent CutOff, as well as helmet mounted versions, are also available.

**ProLine**

The ProLine series has been developed for use in tough environments over periods of longer duration. Uses the very latest technology to provide superb sound quality. A variety of built-in features such as auxiliary audio input, CutOff and FM Radio are available, as well as the Dual Pro which combines all of these features.



**Connected by Cable**

This comfortable range of hearing protection equipment comes with a noise-cancelling microphone as standard, permitting two-way communication with minimal interference from background noise, and a down lead for connection to a two-way radio. Also available with level dependent CutOff feature.



**Wireless World**

Bluetooth® wireless technology gives us enormous freedom to communicate. Whether working as a craftsman, installation engineer, gardener, construction worker, forest worker, in industry, or even at home in the garage, everyone can now communicate “hands-free” at any time within the “Wireless World”, free of the inconvenience of cables.



[ Passive ear muffs ]



**EXC**

The ear muff that’s so comfortable, you’ll never want to take it off! Unique injection moulded inserts provide both excellent noise attenuation and maximum comfort. EXC is suitable for most environments where hearing protection is required.

**HPE**

The HPE ear muffs have been designed to offer protection against very high levels of noise, particularly at low frequency. Thick, soft, foam filled cushions combine maximum comfort with a perfect seal.



**XLS**

XLS combines quality and comfort with great value. It has many of the features usually found only in more expensive ear muffs. XLS is mainly designed for use in lighter industrial environments and for DIY [Do-It-Yourself] use.

[ Helmet mounted ear muffs ]

**Helmet mounted**

All ear muffs are available as helmet mounted versions [except for Supreme].



For details on MSA SORDIN hearing protection please see the respective leaflets.

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