

JIS

JAPANESE INDUSTRIAL STANDARD

Ear Protectors

JIS T 8161 —1983

Translated and Published

by

Japanese Standards Association

**Translation without guarantee
In the event of any doubt arising, the original
standard in Japanese is to be evidence**

1. Scope

This Japanese Industrial Standard specifies the ear protectors, hereinafter referred to as the "protectors", which are used to protect workers in manufacture of jet engine (including maintenance), air terminal, saw mill (including that operated with chainsaw), ship-building, iron and steel making, mine pit, steel fabrication, tunnel work and other factories generating intense noise, from hypacusia.

2. Definitions

Main definitions used in this standard are as follows:

- (1) sound insulation It means to disturb propagation of sound.
- (2) noise insulation performance It means the sound attenuation and the standard deviation of protector at random incidence one third octave band noise.
- (3) sound pressure level It is 20 times the common logarithm of the ratio of sound pressure (r.m.s. value) p Pa of sound to the reference sound pressure (r.m.s. value) 20μ Pa, that is, the level calculated from the following formula:

$$L_p = 20 \log_{10} \frac{p}{2 \times 10^{-5}}$$

where L_p : sound pressure level (dB)

Further, the sound level concerning the test, etc. shall be the value measured with C characteristics of the sound level meter specified in JIS C 1505 or JIS C 1502.

- (4) threshold of audibility It is r.m.s. value of the minimum sound level capable of evoking an auditory sensation. It is generally indicated in sound pressure level.
- (5) raising method It is such method of measuring a threshold of audibility that the sound pressure is gradually raised from a sound level appreciably smaller than threshold of audibility and the sound pressure when the sound is sensed for the first time is taken as the threshold of audibility.
- (6) white noise It is such sound that the sound level in a frequency band of 1 Hz width is constant irrespective of frequencies, and that is continuously distributed and constant in a broad range of frequencies.

Applicable Standards:

JIS C 1502-Sound Level Meters

JIS C 1505-Precision Sound Level Meters

JIS G 3141-Cold Rolled Carbon Steel Sheets and Strip

JIS G 3522-Piano Wire

JIS T 1201-Diagnostic Audiometers

Further, this term is used for electric signals which generate such noise.

- (7) one-third octave band noise It is such sound that the sound pressure level in a frequency band of 1 Hz width is constant over an one-third octave band, and that is continuously distributed over the same octave band. It is generated by a speaker the electric input of which is obtained by passing white noise (electric signal) through on one-third octave band filter.

When the cut-off frequencies of both ends of one-third octave band are set f_1 and f_2 (f_2 being larger than f_1), then $f_2 = 2^{\frac{1}{3}}f_1$, and $f_c = \sqrt{f_1 f_2} = 2^{\frac{1}{6}}f_1$ is called as its centre frequency, and represents that frequency band. Practically, the following equations are used:

when $f_c = 125$ Hz , then $f_1 = 112$ Hz and $f_2 = 140$ Hz
 when $f_c = 250$ Hz , then $f_1 = 224$ Hz and $f_2 = 280$ Hz
 when $f_c = 500$ Hz , then $f_1 = 450$ Hz and $f_2 = 560$ Hz
 when $f_c = 1000$ Hz , then $f_1 = 900$ Hz and $f_2 = 1120$ Hz
 when $f_c = 2000$ Hz , then $f_1 = 1800$ Hz and $f_2 = 2240$ Hz
 when $f_c = 4000$ Hz , then $f_1 = 3550$ Hz and $f_2 = 4500$ Hz
 when $f_c = 8000$ Hz , then $f_1 = 7100$ Hz and $f_2 = 9000$ Hz .

- (8) ambient noise It is the noise at the site where measurement is carried out when there is no sound for testing sound insulation performance of protectors, hereinafter referred to as the "test sound".
- (9) hearing threshold level It is the ratio of actual threshold audibility to the normal threshold audibility at a certain frequency, indicated in decibel (dB).

3. Classification

The classification of protectors are as given in Table 1.

Table 1. Classification

Classification	Grouping	Symbol	Remark
Ear-plug	Class 1	EP-1	It is the ear-plug for insulating sounds from a low-pitched sound to a high-pitched one.
	Class 2	EP-2	It is the ear-plug mainly insulating a high-pitched sound and relatively passing a low-pitched sound of conversation field degree.
Ear-muff	—	EM	—

4. Performance

When protectors are tested according to the method specified in 7., the sound attenuation at each centre frequency shall conform to the sound attenuation given in Table 2.