

85.18 - Microphones and stands therefor; loudspeakers, whether or not mounted in their enclosures; headphones and earphones, whether or not combined with a microphone, and sets consisting of a microphone and one or more loudspeakers; audio-frequency electric amplifiers; electric sound amplifier sets.

8518.10 - Microphones and stands therefor

- Loudspeakers, whether or not mounted in their enclosures :

8518.21 - - Single loudspeakers, mounted in their enclosures

8518.22 - - Multiple loudspeakers, mounted in the same enclosure

8518.29 - - Other

8518.30 - Headphones and earphones, whether or not combined with a microphone, and sets consisting of a microphone and one or more loudspeakers

8518.40 - Audio-frequency electric amplifiers

8518.50 - Electric sound amplifier sets

8518.90 - Parts

This heading covers microphones, loudspeakers, headphones, earphones and audio-frequency electric amplifiers of all kinds presented separately, regardless of the particular purpose for which such apparatus may be designed (e.g., telephone microphones, headphones and earphones, and radio receiver loudspeakers).

The heading also covers electric sound amplifier sets.

(A) MICROPHONES AND STANDS THEREFOR

Microphones convert sound vibrations into corresponding variations or oscillations of electric current, thus enabling them to be transmitted, broadcast or recorded. According to their working principle, they include :

- (1) **Carbon microphones.** These depend on the variations in the electrical resistance of carbon granules, caused by differences in the pressure exerted upon them when the diaphragm is displaced by sound waves. The carbon granules (or powder) are packed in a container between two electrodes, one of which constitutes or is fixed to the diaphragm.
- (2) **Piezo-electric microphones,** in which the pressure of the sound waves, transmitted by means of a diaphragm, sets up strains in a specially cut piece of crystal (e.g., quartz or rock crystal), thus causing the production of electric charges on the crystal. This type of element is often used in the "contact" microphone that is used in the pick-up of acoustic musical instruments such as guitars, pianos, brass and string orchestral instruments etc.
- (3) **Moving coil or ribbon microphones** (also known as dynamic microphones), in which the sound vibrations are brought to bear on a coil or an aluminium ribbon situated in a magnetic field, thus producing electric impulses by induction.
- (4) **Capacitance or electrostatic (condenser) microphones,** containing two plates (or electrodes), one fixed (the backplate) and one able to vibrate (the diaphragm), with an air gap between the two. The sound waves produce differences in capacity between the two plates.

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- (5) **Thermal or hot wire microphones**, containing a heated resistance wire, the temperature of which, and therefore the resistance, is varied by the effect of the sound waves.

This heading also covers wireless microphone sets, each set consisting of one or more wireless microphones and a wireless receiver. The wireless microphone transmits a signal representing the sound waves it receives, by means of radio-transmission circuitry and an internal or external aerial. The receiver has one or more aeriels to receive the transmitted radio waves and internal circuitry to convert the radio waves to an electrical audio signal, and may have one or more volume controls and output plugs.

There are many varied applications of microphones (e.g., in public address equipment; telephony; sound recording; aircraft or submarine detectors; trench listening devices; study of heart beats).

Generally the electric current output from microphones is in the form of an analogue signal, however some microphones incorporate an analogue to digital converter where the output is in the form of a digital signal. Microphones are sometimes rendered more sensitive by the addition of amplifiers (usually referred to as pre-amplifiers). Capacitors are sometimes fitted for tone correction. Some microphones require an electrical power supply for their operation. This power supply may be supplied from a mixing console or the sound recording apparatus or it may be in the form of a separate power pack. Power packs presented separately are not classified in this heading (**generally heading 85.04**). Microphones are also sometimes fitted with devices for concentrating the sound waves, and may have, as in the case of public address microphones, special **stands** for placing on a table, a desk, etc., or on the ground, or from which the microphones are suspended. Such stands or devices fall in this heading, even if presented separately, **provided** they are of a kind specially designed for use with or for fitting to microphones.

On the other hand, monopods, bipods, tripods and similar articles are **excluded** (**heading 96.20**).

(B) LOUDSPEAKERS, WHETHER OR NOT MOUNTED IN THEIR ENCLOSURES

The function of loudspeakers is the converse of that of microphones : they reproduce sound by converting electrical variations or oscillations from an amplifier into mechanical vibrations which are communicated to the air. They include the following types :

- (1) **Moving iron or moving coil loudspeakers**. In the moving iron loudspeaker an armature or reed of soft iron is placed in the field of a permanent magnet and under the influence of the coils in which the current passes. The field varies in accordance with this current, and a diaphragm fixed to the armature or reed sets up corresponding vibrations in the air. Moving coil loudspeakers consist essentially of a coil which is placed in the field of a permanent or electro-magnet and which is energised by the varying current. The coil is rigidly connected to a diaphragm.
- (2) **Piezo-electric loudspeakers**, based on the principle that certain natural or artificial crystals are subject to mechanical distortion when an electric current is applied to them. Such loudspeakers are usually known as "crystal loudspeakers".

- (3) **Electrostatic loudspeakers** (also known as **condenser-type loudspeakers**). These depend on the electrostatic reactions between two plates (or electrodes), one plate serving as a diaphragm.

Matching transformers and amplifiers are sometimes mounted together with loudspeakers. Generally the electrical input signal received by loudspeakers is in analogue form, however in some cases the input signal is in digital format. Such loudspeakers incorporate digital to analogue converters and amplifiers from which the mechanical vibrations are communicated to the air.

Loudspeakers may be mounted on frames, chassis or in cabinets of different types (often acoustically designed), or even in articles of furniture. They remain classified in this heading **provided** the main function of the whole is to act as a loudspeaker. Separately presented frames, chassis, cabinets, etc., also fall in this heading **provided** they are identifiable as being mainly designed for mounting loudspeakers; articles of furniture of Chapter 94 designed to receive loudspeakers in addition to their normal function remain classified in **Chapter 94**.

The heading includes loudspeakers designed for connection to an automatic data processing machine, when presented separately.

(C) HEADPHONES AND EARPHONES, WHETHER OR NOT COMBINED WITH A MICROPHONE, AND SETS CONSISTING OF A MICROPHONE AND ONE OR MORE LOUDSPEAKERS

Headphones and earphones are electroacoustic receivers used to produce low-intensity sound signals. Like loudspeakers, described above, they transform an electrical effect into an acoustic effect; the means used are the same in both cases, the only difference being in the powers involved.

The heading covers headphones and earphones, whether or not combined with a microphone, for telephony or telegraphy; headsets consisting of a special throat microphone and permanently-fixed earphones (used, for example, in aviation); line telephone handsets which are combined microphone/speaker sets for telephony and which are generally used by telephone operators; headphones and earphones for plugging into radio or television receivers, sound reproducing apparatus or automatic data processing machines.

The heading also covers sets consisting of a microphone and one or more loudspeakers which may be fitted together. A headphone or earphone may be included with the set for private listening. These sets are designed to be plugged into or connected to a central control system which includes an amplifier. These units may be used by participants at meetings or conferences.

The heading also includes prenatal listening apparatus which generally consist of a microphone, a headphone, a loudspeaker, a listening cone, on/off/volume control and battery compartment. This apparatus makes it possible to hear the sounds of a foetus as well as the mother's heartbeat. This apparatus does not include a sound recording device. The apparatus is designed for non-medical use.

However, electro-diagnostic apparatus of a type designed for use by professionals in medical, surgical or veterinary sciences is classified in **heading 90.18**.

(D) AUDIO-FREQUENCY ELECTRIC AMPLIFIERS

Audio-frequency amplifiers are used for the amplification of electrical signals of frequencies falling within the range of the human ear. The great majority are based on transistors or integrated circuits, but some are still based on thermionic valves. They are generally powered by a built-in power pack which may be fed from the mains or, particularly in the case of portable amplifiers, from electric accumulators or batteries.

The input signals to audio-frequency amplifiers may be derived from a microphone, a laser optical disc reader, a pick-up cartridge, a magnetic tape head, a radio feeder unit, a film sound track head or some other source of audio-frequency electric signals. Generally speaking, the output is fed into a loudspeaker, but this is not always the case (pre-amplifiers can feed into a succeeding amplifier or be incorporated in an amplifier).

Audio-frequency amplifiers may contain a volume control for varying the gain of the amplifier, and also commonly incorporate controls (bass boost, treble lift, etc.) for varying their frequency response.

The heading includes audio-frequency amplifiers used as repeaters in telephony or as measurement amplifiers.

High or intermediate frequency amplifiers are classified in **heading 85.43** as electrical appliances having an individual function. Audio mixers and equalisers are also classified in **heading 85.43**.

(E) ELECTRIC SOUND AMPLIFIER SETS

This heading also covers amplifier sets consisting of microphones, audio-frequency amplifiers and loudspeakers. This type of equipment is extensively used for public entertainment, public address systems, advertising vehicles, police vehicles or with certain musical instruments, etc. Similar systems are also used on large lorries (particularly those with trailers) for enabling the driver to hear irregular noises or sound signals from behind, which otherwise he could not hear above the sound of the engine.

PARTS

Subject to the general provisions regarding the classification of parts (see the General Explanatory Note to Section XVI), parts of the goods of this heading are also classified here.

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The heading also **excludes** :

- (a) Airmen's headgear incorporating headphones with or without a microphone (**heading 65.06**).
- (b) Telephone sets (**heading 85.17**).
- (c) Hearing aids of **heading 90.21**.