85.05 - Electro-magnets; permanent magnets and articles intended to become permanent magnets after magnetisation; electro-magnetic or permanent magnet chucks, clamps and similar holding devices; electro-magnetic couplings, clutches and brakes; electro-magnetic lifting heads.

- Permanent magnets and articles intended to become permanent magnets after magnetisation :

8505.11 - - Of metal

8505.19 - - Other

8505.20 - Electro-magnetic couplings, clutches and brakes

8505.90 - Other, including parts

This heading covers electro-magnets, those electro-magnet operated appliances specially listed in the heading, permanent magnets and permanent magnet work holders.

(1) **Electro-magnets.**

These are of various sizes and shapes according to the use for which they are intended. They consist essentially of a coil of wire wound around a core of soft iron, this core being either in one piece or laminated. The passing of electric current in the coil confers magnetic properties on the core, which can then be used either for attraction or repulsion.

(2) **Permanent magnets and articles intended to become permanent magnets after magnetisation.**

Permanent magnets consist of pieces of hard steel, special alloys or other materials (e.g., barium ferrite agglomerated with plastics or synthetic rubber) which have been rendered permanently magnetic. Their shape varies according to the use for which they are designed. To reduce the tendency to de-magnetise, horseshoe-shaped magnets are often furnished with a bar of iron (the keeper) adhering to the two poles. Permanent magnets remain classified here whatever their use, including small magnets used, *inter alia*, as toys.

Articles intended to become permanent magnets after magnetisation are recognisable as such by their shape and composition, generally being cubes or discs (tags) of metal or of agglomerated ferrite (e.g., barium ferrite).

(3) **Electro-magnetic or permanent magnet chucks, clamps and similar holding devices.**

These are mainly devices of various types in which magnets are used to hold work pieces in place while they are being worked. This group also covers holding devices for machines other than machine-tools (for example, magnetic devices for holding printing plates in printing machinery).

(4) **Electro-magnetic clutches and couplings**.

These may be of various types. Certain types consist of a fixed coil around a movable armature, the latter being pulled into the coil when current passes and pulled out again by a spring when the current is cut off. The heading also covers variable speed couplings, some of which are based on the principle of an asynchronous motor.

(5) **Electro-magnetic brakes**.

These generally consist of shoes which, under the influence of electro-magnets, act on the rim of a wheel or on the rail. Others are based on the principle of electro-magnetic induction, a soft steel disc mounted on the shaft being braked by the action of eddy currents induced in it by electro-magnets. The heading **does not**, however, **cover** mechanical hydraulic or pneumatic brakes controlled by electro-magnetic devices.

(6) **Electro-magnetic lifting heads**.

These consist essentially of electro-magnets, generally circular, and are usually used in conjunction with cranes (e.g., for the lifting of scrap iron). Certain types are designed for special purposes (e.g., on salvage vessels for the recovery of metal objects from wrecks).

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 **does not cover** :

(a) Magnetic ferrite with a binder, in the form of powder or pellets (**heading 38.24**).

(b) Electro-magnets, permanent magnets or magnetic devices of this heading, when presented with machines, apparatus, toys, games, etc., of which they are designed to form part (classified with those machines, apparatus, etc.).

(c) Media for magnetic recording such as cards composed of unmagnetised magnetic material laminated between two plastic sheets and used, in particular, for opening magnetic locks (**heading 85.23**).

(d) Electro-magnets designed for use by oculists or surgeons (**heading 90.18**).