

CHAPTER 85

ELECTRICAL MACHINERY AND EQUIPMENT AND PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS, TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, AND PARTS AND ACCESSOIRES OF SUCH ARTICLES**8501 Electric motors and generators (excluding generating sets)**

This heading includes rotary electric windscreen-wiper motors, without arms or wiper blades but with appropriate transmission mechanisms (spur gear and oscillating connecting rod) which convert the rotary motion into an oscillating one.

8502 Electric generating sets and rotary converters

In addition to the electrical machinery described in the HS Explanatory Notes to heading No 8502, parts (I) and (II), this heading includes cascade converters, Ward-Leonard sets and rotary dephasers.

8502 39 91 Turbo-generators

Turbo-generators are driven directly by gas or steam turbines. They have a solid cylindrical rotor with longitudinal grooves in which the induction windings are mounted. The rotor may be in one piece or consist of a number of solid sections.

Turbo-generators are generally air-cooled, but high-capacity types are hydrogen-cooled.

8503 00 Parts suitable for use solely or principally with the machines of heading No 8501 or 8502

This heading does not include branch circuit plates for electric motors (heading No 8536).

8504 Electrical transformers, static converters (for example, rectifiers) and inductors

In addition to the products referred to in the HS Explanatory Notes to heading No 8504, this heading includes:

1. adjustable transformers (for example, cursor transformers) and variable ratio transformers;
2. field dispersion transformers for fluorescent tubes;
3. special transformers for communications;
4. compensation coils;
5. output coils;
6. smoothing inductors;
7. moving core coils for modifying inductance;
8. ballasts (chokes) for electrical discharge lamps and tubes;
9. Pupin coils;
10. Godefroy coils;
11. stabilized power packs (rectifier with a regulator).

This heading also includes selenium or copper oxide rectifying elements, whether single (selenium plates, in particular) or multiple.

However, by application of Note 2 to this chapter, this heading does not include germanium or silicon crystal elements, mounted, single or multiple, whether or not equipped with cooling or insulating devices, etc., provided they are not combined with another electrical element such as a transformer or resistor (heading No 8541).

Furthermore, this heading does not include:

- (a) commutators for multiple-point transformers (heading No 8536);
- (b) rectifying lamps, tubes and valves such as phanotrons, thyratrons, ignitrons and high-voltage rectifying tubes for X-ray equipment (subheading 8540 89 00);
- (c) voltage regulators of heading No 9032.

8504 90 05**Electronic assemblies of machines of subheading 85045030**

For the definition of the expression 'electronic assemblies' see the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.

8504 90 91**Electronic assemblies of machines of subheading 85044020**

For the definition of the expression 'electronic assemblies' see the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.

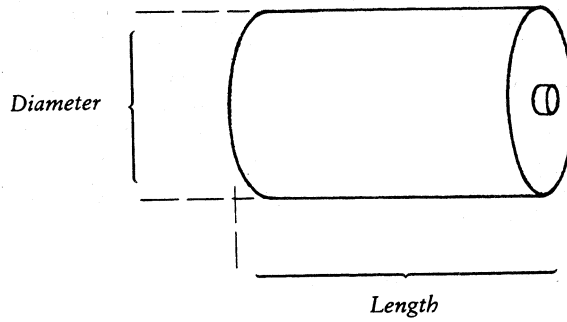
8505**Electro-magnets; permanent magnets and articles intended to become permanent magnets after magnetization; electro-magnetic or permanent magnet chucks, clamps and similar holding devices; electro-magnetic couplings, clutches and brakes; electro-magnetic lifting heads****8505 90 10****Electro-magnets**

This subheading includes electric operating magnets fitted to the doors of private cars and forming part of a central door-locking system. Such systems are connected to the vehicle power supply and are actuated by control signals from an electrical control device belonging to the system. If one of the doors is opened or closed manually, the other vehicle doors will be simultaneously locked or unlocked electromagnetically.

However, this subheading does not include solenoid-operated injection valves for spark-ignition or compression-ignition internal combustion piston engines, the valve bodies and valve needles of which are equipped with a magnet winding and magnet keeper respectively (subheading 8409 91 00 or 8409 99 00).

8506**Primary cells and primary batteries****8506 10 11****Cylindrical cells**

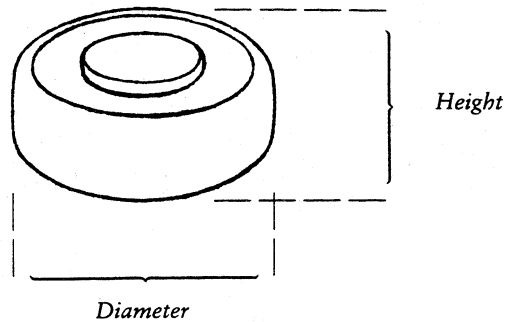
Cylindrical cells have a circular cross-section. Positive and negative poles are at opposite ends. The length of cylindrical cells is greater than their diameter:



8506 10 15

Button cells

The height of button cells is less than or equal to the diameter:



8506 10 91

Cylindrical cells

See the Explanatory Notes to subheading 8506 10 11.

8506 10 95

Button cells

See the Explanatory Notes to subheading 8506 10 15.

8506 30 10

Cylindrical cells

See the Explanatory Notes to subheading 8506 10 11.

8506 30 30

Button cells

See the Explanatory Notes to subheading 8506 10 15.

8506 40 10

Cylindrical cells

See the Explanatory Notes to subheading 8506 10 11.

8506 40 30

Button cells

See the Explanatory Notes to subheading 8506 10 15.

8506 50 10

Cylindrical cells

See the Explanatory Notes to subheading 8506 10 11.

8506 50 30

Button cells

See the Explanatory Notes to subheading 8506 10 15.

8506 60 10

Cylindrical cells

See the Explanatory Notes to subheading 8506 10 11.

8506 60 30

Button cells

See the Explanatory Notes to subheading 8506 10 15.

8506 80 00 Cylindrical cells

See the Explanatory Notes to subheading 8506 10 11.

8506 80 15 Button cells

See the Explanatory Notes to subheading 8506 10 15.

8507 Electric accumulators, including separators therefor, whether or not rectangular (including square)**8507 20 10 to 8507 20 89 Other lead-acid accumulators**

With the exception of accumulators of a kind used for starting piston engines (see subheadings 8507 10 10 to 8507 10 89), these subheadings cover the electric lead-acid accumulators mentioned in the HS Explanatory Notes to heading No 8507, third paragraph, (1).

These accumulators are used, for example, for driving electric vehicles and for supplying power to telecommunication installations.

8507 30 10 to 8507 30 98 Nickel-cadmium

The accumulators of these subheadings are used particularly in safety lamps for miners and often as replacements for dry batteries in equipment such as portable radios, television sets, electric razors and other electrical equipment.

8507 80 10 to 8507 80 99 Other accumulators

These subheadings include silver-zinc and silver-cadmium accumulators.

8507 90 10 to 8507 90 98 Parts

These subheadings do not include connecting parts of accumulator elements (subheading 8536 90 85).

8509 Electro-mechanical domestic appliances, with self-contained electric motor**8509 80 00 Other appliances**

This subheading includes electrical manicure and pedicure sets with self-contained electric motor, connected via a cable to the power-supply unit (mains unit) belonging to the appliance.

8510 Shavers, hair clippers and hair-removing appliances, with self-contained electric motor**8510 10 00 Shavers**

Shavers incorporating hair clippers fall within this subheading.

8511 Electrical ignition or starting equipment of a kind used for spark-ignition or compression-ignition internal combustion engines (for example, ignition magnetos, magneto-dynamos, ignition coils, sparking plugs and glow plugs, starter motors); generators (for example, dynamos, alternators) and cut-outs of a kind used in conjunction with such engines**8511 40 10 and 8511 40 90 Starter motors and dual purpose starter-generators**

The equipment of these subheadings usually operates on 6, 12 or 24 V and has special devices for attachment to motors.

These subheadings include:

1. starter motors with sliding armature, starter motors with sliding feeder, starter motors with a helicoidal motion, and starter motors with a sliding pinion and a helicoidal motion;
2. equipment which is the result of combining in one unit a starter motor and a generator.

8512 Electrical lighting or signalling equipment (excluding articles of heading No 8539), windscreen wipers, defrosters and demisters, of a kind used for cycles or motor vehicles**8512 90 00 Parts**

This subheading includes frames and reflectors for headlights, and wiper arms, with or without wiper blades, for electric windscreen wipers.

However, the subheading does not include lamp-holders (subheading 8536 61 10 or 8536 61 90).

- 8516** **Electric instantaneous or storage water heaters and immersion heaters; electric space heating apparatus and soil heating apparatus; electro-thermic hair-dressing apparatus (for example, hair dryers, hair curlers, curling tong heaters) and hand dryers; electric smoothing irons; other electro-thermic appliances of a kind used for domestic purposes; electric heating resistors, other than those of heading No 8545**
- 8516 10 11** **Electric instantaneous or storage water heaters and immersion heaters**
to
8516 10 99
- These subheadings include:
1. water heaters operating both as instantaneous water heaters and water storage heaters;
 2. electric boilers which produce only hot water, or hot water and low pressure steam simultaneously.
- These subheadings do not include electrically heated steam boilers and 'superheated water' boilers (heading No 8402) and electrically heated electric boilers for central heating (heading No 8403).
- 8516 21 00** **Electric space-heating apparatus and electric soil-heating apparatus**
to
8516 29 99
- These subheadings include:
1. electric heating equipment for saunas;
 2. battery-operated heating devices for warming and defrosting iced-up door locks on motor vehicles by the presence of a heating element in the lock. These small portable devices may incorporate a lamp of the type falling within heading No 8513 to illuminate the working area.
- 8516 60 10** **Cookers (incorporating at least an oven and a hob)**
- Cookers consist of at least a hob and an oven (which may also include a microwave unit or grill).
- 8516 79 80** **Other**
- In addition to the appliances described in the HS Explanatory Notes to heading No 8516, part (E), (5) to (7) and (9) to (18), this subheading includes:
1. saunas with infra-red radiators (individual cubicles);
 2. foot-heating plates;
 3. electrically heated shoe trees;
 4. devices for cleaning contact lenses, consisting of two small electrically heated compartments with screw-on lids to hold the contact lenses and heat up the cleansing fluid.
- 8516 80 91** **Other**
and
8516 80 99
- These subheadings include wire, cables, tapes and the like, which are insulated and provide heat for heating ceilings, walls, pipes, containers, etc.
- However, these subheadings do not include heating resistors connected to parts of equipment, for example, base plates for smoothing irons and plates for electric cookers (subheading 8516 90 00).
- 8517** **Electrical apparatus for line telephony or line telegraphy, including line telephone sets with cordless handsets and telecommunication apparatus for carrier-current line systems or for digital line systems; videophones**
- 8517 19 10** **Videophones**
- This subheading includes videophones for buildings. Such videophones are a combination consisting essentially of a telephone set for line telephony, a television camera and a television receiver (transmission by line).
- This subheading also includes closed-circuit television systems consisting of one camera, a panel with several call buttons, and one or more video monitors connected to a communication post and coaxial cables for linking the different elements, presented in the form of a set put up for retail sale.
- Products of this subheading may also be combined with an electrical door opener, a signalling device or a light source.

- 8517 19 90** **Other**
- In addition to the telephone sets described in the HS Explanatory Notes to heading No 8517, part (I), (A), this subheading includes push-button, telephone sets incorporating a magnetic card reader, a data display, an electronic circuit-board with microprocessor, several data stores, a clock and a modulator-demodulator (modem). These appliances can be used not only as telephone sets but also (for example, in supermarkets) as data terminals, e.g., for verifying magnetic credit cards or cheques or for the transmission of sales data over telephone lines to automatic data processing machines.
- 8517 21 00** **Facsimile machines**
- Facsimile machines described in the HS Explanatory Notes to heading No 8517, part (II), (E), may have a memory and a storage function for the numbers to be dialled.
- They may also have additional functions such as a copying facility.
- 8517 50 10** **For carrier-current line systems**
- Equipment falling within this subheading can be used for the transmission of a large number of messages simultaneously by the same telephone or telegraph line (for example, coaxial cable). It can also be used for the transmission of messages using the electricity grid as a line (for example, to connect power stations with substations).
- Their operating principle is based on the production of a carrier frequency which is then modulated by electric impulses representing the word, message or any other information to be transmitted.
- 8517 80 90** **Other**
- This subheading includes weather map plotters. These are telegraphy receivers in which the modulated signals entering by cable are converted into electrical impulses to control the recording electrodes. As a result of these impulses, the electrodes burn lines of dots in metallized paper and in this way produce weather maps.
- 8517 90 11** **Electronic assemblies**
- See the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.
- 8517 90 82** **Electronic assemblies**
- See the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.
- 8518** **Microphones and stands therefor; loudspeakers, whether or not mounted in their enclosures; headphones, earphones and combined microphone/speaker sets; audio-frequency electric amplifiers; electric sound amplifier sets**
- 8518 40 91** **With only one channel**
- The amplifiers of this subheading can process only one input signal, which they deliver via one or more outlets (e.g., to loudspeakers).
- 8519** **Turntables (record-decks), record-players, cassette-players and other sound reproducing apparatus, not incorporating a sound recording device**
- 8519 92 00** **Pocket-size cassette-players**
- For the determination of the measurements of such apparatus, Subheading Note 1 to chapter 85 applies and the dimensions of the cabinet shall be taken into account; protuberances such as control buttons, closing devices and securing clips shall be ignored.
- 8520** **Magnetic tape recorders and other sound recording apparatus, whether or not incorporating a sound reproducing device**
- 8520 32 30** **Pocket-size recorders**
- The Explanatory Notes to subheading 8519 92 00 apply, *mutatis mutandis*.
- 8520 33 30** **Pocket-size recorders**
- The Explanatory Notes to subheading 8519 92 00 apply, *mutatis mutandis*.

- 8522** **Parts and accessories suitable for use solely or principally with the apparatus of heading Nos 8519 to 8521**
- 8522 90 51** **Electronic assemblies**
and
8522 90 59 See the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.
- 8523** **Prepared unrecorded media for sound recording or similar recording of other phenomena, other than products of Chapter 37**
- 8523 11 00** **Magnetic tapes**
to
8523 13 00 These subheadings also cover tapes which have to be cut to size before use.
- 8525** **Transmission apparatus for radio-telephony, radio-telegraphy, radio-broadcasting or television, whether or not incorporating reception apparatus or sound recording or reproducing apparatus; television cameras; still image video cameras and other video camera recorders**
- 8525 10 10** **Transmission apparatus**
to
8525 10 80 These subheadings include transmitting apparatus for call, alert or paging installations operating by induction.
- 8525 20 10** **Transmission apparatus incorporating reception apparatus**
to
8525 20 99 These subheadings include apparatus consisting of all the elements required for transmission and reception, in one cabinet or housing. Such is the case, for example, with walkie-talkies, which contain the batteries or accumulators required for their operation, or with transmitter-receiver apparatus, the power supply unit of which would be separate and connected to the apparatus by cable only.
- These subheadings also include units in which the transmitter and receiver elements are located in different furniture units or housing, provided they constitute a functional unit. In order to be regarded as constituting a functional unit, transmitter-receiver apparatus must be installed near each other (for example, in the same premises or on the same vehicle) and have certain elements in common, such as the aerial.
- 8525 20 91** **For cellular networks (mobile telephones)**
- These telephones receive and emit radio waves, which are received or retransmitted by radio-telephone stations (base stations) linked to each other. Each base station covers a geographical area (a cell). If the user moves from one cell to another while telephoning, the call is automatically transferred from one cell to the other without interruption.
- They are cordless and are fitted with an antenna. Unlike the telephones falling under subheading 8517 11 00, they do not have a base unit which is connected by line to the telephone network.
- 8525 30 10** **Television cameras**
and
8525 30 90 These subheadings do not cover electronic reading devices for the visually handicapped (see the Explanatory Notes to subheading 8543 89 95).
- 8525 40 11** **Still image video cameras**
and
8525 40 19 See the Explanatory Notes to subheadings 8525 30 10 and 8525 30 90).
- 8525 40 99** **Other**
- This subheading covers apparatus combinations consisting of a video camera and a video recording or reproducing apparatus (so-called 'camcorders') for the recording not only of images taken by the camera but also of television programmes. The images thus recorded can be reproduced by means of an external television receiver.
- However, 'camcorders' with which only the images taken by the video camera can be recorded and reproduced by means of an external television receiver fall within subheading 8525 40 91.
- 8527** **Reception apparatus for radio-telephony, radio-telegraphy or radio-broadcasting, whether or not combined, in the same housing, with sound recording or reproducing apparatus or a clock**
- For transmission apparatus incorporating reception apparatus, see the Explanatory Notes to subheadings 8525 20 10 to 8525 20 99.

**8527 12 10
and
8527 12 90**

Pocket-size radio cassette-players

See the Explanatory Notes to subheading 8519 92 00.

**8527 21 20
to
8527 29 00**

Radio-broadcast receivers not capable of operating without an external source of power, of a kind used in motor vehicles, including apparatus capable of receiving also radio-telephony or radio-telegraphy

The Explanatory Notes to subheadings 8527 31 11 to 8527 39 80 apply, *mutatis mutandis*.

**8527 31 11
to
8527 39 80**

Other radio-broadcast receivers, including apparatus capable of receiving also radio-telephony or radio-telegraphy

These subheadings include radio receivers equipped with selector circuits, which permit tuning to a specific channel or carrier frequency, and with demodulation circuits. This apparatus is usually designed to operate with an individual aerial or a shared aerial system (high-frequency cable distribution).

**8527 31 11
to
8527 31 98**

Combined with sound recording or reproducing apparatus

Stereo systems (hi-fi systems) containing a radio receiver, put up in sets for retail sale, consisting of modular units in their own separate housings, e.g., in combination with a CD player, a cassette recorder, an amplifier with equalizer, always fall within these subheadings as the radio receiver gives them their essential character.

**8527 31 11
and
8527 31 19**

With in the same housing one or more loudspeakers

These subheadings cover apparatus from which the loudspeakers are inseparable.

However, these subheadings do not cover apparatus with detachable loudspeakers, even if the loudspeakers can be attached with fastening devices (subheading 8527 31 91, 8527 31 93 or 8527 31 98).

**8527 31 91
to
8527 31 98**

Other

If loudspeakers for stereo systems (hi-fi systems) are specially designed for and packed together with other components of the sets, they are included within these subheadings.

8528

Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus; video monitors and video projectors

The apparatus covered by this heading, and particularly the type for domestic use, are frequently equipped with devices for the reception and amplification of the sound which can accompany the camera signals. They may or may not incorporate loudspeakers.

Reception apparatus for television operating in conjunction with, or incorporated in, other apparatus, together with which they form a unit, are generally classified within the heading covering the part that gives such a unit its essential character.

Thus, this heading does not include apparatus used for transmitting and receiving telegraph messages (in Morse, Baudot, ISO, ASCII or other codes) and displaying them on a monitor (heading No 8517).

This heading does not cover electronic reading devices for the visually handicapped (see the Explanatory Notes to subheading 8543 89 95).

8528 12 10

Television projection equipment

Television projection equipment consists of apparatus with one or more built-in picture tubes which project the image via an optical system onto a screen.

The projection screen may be either incorporated in the same housing as the television receiver or may be separate.

**8528 12 52
to
8528 12 76**

With integral tube

These subheadings include apparatus combining tuner and monitor functions in the same housing, with possible simultaneous use of certain elements of each. Domestic television receivers generally belong to this category.

The diagonal measurement of the screen means the active part of the picture tube measured in a straight line.

**8528 12 81
and
8528 12 89**

With screen

These subheadings include apparatus with liquid crystal screen (LCD screen).

- 8528 12 90**
to
8528 12 95
- Video tuners**
- These apparatus incorporate selector circuits, which permit tuning to a special channel or carrier frequency, and demodulation circuits. They are generally designed to operate with an individual aerial or a shared aerial (high-frequency cable distribution). The output signal can be used as an input signal for video monitors or for video recording or reproducing apparatus. It consists of the original camera signal (i.e., not modulated for transmission purposes).
- Sometimes, the apparatus are also equipped with decoding device (colour) or separator circuitry for synchronization.
- 8528 12 90**
- Electronic assemblies for incorporation into automatic data processing machines**
- For the definition of the expression 'electronic assemblies' see the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.
- 8528 13 00**
- Black and white or other monochrome**
- With regard to the tuners of this subheading, the Explanatory Notes to subheadings 8528 12 90 to 8528 12 95 apply, *mutatis mutandis*.
- 8528 21 14**
to
8528 21 90
- Colour**
- See the HS Explanatory Notes to heading No 8528, second paragraph, (6).
- These subheadings do not include closed-circuit television systems consisting of one camera, a panel with several call buttons, and one or more video monitors connected to a communication post and coaxial cables for linking the different elements, presented in the form of a set put up for retail sale (subheading 8517 19 10).
- 8528 22 00**
- Black and white or other monochrome**
- The Explanatory Notes to subheadings 8528 21 14 to 8528 21 90 apply, *mutatis mutandis*.
- In monitors of this subheading, the video signal can be independent of the synchronization signals (separate inputs) or the two signals can be combined. In the latter case, the monitor must be equipped with a circuit which separates the synchronization signals from the 'combined video signal'.
- 8529**
- Parts suitable for use solely or principally with the apparatus of heading Nos 8525 to 8528**
- 8529 90 10**
to
8529 90 88
- Other**
- These subheadings include:
1. dials;
 2. tuning blocks;
 3. diaphragms for television cameras;
 4. so-called PAL-Secam adapters. These are decoder boards (printed circuit boards mounted with electrical components) for subsequent incorporation in television receivers designed for the reception of PAL signals, so as to make these sets suitable for the dual reception of PAL/Secam signals.
- These subheadings do not include waveguides (classification of the tubes according to the constituent material) and tripods for television cameras of the type used for cinematographic cameras (heading No 9007).
- 8529 90 72**
- Electronic assemblies**
- See the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.
- 8531**
- Electric sound or visual signalling apparatus (for example, bells, sirens, indicator panels, burglar or fire alarms), other than those of heading No 8512 or 8530**
- 8531 10 20**
to
8531 10 80
- Other**
- These subheadings include electric burglary signalling systems, in which a radio transmitter incorporated in a sensor causes the system's central unit, which is equipped with a radio receiver, to actuate the alarm devices (e.g., siren, flashing lights).

8531 20 10
to
8531 20 80

Indicator panels incorporating liquid crystal devices (LCD) or light emitting diodes (LED)

These subheadings include variable electroluminescent diode readouts used principally as numerical and/or alphanumerical signals or display panels, for example, made up of cells or various light-emitting diodes. Each sign contains a certain number of light-emitting diodes in the form of components which are either discrete or attached to a single microchip. These devices are mounted on a printed circuit with a driver/decoder. Each digit or assembly of digits is covered by translucent material which amplifies the intensity of the light points produced by the diodes in order to produce figures or letters as a function of the pulse applied to the circuit by an input signal.

8531 90 80

Other

This subheading includes anti-theft tags attached to goods which, when they come within the signal field of a burglar alarm system installed at a shop exit, of a type falling within subheading 8531 10 30, influence the receiving electronics of the system and trigger off an alarm.

This subheading does not, however, cover paper tags in the form of a printed circuit (heading No 8534 00).

8534 00

Printed circuits

This heading includes paper tags in the form of a printed circuit to prevent theft, e.g., of library books.

8536

Electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits (for example, switches, relays, fuses, surge suppressors, plugs, sockets, lamp-holders, junction boxes), for a voltage not exceeding 1000 V

In addition to the apparatus described in the HS Explanatory Notes to heading No 8536, (I) to (III), this heading includes:

1. distribution frames for telephone exchanges;
2. intersection or junction plates for overhead tram cables;
3. junction plates for electric motors;
4. commutators for multiple point transformers;
5. connecting parts for accumulator elements;
6. so-called inductive proximity switches, i.e., electronic switches incorporating a free-radiating induction coil for the contactless actuation (closure) of the switch when a metal object comes within the stray field of the induction coil. Such switches are used, for example, in machine tools, conveyor machinery and weighing balances instead of mechanically operated electrical terminal switches;
7. on-off switches housed alongside an intensity modulation device (dimmer) in a single housing. By means of this equipment, it is possible not only to switch mains-operated lamps on and off but also to vary their intensity continuously;
8. so-called contact pads for connecting electrical circuits. These consist of two superposed resilient films of plastics in which are embedded, at regular intervals, a large number of electrically conductive contact points of silicone rubber. These contact pads are incorporated, for example, under the keys of telephone sets. Each time a key is pressed the appropriate contact points on the two films touch, and electrical contact is established;
9. electronic switches which operate by contactless means, using semiconductor components (for example, transistors, thyristors, integrated circuits).

However, this heading does not include:

- (a) insulation and sheathing for electric lines (generally heading No 7326);
- (b) control equipment for railways and other communication routes (heading No 8530).

8536 50 11

Push-button switches

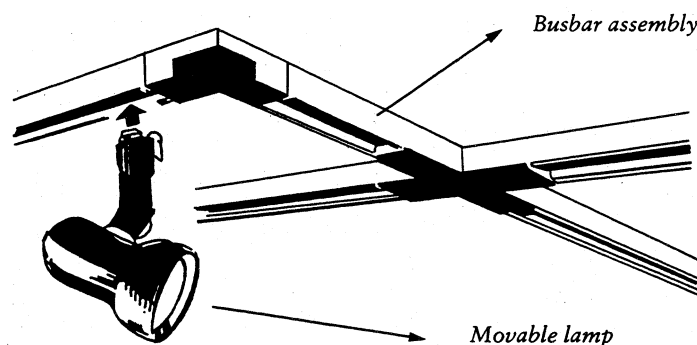
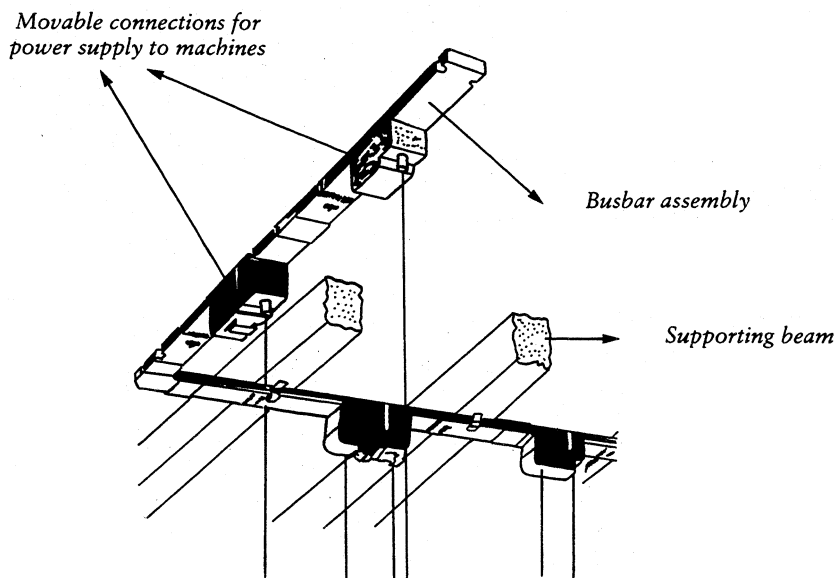
This subheading does not cover touch-sensitive switches (subheading 8536 50 19).

8536 90 01

Prefabricated elements for electrical circuits

This subheading includes ready-to-mount elements for the transmission of electricity. Such elements provide a degree of spatial flexibility in the power supply for lamps and electrically powered machines and equipment. The contact points across which the current is delivered are of the clamp or sliding variety.

Typical applications are shown in the diagrams below:



8537

Boards, panels, consoles, desks, cabinets and other bases, equipped with two or more apparatus of heading No 8535 or 8536, for electric control or the distribution of electricity, including those incorporating instruments or apparatus of Chapter 90, and numerical control apparatus, other than switching apparatus of heading No 8517

This heading includes assemblies on a support (e.g., panel, box) of identical items of equipment to those of heading No 8536 (for example, light switches).

8537 10 91

Programmable memory controllers

This subheading includes panel cabinets incorporating application memory for the electrical control of machines. They are fitted not only with equipment of heading No 8535 or 8536 (e.g., relays) but also, for example, with transistors or triacs of heading No 8541 as switching devices and which, in addition to these switching elements, also include microprocessors (e.g., for logic processing and the management of inputs and outputs), interfaces and a power supply unit (power pack).

8537 10 99

Other

This subheading includes:

1. remote cable control units for video recorders. These are electrical control pads (with push-button switches and other electrical components mounted on a board) which are used to execute, via a connecting cable, all the functions of the linked-up video recorder;
2. electrical control devices for automatic vending machines. These consist of a control pad incorporating, in addition to relays and electrical switches, triacs and integrated circuits.

This subheading does not include:

- (a) electrical control devices known as 'joystick' (heading No 8471);
- (b) cordless infra-red devices for the remote control of television receivers, video recorders or other electrical equipment (heading No 8543).

8538 **Parts suitable for use solely or principally with the apparatus of heading No 8535, 8536 or 8537**

8538 90 11 **Electronic assemblies**

See the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.

8538 90 91 **Electronic assemblies**

See the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.

8539 **Electric filament or discharge lamps, including sealed-beam lamp units and ultraviolet or infra-red lamps; arc-lamps**

With the exception of certain arc-lamps (see the Explanatory Notes to subheadings 8539 41 00 to 8539 49 30) which are specially equipped or mounted, only lamps and tubes as such and parts thereof which are identifiable in accordance with Note 2 (b) of section XVI, fall within this heading.

Apparatus fitted with such lamps (consisting, for example, of a simple reflector with a support or base) is classified within its appropriate heading, as lighting equipment (heading No 9405), heating equipment (heading No 7321, for example) or medical equipment (heading No 9018), etc.

8539 21 30 **Other filament lamps, excluding ultraviolet or infra-red lamps**

to

8539 29 98

These subheadings do not include:

- (a) resistance lamps with carbon filaments and variable resistance lamps with iron filaments in hydrogen (heading No 8533);
- (b) electric lamp sets of a specific length comprising a fixed number of fancy lights, mainly used for decorating Christmas trees (heading No 9405).

8539 31 10 **Discharge lamps, other than ultraviolet lamps**

to

8539 39 00

These subheadings include:

1. xenon tubes;
2. spectral discharge lamps;
3. glow discharge lamps;
4. alphanumeric tubes.

8539 41 00
to
8539 49 30

Ultra-violet or infra-red lamps; arc-lamps

These subheadings include:

1. ultraviolet tubes and lamps. In addition to the uses referred to in the HS Explanatory Notes to heading No 8539, part (D), first paragraph, the following may be mentioned:
 - (a) actino-chemical printing;
 - (b) vitaminization;
 - (c) sterilization;
 - (d) photo-chemistry;
 - (e) production of ozone.
2. infra-red lamps and tubes. In addition to the uses referred to in the HS Explanatory Notes to heading No 8539, part (D), second paragraph, the following may be mentioned:
 - (a) space heating;
 - (b) equipment for infra-red emitters (for example, in anti-theft apparatus);
 - (c) scientific research (for example, spectral analysis).
3. arc-lamps described in the HS Explanatory Notes to heading No 8539, part (E).

Carbon-electrode arc-lamps are installed, for example, in cinematographic projection equipment of heading No 9007 or used in document-reproducing equipment.

Subheading 8539 41 00 includes electric arc-lamps equipped with special supports as well as guidable light equipment consisting of one or more arc lamps mounted on a mobile support, intended for use particularly in photographic or cinematographic studios.

These subheadings do not include:

- (a) luminescent diodes (heading No 8541);
- (b) electro-luminescent devices, generally in strips, plates or panels, and based on electro-luminescent substances (e.g., zinc sulphide) placed between two layers of conductive material (heading No 8543).

8539 90 10
and
8539 90 90

Parts

These subheadings include:

1. bases for incandescent and discharge electric lamps and bulbs;
2. tungsten filaments, spiral, cut to length and ready for mounting;
3. metal electrodes for discharge lamps and tubes;
4. glass parts (excluding insulating parts of subheading 8547 90 00) intended for mounting inside lamps or tubes;
5. supporting brackets for filaments.

8540

Thermionic, cold cathode or photocathode valves and tubes (for example, vacuum or vapour or gas filled valves and tubes, mercury arc rectifying valves and tubes, cathode-ray tubes, television camera tubes)

8540 11 11
to
8540 11 99

Colour

These subheadings cover the cathode-ray tubes described in the HS Explanatory Notes to heading No 8540, fourth paragraph, (2), and which comply with the conditions set out below:

1. slit mask;
2. gap between two lines of the same colour at the centre of the screen not less than 0,4 mm.

For the diagonal measurement of the screen, see the Explanatory Notes to subheadings 8528 12 52 to 8528 12 76.

8540 60 00

Other cathode-ray tubes

This subheading covers the cathode-ray tubes described in the HS Explanatory Notes to heading No 8540, fourth paragraph, (2), (d), other than those covered by subheadings 8540 11 and 8540 12.

8540 71 00
to
8540 79 00

Microwave tubes (for example, magnetrons, klystrons, travelling wave tubes, carcinotrons), excluding grid-controlled tubes

These subheadings cover the tubes described in the HS Explanatory Notes to heading No 8540, fourth paragraph, (4).

These subheadings do not include Geiger-Müller counter tubes (subheading 9030 90 10 or 9030 90 80).

8540 81 00
and
8540 89 00

Other valves and tubes

In addition to the lamps, tubes and valves for rectifying electric current referred to in the HS Explanatory Notes to heading No 8540, fourth paragraph, (1), these subheadings include phanotrons, thyratrons, ignitrons and high-voltage rectifying tubes for X-ray apparatus.

8541

Diodes, transistors and similar semiconductor devices; photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes; mounted piezo-electric crystals

8541 90 00

Parts

In addition to the parts mentioned in the HS Explanatory Notes to heading No 8541, this subheading includes:

1. supports and housings for piezo-electric crystals;
2. housings of metal, steatite, etc., for mounted semiconductors.

This subheading does not include:

- (a) electrical connectors for conducting current between pins (or contacts) and electrodes (heading No 8536);
- (b) graphite parts (subheading 8545 90 90).

8542

Electronic integrated circuits and microassemblies

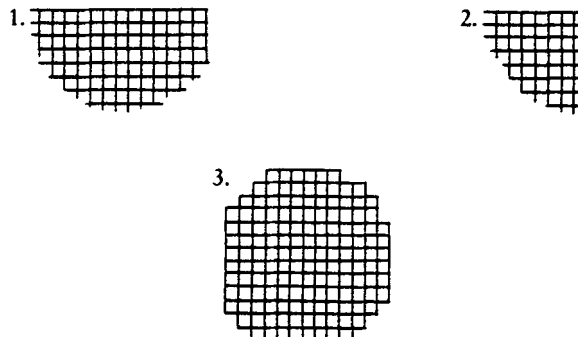
This heading includes interchangeable pre-programmed memory modules in the form of a monolithic integrated circuit for electronic translation devices falling within subheadings 8470 10 00 and 8543 89 15.

8542 13 01

Wafers not yet cut into chips

This subheading covers discs (wafers), generally of silicon, about 2,5 cm to 10 cm diameter and 0,05 cm in thickness, which are intended to be cut into chips. One surface of these wafers takes the form of a lattice pattern of a large number of rectangles or squares, each one of which constitutes a diode, transistor, integrated circuit or similar semiconductor device.

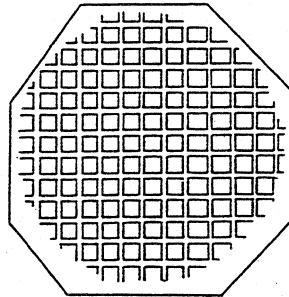
This subheading also covers wafers which are not completely cut into chips and which might, for example, have one of the following shapes:



This subheading does not include:

- (a) discs (sometimes referred to as wafers) which, for the purposes of their applications in the field of electronics, consist of doped chemical elements, whether or not polished and whether or not epitaxially coated, provided they have not been selectively doped or diffused to create discrete regions (heading No 3818 00);
- (b) chips (microchips) of rectangular shape with sides of a few millimetres, formed by cutting up the wafers (discs) of this subheading.

- (b) Wafers completely cut into microchips and held, for example, between two plastic sheets, and which may come in the following shape, are also considered to be chips and not wafers:



8542 13 20

Static random-access memories (S-RAMs), including cache random-access memories (cache-RAMs)

Cache random-access memories (cache-RAMs) are static random-access memories with an access time faster than the main memory. Cache-RAMs are generally used as temporary buffer memories to accommodate the speed differential between a central processing unit and the main memory.

8542 13 42
to
8542 13 49

Electrically erasable, programmable, read only memories (E²PROMs), including FLASH E²PROMs

E²PROMs are in general byte-erasable memories.

FLASH E²PROMs are memories also called 'FLASH Memories', 'FLASH EPROMs', 'FLASH EEPROMs' or 'FLASH E²PROMs'.

FLASH memories may be based on EPROM or E²PROM-technology and are electrically erasable, either totally (bulk wise) or by sector (page or block wise).

Programming, reading and erasure of these memories can be accomplished at a dual power supply or at a single power supply.

FLASH memories based on EPROM technology have an array structure composed of one transistor cells.

FLASH memories based on E²PROM technology have an array structure composed of two or more transistor cells or of one transistor cells combined with another transistor per sector (page or block). The latter type further differentiates from EPROM-technology based memories because they contain a number of characteristic E²PROM elements (e.g., an E²PROM command-set).

8542 13 54

Other memories

This subheading includes content addressable memories (CAMs) and ferroelectric memories.

Content addressable memories (CAMs) are content associative storage devices. Storage locations of these devices are identified by their contents or by part of their contents, rather than by their names or positions (addresses).

Ferroelectric memories are non-volatile memories obtained by combining ferroelectric and semiconductor material. The ferroelectric material is able to retain electric polarizations in the absence of an applied electric field.

These devices are both electrically programmable and erasable.

8542 13 55

Microprocessors

Microprocessors, also called micro processing units (MPUs), are integrated circuits that can be defined as devices that perform the primary instruction, execution and system control functions. They consist of the following main parts:

- the arithmetic logic unit (ALU);
- the instruction decoder and programme counter;
- the control unit;
- the input/output (I/O) unit, for communications with other devices.

A microprocessor can only operate if apart from the internal memory an external memory or other device is being used.

They may have one or more micro-program-memories (RAM or ROM) for loading or storing micro-instructions, thereby increasing the number of primary instructions in the control unit.

The micro-programmed ROM that a microprocessor may contain is dedicated to storing binary basic-instructions and is not to be considered as a real program memory storing the instructions to be executed.

These products may contain an instruction cache memory or micro-peripheral functions.

Microprocessors entirely processed for a specific application, based on 'full custom', 'gate array' or 'standard cell' designs, are included.

The processing capacity of microprocessors means the length of each word (e.g., 8, 16 or 32 bits) which the accumulator of the arithmetic and logic unit can process in a single micro-instruction cycle.

8542 13 60

Microcontrollers and microcomputers

Microcontrollers and microcomputers are integrated circuits, consisting of at least the following main parts:

- a microprocessor, also called micro processing unit (MPU),
- a program memory (e.g., RAM, ROM, PROM, EPROM, E²ROM, FLASH E²PROM) linked to the instruction decoder and containing a program defining an instruction sequence,
- a data memory (e.g., RAM or E²PROM), not accessible from outside the chip contrary to microprocessors,
- an external bus (for data, addresses or instructions).

Microcontrollers are programmed or further programmable to perform specific functions and only for certain use (e.g., for television receivers, video recording or reproducing apparatus or microwave ovens).

Microcomputers are capable of operating independently (stand alone) and for general use (e.g., mainframes, minicomputers and personal computers). Microcomputers are freely programmable in accordance with the requirements of the user.

Microcontrollers, entirely processed for a specific application, based on 'full custom', 'gate array' or 'standard cell' designs, are included.

The processing capacity of microcontrollers or microcomputers means the length of each word (e.g., 8, 16 or 32 bits) which the accumulator of the arithmetic logic unit can process in a single micro-instruction cycle.

8542 13 70

Microperipherals

Microperipherals are integrated circuits performing specific functions to complement microprocessors, microcontrollers or microcomputers and improve their external communication, control and interface features.

Technical specifications of a microperipheral clearly express its relationship with and dedication to a microprocessor, microcontroller or microcomputer.

Communications, control and interface features may consist of bus controllers, memory controllers (DRAM controllers, memory management units (MMUs), direct memory access controllers) or peripheral interface controllers (graphic controllers, local area network controllers, universal asynchronous receiver/transmitter controllers, keyboard controllers, mass storage controllers).

8542 13 80

Other

This subheading includes:

1. full custom logic circuits which are defined by and produced for a single user. The manufacturing process involves routing and placement of cells (logic gates), using fully customized diffusion masks. Full custom logic circuits are designed to perform application specific functions. They are known as application specific integrated circuits, so called ASICs;
2. gate arrays which are integrated logic circuits, consisting of a fixed and regular arrangement of uncommitted logic elements (transistor cells of, for example, AND-, NAND-, OR- or NOR- gates). Gate arrays are programmed in accordance with user-specific interconnection of these logic elements by one or more metallization patterns;
3. standard cells which are integrated logic circuits, consisting of a user-specific arrangement of predefined subcircuits and fixed subcircuits. These subcircuits may contain any integrated function (e.g., a logic function or a memory function);
4. programmable logic circuits which are integrated circuits, consisting of fixed logic elements. The eventual function of these circuits is determined by the user by blowing fusible links or by electrically programming the interconnections between the logic elements;

5. standard logic circuits which are integrated logic circuits consisting of less than 150 logic gates (e.g., AND, NAND, OR, NOR). These devices may integrate several functions or sets of identical and independent functions;
6. control circuits which are integrated circuits used to influence a process or the performance of a machine (e.g., an automatic data processing machine). Control circuits (e.g., for disk storage units, memories, electric motors or cathode-ray tubes) are generally capable of interpreting signals and, in accordance with the interpretation, determining the timing and sequence of certain functions (e.g., input, processing, storage and output in an automatic data processing system);
7. interface circuits which are integrated circuits which perform a link function (e.g., by code conversion, by conversion between bit-serial and bit-parallel or by synchronization) to interconnect programs, integrated circuits, peripherals or systems with different characteristics.

This subheading does not include programmable read only memories (PROMs) (subheading 8542 13 54, 8542 14 11 or 8542 19 40).

8542 14 01

Wafers not yet cut into chips

The Explanatory Notes to subheading 8542 13 01 apply, *mutatis mutandis*.

8542 14 11

Memories

The Explanatory Notes to subheadings 8542 13 20, 8542 13 42 to 8542 13 49 and 8542 13 54 apply, *mutatis mutandis*.

8542 14 30

Microprocessors

The Explanatory Notes to subheading 8542 13 55 apply, *mutatis mutandis*.

8542 14 40

Microcontrollers and microcomputers

The Explanatory Notes to subheading 8542 13 60 apply, *mutatis mutandis*.

8542 14 50

Microperipherals

The Explanatory Notes to subheading 8542 13 70 apply, *mutatis mutandis*.

8542 14 90

Other

The Explanatory Notes to subheading 8542 13 80 apply, *mutatis mutandis*.

8542 19 01

Wafers not yet cut into chips

The Explanatory Notes to subheading 8542 13 01 apply, *mutatis mutandis*.

8542 19 40

Memories

The Explanatory Notes to subheadings 8542 13 20, 8542 13 42 to 8542 13 49 and 8542 13 54 apply, *mutatis mutandis*.

8542 19 55

Microprocessors

The Explanatory Notes to subheading 8542 13 55 apply, *mutatis mutandis*.

8542 19 66

Microcontrollers and microcomputers

The Explanatory Notes to subheading 8542 13 60 apply, *mutatis mutandis*.

8542 19 71

Microperipherals

The Explanatory Notes to subheading 8542 13 70 apply, *mutatis mutandis*.

8542 19 85

Other

The Explanatory Notes to subheading 8542 13 80 apply, *mutatis mutandis*.

8542 30 10

Wafers not yet cut into chips

The Explanatory Notes to subheading 8542 13 01 apply, *mutatis mutandis*.

8542 30 60**Control circuits**

The Explanatory Notes to subheading 8542 13 80, first paragraph, (6), apply *mutatis mutandis*.

This subheading includes smartpower circuits which are integrated analog circuits which combine digital and analog circuitry (power transistors) to control logic output signals and power output signals. These devices are able to provide, e.g., internal power dissipation protection, fault management or diagnostic capabilities.

8542 30 70**Interface circuits; interface circuits capable of performing control functions**

The Explanatory Notes to subheading 8542 13 80, first paragraph, (7), apply *mutatis mutandis*.

8542 40 00**Hybrid integrated circuits**

This subheading includes:

1. microprocessors, microcontrollers and microcomputers (the Explanatory Notes to subheadings 8542 13 55 and 8542 13 60 apply, *mutatis mutandis*;
2. converters which are integrated circuits that change one kind of signal to another so as to render the signal acceptable to the receiving circuits (e.g., analog to digital and vice versa).

8543**Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter****8543 89 95****Other**

This subheading includes:

1. electrostatic devices (for example, for flocking machines);
2. electroluminescent devices, generally in the form of strips, plates or panels;
3. thermo-electric generators consisting of a thermopile comprising a variable number of thermocouples and a heat source (e.g., butane gas), producing direct current by the Seebeck effect;
4. static electricity eliminator devices;
5. demagnetizing equipment;
6. shock-wave generators;
7. digital flight-data recorders (flight recorders) in the form of a fire-proof, crash-proof electronic apparatus for the continuous in-flight recording of specific flight data;
8. cordless infra-red devices for the remote control of television receivers, video recorders or other electrical equipment;
9. cordless infra-red stereo receivers for the reception of broadcasts transmitted by infra-red beams which are converted into electrical signals which can be received as stereophonic signals through attachable headphones;
10. electronic sound-effect devices used as peripherals for electric guitars for the production of various effects (e.g., sound duplication, sound distortion, echoing). These devices are not housed in the guitar casing but are wired between the guitar and the power amplifier;
11. electronic reading devices for the visually handicapped. These devices comprise, in a single housing, a camera, which scans the original text (e.g., newspaper or book) and a monitor which reproduces the text in magnified form.

This subheading also covers small electronic devices not mounted on a base-plate (also called 'minicomputers'), which can be used to form words and sentences which are translated into a chosen foreign language depending on the memory modules used with these devices. They have an alphanumeric keyboard and a rectangular display. However, this subheading does not cover similar devices with calculating functions (heading No 8470).

Separately presented memories fall within heading No 8542 as monolithic integrated circuits.

This subheading does not include:

- (a) electrostatic filters and electromagnetic water purifiers (heading No 8421);
- (b) ultraviolet irradiation equipment for treating milk (heading No 8434);
- (c) equipment for cleaning various articles ultrasonically (metal parts, in particular) and ultrasonic generators (heading No 8479);
- (d) ultrasonic welding equipment (heading No 8515);
- (e) ultraviolet irradiation equipment for medical purposes, even if a practitioner is not needed to use them (heading No 9018);
- (f) electric regulators for regulating electric or non-electric variables, falling within heading No 9032.

8543 90 20 Electronic assemblies for incorporation into automatic data processing machines

For the definition of the expression 'electronic assemblies' see the Explanatory Notes to subheadings 8473 10 11 and 8473 10 19.

8545 Carbon electrodes, carbon brushes, lamp carbons, battery carbons and other articles of graphite or other carbon, with or without metal, of a kind used for electrical purposes

8545 90 90 Other

This subheading includes:

1. carbons for lightning arresters;
2. contacts for electrical control equipment or for rheostats.

This subheading does not include compositions of paste for electrodes with a basis of carbonized material (heading No 3824).

8547 Insulating fittings for electrical machines, appliances or equipment, being fittings wholly of insulating material apart from any minor components of metal (for example, threaded sockets) incorporated during moulding solely for purposes of assembly, other than insulators of heading No 8546; electrical conduit tubing and joints therefor, of base metal lined with insulating material

8547 20 00 Insulating fittings of plastics

This subheading includes insulating parts obtained by compressing glass fibres steeped in resin or by superposing or compressing layers of paper or woven materials previously impregnated with artificial resins, provided the products in question are hard and rigid (see the HS General Explanatory Notes to chapter 39, 'combinations of plastics and materials other than textiles', (d)).

8547 90 00 Other

This subheading includes insulating fittings of paper or paperboard, asbestos cement and mica as well as the conduit tubing and joints therefor referred to in the HS Explanatory Notes to heading No 8547, (B).

8548 Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators; electrical parts of machinery or apparatus, not specified or included elsewhere in this chapter

8548 90 90 Other

This heading includes:

1. electric coils without magnetic cores which are equally suitable for use in machines or apparatus falling within different headings, for example, for transformers of heading No 8504 and for electromagnets of heading No 8505 (application of Note 2 (c) to section XVI);
2. delay lines uses, e.g., in automatic data processing machines or television receivers;
3. electronic filters used for the selective transmission of different frequencies of electro-magnetic, electro-mechanical or electro-acoustic vibrations.