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84.19 - Machinery, plant or laboratory equipment, whether or not electrically heated (excluding furnaces, ovens and other equipment of heading 85.14), for the treatment of materials by a process involving a change of temperature such as heating, cooking, roasting, distilling, rectifying, sterilising, pasteurising, steaming, drying, evaporating, vaporising, condensing or cooling, other than machinery or plant of a kind used for domestic purposes; instantaneous or storage water heaters, non-electric.

- Instantaneous or storage water heaters, non-electric :

8419.11 -- Instantaneous gas water heaters

8419.19 -- Other

8419.20 - Medical, surgical or laboratory sterilisers

- Dryers :

8419.31 -- For agricultural products

8419.32 -- For wood, paper pulp, paper or paperboard

8419.39 -- Other

8419.40 - Distilling or rectifying plant

8419.50 - Heat exchange units

8419.60 - Machinery for liquefying air or other gases

- Other machinery, plant and equipment :

8419.81 -- For making hot drinks or for cooking or heating food

8419.89 -- Other

8419.90 - Parts

It should be noted that this heading **does not include** :

- (a) Domestic stoves, grates, cookers, etc., of **heading 73.21**.
- (b) Air heaters and hot air distributors, not electrically heated of **heading 73.22**.
- (c) Domestic cooking or heating apparatus of **heading 74.18**.
- (d) Apparatus for fractional distillation (for example, in the production of heavy water) and for rectification, specially designed for isotopic separation, and isotopic exchange apparatus employing the "dual-temperature" method (**heading 84.01**).
- (e) Steam generating boilers and super-heated water boilers (**heading 84.02**) and auxiliary plant therefor (**heading 84.04**).
- (f) Central heating boilers of **heading 84.03**.

- (g) Industrial or laboratory furnaces and ovens, including those for the separation of irradiated nuclear fuel by pyrometallurgical processes and microwave ovens (**heading 84.17 or 85.14**, as the case may be).
- (h) Refrigerating machinery and heat pumps of **heading 84.18**.
- (ij) Germination plant, incubators or brooders (**heading 84.36**).
- (k) Grain dampening machines (**heading 84.37**).
- (l) Diffusing apparatus for sugar juice extraction (**heading 84.38**).
- (m) Machinery for the heat-treatment of textile yarns, fabrics or made up textile articles (e.g., yarn conditioners and singeing machines) (**heading 84.51**).
- (n) Chemical vapour deposition apparatus for the manufacture of semiconductor devices (**heading 84.86**).
- (o) Industrial or laboratory equipment for the heat treatment of materials by induction or dielectric loss including microwave equipment (**heading 85.14**).
- (p) Microwave ovens for industrial or commercial use, of the type used in restaurants or similar establishments (**heading 85.14**).
- (q) Immersion heaters, not permanently incorporated for heating liquids, semi-fluid (other than solid) substances or gases, **as well as** immersion heaters permanently incorporated in a vat and designed for water heating only (**heading 85.16**).
- (r) Electric soil heating apparatus, electric space heating apparatus, and electro-thermic domestic appliances of **heading 85.16**.

With these exceptions, the heading covers machinery and plant designed to submit materials (solid, liquid or gaseous) to a heating or cooling process in order to cause a simple change of temperature, or to cause a transformation of the materials resulting principally from the temperature change (e.g., heating, cooking, roasting, distilling, rectifying, sterilising, pasteurising, steaming, drying, evaporating, vaporising, condensing or cooling processes). But the heading **excludes** machinery and plant in which the heating or cooling, even if essential, is merely a secondary function designed to facilitate the main mechanical function of the machine or plant, e.g., machines for coating biscuits, etc., with chocolate, and conches (**heading 84.38**), washing machines (**heading 84.50 or 84.51**), machines for spreading and tamping bituminous road-surfacing materials (**heading 84.79**).

The machinery and plant classified in this heading may or may not incorporate mechanical equipment.

They may be heated by any system (coal, oil, gas, steam, electricity, etc.), **except** in the case of instantaneous water heaters and storage water heaters which are classified in **heading 85.16** when heated electrically.

The heading covers **only** non-domestic equipment, **except** for the instantaneous or storage water heaters referred to later in this Explanatory Note.

The heading includes a very wide range of machinery and plant of the types described below.

(I) HEATING OR COOLING PLANT AND MACHINERY

This group covers plant of general use in many industries for the simple treatment of materials by heating, boiling, cooking, concentration, evaporation, vaporisation, cooling, etc. They include :

(A) Vessels, vats, etc., of various kinds for heating or cooling :

- (1) Vessels, vats, etc., for indirect heating or cooling with double walls or bottoms incorporating provision for the circulation of steam, chilled brine or other heating or cooling media. However, double-walled or double-bottomed vessels fall in **Section XIV** or **Section XV** (e.g., **heading 73.09**) if they do not have such provision for circulating heating or cooling media (e.g., heat-insulated containers) or in **heading 84.18** if they incorporate an evaporator of a refrigerating unit (direct cooling).
- (2) Single-wall vessels, vats, etc., incorporating provision for direct heating (including heating by perforated steam coils) **other than** such vessels normally used in the household (**heading 73.21**, generally). In general, the industrial types are distinguished by their large size and solid construction, or the provision of filters or condensing domes or of mechanical devices such as agitators or tippers.

Such vessels, whether of the single or double-walled type, are frequently constructed for working under high pressure (e.g., autoclaves), or at reduced pressures for special purposes, particularly in the chemical and allied industries.

Vessels fitted with mechanical devices but **not** incorporating means of direct or indirect heating fall in **heading 84.79** unless clearly designed as machinery of a type specified in another heading.

This group of heating vessels includes pasteurisers, sometimes operating at reduced pressure, used to submit food or drink products (milk, butter, wines, beers, etc.) to pre-determined temperatures to eliminate harmful micro-organisms.

(B) Heat exchange units in which a hot fluid (hot gas, steam or hot liquid) and a cold fluid are made to traverse parallel paths, but usually in opposite directions, separated by thin metal walls in such a manner that the one fluid is cooled and the other heated. These units are usually of the three following types, viz., in the form of :

- (i) Concentric tube systems : one fluid flows in the annular interval, the other in the central tube.
- (ii) A tubular system for the one fluid, enclosed in a chamber through which flows the other fluid.
- or (iii) Two parallel series of interconnected narrow chambers formed of baffle plates.

As stated in the first paragraph of this Explanatory Note (exclusion (e)), the heading **does not include** auxiliary plant for steam generating boilers (**heading 84.04**) much of which (e.g., steam condensers, air pre-heaters and economisers) are of the general type of heat exchange unit mentioned above.

The following are examples of machinery and plant which, **subject** to the provisions referred to above, are covered by Part (I) of this Explanatory Note :

- (1) Freezing-salt type freezers (**other than** those of **heading 82.10**).
- (2) Condensers for nitrogen or other gases.
- (3) Pasteurising, concentrating, cooling, etc., plant for milk (including storage vats with cooling equipment).
- (4) Processing and maturing vats for the cheese industry.
- (5) Plant for concentrating, cooling, etc., fruit juices, wines, etc.
- (6) Plant for use in agriculture (e.g., autoclaves for cooking potatoes, etc., as fodder; hot water baths for re-melting honeycombs, including those with pressing screws).
- (7) Cooling columns (e.g., for the bread grain milling industry).
- (8) Autoclaves and steaming, boiling, cooking, frying, etc., plant for cooking, preparing or preserving food (e.g., cooking chests for ham; fish friers; cookers, blanching autoclaves, etc., for fruit, vegetables, etc.; autoclaves and coolers for the canning or preserving industry; jam boilers; confectionery boilers).
- (9) Macerating vessels and mashing vats with heating equipment; vessels for the decoction of hops; beer pasteurisers, coolers, etc.
- (10) Defecation vessels, juice concentration plant, vacuum boiling pans, carbonation, sulphiting or refining vats, etc., for use in the sugar industry.
 Diffusing apparatus (diffusor vessel and "calorisator" presented together), for extracting the juice from sugar beet, are **excluded** (see Part (V) (B) (3) of Explanatory Note to **heading 84.38**); "calorisators" presented separately are, however, classified in this heading.
- (11) Autoclaves for melting tallow or for saponifying fats; margarine solidifying tanks, incorporating a cooled rotating cylinder on to which the margarine solidifies.
- (12) Vats, vessels, autoclaves, etc., for the chemical preparation of wood pulp or for the hydrolysis of wood.
- (13) Vats, etc., for the preparation of dyes.
- (14) Autoclaves for vulcanising rubber.
- (15) Vats, etc., for pickling or de-greasing metals.

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- (16) *Immersion coils* consisting of an assembly of plastic tubes, placed in parallel or braided, and sealed at each end into a honeycomb structure to which a connector is attached. When immersed in a bath, these devices will keep it at a constant temperature, or heat or cool it, by means of a fluid or steam circulating in the tubes.
- (17) Specialised heating or cooking apparatus which are not normally used in the household (e.g., counter-type coffee percolators, tea or milk urns, steam kettles, etc., used in restaurants, canteens, etc.; steam-heated cookers, hot-plates, warming cupboards, drying cabinets, etc.; deep-fat friers).
- (18) Automatic hot or cold beverage-dispensing machines without a device to accept payment.

The apparatus described above is essentially used industrially, but the heading also covers **non-electric instantaneous water heaters and storage water heaters, including solar water heaters, domestic or not**. If electrically heated, such appliances are **excluded** (heading 85.16).

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It is to be noted that this heading **excludes** domestic steamers, pressure cookers and certain percolators, of base metal (Section XV).

(II) DISTILLING OR RECTIFYING PLANT

With the **exception** of distillation apparatus of ceramics (heading 69.09) or of glass (heading 70.17 or 70.20), this group comprises all plant designed for distilling substances (whether liquid or solid).

(A) Simple distillation plant.

This consists essentially of a retort or still body in which the liquid to be distilled is vaporised, a cooling device for condensing the vapours issuing from the retort and a receptacle(s) in which the distillate(s) is collected. They may be arranged for intermittent use (e.g., simple batch stills heated directly or by internal steam coils), or for continuous use, in which case the still body is fed continuously with liquid and is usually heated by steam tubes or coils. Continuous stills may be connected in series, the first being heated directly or with steam while the others are fed by the distillate and heated by the distillation vapours from the preceding still.

(B) Fractionating or rectifying plant.

These are more complicated continuous installations incorporating vertical fractionating columns which enable complex mixtures to be separated in one operation. The most usual type of column is divided into interconnecting sections by plates fitted with bubbling caps and down-flow tubes. Vapour rising from one section is thus brought into intimate contact with a condensed portion of the vapour in the section above and, since the temperature decreases as the vapours rise in the column, they can be separated at different levels corresponding to their boiling points.

Plant for distilling solids (coal, lignite, wood, etc.) work on the same principle, but the products are heated in furnaces classified in **heading 84.17**. This heading covers **only** the condensing or rectifying plant used for separating the volatile products evolved in the furnace.

The essential parts of distilling, etc., plants are usually made of metal (e.g., stainless steel, copper or nickel), but they may be lined with glass or refractory material. Plant for distillation at reduced or increased pressure may be fitted with vacuum pumps or compressors.

Batch stills are mainly used for the preparation of essential oils, liqueurs, etc. Continuous distillation plant (simple or fractional) is used in many industries (e.g., for the distillation of industrial alcohols, fatty acids, liquid air, synthetic motor-fuels or chemical products; in crude petroleum refining; for the distillation of wood, coal, shale, lignite, coal tar).

Also included in this group are separators for irradiated fuels or for processing effluents, operating by fractional distillation.

(III) EVAPORATING OR DRYING PLANT

This plant is constructed in various designs (sometimes for operation *in vacuo*), to suit different types of materials and their sensitivity to heat. It may be heated directly or indirectly. The heading applies, however, **only** to plant evaporating or drying at a relatively low temperature, and is not to be confused with the industrial furnaces or ovens of **heading 84.17** in which much higher temperatures are developed.

The most common forms of the industrial appliances of this heading are :

- (A) **Evaporators.** These usually take the form of vessels, providing a large surface heated directly or indirectly by steam coils, and often equipped with an evacuator for removing the vapours produced. They may be single or multiple-effect, the latter being similar in operation and construction to multiple-effect stills but without provision for the recuperation of the condensed vapour.

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- (B) **Laboratory lyophilisation apparatus and freeze drying units.** These are used for the stabilising and preservation by dehydration of biological specimens such as antitoxins, bacteria, viruses, plasma and serums. The specimens are frozen, and then allowed to reheat gently under very low pressure when the ice sublimates leaving the dehydrated product.
- (C) **Tunnel dryers.** These consist of large chambers generally provided with conveyor equipment on which the products are conveyed through the chambers at a suitable speed against a current of hot air. They are used, *inter alia*, in pottery; in glass-making; in the food industry (including plant incorporating provision for smoking fish, meat, etc.); for drying wood, hay, etc.
- (D) **Rotary dryers.** These consist of revolving cylinders or drums which may be heated internally or **externally**. They are used in various industries (paper-making, preparation of potato flakes, etc.).
- (E) **Plate dryers.** These consist of metal chambers fitted with a number of horizontal slotted plates or shelves, sometimes internally heated. A central revolving shaft fitted with grids spreads the material over the hot plates and directs it downwards through the slots to each succeeding plate. This type of plant is used for treating malted barley.
- (F) **Spray dryers.** These function as evaporators, and consist of metal chambers fitted internally with a horizontal disc revolving at high speed. They incorporate a heater and fan to provide a current of hot air through which the liquid material is dispersed centrifugally as a fine spray by the revolving disc; the liquid is thus dried instantaneously in powder form. In another type the liquid is injected into the chamber as a fine spray against a counter-current of hot air. This type is used particularly for the preparation of powdered milk.

This group also includes machinery and apparatus for the evaporation of fissile solutions or radioactive solutions or for drying fissile or radioactive products.

The heading **does not**, however, **include** :

- (a) Centrifuges for drying radioactive precipitates (**heading 84.21**).
- (b) Machinery for drying bottles or other containers (**heading 84.22**).
- (c) Machinery specialised for the drying of textile yarns, fabrics or made up textile articles (**heading 84.51**).

(IV) ROASTING PLANT

This frequently consists of revolving cylindrical or spherical receptacles in which the products to be treated (e.g., coffee beans, cocoa beans, cereals or nuts) are subjected to controlled heat by contact with the heated walls of the containers, or by a direct stream of air forced through the heating medium (e.g., gas or oil burners or coke fires). These appliances usually incorporate devices which keep the products in constant rotation to ensure uniform treatment and to prevent charring. Other types take the form of perforated, inclined or rotating shelves in a chamber fed with heated gases.

The goods of this heading should not be confused with the industrial or laboratory furnaces and ovens of heading 84.17.

(V) STEAMING PLANT

This may be in the form of closed vessels (of the general type described earlier in this Explanatory Note) in which materials of various kinds may be subjected to humid heat (e.g., by steaming under pressure, or by the action of the vapours given off by the products themselves).

Such plant is used in various manufacturing operations (e.g., in the preparation of vegetable or animal extracts; in the food industry generally; in operations involving the use of steam for de-greasing or cleansing processes). Other types consist of larger chambers for subjecting material to more or less prolonged action of an atmosphere of steam; these are used, for example, for conditioning textile fibres in the mass, for steam-treatment of wood, etc.

The heading **excludes** machines for conditioning textile yarns or fabrics or for other steam-treatment of such textiles (heading 84.51).

(VI) STERILISING APPARATUS

These consist essentially of receptacles or chambers, heated usually by steam or boiling water (or sometimes by hot air), in which the articles or materials to be sterilised are maintained for a period at a sufficiently high temperature to kill bacteria, etc., without alteration of the composition or physical condition of the articles or materials themselves.

Many sterilisers for liquids resemble the apparatus described in Part (I) above (e.g., pasteurisers). Some large types of sterilisers may be equipped with a conveyor on which the goods are carried through the heating medium and, if necessary, subsequently through a cooling apparatus which may also form part of the plant.

The group includes not only sterilisers for industrial use (e.g., for milk, wine, fruit juices, cotton wool) but also those for installation in operating theatres, etc.

**(VII) MACHINERY FOR LIQUEFYING AIR;
SPECIAL LABORATORY APPARATUS AND EQUIPMENT**

The heading includes **machines of the Linde or Claude type used for the liquefaction of air.**

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The heading further includes **specially designed laboratory apparatus and equipment**, generally small in size (autoclaves, distilling, sterilising or steaming apparatus, dryers, etc.), but it **excludes** demonstrational apparatus of **heading 90.23**, and measuring, checking, etc., apparatus more specifically covered by **Chapter 90**.

PARTS

Subject to the general provisions regarding the classification of parts (see the General Explanatory Note to Section XVI), the heading covers parts of the above. Such parts include certain elements of distillation apparatus or rectifying columns, such as retorts, bubble caps and rings, plates and certain tube elements; revolving plates and drums, etc., for roasters or dryers.

Metal tubes and pipes which have been bent or curved but not otherwise worked, presented unassembled, are **not** identifiable as parts of goods of this heading and are therefore to be classified in **Section XV**.