84.74 - Machinery for sorting, screening, separating, washing, crushing, grinding, mixing or kneading earth, stone, ores or other mineral substances, in solid (including powder or paste) form; machinery for agglomerating, shaping or moulding solid mineral fuels, ceramic paste, unhardened cements, plastering materials or other mineral products in powder or paste form; machines for forming foundry moulds of sand.

8474.10 - Sorting, screening, separating or washing machines

8474.20 - Crushing or grinding machines

- Mixing or kneading machines :

8474.31 - - Concrete or mortar mixers

8474.32 - - Machines for mixing mineral substances with bitumen

8474.39 - - Other

8474.80 - Other machinery

8474.90 - Parts

This heading covers :

(I) Machinery of a kind used, mainly in the extractive industries, for the treatment (sorting, screening, separating, washing, crushing, grinding, mixing or kneading) of solid mineral products (in general the products of Section V of the Nomenclature) such as earth (including earth colours), clay, stone, ores, mineral fuels, mineral fertilisers, slag cement or concrete.

(II) Machinery for agglomerating, shaping or moulding solid mineral products in powder or paste form (e.g., agglomerating solid mineral fuels; moulding to shape ceramic pastes, unhardened cements, plastering materials, etc., whether or not with an added binder or filler).

(III) Machines for forming foundry moulds of sand.

Many machines of this heading combine two or more of the functions in question (e.g., hydraulic sorting and washing, grinding and sorting, grinding and mixing, mixing and moulding machines).

Certain machines of the kind **normally** used for the treatment of mineral products can, as a secondary use, also treat non-mineral products (e.g., wood or bone); such machines remain in this heading. However, the heading **does not extend** to machinery specially designed for carrying out similar operations on non-mineral materials (e.g., for sorting or screening wood chips; for grinding wood flour; for grinding or mixing chemicals or organic colouring materials; for grinding bone, ivory, etc.; for agglomerating or moulding cork powder).

(I) MACHINES REFERRED TO IN CATEGORY (I) ABOVE (MACHINES MAINLY FOR THE EXTRACTIVE INDUSTRIES)

This group includes :

(A) **Sorting, screening, separating or washing machines** for separating the materials, usually according to the size or weight of the lumps or particles, or for washing the materials free of impurities. These machines include :

(1) **Roller sorters**. These consist of a number of parallel rollers revolving in the same direction in more or less close contact with each other. Each roller has a number of grooves so that, with the adjacent roller, it forms a channel through which the material passing over the rollers can fall if small enough. These channels increase in size along the machine, so that the material falls through the channels and is collected in receptacles below according to the size of the particles.

(2) **Screening machines using wire mesh or perforated sheet**. The material passes over an inclined screen whose meshes or perforations increase in size towards the lower end. These machines are of two types : in the first type, the wire mesh or perforated sheet is formed into a revolving inclined drum, usually cylindrical or hexagonal (trommels); in the other type, a flat inclined mesh or perforated screen is vibrated or oscillated by the machine.

(3) **Rake type sorting machines**. The material is sorted by a series of rakes whose teeth are spaced at appropriate distances.

(4) **Specialised machines** of various types for removing stones, etc., from coal.

(5) **Hydraulic washing, separating or concentrating machines**. Some simply wash away impurities; others separate out or concentrate the heavier part not held in suspension by the water.

(6) **Flotation separating machines**, mainly for ore concentration. The crushed ore is mixed with water and certain surface active agents (oil or various chemicals). A film forms on certain of the mineral particles which are then carried to the surface and are removed; in certain cases, the action is accelerated by blowing air into the mixture.

The heading also covers sorting or separating machines incorporating magnetic or electrical devices (e.g., electrostatic separating machines), and machines using electronic or photoelectric detecting devices, for example, sorting equipment for uranium or thorium ore, operating by radioactivity measurement.

The heading **does not cover** centrifugal sorting machines, i.e., machines in which separation depends entirely on the centrifugal principle that particles of differing specific gravities can be collected at differing distances from the quickly rotating centre (**heading 84.21**). However, machines in which centrifugal force is used to throw the material against a wire screen remain in this heading.

Conveyor bands used in conjunction with sorting or screening apparatus remain in their own appropriate headings unless forming an integral part of a sorting or screening machine, or **unless** the conveyor band itself acts as a screening or sorting device (e.g., has perforations for sorting or screening).

(B) **Crushing or grinding machines**. These include :

(1) **Vertical rotary crushers**. Essentially, they comprise a vessel in which a cone revolves, sometimes with an eccentric motion; the material is crushed between the cone and the walls of the vessel.

(2) **Jaw crushers of various types**. The material to be crushed falls between two vertical grooved jaws, one of which is fixed and the other movable.

(3) **Drum crushers**. The material is lifted to the top of a drum and is broken by falling on to the bottom.

(4) **Roller crushers or grinders**. The material is crushed between parallel rollers revolving in opposite directions - the distance between the rollers varying according to the fineness required. In many cases the machine consists of a number of pairs of such rollers.

(5) **Percussion grinders**. The material is thrown violently (e.g., by rapidly rotating arms) against the walls of the machine.

(6) **Hammer type crushers**.

(7) **Ball or rod mills**. These consist essentially of a rotating drum containing a number of balls or short rods (e.g., of steel or porcelain). The material is placed in the rotating drum and is crushed or ground by the action of the balls or rods.

(8) **Millstone type grinders**.

(9) **Drop hammer crushers** (known as stamp mills); mainly used for crushing ores. A series of cam-operated drop hammers, often arranged in graduated stages, break up the material to the required fineness.

(10) **Machines for breaking up and kneading** lumps of clay prior to further working in the ceramics industry.

(C) **Mixing or kneading machines**. These consist essentially of a container, equipped with paddles or other stirring devices, in which two or more materials are mixed or kneaded by stirring or agitation. They include :

(1) **Concrete or mortar mixers**. Concrete mixers permanently mounted on a railway wagon or on a lorry chassis are, however, **excluded (heading 86.04** or **87.05)**.

(2) **Machinery for mixing mineral substances** (crushed or broken stone, gravel, limestone, etc.) **with bitumen**, for the preparation of bituminous road-surfacing materials. These may take the form, for example, of installations consisting of a group of separate components (feed hopper, dryer, dust extractor, mixer, elevator, etc.) mounted on a common chassis, or of functional units in which the components are simply placed side by side (fixed or transportable asphalt plant).

(3) **Ore mixers**.

(4) **Machines for mixing coal dust, etc., with binding substances** in the production of agglomerated fuels.

(5) **Machines used in the ceramics industry** (e.g., for mixing the clay with colouring materials, or for kneading the ceramic paste).

(6) **Mixing machines used in the preparation of foundry sand.**

(II) AGGLOMERATING, MOULDING OR SHAPING MACHINERY

In general these machines are of one of the three following types :

(i) Various types of presses operating with moulds in which the material previously prepared is agglomerated and pressed into the required shape.

(ii) Large cylinders whose surfaces are fitted with a series of hollows or moulds where the material is pressed into the required shape.

or (iii) Extruding machines.

This group includes :

(A) **Machines for agglomerating solid mineral fuel** (coal dust, peat fibres, etc.) into brick, ball, egg, etc., shapes.

(B) **Machines for agglomerating or shaping ceramic pastes**. These include :

(1) **Brick making machines of the press or extrusion types**, including machines for cutting the extruded bars into bricks.

(2) **Tile moulding machines**, including machines for trimming the edges.

(3) **Machines for moulding or extruding earthenware pipes.**

(4) **Bricanion lath making machines**. In these, wire mesh is passed through rollers and covered at the intersections with clay.

(5) **Potters' wheels and similar machines** on which the ceramic paste is rotated and moulded to shape by hand, or with the aid of tools.

(6) **Machinery for moulding porcelain artificial teeth.**

(C) **Machinery for agglomerating abrasives**, in the manufacture of grinding wheels.

(D) **Machinery for making various prefabricated concrete articles** (e.g., paving stones, posts, balustrades, pylons), including **centrifugal moulding machines for tubes**.

(E) **Machinery for moulding various plaster, staff, stucco, etc., articles** (e.g., toys, statuettes and ceiling decorations).

(F) **Machinery for moulding articles of asbestos-cement** (e.g., vats, drinking troughs, chimneys), and **machines for making tubes or pipes of asbestos-cement** by rolling on a mandrel.

(G) **Machinery for moulding graphite electrodes.**

(H) **Machinery for extruding graphite pencil leads.**

(IJ) **Machinery for moulding blackboard chalks.**

(III) MACHINES FOR FORMING FOUNDRY MOULDS OF SAND

These machines, which may be of various types, are designed to press previously prepared foundry sand either into a mould to form a foundry core, or round a pattern in a moulding box to form a mould. They often incorporate a jolting mechanism to settle the sand firmly in the mould.

This heading covers the many types in which compressed air acts either on a piston or directly on to the surface of the sand; but machines in which sand is sprayed in a jet of compressed air are **excluded** (**heading 84.24**). Core or mould drying stoves are also **excluded** (**heading 84.19**).

PARTS

Subject to the general provisions regarding the classification of parts (see the General Explanatory Note to Section XVI), parts of the machines of this heading are also classified here. However, balls for ball mills are classified according to their constituent material.

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The heading also **excludes** :

(a) Pulverised fuel burners; mechanical stokers, incorporating pulverising or grinding equipment (**heading 84.16**).

(b) Calendering or rolling machines (**heading 84.20**).

(c) Filter presses (**heading 84.21**).

(d) Machine-tools for working stone or other mineral materials, or for cold working glass (**heading 84.64**).

(e) Concrete vibrators (**headings 84.67** or **84.79**, as the case may be).

(f) Machinery for moulding or pressing glass (**heading 84.75**).

(g) Machinery for moulding plastics (**heading 84.77**).

(h) General purpose presses (**heading 84.79**).

(ij) Concrete spreaders (**heading 84.79** or **Chapter 87**).

(k) Moulding boxes for metal foundry; moulds for use in the machines of this heading (**heading 84.80**).