

28.05 - Alkali or alkaline-earth metals; rare-earth metals, scandium and yttrium, whether or not intermixed or interalloyed; mercury.

- Alkali or alkaline-earth metals :

2805.11 - - Sodium

2805.12 - - Calcium

2805.19 - - Other

2805.30 - Rare-earth metals, scandium and yttrium whether or not intermixed or interalloyed

2805.40 - Mercury

(A) ALKALI METALS

The five alkali metals are soft and rather light. They decompose cold water; they deteriorate in air, forming hydroxides.

(1) Lithium.

This is the lightest (specific gravity 0.54) and hardest of the group. It is kept in mineral oil or inert gases.

Lithium helps to improve the qualities of metals, and is used in various alloys (e.g., anti-friction alloys). Because of its great affinity for other elements, it is also used, *inter alia*, to obtain other metals in the pure state.

(2) Sodium.

A solid (specific gravity 0.97) with a metallic lustre, readily tarnishing after cutting. It is preserved in mineral oil or in airtight welded tins.

Sodium is obtained by electrolysing molten sodium chloride or sodium hydroxide.

It is used in the manufacture of sodium peroxide ("dioxide"), sodium cyanide, sodamide, etc., the indigo industry, the manufacture of explosives (chemical primers and fuses), the polymerisation of butadiene, anti-friction alloys, or titanium or zirconium metallurgy.

The heading **excludes** sodium amalgam (**heading 28.53**).

(3) Potassium.

A silvery-white metal (specific gravity 0.85), which can be cut with an ordinary knife. It is preserved in mineral oil or in sealed ampoules.

Potassium is used for the preparation of certain photoelectric cells, and in anti-friction alloys.

(4) Rubidium.

A silvery-white solid (specific gravity 1.5), more fusible than sodium. It is preserved in sealed ampoules or in mineral oil.

Like sodium, it is employed in anti-friction alloys.

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(5) Caesium.

A silvery-white or yellowish metal (specific gravity 1.9), which ignites on contact with air; the most readily oxidising metal; presented in sealed ampoules or in mineral oil.

The radioactive alkali metal francium is excluded (**heading 28.44**).

(B) ALKALINE-EARTH METALS

The three alkaline-earth metals are malleable and decompose cold water fairly readily; they deteriorate in damp air.

(1) Calcium.

Obtained by the alumino thermal reduction of calcium oxide or by electrolysing molten calcium chloride. It is a white metal (specific gravity 1.57), used in the purification of argon, the refining of copper or steel, the manufacture of zirconium, calcium hydride (hydrolith), anti-friction alloys, etc.

(2) Strontium.

White or pale yellow metal, ductile (specific gravity 2.5).

(3) Barium.

White metal (specific gravity 4.2); used in certain anti-friction alloys and in the preparation of getters for vacuum tubes (**heading 38.24**).

This heading **does not include** radium, a radioactive element (**heading 28.44**), magnesium (**heading 81.04**), or beryllium (**heading 81.12**); these all resemble alkaline-earth metals in certain respects.

(C) RARE-EARTH METALS; SCANDIUM AND YTTRIUM, WHETHER OR NOT INTERMIXED OR INTERALLOYED

Rare-earth metals (the term "rare-earth" applies to their oxides) or lanthanons comprise the elements with atomic numbers (*) from 57 to 71 in the periodic system, i.e.:

Cerium group	Terbium group	Erbium group
57 Lanthanum	63 Europium	66 Dysprosium
58 Cerium	64 Gadolinium	67 Holmium
59 Praseodymium	65 Terbium	68 Erbium
60 Neodymium		69 Thulium
62 Samarium		70 Ytterbium
		71 Lutetium

Promethium (element 61), which is radioactive, is classified in **heading 28.44**.

The rare-earth metals are generally greyish or yellowish, and ductile or malleable.

(*) The atomic number of an element is the total number of orbital electrons contained in an atom of that element.

Cerium, the most important of the group, is obtained from monazite (rare-earth phosphate) or thorite (rare-earth silicate), after the removal of thorium. Cerium is obtained by metallothermic reduction of the halides using calcium or lithium as the reductant or by electrolysis of the fused chloride. It is a grey ductile metal, a little harder than lead, and gives off sparks when rubbed on rough surfaces.

Lanthanum, which exists in the impure state in ceric salts, is used in the manufacture of blue glass.

This heading also covers **scandium** and **yttrium** which resemble the rare-earth metals quite closely - **scandium** in addition resembles the metals of the iron group. These two metals are extracted from the ore thortveitite, a silicate of scandium containing yttrium and other elements.

These elements remain classified here whether or not intermixed or interalloyed. For instance, the heading covers " Mischmetal ", which is an alloy containing 45 to 55 % cerium, 22 to 27 % lanthanum, other lanthanons, yttrium and various impurities (up to 5 % iron, traces of silicon, calcium, aluminium). " Mischmetal " is used mainly in metallurgy and for the manufacture of lighter flints. When alloyed with more than 5 % iron or with magnesium or other metals it falls elsewhere (e.g., if it has the character of a pyrophoric alloy, in **heading 36.06**).

The heading **excludes** the salts and compounds of rare-earth metals, of yttrium and of scandium (**heading 28.46**).

(D) MERCURY

Mercury (quicksilver) is the only metal which is liquid at room temperature.

It is obtained by roasting natural mercury sulphide (cinnabar) and is separated from the other metals contained in the ore (lead, zinc, tin, bismuth) by filtration, distillation in a vacuum, and treatment with dilute nitric acid.

Mercury is a very brilliant silver-coloured liquid, heavy (specific gravity 13.59), toxic and liable to attack precious metals. At room temperature, pure mercury is unaffected by exposure to air, but the impure metal takes on a coating of brownish mercuric oxide. Mercury is presented in special iron containers (" flasks ").

Mercury is used for preparing the amalgams of heading 28.43 or 28.53. It is used in gold or silver metallurgy, in the gold- or silver-plating industries, and in the manufacture of chlorine, sodium hydroxide, mercury salts, vermillion or fulminates. It is also used for making mercury vapour lamps and in various physical instruments, in medicine, etc.
