28.29 - Chlorates and perchlorates; bromates and perbromates; iodates and periodates.

- Chlorates :

2829.11 - - Of sodium

2829.19 - - Other

2829.90 - Other

Subject to the **exclusions** specified in the introduction to this sub-Chapter, this heading covers chlorates and perchlorates, bromates and perbromates, and iodates and periodates of metals.

(A) CHLORATES

This group covers the salts of chloric acid ($HClO_3$) (heading 28.11).

(1) **Sodium chlorate** ($NaClO_3$). Obtained by electrolysing an aqueous solution of sodium chloride. Shiny colourless crystals (tablets); very soluble in water; readily gives off its oxygen. Often contains impurities (e.g., chlorides of the alkali metals). Used as an oxidising agent, in organic synthesis, in textile printing (aniline black dyes), for the manufacture of fulminating primers and preparations for match heads, as a weed-killer, etc.

(2) **Potassium chlorate** ($KClO_3$). Prepared in a similar manner to sodium chlorate. Colourless crystals, sparingly soluble in water. Its other properties are similar to those of sodium chlorate. It is also used in medicine and in the manufacture of blasting explosives (e.g., cheddite).

(3) **Barium chlorate** ($Ba(ClO_3)_2$). Obtained by electrolysing a solution of barium chloride; colourless crystals, soluble in water. Used as green colouring matter in pyrotechnics and in the manufacture of explosives and certain other chlorates.

(4) **Other chlorates**. These include ammonium chlorate, used in the manufacture of explosives; strontium chlorate, used in the manufacture of explosives and in pyrotechnics to produce red lights; chromium chlorate, used as a mordant in dyeing; copper chlorate, green crystals used in dyeing, in the manufacture of explosives and in pyrotechnics to produce green lights.

(B) PERCHLORATES

This group covers the salts of perchloric acid ($HClO_4$) (heading 28.11). These powerful oxidising agents are used in pyrotechnics and in the manufacture of explosives.

(1) **Ammonium perchlorate** (NH_4ClO_4). Prepared from sodium perchlorate. Colourless crystals, soluble in water especially when hot; decomposed by heat, sometimes explosively.

(2) **Sodium perchlorate** ($NaClO_4$). Obtained by electrolysing cold solutions of sodium chlorate; deliquescent, colourless crystals.

(3) **Potassium perchlorate** ($KClO_4$). Obtained from sodium perchlorate. Colourless crystalline powder of comparatively low solubility, exploding on shock. Used in the chemical industry as an oxidising agent more powerful than chlorates.

(4) **Other perchlorates**. These include : barium perchlorate (hydrated powder) and lead perchlorate; the saturated solution of the latter is a heavy liquid (specific gravity 2.6) used in the flotation process.

(C) BROMATES AND PERBROMATES

This group covers the salts of bromic acid ($HBrO_3$) (heading 28.11), for example potassium bromate ($KBrO_3$), and the salts of perbromic acid ($HBrO_4$).

(D) IODATES AND PERIODATES

This group covers the salts of iodic acid (HIO_3) (heading 28.11) and the salts of periodic acid (heading 28.11).

Sodium iodate ($NaIO_3$), potassium iodate (KIO_3) and potassium hydrogen di-iodate ($KH(IO_3)_2$) are employed in medicine and as reagents in chemical analysis. Barium iodate, in crystals, is used for manufacturing iodic acid.

Sodium periodates (monosodium and disodium) are obtained by the action of chlorine on an alkaline solution of sodium iodate.