



## Element Fact Sheet – Chlorine

**Chlorine** is a chemical element with symbol **Cl** and atomic number 17. Chlorine is in the halogen group (17) and is the second lightest halogen following fluorine. The element is a yellow-green gas under standard conditions, where it forms diatomic molecules. Chlorine has the highest electron affinity and the fourth highest electronegativity of all the reactive elements. For this reason, chlorine is a strong oxidizing agent. Free chlorine is rare on Earth, and is usually a result of direct or indirect oxidation by oxygen.

The most common compound of chlorine, sodium chloride (common salt), has been known since ancient times. Around 1630 chlorine gas was first synthesized in a chemical reaction, but not recognized as a fundamentally important substance. Characterization of chlorine gas was made in 1774 by Carl Wilhelm Scheele, who supposed it to be an oxide of a new element. In 1809 chemists suggested that the gas might be a pure element, and this was confirmed by Sir Humphry Davy in 1810, who named it from Ancient Greek: *χλωρός* *khlôros* "pale green".

Nearly all chlorine in the Earth's crust occurs as chloride in various ionic compounds, including table salt. It is the second most abundant halogen and 21st most abundant chemical element in Earth's crust. Elemental chlorine is commercially produced from brine by electrolysis. The high oxidizing potential of elemental chlorine led commercially to free chlorine's bleaching and disinfectant uses, as well as its many uses of an essential reagent in the chemical industry. Chlorine is used in the manufacture of a wide range of consumer products, about two-thirds of them organic chemicals such as polyvinyl chloride, as well as many intermediates for production of plastics and other end products which do not contain the element. As a common disinfectant, elemental chlorine and chlorine-generating compounds are used more directly in swimming pools to keep them clean and sanitary.

In the form of chloride ions, chlorine is necessary to all known species of life. Other types of chlorine compounds are rare in living organisms, and artificially produced chlorinated organics range from inert to toxic. In the upper atmosphere, chlorine-containing organic molecules such as chlorofluorocarbons have been implicated in ozone depletion. Small quantities of elemental chlorine are generated by oxidation of chloride to hypochlorite in neutrophils, as part of the immune response against bacteria. Elemental chlorine at high concentrations is extremely dangerous and poisonous for all living organisms, and was used in World War I as the first gaseous chemical warfare agent.