

Scrubber

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This article is about the pollution control device. For other uses, see [Scrubber \(disambiguation\)](#).

Scrubber systems (e.g. chemical scrubbers, gas scrubbers) are a diverse group of [air pollution](#) control devices that can be used to remove some [particulates](#) and/or gases from industrial exhaust streams. The first air scrubber was designed to remove carbon dioxide from the air of an early submarine, the [Ictineo I](#), a role for which they continue to be used today.^[1] Traditionally, the term "scrubber" has referred to pollution control devices that use liquid to wash unwanted pollutants from a gas stream. Recently, the term has also been used to describe systems that inject a dry [reagent](#) or [slurry](#) into a dirty exhaust stream to "wash out" [acid gases](#). Scrubbers are one of the primary devices that control gaseous emissions, especially acid gases. Scrubbers can also be used for heat recovery from hot gases by [flue-gas condensation](#).^[2] They are also used for the high flows in solar, PV, or LED processes.^[3]

A steam powered

submarine: the Ictíneo

Few Victorian inventions have the grace and charm of the Ictíneo, the series of two wooden submarines built by Narcís Monturiol i Estarrol in the second half of the nineteenth century.

Unlike some of the better known early submarines from his contemporaries in Germany, France and the United States, the Catalan inventor managed to build submarines that operated flawlessly.

The Ictíneo II was the first combustion engine driven submarine ever, pioneering concepts that were only rivalled in the 1940s. Sadly, both submarines were eventually scrapped and Monturiol died penniless and forgotten.

