

History of fire extinguishers



An antique glass 'grenade' fire extinguisher

For most of history, the most widespread fire extinguisher of any kind was a bucket of water stored next to the stove or on the front porch.

In about 200 BC, Ctesibius of Alexandria invented a hand pump able to deliver water to a fire and it is known that the Romans used bucket chains, buckets passed hand-to-hand to deliver water to the fire. Then, in the Middle Ages, 'squirts' began to be used to apply jets of water to fires. The squirt worked rather like a bicycle pump. The nozzle was dipped into water and about one litre was sucked up by pulling out the plunger. The charged squirt was then directed at the fire and the plunger pushed home to eject the water. Squirts were used on the 1666 Great Fire of London. The first version of the modern portable fire extinguisher was invented by Captain George William Manby, a writer and inventor from England, in 1819, consisting of a copper vessel of 13,6 litres of pearl ash (potassium carbonate) solution under compressed air pressure.

In the second half of the 1800s, numerous inventors came up with extinguishers that did more than just spray ordinary water onto a fire. Starting in the 1860s, inventors created the soda-acid extinguisher, where a cylinder contained one or two gallons of water that had

sodium bicarbonate mixed in it, which was particularly useful for fires where there might be poisonous chemicals around. Suspended in the cylinder was a vial containing concentrated sulphuric acid. The vial of acid was broken by one of two means depending on the type of extinguisher. One means involved the use of a plunger that broke the acid vial, while the second involved the release of a lead bung that held the vial closed. Once the acid was mixed with the bicarbonate solution, carbon dioxide gas would be expelled and this would in turn pressurise the water. The pressurised water was forced from the canister through a short length of hose and a nozzle. The acid was neutralised by the sodium bicarbonate.

The foam extinguisher consisted of the main body of the extinguisher filled with foam producing chemical and a second container filled with another chemical, which reacts when it came into contact with the solution in the main cylinder. To operate you turned the extinguisher upside down and allowed the two solutions to mix, then hold your finger over the discharge nozzle and shake the extinguisher to ensure the solution was properly mixed then direct it at the fire. The resultant reaction created high pressure and a lot of carbon-dioxide gas. This could be forced out of the nozzle of the extinguisher to put out the fire.

Around 1912 Pyrene pioneered the carbon tetrachloride or CTC extinguisher, where the liquid was expelled from a brass or chrome container by hand pump, onto a fire. The sizes were usually of one imperial quart (1,1 litre) or one imperial pint (0,6 litre) capacity but also made in up to nine litre sizes. The CTC vapourised and extinguished the flames by interfering with the chemical reaction. This extinguisher was suitable for liquid and electrical fires and was popular in motor vehicles for the next 60 years. The vapour and combustion by-products were highly toxic and deaths did occur from using these extinguishers in confined spaces.

One of the more interesting types of fire extinguishers developed during the 19th and early 20th centuries were the so-called 'fire grenade'. The 'fire 'grenade' was a sphere of glass filled with either salt-water or the chemical carbon tetra-chloride (CTC). Fire grenades could be used by firemen or people in distress to put out a fire from a distance. One simply lined up the fire in one's sight and threw the grenade at its base. The glass shattered and the spreading water (or chemicals, as the case might be) put out the fire, with minimal risk to the fire fighter or person in distress.

In some places, fire grenades were placed on special hair-trigger harnesses above doorways in big, public buildings. This way, if there was a fire, the grenades could



*Read and Campbells
fire extinguisher*



*The Pyrene pioneered
the CTC extinguisher*



Cartridge-operated fire extinguisher

fall from their harnesses into the doorways above which they were installed. This kept the doorway clear of flames, allowing people a safe escape route (so long as you were fine with running on top of broken glass!).

In the middle of the twentieth Century the modern type of extinguisher appeared using different extinguishing agents. Manufacturers of extinguishers generally use some type of pressurised vessel to store and discharge the extinguishing agent.

The first type of fire extinguishers are pressurised with air to approximately 10 bar, five times a car tyre pressure, from a compressor. A squeeze-grip handle operates a spring-loaded valve threaded into the pressure cylinder. Inside, a pipe or dip tube extends to the bottom of the extinguisher so that in the upright position, the opening of the tube is submerged. The extinguishing agent is released as a steady stream through a hose and nozzle, pushed out by the stored pressure above it.

The second type of fire extinguishers are the 'gas cartridge' type operate in the same manner but the pressure source is a small cartridge of carbon dioxide gas (CO₂) at 130 bars, rather than air. A squeeze-grip handle operates a spring-loaded device causing a pointed spike to pierce the disc that held back the pressure, releasing the gas into the pressure vessel. The released CO₂ expands several hundred times its original volume, filling the gas space above the extinguishing agent. This pressurises the cylinder and forces the extinguishing agent up through a dip-pipe, out through a hose and nozzle to be directed upon the fire. This design proved to be less prone to leak down, loss of pressure over time, than simply pressurising the entire cylinder.

In 2011 Britannia introduced the first self-maintenance extinguishers, which for the first time in extinguisher history do not require service engineers to visit sites and maintain them. ▲