# 001 – HYDROGEN – H

| *Fact File* | |
|---|---|
| **Appearance** | Colourless Gas |
| **Standard Atomic Weight, $A_r$** | [1.007 84, 1.008 11] amu |
| **Conventional Standard Atomic Weight, $A_r$** | 1.008 amu |
| **Atomic/Proton Number, *Z*** | 1 |
| **Group** | Group 1 |
| **Period** | Period 1 |
| **Block** | s-block |
| **Electron Configuration/Ground Shells** | $1s^1$ |
| **Electrons Per Shell** | 1 |
| **Core Electrons** | 0 |
| **Valence Electrons** | 1 |
| **Phase/State of Matter at STP** | Gas |
| **Melting/Liquefaction Point** | 14.01 K |
| **Boiling Point** | 20.28 K |
| **Density at STP** | 0.08988 g/L |
| **Ionic Charge(s)** | 1+ / 1- |
| **Emission Spectrum** |  |
| **Natural Occurrence** | Primordial |
| **Discovered By** | Henry Cavendish, 1766 |
| **Named By** | Antoine Lavoisier, 1783 |

## *Discovery*

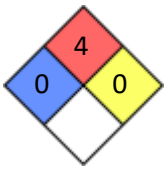
In 1671, Robert Boyle discovered and described the reaction between iron filings and dilute acids, which produces hydrogen gas; and in 1766 Henry Cavendish was the first to recognise that this gas is a discrete substance, naming it “inflammable air”. In 1781 he further discovered that the gas produced water when burned.

## *Name Origins*

Antoine-Laurent de Lavoisier named hydrogen in 1783 from the Greek ὑδρο- *hydro* meaning "water" and -γενής *genes* meaning "former" (literally “water-former”) when he and Pierre-Simon, marquis de Laplace reproduced Henry Cavendish’s findings that water is produced when hydrogen is burned.

## *Isotopes*

Hydrogen has three naturally occurring isotopes; $^1H$ (99.988 5%), $^2H$ (0.011 5%), and $^3H$ (trace). $^4H$ to $^7H$ have also been synthesised in laboratory conditions.

| *Hazards* | |
|---|---|
| **GHS pictograms** |  GHS02 |
| **GHS Signal word** | Danger |
| **GHS hazard statements** | H220 |
| **GHS precautionary statements** | P202, P210, P271, P377, P381, P403 |
| **NFPA 704 (fire diamond)** |   |