Composition of compressed air

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Compressed air is used as a breathing gas by underwater divers. It may be carried by the diver in a high-pressure diving cylinder, or supplied from the surface at lower pressure through an air line or diver"s umbilical.[1] Similar arrangements are used in breathing apparatus used by firefighters, mine rescue workers and industrial workers in hazardous atmospheres.

In Europe, 10 percent of all industrial electricity consumption is to produce compressed air--amounting to 80 terawatt hours consumption per year.[2][3]

Air under moderately high pressure, such as is used when diving below about 20 metres (70 ft), has an increasing narcotic effect on the nervous system. Nitrogen narcosis is a hazard when diving. For diving much beyond 30 metres (100 ft), it is less safe to use air alone and special breathing mixes containing helium are often used.[8]

In industry, compressed air is so widely used that it is often regarded as the fourth utility, after electricity, natural gas and water. However, compressed air is more expensive than the other three utilities when evaluated on a per unit energy delivered basis.[9]

When air at atmospheric pressure is compressed, it contains much more water vapor than the high-pressure air can hold. Relative humidity is governed by the properties of water and is not affected by air pressure.[13] After compressed air cools, then the vaporized water turns to liquefied water.[14][15]

Cooling the air as it leaves the compressor will take most of the moisture out before it gets into the piping. Aftercooler, storage tanks, etc. can help the compressed air cool to 104 ?F; two-thirds of the water then turns to liquid.[16]

The molar mass of dry air with oxygen, nitrogen and the other components as indicated below is 28.9647 g/mol. Composition and content of each gas in air is given in the figures and the table below.

See also Air Density at varying pressure, Density and specific weight at varying temperature, Diffusion Coefficients for Gases in Air, Dynamic (absolute) and kinematic viscosity, Prandtl Number, Specific heat at varying temperature and Specific heat at varying pressure, Thermal Conductivity, Thermal Diffusivity, Properties at gas-liquid equilibrium conditions and Air properties, for other properties of air.

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