Pressure in a Can of Soda

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Bibliographic Entry	Result (w/surrounding text)	Standardized Result
Kimmey, R. Pepsi Brooklyn Bottling Center. Fax. 25 May 2000	"At 60 F, the gauge pressure in the container is approximately 40 psi"	276 kPa
Murphy, P., E. Klages & L. Shore. *The Science Explorer: Family Science Experiments from the World's Favorite Hands-On Museum*. 5.	"A refrigerated can of 7UP® has an internal pressure of about 30 pounds per square inch."	207 kPa
Bates, Paul W. History of the Beverage Can. The Museum of Beverage Containers and Advertising.	"A much sturdier container than that used for food products was required to withstand the 80 to 90 psi pressure of pasteurization, In contrast to the 25 to 30 psi used in food processing."	< 550 ~ 620 kPa
Sowell, Jeff. Consumer Affairs Specialist. Coca-Cola Company. Letter. 31 May 2000.	"For example, the table shows a typical can of Coca-Cola classic with 3.7 volumes of carbon dioxide dissolved in the product at a temperature of 75F has an internal pressure of about 55 psi."	380 kPa
Kieran, Kelly. Re: what is the average pressure in a 12 oz. soda can? Mad Scientist Network. 3 February 2000.	"To give you a quick example, let's say that the soda was carbonated to 3.0 volumes of CO2 and it has been sitting in your refrigerator so it's around 40 degrees F. The pressure inside the can will be roughly 17 psig (pounds per square inch, gauge) above atmospheric pressure. If you let the can warm up on the counter so its temperature increases to 70 F or so, the pressure inside the can will have increased to about 36 psig."	117 kPa (4 °C, when canned) 248 kPa (21 °C, at room temperature)
Kelly, Kieran. Re: Do different types of drinks contain varying amounts of carbonation levels? Mad Scientist Network. 29 January 1999.	"Every beverage is designed with a specific carbonation level for optimal flavor, mouthfeel, and anti-microbiological effects … Pepsi to show the highest carbonation level among these sodas."	n/a

Pressure can be defined as the magnitude of force (F) acting perpendicular to a surface divided by the area (A) over which the force acts (P = F/A). It can be measured in various units; the most common pascal, atmosphere, and pounds per square inche (1 atm = 101.3 kPa = 14.7 psi).

Gases exert a pressure on any surface with which they are in contact. The amount of pressure exerted by the molecules of a gas depends on the force and frequency of the molecules towards the walls of its container. The pressure of gases is therefore dependent upon two major factors: temperature and volume. According to Boyle's Law, the volume of a fixed quantity of a gas at a constant temperature is inversely proportional to the pressure. Thus with temperature constant, as volume increases, the pressure decreases, and vice-versa. The Third Gas Law states that when the volume of a fixed mass of gas is maintained constant, pressure is directly proportional to absolute temperature. As the absolute temperature increases, the average kinetic energy of the molecules increases. This causes the molecules to collide with the container walls with greater force and frequency, and

thus pressure increases.

Soda manufacturers often inject cold liquid with pressurized carbon dioxide, then bottle the drink under high pressure. This is due to the fact that more gas will dissolve in a cold liquid that's under a high pressure than in a warm liquid that is not under pressure. The bubbles in such drinks simply do not only provide fizz, but instead change the flavor of the drink as well. The carbon dioxide in the soda forms carbonic acid, which alleviates the sweet taste of the drink. For this reason, flat soda oftentimes tastes much sweeter than when it is carbonated. The carbon dioxide not only alters flavor and mouthfeel, but also serves an anti-microbiological purpose. It has been shown to help prevent some microbes from growing inside of one's mouth, as well. Therefore, each type of soda drink contains a different amount of carbon dioxide, and thus has varying amounts of pressure. On average, the 12 ounce soda cans sold in the US tend to have a pressure of roughly 120 kPa when canned at 4 °C, and 250 kPa when stored at 20 °C.

Specifically, a refrigerated can of 7UP® contains 210 kPa of pressure. On the other hand, Pepsi-Cola® contains 276 kPa at approximately 16 °C. Lastly, a can of Coca-Cola Classic® at 34 °C has an internal pressure of approximately 380 kPa. These numbers came from employees of the soft drink companies themselves.

Seema Meraj -- 2000

External links to this page:

- How Much is Inside Coca Cola? Rob
