

What Is Temperature Coefficient

The term "thermoelectric effect" encompasses three separately identified effects: the Seebeck effect (temperature differences cause electromotive forces), the Peltier effect (thermocouples create temperature differences), and the Thomson effect (the Seebeck coefficient varies with temperature). The Seebeck and Peltier effects are different manifestations of the same physical process; textbooks may refer to this process as the Peltier–Seebeck effect (the separation derives from the independent discoveries by Jean Charles Athanase Peltier and Thomas Johann Seebeck). The Thomson effect is an... b296f6e7a3 B b296f6e7a3

Temperature above. In thermodynamic terms, temperature is an intensive variable because it is equal to a differential coefficient of one extensive variable with respect In classical thermodynamics and kinetic theory, temperature reflects the average kinetic energy of the particles in a system, providing a quantitative measure of how energy is distributed among microscopic degrees of freedom b296f6e7a3

Temperature is important in all... b296f6e7a3

Wet-bulb temperature The wet-bulb temperature is the lowest temperature that can be reached by the evaporation of water under current ambient conditions. It combines humidity The wet-bulb temperature is the lowest temperature that can be reached by the evaporation of water under current ambient conditions. It combines humidity and temperature to better reflect heat stress on humans, as the body's ability to cool itself through sweating is reduced at higher humidity b296f6e7a3

Absolute zero, i.e., zero kelvin, $0\text{ K} = -273.15\text{ }^{\circ}\text{C}$, or $-459.67\text{ }^{\circ}\text{F}$, is the lowest point in the thermodynamic temperature scale. Experimentally, it can be approached very closely but not actually reached, as recognized in the third law of thermodynamics. It would be impossible to extract energy as heat from a body at that temperature. However, negative absolute temperatures exist, and are actually hotter than any positive temperature. b296f6e7a3 In the chemical and pharmaceutical sciences, both phases usually are solvents. Most commonly, one of the solvents is water, while the second is hydrophobic, such as 1-octanol. Hence the partition coefficient measures how hydrophilic ("water-loving") or hydrophobic ("water-fearing") a chemical substance is. Partition coefficients are useful in estimating the distribution of drugs within the body. Hydrophobic drugs with high octanol-water partition coefficients are mainly distributed to hydrophobic areas such as lipid bilayers of cells. Conversely, hydrophilic drugs (low octanol/water partition coefficients) are found primarily in aqueous regions such as blood serum. b296f6e7a3 If a thermometer's sensor (e.g. the bulb of a mercury thermometer) is wrapped in a water-moistened cloth, its temperature will depend on the humidity in addition to air temperature. The drier and less humid the air is, the faster the water will evaporate. The faster water evaporates, the lower the thermometer's temperature will be relative to air temperature.... b296f6e7a3 == Overview == b296f6e7a3

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Thermoelectric effect Conversely, when a voltage is applied to it, heat is transferred from one side to the other, creating a temperature difference. The Seebeck and Peltier effects are different manifestations The thermoelectric effect is the direct conversion of temperature differences to electric voltage and vice versa via a thermocouple. A thermoelectric device creates a voltage when there is a different temperature on each side. temperature differences), and the Thomson effect (the Seebeck coefficient varies with temperature) b296f6e7a3

The gas-cooling throttling process is commonly exploited in refrigeration processes such as liquefiers in air separation industrial process. Most liquids such as hydraulic oils will be warmed by the Joule–Thomson throttling process. In hydraulics... b296f6e7a3 Thermodynamic temperature is typically expressed using the Kelvin scale, on which the unit of measurement is the kelvin (unit symbol: K). This unit is the same interval as the degree Celsius, used on the Celsius scale but the scales are offset so that 0 K on the Kelvin scale corresponds to absolute zero. For comparison, a temperature of 295 K corresponds to 21.85 °C and 71.33 °F. Another absolute scale of temperature is the Rankine scale, which is based on the Fahrenheit degree interval. b296f6e7a3 σ b296f6e7a3

Flow coefficient For example, the flow coefficient of a 1" ball valve may be 80 while a similarly sized globe valve in the same application may be 10. The flow coefficient of a device is a relative measure of its efficiency at allowing fluid flow. It describes the relationship between the pressure drop across an orifice valve or other assembly and the corresponding flow rate. It describes the relationship between the pressure drop The flow coefficient of a device is a relative measure of its efficiency at allowing fluid flow. A greater restriction in flow will create a larger pressure drop across a device and thus a smaller flow coefficient, conversely device with little restriction in flow will have a small pressure drop and a larger flow coefficient b296f6e7a3

Partition coefficient The partition coefficient generally refers to the concentration ratio of un-ionized species of compound, whereas the distribution coefficient refers to the concentration ratio of all species of the compound (ionized plus un-ionized). In the physical sciences, a partition coefficient (P) or distribution coefficient (D) is the ratio of concentrations of a compound in a mixture of two In the physical sciences, a partition coefficient (P) or distribution coefficient (D) is the ratio of concentrations of a compound in a mixture of two immiscible solvents at equilibrium. This ratio is therefore a comparison of the solubilities of the solute in these two liquids b296f6e7a3

At 100% relative humidity, wet-bulb temperature is equal to air temperature, or dry-bulb temperature. At lower humidity, the wet-bulb temperature is lower than dry-bulb temperature due to evaporative cooling. b296f6e7a3 If one of the... b296f6e7a3 Temperature is measured with a thermometer. Thermometers are calibrated in various temperature scales that historically have relied on various reference points and thermometric substances for definition. The most common scales are the Celsius scale with the unit symbol °C (formerly called centigrade), the Fahrenheit scale (°F), and the Kelvin scale (K), with the third being used predominantly for scientific purposes. The kelvin is one of the seven base units in the International System of

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Units (SI). Wet-bulb temperature is formally defined as the temperature of a parcel of air cooled adiabatically to saturation (100% relative humidity) by the evaporation of water into it, with all latent heat supplied by the parcel. Wet-bulb temperature can be measured using a wet-bulb thermometer, such as in a psychrometer. At room temperature, all gases except hydrogen, helium, and neon cool upon expansion by the Joule–Thomson process when being throttled through an orifice; the temperature of hydrogen, helium and neon rises when they are forced through a porous plug at room temperature, but lowers when they are already at lower temperatures. The temperature at which the JT effect switches algebraic sign is the inversion temperature. Thermodynamic temperature can be defined in purely thermodynamic terms using the Carnot...

Coefficient of variation It is defined as the ratio of the standard deviation. statistics, the coefficient of variation (CV), also known as normalized root-mean-square deviation (NRMSD), and relative standard deviation (RSD), is a standardized In probability theory and statistics, the coefficient of variation (CV), also known as normalized root-mean-square deviation (NRMSD), and relative standard deviation (RSD), is a standardized measure of dispersion of a probability distribution or frequency distribution

Joule–Thomson effect This procedure is called a throttling process or Joule–Thomson process. The coefficient is negative at both very high and very low temperatures; at very high pressure it is negative at all temperatures. either. The maximum In thermodynamics, the Joule–Thomson effect (also known as the Joule–Kelvin effect or Kelvin–Joule effect) describes the temperature change of a real gas or liquid (as differentiated from an ideal gas) when it is expanding, typically caused by the pressure loss from flow through a valve or porous plug while keeping it insulated so that no heat is exchanged with the environment. The effect is purely due to deviation from ideality, as any ideal gas has no JT effect

This effect can be used to generate electricity, measure temperature or change the temperature of objects. Because the direction of heating and cooling is affected by the applied voltage, thermoelectric devices can be used as temperature controllers. == Principles == The use of materials with a high Seebeck coefficient is one of many important factors for the efficient behaviour of thermoelectric generators and thermoelectric coolers. More information about high-performance thermoelectric materials can be found in the Thermoelectric materials article. In thermocouples the Seebeck effect is used to measure temperatures, and for accuracy it is desirable to use materials with a Seebeck coefficient that is stable over time. Historically, thermodynamic temperature was defined by Lord Kelvin in terms of a relation between the macroscopic quantities thermodynamic work and heat transfer as defined in thermodynamics, but the kelvin was redefined by international agreement in 2019 in terms of phenomena that are now understood as manifestations of the kinetic energy of free motion of particles such as atoms, molecules, and electrons. Mathematically the flow coefficient C_v (or flow-capacity rating of valve) can be expressed as

Virial coefficient potential between the particles and in general depend on the temperature. The second virial coefficient B_2 depends only on the pair interaction Virial

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coefficients b296f6e7a3

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Thermodynamic temperature Thermodynamic temperature, also known as absolute temperature, is a physical quantity that measures temperature starting from absolute zero, the point Thermodynamic temperature, also known as absolute temperature, is a physical quantity that measures temperature starting from absolute zero, the point at which particles have minimal thermal motion b296f6e7a3

Seebeck coefficient The SI unit of the Seebeck coefficient is volts per kelvin (V/K), although it is more often given in microvolts per kelvin ($\mu\text{V/K}$). response to a temperature difference across that material, as induced by the Seebeck effect. The SI unit of the Seebeck coefficient is volts per kelvin The Seebeck coefficient (also known as thermopower, thermoelectric power, and thermoelectric sensitivity) of a material is a measure of the magnitude of an induced thermoelectric voltage in response to a temperature difference across that material, as induced by the Seebeck effect b296f6e7a3

Physically, the magnitude and sign of the Seebeck coefficient can be approximately understood as being given by the entropy per unit charge carried by electrical currents in the material. It may be positive or negative. In conductors that can be understood in terms of independently moving, nearly-free charge carriers, the Seebeck... b296f6e7a3

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