STRAIN GAUGE

A strain gauge is a device used to measure strain on an object. It was invented by Edward E Simmons and Arthur C Ruge in 1938. While there are several methods of measuring strain, the most common is with a strain gage, a device whose electrical resistance varies in proportion to the amount of strain in the device. The most widely used gage is the bonded metallic strain gage.

If a strip of conductive metal is stretched, it will become skinnier and longer, both changes resulting in an increase of electrical resistance end-to-end. Conversely, if a strip of conductive metal is placed under compressive force (without buckling), it will broaden and shorten. Strain gauges are frequently used in mechanical engineering research and development to measure the stresses generated by machinery. Aircraft component testing is one area of application.

RESISTANCE THERMOMETERS

The resistance thermometer, often called a Resistance Temperature Detector (RTD) is a common thermometer, well known for its stability and accuracy.

The temperature measurement with resistance thermometers is based on the characteristic of conducting materials to change their electrical resistance with temperature. For metals, the resistance increases with rising temperature. If the relation between temperature and resistance is known, you can determine the temperature by measuring the resistance. They are slowly replacing the use of [thermocouples](https://en.wikipedia.org/wiki/Thermocouple) in many industrial applications below 600 °[C](https://en.wikipedia.org/wiki/Celsius), due to higher accuracy and repeatability.eg:Platinum RTD

Application of conductors in daily life- Mercury is used in thermometers to absorb heat- aluminium is used for making frying pans to absorb heat quickly.- Motor vehicle engines are made of iron to conduct away heat- refrigerators have copper pipes at the back for conducting away heat from coolant.

**Conducting Materials**  
\* The Conduction material has large number of conduction electron (free to move under the influence of an electric field).   
\* They conduct electricity when an electric potential difference is applied across them.  
\* Conduction electron or Free electron are responsible for the most of the property of metals such as Electrical conduction, Thermal conduction, etc.

**Properties of Conducting Material:**  
\* High Electrical and Thermal (Heat) conductivities.   
\* At steady state, they obey Ohm’s Law (V=IR)  
\* They obey Widemann – Franz Law (K/α = LT)  
\* They exhibit the phenomenon of superconductivity.

**Classification of Conducting Material:**

* Zero Resistivity Material (Super Conductor)
* Low Resistivity Material (Semi-Conductor)
* High Resistivity Material (Insulator)