

Thesis Title	Construction of Cold-Cathode Ionization Gauge
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Abstract

A Cold-Cathode ionization gauge is a device used for measuring the pressure in a vacuum system. The Commercial name of this type of gauge is " Philips gauge " or " Penning gauge ". The measured range of a pressure is about 5.0×10^{-3} to 1.0×10^{-6} mbar which is high vacuum. The device consists of 2 parts, namely a gauge head and a control unit. The gauge head is made of stainless steel in a cylindrical shape which acting as a cathode and a small central rod of tungsten with a purity of 97 percent, acting as an anode. The gauge head is surrounded by a cylindrical permanent magnet to produce the magnetic field perpendicular to the electric field. The control unit supplies a high voltage of 2500 volts to the gauge head and also displays the measuring pressure. This gauge is operated by the measurement of the ion current which is caused by the ionization of gas in an electric field. Those positive ions can be increased by the magnetic field. The pressure of a system depend on the magnitude of an ion current. The constructed gauge is calibrated with the standard cold-cathode ionization gauges, the DN40ISO-KF of BALZERS for making the pressure scale and the AIM-S-NW25 of EDWARDS for measurement system analysis. The constructed gauge measure the pressure in range of 8.0×10^{-4} to 2.0×10^{-3} mbar with the bias about 2-15 percent. All materials used for the construction of the gauge are obtained from local areas. The cost of the gauge is approximately 25,000 baht and very cheap compared with the price of 90,000 baht for an analog type and 110,000 baht for a digital type from commercials.

Keywords : Vacuum / Cold-Cathode Ionization / Calibrated