Abstracts

General Vacuum Science and Engineering

11. Production of Low Pressures

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134. Cryopumping.
This is a new, unconventional and also economical technique for producing a high vacuum at a low temperature on a large scale. It has been used to simulate flight conditions of missiles at high altitudes and at hypersonic speeds. In a windtunnel supplied with dry, gaseous nitrogen at a controlled rate of flow, the model or object under test is located at one end in the throat of the main nozzle. At the far end of the windtunnel large cooling plates are maintained at a temperature of −420°F. Freezing of the gaseous nitrogen to a solid on these plates causes a high speed flow of the remaining gaseous nitrogen toward the cold end to fill the void caused by that fixation. Gas velocities of the order of 20 times the speed of sound have been obtained for 10 hr at a stretch. The low temperature is obtained with a He refrigerator driven by a 50 h.p. motor. These constitute the only moving parts. Pressures of the order of 10^{-4} Torr have been achieved representing the air density at perhaps sixty miles above the earth. C. R. M.

Franklin Inst. **267**, 97–98, Jan. 1959. (Current Topics).

12. Measurement of Low Pressures

12

135. The Speed of Evacuation of High Vacuum Plant.
This is an attempt to predict the speed of evacuation of vacuum plant down to the order of 10^{-6} Torr taking into account the evolution of gas.

Th. Kraus, *Vakuum-Technik* **8**, 39–43, 1959.

12

136. Two Methods for the Measurement of Low Vapour Pressures.
(a) Radiometer method using a thermal molecular manometer. A well evacuated system is isolated with the gauge and the equilibrium vapour pressure measured. This method is useable in the pressure range 10^{-3}–10^{-6} Torr (and lower).
(b) Molecular beam method.
Vapour molecules streaming from an evaporation chamber into a space evacuated to a low pressure are detected by a molecular flow meter. The indication is directly proportional to vapour pressure. This method is best suited for the pressure range 10^{-1}–10^{-4} Torr.

H. Klumb und J. Lückert, *Vakuum-Technik* **8**, 62–66, 1959.

12 : 34

137. Density Determinations based on the Explorer and Vanguard Satellites.
I. Harris and R. Jastrow, *Science* **128**, No. 3321, 420–421, 22 August, 1958.

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138. Partial Pressure of Ammonia in Alveolar Air.
John A. Jacquez, J. William Poppell and Rudolph Jeltsch, *Science* **129**, No. 3344, 269–270, 30 January, 1959.

15. Fluid Dynamics

15 : 51

139. Polyhedral Satellite for more accurate Measurement of Orbit Data of Earth Satellites.
Donald R. Herriott, *Opt. Soc. Amer.* **48**, No. 9, 667–668, Sept. 1958.

15 : 58

140. Stabilized Pinch and Controlled Fusion Power.
S. A. Colgate and H. P. Furth, *Science* **128**, No. 3320, 337–343, 15 August, 1958.

15

141. Flow through Capillary Tubing with Eccentric Annular Sections.
C. H. Bachman and H. G. Hottentrot, *Rev. Sci. Instrum.* **30**, No. 2.

16. Gases and Solids

16

142. The Influence of the Gas Atmosphere on the Pulverisation Process in Vibratory and Rotary Mills.
Among other things the influence absorbed layers and the effect of residual atmospheres on pulverization in a high vacuum are investigated. The milling processes are partly carried out at a pressure of 10^{-5} Torr. It is shown that the surface conditions affect the processes of fracture during milling as well as the formation of agglomerates.

W. Batel, *Chemie-Ingenieur-Technik* **30**, 651–660, 1958.

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143. First Adsorbed Layer of He at 4.2°K.
J. P. Hobson, *Canad. J. Phys.* **37**, 300, March, 1959.

17. Thermodynamics

17

144. Simple Continuous He^3 Refrigeration System.
United States. A simple continuous He^3 refrigerator which uses a minimal amount of gas (80 cc S.T.P.) has been built. Temperatures below 0.5°K may be attained for as long as He^4 remains in the cryostat. Commercial components are used throughout. (Author)

H. A. Reich and R. L. Garwin, *Rev. Sci. Instrum.* **30**, 7, Jan. 1959.

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145. Extremely Low Temperatures.
This review article covers methods of attaining cryogenic temperatures, applications of low temperatures and the types of equipments used. Included are the physical properties of various liquid gases and of metals at room and liquid nitrogen temperatures, the thermal conductivities of fine powders as a function of pressure and the absorbing capacities of molecular sieves as functions of temperature and pressure. A. G.

O. Arnold Hansen, *Chem. Eng.* **66**, 123–138, Feb. 1959.

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146. Cryostat for Electron Bombardment and Electron Diffraction Work.
United States. A cryostat was constructed for the production