

(EXPERIMENT NO. 4)

CALIBRATION OF A PRESSURE GAGE USING DEAD-WEIGHT TESTER

1. Theory

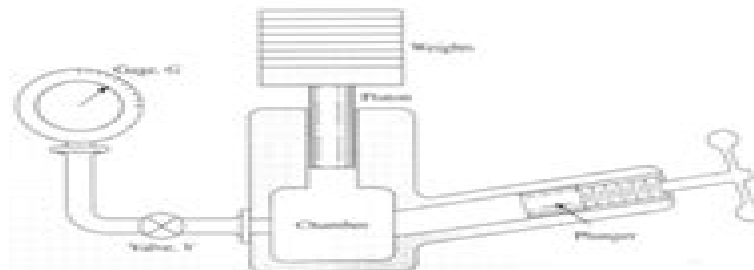


Figure 1. Deadweight Tester for Bourdon-tube pressure gage

A dead-weight tester is a device used for balancing a fluid pressure with a known weight. Typically, it is used for static calibration of pressure gages.

As seen in Figure 1, the apparatus is set up for calibration of the pressure gage G. The chamber and cylinder of the tester are filled with clean oil by first moving the plunger to its most forward position and then slowly withdrawing it while the oil is poured in through the opening for the piston. The gage to be tested is installed and piston pressure is now transmitted to the gage when the valve is opened. This pressure may be varied by adding weights to the piston or by using different piston-cylinder combinations of varying areas. The viscous friction between the piston and the cylinder in the axial direction may be substantially reduced by rotating the piston-weight assembly while the measurement is taken. As the pressure is increased, it may be necessary to advance the plunger to account for the compression of the oil and any entrapped gasses in the apertures.

The accuracies of dead-weight tester are limited due to: (1) the friction between the cylinder and the piston, (2) the uncertainty in the area of piston, (3) the buoyancy error and (4) gravity error.

The gravity error due to elevation, z [m], and latitude, ϕ [°] can be corrected by the dimensionless correction factor as:

$$e_{gravity} = -(2.637 \cdot 10^{-3} \cos(2\phi) + 2.9 \cdot 10^{-5} z + 5 \cdot 10^{-2}) \quad (1)$$

Metrology Lab Manual For Pressure Gauge

Wenbin Ji



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Laboratory Manual for Exercise Physiology, Exercise Testing, and Physical Fitness Terry J. Housh, Joel T. Cramer, Joseph P. Weir, Travis W. Beck, Glen O. Johnson, 2017-06-30 *Laboratory Manual for Exercise Physiology Exercise Testing and Physical Fitness* is a comprehensive text that will provide students with meaningful lab experiences whether they have access to sophisticated laboratories and expensive equipment or they are looking for procedures that can be done without costly materials. It will be a useful resource as they prepare for a career as an exercise science professional, athletic trainer, coach, or physical educator. The more than 40 labs cover seven major components of physical fitness. They are practical and easy to follow, consisting of a clear logical format that includes background information, step by step procedures, explanatory photographs, sample calculations, norms and classification tables, and worksheets. Lab ending activities and questions provide additional opportunities to practice the procedures and explore issues of validity, reliability, and accuracy. Readers will find this manual a valuable tool in learning to apply physiological concepts and to perform exercise tests as well as an essential resource for any career involving physical fitness and performance testing. Experiments in Hydraulics and Hydraulic

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Laboratory Manual for Anatomy and Physiology Connie Allen, Valerie Harper, 2011-01-05. The *Laboratory Manual for Anatomy and Physiology* by Allen and Harper presents material in a clear and concise way. It is very interactive and contains activities and experiments that enhance readers' ability to both visualize anatomical structures and understand physiological topics. Lab exercises are designed to require readers to first apply information they learned and then to critically evaluate it. All lab exercises promote group learning and the variety offers learning experiences for all types of learners: visual, kinesthetic, and auditory. Additionally, the design of the lab exercises makes them easily adaptable for distance learning courses.

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Equipment and Components in the Oil and Gas Industry Volume 2 Karan Sotoodeh,2024-05-03 Equipment and Components in the Oil and Gas Industry Volume 2 Components provides an overview of the components used in the oil and gas industry including instrumentation pipe components and safety components Using practical industry examples and an accessible approach the book is a key reference point for those seeking to learn more about the industry Covering both larger and smaller components used throughout the oil and gas industry the book details the theory behind pressure gauges temperature gauges flow gauges and level gauges It then goes on to discuss piping components such as pipes flanges and gaskets and introduces piping special components Valves are particularly crucial to the oil and gas industry including on off valves control valves safety valves and special valves The book also details actuators sprinklers fire and gas detectors hoses and hose reels along with electrical components such as switches cables wires and cable glands Finally the book ends with a discussion of heating ventilation and air conditioning HVAC components This book will be of interest to mechanical and chemical engineers working in the oil and gas industry **Validating Medical Packaging** Ronald Pilchik,2002-09-27 According to the FDA Quality System Regulations manufacturers must ensure that device packaging and shipping containers are designed and constructed to protect the device from alteration or damage during the customary conditions of processing storage handling and distribution As specific as this statement is the FDA does not provide instruc **Scientific and**

Technical Aerospace Reports ,1990 [NASA Tech Briefs](#) ,1996 **Collected Papers of Carl Wieman** C. E.

Wieman,2008 Carl Wieman s contributions have had a major impact on defining the field of atomic physics as it exists today His ground breaking research has included precision laser spectroscopy using lasers and atoms to provide important table top tests of theories of elementary particle physics the development of techniques to cool and trap atoms using laser light particularly in inventing much simpler less expensive ways to do this the understanding of how atoms interact with one another and light at ultracold temperatures and the creation of the first BoseOCoeinstein condensation in a dilute gas and the study of the properties of this condensate In recent years he has also turned his attention to physics education and new methods and research in that area This indispensable volume presents his collected papers with annotations from the author tracing his fascinating research path and providing valuable insight about the significance of the works Sample Chapter s Introduction 197 KB Contents Precision Measurement and Parity Nonconservation Laser Cooling and Trapping BoseOCoeinstein Condensation Science Education Development of Research Technology Readership Graduates postgraduates and researchers in atomic physics laser physics and general physics

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