



BME 332
Biomaterials and Biomechanics Lab

Lab 3
Hydrostatic Bench-II

Doç. Dr. Pınar Yılgör Huri
phuri@ankara.edu.tr

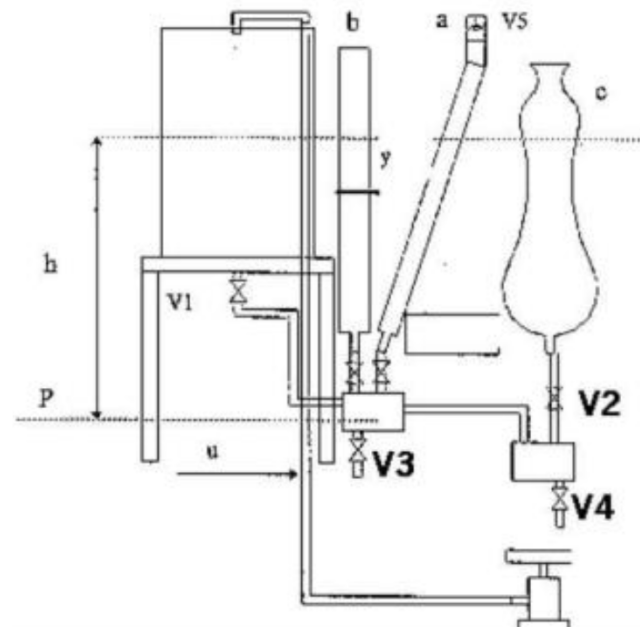
Ankara University
Department of Biomedical Engineering

Purpose

- The Hydrostatic Bench enables the study of the main properties and the behavior of such liquids under hydrostatic conditions, with the aid of some accessories to make the different experiments.

Experiment -2.1

- **Free surface of a static liquid**
- **Aim of this Experiment**
- To demonstrate that the surface of a static liquid is horizontal
- **Necessary devices**
- We have to use tanks "1" and "2" and tubes "a", "b" and "c".



Procedure

1. Make sure that V1 communicates the receiver with the tubes.
2. Make sure that valves V3 and V4 are closed and open valves V1, V2 and V5.
3. Using the hand operated pump B, pump water from tank 1 to tank 2 until the level coincides with the first horizontal line in the wall.
4. Repeat for the second, third, and fourth horizontal lines, check that the water level is always horizontal, regardless of the size and the form of the tube.

Procedure

5. Empty tank 2 by opening valve V1. Change the position of valve V5 in the upper part of tube "b" (tube "b" shall not have a free surface).
6. Using the hand operating pump A, fill tank 2 up to the level of the second, third and fourth line.
7. Observe that the level in tube "b" remains constant, while the level of the tank is followed in tubes "a" and "c".

Equipment Description

- Bourdon manometers calibration (13)
- ☐ Mercury manometers (9)
- ☐ Accessory to determine the metacentric height (FME11)
- ☐ Accessory for studying Archimedes' principle
- ☐ Accessory for studying the hydrostatic pressure (FME08) (14)
- ☐ Fluid level gauge calibrator (16)
- ☐ Set of weights (5, 10, 20, 50, 100, 400, 1000, 2000, 5000 gr.)
- ☐ Air pump
- ☐ 2 water pumps (11 and 12)

Appendix – I Useful Data

Table 1. Table of the atmospheric pressure in function of the height

HEIGHT (m)	LEVEL OF THE VARIABLE	HEIGHT (m)	LEVEL OF THE VARIABLE	HEIGHT (m)	LEVEL OF THE VARIABLE
0	760	680	700.8	1360	645.2
20	758.2	700	698.9	1380	643.6
40	756.4	720	697.3	1400	642
60	754.6	740	695.5	1420	640.4
80	752.9	760	693.9	1440	638.8
100	751	780	692.4	1460	637.2
120	749.2	800	690.7	1480	635.6
140	747.4	820	689	1500	634
160	745.7	840	687.2	1520	632.5
180	744	860	685.5	1540	630.9
200	742.1	880	683.9	1560	629.4
220	740.2	900	682.4	1580	627.9
240	738.4	920	680.7	1600	626.4
260	736.8	940	679	1620	624.9
280	735	960	677.2	1640	623.3
300	733.4	980	675.6	1660	621.8
320	731.8	1000	674	1680	620.3
340	730	1020	672.4	1700	618.8
360	728.3	1040	670.8	1720	617.3
380	726.5	1060	669.1	1740	615.7
400	724.7	1080	667.5	1760	614.2
420	723	1100	666	1780	612.7
440	721.3	1120	664.3	1800	611.2
460	719.5	1140	662.6	1820	609.7
480	717.7	1160	661	1840	608.2
500	716	1180	659.3	1860	606.6
520	714.2	1200	657.9	1880	605.2
540	712.5	1220	656.4	1900	603.6
560	710.9	1240	654.8	1920	602.1
580	709.3	1260	653.2	1940	600.6
600	707.5	1280	651.6	1960	599
620	705.8	1300	650	1980	597.5
640	704.1	1320	648.3	2000	596
660	702.5	1340	646.7		