

# Characteristics of a Second-Order Pressure Measurement System

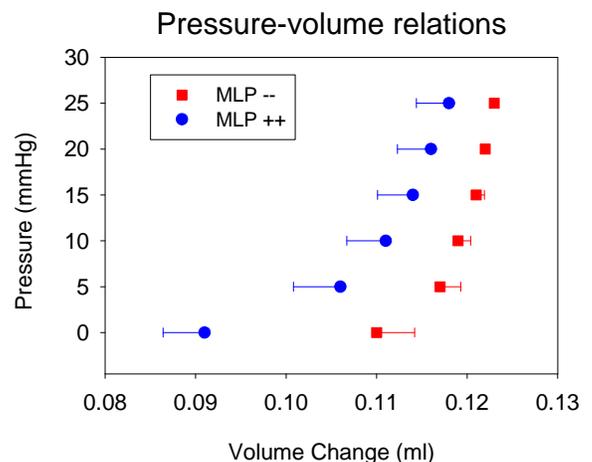
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**Group: Friday AM, Station #3**

**Introduction:** The introduction should start with a general statement about the importance of the study, for example "Accurate measurements of systemic pressure in patients is important because....". This should be followed by the objective of the study or the hypothesis under investigation, in one sentence. There should also be a **short** review of relevant background information (i.e., what is already known about the field, general background on the topic, etc). Finally, a summary of how the results of the experiments help answer the hypothesis or complete the objective should be included, for example: "In order to determine the force-length relationship in isolated muscle, tests were performed by varying the....". Make sure all text is no smaller than **12 pt**, single spaced. For these reports, the introduction should be no longer than one paragraph, at most 1/3 of a page.

**Materials & Methods:** A brief summary of the experimental techniques and protocols should be included so that the reader has some idea of how the experiment was performed. In a full-length publication, enough detail should be included so that the reader could duplicate the experiment. However, in an abstract, there is not room for such a level of detail. Information that is important would be number of repetitions, ranges of test cases, environmental variables, data manipulation information. The lab handout may be referenced, but not without further explanation. For example, "As described in detail in the lab manual [1], data were collected at 10 uniform increments (0.1 mm) starting at a length of 1 mm." is acceptable. Since this describes work that is completed, it should be worded in the past tense. Details on the materials and methods can be found in the referenced lab manual, hence this section should not be very long, again one paragraph of 10-12 lines.

**Results:** Include a summary of the data that you obtained. This should include descriptive prose (paragraphs, also in the past tense) that contain or describe the data in graphs or tables. The data that you present should be appropriately reduced from the attached raw data. Remember that every data reading has units associated with it; be sure to include the correct units on all data and plots. Data may be presented tabular form, but figures are usually more informative. Color can be very useful on plots, however, don't include figures just because they look nice! They should demonstrate some relationship or trend. Each Figure should have a short interpretation with it. For example "The pressure-volume relations shown in Figure 1 demonstrate the effect of MLP is seen mostly at the lower pressures, indicating a change in chamber size and compliance at low loads". This is much more useful than, for example, "The pressure-volume relations are shown in Figure 1 " without the second sentence.



This Figure and caption were inserted in Microsoft Word with "Insert/text box". The figure was pasted inside the text box, and this text typed and formatted. This way the figure and this caption can be moved around more easily. Right click on the text box to change text "wrapping", border, etc.

Also notice that the axis labels (text and numbers) are large enough to be legible. Tables can be included for data not suitable for plots. For example, the table below gives the experimental calculations for 3 catheters:

	Resonant Frequency	-3dB Bandwidth	Damped Natural Frequency	Damping Ratio
Catheter #1	55 Hz	60 Hz	34 Hz	.096
Catheter #2	45 Hz	180 Hz	45 Hz	.127
Catheter #3	90 Hz	120 Hz	110 Hz	.109

and should include some sentence of explanation, either as a caption or in the text.

**Discussion and Conclusions:** The discussion section is probably the most important section of your report, and also the hardest to write! Notice that the discussion is worth a large percentage of the score, so spend some time on it. It should be at least 1/2 of a page in length. Include discussion of the data and its relevance to the objective of the lab. Typically the results section contains just that, the results (with some brief interpretation). The discussion is used to interpret the results and present the conclusions as related to the original hypothesis or objective. What do your findings show and how do they relate to the function of the body? If one set of measurements is bigger, stronger, or faster than another, why are they, and what are the implications? Do your findings support or refute other investigators work, and can they explain differences in other experiments? What are limitations of the experiment and how could it be improved?

*References* - Include and cite in the appropriate place in the report any references used in writing the report or which relate to your research findings. For example, "The Frank-Starling mechanism was important in this experiment [2]". You should also reference raw data of other groups if you do not get data for some section of the lab and used theirs instead with prior approval of the instructor or TA.

*Note about borders:* The line borders such as those shown here are easily applied in Microsoft Word with the Format:Borders and Shading tool, using page border. The border is a required part of the write up (get used to it, many scientific submissions require specific items such as this!).

## References

- [1] BE172 Laboratory Manual, 2004.
- [2] Lecture notes from Dr. Lieber, 4/8/02.
- [3] Group data from station #7 on 4/2/02, approved by TA J. Smith
- [4] Webster JG, *Medical Instrumentation: Application and Design*, 1998 John Wiley & Sons: N.Y.
- [5] Grupp, I.L. et al., *Am J Phys*, 265:H1401-10, 1993.