

NE-104A: Nuclear Engineering Laboratory

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The Data Log*

The maintenance of accurate and detailed records of procedure and measurement of results is essential to any scientific or engineering laboratory work. Records from which you can prepare a detailed report the next day or the next week are only barely adequate. Truly adequate records should permit a reconstruction of procedure and results a year or more later, and very good records should be adequate for someone other than the usual experimenter to make such a reconstruction. The following procedures are basic to proper record keeping and are to be followed in the maintenance of your data log.

I. Characteristics of the Log Book

- A. Pages should be sewn or well stapled, not glued or spiral wired. They must remain in place almost indefinitely under conditions of constant use.
- B. Pages should be numbered so that they can be referenced easily.
- C. Square (or quadrille) ruling is better than lines, because it makes it facilitates the drawing of sketches, tables, and graphs. The most useful grid spacing is between 1/8 and 1/4 inch.

II. Maintenance of the Log

- A. Table of Contents. The log should begin with a Table of Contents. Leave about 5 pages at the beginning blank for the table. Then periodically update it to help you locate a particular piece of recorded information—the start of an experiment or a laboratory session.
- B. Entries. Entries should be made in time sequence and started with the time and date of entry (e.g., 13:00 9/12/2000). All entries should be made in ink, and comments should be initialed by the person making the entry.
- C. Errors. Everyone makes errors, and such errors are not always discovered immediately. The error can be in a word, a line, or in an entire table of data. When such errors are discovered and confirmed, they should be lined out neatly. Nontrivial deletions should be explained in a short, dated note in the page margin.

- D. Gaps (pages or large parts of pages left blank) should not occur. They present a temptation to backfill at some later, thereby putting entries out of time sequence. Even if several experiments are going on simultaneously, the time sequence rule should be followed.

There is one exception to this rule. Space may be left for an externally produced piece of data, such as a computer printout or photograph, that was produced in the appropriate time sequence but is not yet ready for entry.

- E. What to record. All thoughts, observations, and measurements that might be useful to have later. No one has ever been found guilty of putting too much information in his or her log.

When starting an experiment, begin with a block sketch of the apparatus, identifying all significant equipment items. If there is a good sketch on the handout, it is acceptable procedure to tape or glue a xerox copy in your log, labeling each item appropriately and indicating any modifications in the actual setup.

Although the log book is a running collection of all experimental results, not a highly organized report, some thought should be given to recording data in an organized way. This is especially true for a series of related measurements in which experimental parameters (e.g., input voltage) are varied and some output variable is recorded for each set of input values. A table is usually the preferred way to record such data, rather than listing each parameter value and the output variable in text stream.

When recording a series of measurements, it is often a good procedure to plot a graph in the log book, adding points as they are being recorded in the table. Such a preliminary graph will show you much more readily than the raw number whether the data look OK, or if there is a problem.

* S. Kaplan (August 1987), revised by C. M. Lederer (February 2005)