



Technical Bulletin

North Carolina State Laboratory of Public Health | Laboratory Improvement Unit

Maintenance Basics for Laboratory Equipment and Instruments

Clinical laboratories require several common pieces of equipment to perform testing properly. Local health department laboratories also commonly have “simple” analyzers in use to perform testing such as hemoglobin, glucose, and urinalysis. These pieces of equipment and analyzers are the “work horses” of a laboratory and will last for many years if properly maintained.

The most important components of basic laboratory equipment and instrument maintenance are:

1. Following the manufacturer’s recommendations,
2. Proper training of all users, and
3. Documentation of the above.

Equipment

Standard laboratory equipment usually includes at least one of each of the following items:

- Refrigerator.
- Freezer.
- Centrifuge.
- Incubator.
- Microscope.

Maintenance requirements should be explored when considering the purchase of one of these items. The extent of the maintenance should be compatible with the staff’s ability and time. If a maintenance agreement is available at an additional cost, a cost/benefit analysis should be done to determine if it is worthwhile. After the equipment is purchased, the manufacturer’s Operator Manual should be reviewed and any maintenance requirements should be noted and incorporated into a maintenance policy.

A form should be created to document any maintenance and repairs done to the equipment and kept for at least 2 years after the equipment is taken out of service.

Basic maintenance on the equipment listed above usually consists of:

1. Initial set up according to the manufacturer. Make sure the electrical supply is suitable. A commercial grade refrigerator/ freezer may require a special electrical outlet with voltage different than a standard outlet. Make sure the equipment is stable and level. When applicable, verify temperature settings. The desired temperature should be set and then monitored for several days to allow and assure stabilization of the specified temperature.
2. Cleaning the equipment periodically. Check the manufacturer’s product information for recommendations on a schedule for cleaning the equipment. If there is no recommendation, the laboratory should establish a frequency that corresponds with the use of the equipment. Generally, the external surfaces of equipment should be cleaned daily. Spills in or on the equipment should be cleaned immediately.
3. Periodic specific maintenance. For example, for optimum performance, a microscope may need the optical components checked and cleaned by a professional once each year. The manufacturer’s product information should be consulted for the schedule for this type of maintenance.

Instruments

Many local health department laboratories use waived instruments to perform hemoglobin, glucose, and urinalysis testing. Maintenance for waived instruments is similar to maintenance for equipment in that there are usually initial setup and routine cleaning protocols. Instrument setup may include choosing reporting parameters, printing options, and assigning operator privileges. Routine cleaning is usually a daily task, but an additional weekly task may be required to provide more thorough cleaning or disinfection. Again, the Operator Manual should be consulted. Specific specialized maintenance is rarely needed due to the simplistic nature of the instrumentation.

Maintenance of non-waived instruments is addressed in CLIA regulations. The regulations require that maintenance be performed at least as often as the manufacturer recommends and that it be documented. Principles of good laboratory practice may lead laboratory personnel to do more frequent maintenance to assure proper performance of waived and non-waived instruments.

Most laboratory instruments have environmental requirements for storage and operations. The temperature and humidity requirements will be found in the Operator Manual for each instrument. The temperature and humidity need to be recorded each day of instrument use. If the readings exceed the acceptable range, the instrument cannot be used. The unacceptable reading should be recorded as well as the acceptable reading after corrective action has occurred.

Example of Equipment/Instrument History Form

Equipment/Instrument	Manufacturer
Date of purchase	
Warranty expiration date	
Service contract?	
Set-up date	
Storage temp./humidity	
Operation temp./humidity	
Routine maintenance schedule	
<ul style="list-style-type: none">List by frequency	
Service/repair record	
<ul style="list-style-type: none">List dates and type of repair	

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References

42 CFR 493, CLIA regulations
<http://www.cdc.gov/clia/regs/toc.aspx>
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Maintenance Manual for Laboratory Equipment, 2nd Ed.
2008. World Health Organization Press.
http://whqlibdoc.who.int/publications/2008/9789241596350_eng_low.pdf Accessed March 28, 2011.