

A Guide to Choosing and Buying Laboratory Equipment

Submitted by [Warren Johns](#) on March 19, 2003 - 1:00am.

Before purchasing a piece of laboratory equipment a number of selection criteria should be considered which means asking yourself and your colleagues some questions.

Durability and Robustness

- Will the equipment stand up to the local conditions, e.g. high or low temperatures, humidity, drought, or dust?
- Will the equipment be moved frequently?

Safety

- What risks or dangers are associated with this piece of equipment?

Price

Consider both the initial and operating costs of the equipment as well as costs of necessary accessories and maintenance. Shipping and insurance will add expense to overseas orders. Price and quality - assess for both not just price. Do not buy the cheapest just because it is the cheapest.

- Have you set aside enough money for consumables, for one year (or for two years)?
- What is likely to be the cost of maintenance? (allow 10% of the capital value).
- If a service contract is available, what is the cost?
- Set aside 15 - 20% of the cost price for essential spare parts.

Power and Resources

In developing countries local electricity supplies may not be constant and reliable.

- Power fluctuations. If voltage fluctuations in the mains electricity (spikes, surges, sags) are likely to interfere with the performance of the instrument, e.g. colorimeter then buy a voltage stabilizer (surge suppressor plus filter).
- Blackouts. In the event of power cuts protection can be provided by a control system which automatically switches to battery supply. This is known as an uninterruptible power supply unit (UPS).
- If the equipment is battery powered what type of battery is needed? a/. Primary cells or use once dry cell battery. Alkaline batteries have a long life. b/. Rechargeable dry cell batteries. Nickel-cadmium batteries (NI-Cd) are the most common. Disadvantages include: lose their charge more quickly than other types of battery during storage; initially expensive; rated voltage lower than primary cells.

- When local power supplies are unreliable the microscope, the most important piece of equipment used in the laboratory must be able to operate from a battery. A connection for a 12v battery should be built into the base. The connections for the mains and battery should not be interchangeable. The light source should be built in.
- Is it possible to provide a reliable power supply through batteries charged by solar energy¹ or by intermittent recharging by a generator?

Spare Parts

- Ask the supplier to obtain from the manufacturer a list of essential spare parts and a guide to the expected life (in years) of the parts. The local supplier must have a demonstrable capacity to service and maintain the equipment.
- It is advisable not to rely on local supply only, but also to keep in store parts which are important, but hard to get.

Environmental Conditions

- Have the electronics been protected against high humidity?

Specifications

Specifications are details of design and materials used in an item of equipment. There are your specifications for an item of equipment required - and the manufacturers specifications for each model.

- An Equipment Data Specification Sheet, or equivalent should be prepared by the laboratory and submitted at the time of ordering and when requesting a quotation for a major item of equipment. Begin making your specifications by examining in detail the local needs, conditions and resources, as well as the environmental and user requirements.
- These manufacturers specifications should be matched against your own specifications, requirements and circumstances. A change in environmental and user requirements will necessitate preparing new specifications.

Remember: *The bitterness of poor quality remains long after the sweetness of a low price is forgotten.*

This selection process is also presented as a [flowchart](#)

Further resources: Books and useful web sites

1. Selection of Basic Laboratory Equipment for Laboratories with Limited Resources, W.L. Johns and M.M. El-Nageh, WHO Regional Publications, Eastern Mediterranean Series, No. 17, 2000, 259 pages. Includes a 62-page buyer's guide to the selection of sixteen major equipment items; batteries and solar energy systems. Order online from <http://bookorders.who.int> or email bookorders@who.int. Reviews of this book may be found at: <http://www.phclab.com/Equipment/BookReview.htm> and at <http://www.emro.who.int/Publications/RegionalPublications/Series17/Index.htm>

2. District Laboratory Practice in Tropical Countries, Part 1, by Monica Cheesbrough. Cambridge: Cambridge University Press, 1998. Tropical Health Technology at: www.tht.ndirect.co.uk Book and learning bench aid orders, e-mail: thtbooks@tht.ndirect.co.uk
3. Medical supplies and equipment for primary health care by Manjit Kaur and Sarah Hall. ECHO International Health Services Limited, 2001. www.echohealth.org.uk (text available online)
4. Useful web site: The Public Health Care Laboratory. <http://www.phclab.com/Equipment/EquipmentHome.htm>
5. Health Laboratory Facilities in Emergency and Disaster Situations, edited by M. El-Nageh and C. Heuck, WHO Regional Publications, Eastern Mediterranean Series, No. 6 1994, 169 pages. This book includes laboratory kits and 22 modules.
6. Manual of Basic Techniques for a Health Laboratory, WHO, Second Edition (expected end of March) 2003, 410 pages.

Warren L. Johns is co-author of "Selection of Basic Laboratory Equipment for Laboratories with Limited Resources," WHO Regional Publications, Eastern Mediterranean Series, No. 17, 2000, 259 pages. Includes a 62-page buyer's guide to the selection of sixteen major equipment items; batteries and solar energy systems. e-mail: bookorders@who.int