

Lab Module Design Considerations

Introduction

The width of the laboratory module is a fundamentally important decision that has operational and planning implications for the life of the building. The module has far-reaching impact because it not only dictates the location of casework and other items that can be expected to change over time, but also fixed building elements, such as structure and utility risers and distribution.

When determining a module dimension, a number of issues have to be considered. Due to the high cost of construction or operation, there are pressures to maximize the utilization of a lab building by using the narrowest possible module. This approach has to be weighed against a wider module which may be more flexible and suitable for a wider range of uses.

The prevailing wisdom is that 11'-0" is the ideal module width for most biomedical research labs. Assuming a nominal 6" wide laboratory wall, this will yield a 5'-6" center aisle with 30" deep lab benches on both sides, and a 5' aisle with equipment up to 36" deep on one side (see figure 1). A 5' aisle width is ideal for a number of reasons:

- 5' is the minimum ADA turning radius.
- 5' is wide enough to allow people to work back-to-back without conflict.
- 5' is the minimum clearance from a biological safety cabinet to an opposing bench.¹
- 5' is narrow enough to discourage equipment in the aisle.

Although an 11' module may be suitable for most applications, there are instances where a wider module should be considered:

Deeper Equipment

In some instances, laboratory equipment deeper than 36" may be used. In this case, a wider module may be required to maintain a 5' aisle. Deep equipment can include:

- Equipment Containment Enclosures – 48" depth or more
- High Efficiency Fume Hoods – 40" depth or more
- Freezers – 40" depth or more
- Centrifuges

Specialized Equipment

Specialized equipment often does not conform to the typical laboratory model. Equipment is often large, and may require 360 degree access. Often a single 11' wide module is too narrow for a set-up and a double 22' wide module is oversized. Specialized equipment can include:

- Optical equipment, including optical tables.

- Imaging equipment, including microscopes and vibration tables
- Electronics
- Robotics

Specialty Labs

One strategy is to relocate deep and specialized equipment from standard labs and into specialty labs. In addition to the size issue, separate specialty labs may be advantageous due to noise and heat production, vibration or RF sensitivity, security or other issues often associated with large equipment.

Specialty labs can be designed with a wider module (often 12' to 15'), or can be located within an area that is designed for non-standard arrangements (see figure 2). A large, column-free space with utilities at regular intervals in the ceiling and at the perimeter will provide flexibility and allow an area to be uniquely configured to meet the needs of specialized equipment.

Distribution of Specialty Labs

A new building or major renovation can be designed to accommodate non-standard specialty labs. Specialty labs can be located in groups on the lab floor. This may be beneficial if they function in support of the labs and proximity if needed. Alternately, they may be located on the lowest level of the building, which may be beneficial if the equipment is heavy or vibration sensitive.

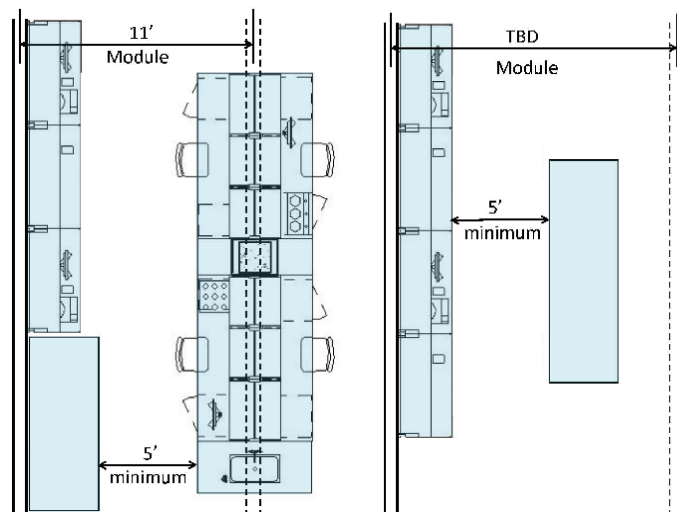


Figure 1: Standard 11' Lab Module

Figure 2: Specialty Lab Module

¹ Biosafety Cabinet Placement Requirements for new Buildings and Renovations, Design Requirements Manual, National Institutes of Health