

Printing Hardware for Labeling of Biological Specimens

Several basic questions must be addressed before planning any labeling project to ensure the proper printing equipment is chosen. For instance, should printing be outsourced? What are the associated costs, and what types of quality control should be in place to ensure only high quality labels are generated?

For applications where in-house printing makes sense, there are several common bar code print technologies for variable, operator-entered data including:

- **Dot Matrix:** Creates images by producing overlapping dots with multiple passes over a ribbon. Dot matrix printers are inexpensive, but are often inflexible and produce limited quality print.
- **Ink Jet:** Projects tiny droplets of ink onto a substrate to create an image with overlapping dots. Used for in-line direct marking on products or containers, ink jet print often leads to poor contrast and durability.
- **Laser (Xerographic):** Creates an image on an electrostatically charged, photoconductive drum using a controlled laser beam. Produces excellent print quality but poor print permanence.
- **Direct Thermal:** Heating elements are selectively activated to form an image made of overlapping dots on a heat-sensitive substrate. Direct thermal printing does not require a ribbon but can increase wear on the print head, leading to frequent replacements.
- **Thermal Transfer:** Transfers the image to the substrate using an intervening ribbon technique to produce the most stable image for a range of environments and applications, with a crisp 200-600 dpi resolution. Thermal transfer is the recommended method of printing for biological specimen labels.

Labeling and Waste Reduction

Ever-present and often overlooked, waste accumulates through data obsolescence, label degradation, application problems and other factors. It is estimated that waste adds a staggering 10% to the overall cost of label creation. To decrease waste and lower costs, dedicated printers should be used for each type of label design and stock. Suggested printers for on-site container labeling are described below, based on print volume and other requirements.

Brady BMP® 21-LAB Printer

Low Volume Requirements, Highly Mobile Solution

- Lightweight and rugged, with a single-handed design for use in the field or in the lab
- 1.6 lbs total weight including 6 AA batteries and label cartridge
- Includes lab templates for vials, tubes, slides, general ID and more
- Compatible with a range of lab-specific temperatures and environments
- Stand-alone operation with 203 dpi print resolution
- Features continuous label supply in ¼" – ¾" widths

Brady BMP® 51 Label Printer

Low-to-Medium Volume Requirements, Mobile Solution

- Lightweight, compact design for dual-handed use
- 2.8 lbs total weight includes 6 AA batteries and label cartridge
- Includes lab templates for vials, tubes, slides, general ID and more
- Compatible with a range of lab-specific temperatures and environments
- Stand-alone and PC-connect operation with 300 dpi print resolution
- Features continuous label supply in 3/8" – 1½" widths

Brady BBP® 33 Label Printer

Medium-to-Higher Volume Requirements, Desktop Solution

- Small footprint, benchtop printer designed for ease of use
- Designed for 15-second material changeovers to eliminate waste
- Compatible with a range of materials for facility and safety ID
- Suitable for a range of lab-specific temperatures and environments
- PC-connect operation with 300 dpi print resolution
- Features continuous label supply in ½" – 4" widths plus pre-cut label parts

Brady IP® Label Printer

High-Volume Requirements, Desktop Solution

- High volume benchtop design for high-speed printing
- RFID chop design offers ease of use and reduces waste
- Compatible with hundreds of parts and materials for labeling
- Suitable for a range of lab-specific temperatures and environments
- PC-connect operation with 300 or 600 dpi print resolution
- Pre-cut label parts available on bulk rolls for tubes, vials and slides

This information is based on an original publication by Brady.