GA INTERNATIONAL LABTAG

The Cryogenic Label Guide

www.Labtag.com

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Overview

About This Guide

This guide is for anyone working in a biobank or laboratory seeking a comprehensive and reliable way of identifying and tracking biological samples that are destined for long-term cryogenic storage in liquid nitrogen or ultra-low temperature freezers.

By the end, you will gain a deeper understanding of the many attributes of a cryogenic label, the thought process behind choosing a label, the selection of labels in our catalog, and how to integrate it all within your process.

Note that all the labels and tapes listed in this guide are rated to resist to liquid nitrogen (-196°C) unless specified otherwise (at -80°C).

Who We Are

For over two decades, LabTAG® has innovated and developed laboratory labels and labeling solutions that satisfy the stringent requirements of identification in harsh environments. Our success can be attributed to our vast catalog of application-specific cryo labels — a concept we are delighted to have pioneered. We're proud to have the largest catalog of cryogenic labels in the world.

Why Cryogenic Labels are Critical

Storage in liquid nitrogen and laboratory freezers poses a risk to accurate sample identification, as specimen labels can detach or become smudged and/or faded. It's important to choose labels that are made for a specific application in order to avoid label failure.

The Process of Choosing a Cryogenic Label

When choosing a label, you should invariably ask yourself the following questions, in this order:

1. **What type of container am I trying to label?**

   Tubes, vials, boxes, plates, racks, straws.

2. **What environmental conditions will the container be subject to?**

   Water, frost, chemicals, heat.

3. **Do I require any special features?**

   Color, transparency, permanent or removable adhesive, tamper-evidence.

4. **What printing method and format can I choose from?**

   Laser, inkjet, thermal-transfer, direct thermal, DYMO.

We have done our best to offer labeling options for all types of requirement combinations. If you find yourself in a special case where your requirements have no available options, you can always take advantage of our **custom manufacturing capabilities.**

LabTAG's Cryogenic Labels

LabTAG has an extensive catalog of cryogenic labels that each fulfill a different purpose. This table outlines our cryo label classes, and their main differentiating attributes which you should consider when assessing your needs. These classes are available in many sizes, colors, and configurations, which are identifiable by SKU#.

L: Laser **H:** Hand-Writable **TT:** Thermal-Transfer **DT:** Direct Thermal **DY:** DYMO Direct Thermal

Brand	Class	Printing Method	Format	Lower Temp.	Upper Temp.	Feature	Recommended Application Surface	Adhesive
Cryo-LazrTAG™	CL	L	Sheet	-196°C	+120°C	Standard	Vials, Tubes, Boxes	Permanent
	CLH	L	4" x 6" Sheet	-196°C	+120°C	Standard	PCR Tubes & Vials	Permanent
	RCL	L	Sheet	-196°C	+120°C	Standard	Vials, Tubes, Boxes	Removable
	DFSL	L	Sheet	-196°C	+150°C	Wrap, Autoclave	Vials & Tubes	Permanent
	DFLT	L	Sheet	-196°C	+150°C	Clear, Autoclave	Vials & Tubes	Permanent
	TRCL	L	Sheet	-196°C	+120°C	Clear	Flat Surfaces	Removable
Lab-Tag™	LT, JTA, JTRA, LTR	H	4" x 6" Sheet, Roll	-196°C	+110°C	Standard	Vials & Tubes	Permanent
NitroTAG®	JTTA	TT	Roll	-196°C	+110°C	Standard	Vials, Tubes, Boxes	Permanent
CryoSTUCK®	LCS	L	Sheet	-196°C	+100°C	Standard	Frozen Vials, Tubes & Boxes	Permanent
	FIX	TT	Roll	-196°C	+110°C	Wrap	Frozen Vials & Tubes	Permanent
	L2FS	TT	Roll	-196°C	+100°C	Wrap	Frozen Vials & Tubes	Permanent
	AEA	TT	Roll	-196°C	+100°C	Cover-Up, Wrap	Frozen Vials & Tubes	Permanent
	L2FC	TT	Roll	-196°C	+110°C	Cover-Up, Wrap	Frozen Vials & Tubes	Permanent
	AHA	TT	Roll	-196°C	+100°C	Clear, Wrap	Frozen Vials & Tubes	Permanent
MetaliTAG™	AWA	TT	Roll	-196°C	+100°C	Standard	Metal Racks & Canes	Permanent
	AWC	TT	Roll	-196°C	+100°C	Clear	Metal Racks	Permanent
Cryo-WrapTAG™	HBTT	TT	Roll	-196°C	+100°C	Wrap	Vials & Tubes	Permanent
	CATT	TT	Roll	-196°C	+150°C	Wrap, Autoclave	Vials & Tubes	Permanent
Cryo-StrawTAG™	CST	TT	Roll	-196°C	+80°C	Wrap	IVF straws	Permanent
Cryo C-KurTAG™	TELA	TT	Roll	-196°C	+110°C	Tamper-Evident	Vials, Boxes	Permanent
	CTDA	TT	Roll	-196°C	+100°C	Destructible	Vials, Boxes	Permanent
DTermo™	ED1F, EC1F, EF1F, EG1F	DY	Roll	-196°C	+70°C	Standard	Vials, Boxes	Permanent
	EDCC	DY	Roll	-196°C	+70°C	Chemical Resistant	Vials, Tubes, Boxes, Bottles	Permanent
Cryo-DirectTAG™	DFP, DFPC	DT	Roll	-196°C	+70°C	Standard	Vials, Tubes, Boxes	Permanent
Cryo-OmniTAG™	HBCL	TT	Roll	-196°C	+100°C	Clear	Vials & Tubes	Permanent
	GANA	TT	Roll	-196°C	+150°C	Clear, Autoclave	Vials & Tubes	Permanent

Containers

The first and most important factor to consider is the type of container you intend to label. Depending on the container's material, curvature, and its dimensions, you will require labels made of different materials, flexibility, adhesive, and size. At LabTAG, we have a variety of classes available in different sizes, designed to fit any cryo container.

	Vial/Tube	Max. Usable Label Area	Suggested Product (Roll)	Suggested Product (Sheet)
A	0.2 ml (PCR)	0.75" x 0.28" 19mm x 7mm	JTTA-213 0.75" x 0.2" 19.1mm x 5.1mm	CLH-2 0.79" x 0.2" 20mm x 5.1mm
B	0.5 ml (Eppendorf™)	0.87" x 0.59" 22mm x 15mm	JTTA-51 0.75" x 0.4" 19.1mm x 10.2mm	CL-12* 0.94" x 0.5" 23.9mm x 12.7mm
C	1.0 ml (Matrix™/Biotube™)	1.26" x 1" 32mm x 25mm	JTTA-29 1" x 1" 25.4mm x 25.4mm	N/A
D	1 ml (skirted)	1.14" x 0.75" 29mm x 19mm	JTTA-4 1" x 0.75" 25.4mm x 19.1mm	CL-32 0.94" x 0.78" 23.9mm x 19.8mm
E	1.5 ml (Eppendorf™)	1.14" x 0.71" 29mm x 18mm	JTTA-7 1" x 0.5" 25.4mm x 12.7mm	CL-12 0.94" x 0.5" 23.9mm x 12.7mm
F	1.8 – 2 ml (skirted)	1.26" x 1.1" 32mm x 28mm	JTTA-29 1" x 1" 25.4mm x 25.4mm	CL-71 1" x 1" 25.4mm x 25.4mm
G	5 ml (skirted)	3" x 1.38" 75mm x 35mm	JTTA-28 2" x 1" 50.8mm x 25.4mm	CL-33 1.97" x 0.97" 50mm x 24.6mm
H	15 ml (conical tube)	3.35" x 1.73" 85mm x 44mm	JTTA-5 2.5" x 1" 63.5mm x 25.4mm	CL-3 2.63" x 1" 66.8mm x 25.4mm
I	50 ml (conical tube)	3.39" x 3.23" 86mm x 82mm	JTTA-238 2.5" x 1.5" 63.5mm x 38.1mm	CL-29 2.83" x 1.57" 72mm x 39.9mm
J	13 x 75 mm (blood collection vial)	2" x 1.57" 50mm x 40mm	JTTA-28 2" x 1" 50.8mm x 25.4mm	CL-33 1.97" x 0.97" 50mm x 24.6mm
K	13 x 100 mm (blood collection vial)	2.95" x 1.57" 75mm x 40mm	JTTA-5 2.5" x 1" 63.5mm x 25.4mm	CL-3 2.63" x 1" 66.8mm x 25.4mm
L	16 x 100 mm (blood collection vial)	2.95" x 2" 75mm x 50mm	JTTA-5 2.5" x 1" 63.5mm x 25.4mm	CL-3 2.63" x 1" 66.8mm x 25.4mm
M	16 x 125 mm (blood collection vial)	4" x 2" 100mm x 50mm	JTTA-36 3" x 1" 76.2mm x 25.4mm	CL-3 2.63" x 1" 66.8mm x 25.4mm

*Slight overlap on 0.5ml tubes

Tubes & Vials

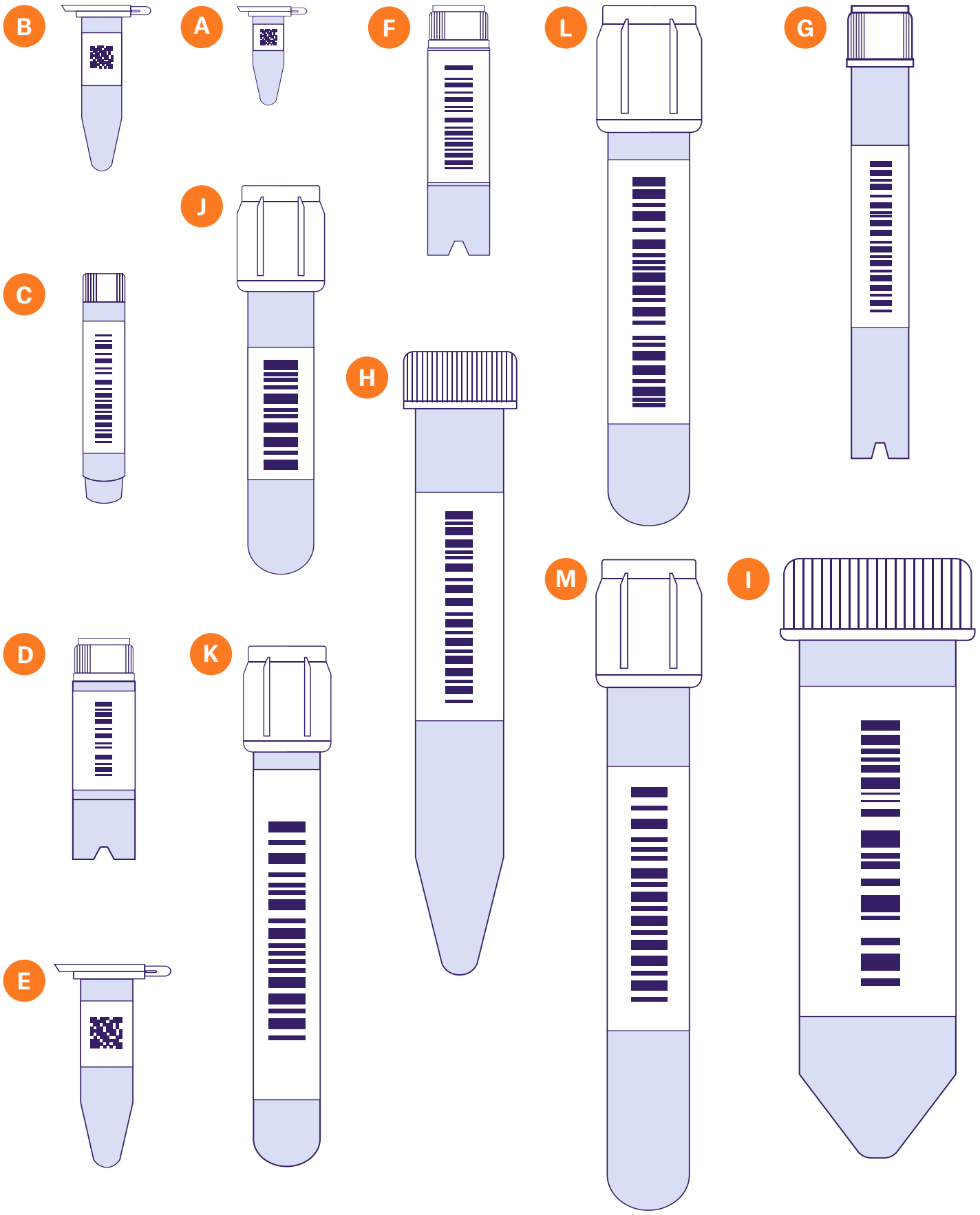
Plastic or glass tubes and vials may be identified using labels affixed to either the side or top of the container or both. As many cryogenically stored containers are used for cell culture, labels must also be resistant to spraying and wiping with alcohols. It is also important that the label fits securely on the container.

Our **NitroTAG®** and **Cryo-LazrTAG™** are the workhorses of our cryogenic labels. They fully withstand cryogenic conditions and come in a variety of different sizes to fit almost any tube, vial, and many other lab containers. Many other classes are available in tube and vial sizes, each with different properties such as removable adhesive, tamper-evidence and other special features.

- Maximum sizes are approximate and may vary depending on the exact brand of vial/tube that you are using.
- The maximum useable label area represents the height and circumference of the cylindrical portion of the indicated vial/tube.
- Many more sizes and types of labels are available per container.
- If you do not find the information you are searching for within this table, please feel free to contact us, and our support team will gladly assist you.

Tubes & Vials Illustrations

Scale: 100%



Storage Boxes & Plastic Plates

NitroTAG labels can also adhere to cardboard or plastic storage boxes and plastic plates that are stored cryogenically. However, **NitroTAG** are permanent labels, and in many cases, boxes and plates require re-labeling. We offer two classes of cryogenic labels, **RCL** and **TRCL**, that are made with a removal adhesive and can be used for boxes and plates. Note that these two classes are for laser printers only. If you require removable labels for plates that are thermal-transfer printable, we manufacture **AMA** and **RMTT** label classes; however, these labels are only applicable for plates and containers stored at -80°C.

Cryogenic tape is another common method of identifying storage boxes destined for liquid nitrogen and low-temperature freezers. Our patent-pending **CryoHUG™,** an adhesive-free tape, is the best solution for boxes, bottles, and even tubes and vials that require tape to seal them prior to storage. If you require tape with a permanent adhesive, **NitroTAPE™**, which uses the same adhesive and face stock as **NitroTAG**, is recommended.

Metal Racks & Canes

Metal surfaces require a special adhesive that allows the label to stick in cryogenic conditions. For this purpose, we offer **MetaliTAG™**, a brand of cryo labels specially designed for these containers. These labels share many of the same properties as other cryogenic labels but are tailored for metal surfaces, including aluminum cryo canes, stainless-steel canisters, and racks.

Cryo Straws

Cryo straws require specialized labels that are both cryogenic and low emitters of volatile organic compounds (VOCs), particularly for in vitro fertilization (IVF) clinics. **Cryo-StrawTAG™** is our brand of wrap-around labels, with a strong cryo-adhesive that easily conforms to the small diameter of standard and high-security cryo straws as well as other vitrification devices and remains permanently attached during snap-freezing and long-term cryogenic storage (-196°C/-321°F).

Environmental Conditions

The next step in the decision-making process is determining the environment in which the label must perform. Apart from cryogenic freezing, you may require a label that performs in different environmental conditions such as being able to adhere to wet or frozen surfaces, resist chemical exposure or high-heat sterilization.

Wet Surfaces

All our cryo labels are waterproof when applied to a dry surface. Applying cryo labels to already wet surfaces, however, is a different scenario. Wet surfaces, including containers removed from water baths and other solutions, require a special adhesive to properly label. Our **NitroTAG** labels are designed to withstand low temperatures and can be applied to wet surfaces as well, with zero cure time.

Frozen Surfaces

Frozen tubes and vials are much harder to label due to the low affinity of most adhesives for extremely cold surfaces. To meet this need, LabTAG manufactures **CryoSTUCK®** labels that can be applied directly to frozen tubes or vials at -80°C and placed back in liquid nitrogen immediately, maintaining the integrity of your samples.

High Temperatures

You may require labels that are both cryogenic and resist high-heat sterilization protocols, such as steam autoclaving, boiling water, and dry heat ovens. For this purpose, we offer **CATT, DFLT, DFSL,** and **GANA** label classes that withstand both conditions.

Chemical Exposure

NitroTAG labels are ideal when your cryogenically stored containers require only short-term exposure to alcohols. However, when exposure to harsh solvents for longer periods is necessary, we recommend **Cryo-WrapTAG™** and **DFSL** wrap-around labels that self-laminate when wrapped around and over the circumference of a tube, providing the printout with an extra layer of protection against harsh solvents as well as abrasion.

Special Features

Now that the two main criteria have been met, we can look at special features. Apart from container-appropriateness and environmental performance, you may also require specific material features related to convenience or preference such as transparency, opacity, adhesive, and tamper-evidence.

Adhesives

Labels come with either a removable or permanent adhesive. Though many containers require permanent identification, others, such as bottles and cardboard boxes, may require removable labels. Both will remain firmly attached during cryogenic storage. The permanent labels will be nearly impossible to remove afterwards while the removable labels can be lifted from the container without leaving a mark.

Blackout (Cover-Up)

Blackout labels have a unique opaque face stock and can be placed over an existing label to efficiently cover-up any pre-existing information. They are generally used to re-label or over-label containers and can also be employed to block-out sensitive information. Our **AEA** and **L2FC** label classes accomplish this.

Transparent

Our **AHA**, **HBCL**, **GANA**, and **DFLT** classes of transparent labels ensure the contents of labeled containers remain visible. They are ideal for identifying aliquot tubes and vials as well as containers where the volume needs to be readily evident.

Tamper-Evident

LabTAG's line of tamper-evident labels, **Cryo C-KurTAG™**, will tear if there is any attempt to remove them, clearly indicating that the contents of the container have been tampered with.

Destructible

Similar to tamper-evident labels, our **SDL** and **CTDA** destructible label classes will destruct if there is an attempt to tamper with them. However, unlike tamper-evident labels, destructible labels will tear into extremely small pieces, leaving no decipherable printout behind.

Piggyback

Our **PJTTA** class of labels has a unique label-on-label multi-layer design that provides a versatile organization tool. They are composed of one or more smaller labels nestled within a larger adhesive label, making them perfect for record keeping and tracking of cryogenically stored specimens.

Printing Methods

At this point, you have identified what containers you are labeling, which environments the labels will be subject to, and which special features you require. It is time to choose your printing method. Depending on the previously chosen factors, your options will be limited. Remember, you can't change your criteria, but you can always change your printer! If you do not wish to deal with label printing yourself, you can always take advantage of our custom label printing services.

Thermal-Transfer

Thermal-transfer is the gold standard of printing methods as it provides the most versatility and resistance. The technology works by heating a ribbon to transfer ink onto the label. The ribbons are made of resin, and provide the most resistance, of the five printing methods listed here, against harsh solvents (e.g. Xylene and DMSO), cold storage, extreme temperatures, high-pressure sterilization, smudging, and scratching.

> **"Thermal-transfer is the gold standard of printing methods as it provides the most versatility and resistance. "**

These printers use rolls of labels and print using a thermal ribbon in only one color (commonly black). Thermal-transfer printing also provides the most options for different label materials, so you're highly likely to find the product you need by sticking with thermal-transfer as your printing method.

Direct Thermal

Direct thermal printers use rolls of labels that are coated with a leuco dye, a chemical that changes color when heat from the print head is applied to it. Direct thermal labels **do not** use ribbons and the printout is only black, not colored. Although not the primary choice for cryogenic labels, direct thermal printing does not require a ribbon and provides a hassle-free option when a thermal-transfer printer is not available.

Direct thermal printing is not compatible with sterilization protocols, as the labels turn entirely black when heated, and they are prone to fading over time, especially with exposure to light and chemicals.

DYMO

DYMO is a brand of direct thermal printers that inherit the same properties of the previously mentioned direct thermal technology. DYMO label rolls have special markings that make them compatible with only DYMO printers. We provide labels that are compatible with DYMO's LabelWriter printer models, including our **EDCC** class that offers moderate chemical-resistance to incidental or occasional spraying and swabbing.

Laser

Laser desktop printers use toner cartridges to produce a smudgeproof, waterproof, UV-resistant, and cryogenic-resistant printout. You can print in color if your laser printer allows it. Labels printed with laser printers are not recommended for chemical exposure unless there is a protective layer on top of the printout, such as the one provided by our **DFSL** label class.

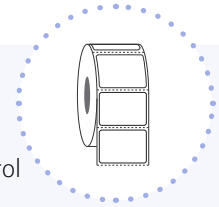
Automation

Automated tube and plate labelers use thermal-transfer or direct thermal technology. LabTAG has partnered with automated labeling systems, such as **Scinomix,** to provide cryogenic labels tailored for automated tube and plate print-and-apply systems, perfect for high volumes of labeling. **Contact us** for more information.

Formats

There are two basic label formats: sheets and rolls. Our cryogenic labels are available in rolls for thermal-transfer or direct thermal printers and in sheets for laser printers.

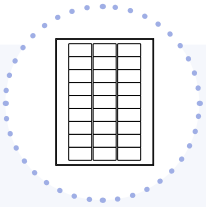
Roll Labels



- Give more flexibility and control over what you're printing
- Greater choice of label types and configurations
- Free label design software is available
- Great for small or large batches of variable data
- Great for long-term projects or daily workflows

Note: Roll labels require a dedicated thermal label printer. When printing in thermal-transfer mode, a matching ink ribbon is required.

Sheet Labels



- Used by regular office desktop laser or inkjet printers
- Ideal for printing large batches of identical information
- For labels destined for different containers, having many columns is convenient for varying the data in each column
- Easy to use, free label templates with MS Word
- Great for one-time projects

Note: Constantly feeding sheets into the printer can become a burden. Sheets can be impractical when printing a single label. Always factor in the cost of ink cartridges

	Thermal-Transfer	Direct Thermal	DYMO-Compatible	Laser
Format	Roll	Roll	Roll	Sheet
Printout Colors Available	Black, white, red, or blue	Black	Black	Full Color
High Throughput Variable Data Printing	Yes	Yes	Yes	No
Smudge-proof	Yes	No	No	Yes
Fade-proof	Yes	No	No	Yes
Alcohol Resistant	Yes	No	Limited*	Limited‡
Resistant to 10% DMSO	Yes	No	Limited*	Limited‡
Water Resistant	Yes	Yes	Yes	Yes
Autoclave Resistant	Limited*	No	No	Limited‡
-	*Only CATT and GANA label classes are auto-claveable	-	*Our EDCC labels offer limited resistance	‡DFSL/DFLT labels are resistant to DMSO (10%), alcohols, and autoclaving when the printout is protected by the wrap-around laminate

Data

Best practices state that a label should display human readable data alongside a scannable code. Common elements displayed on a label are a unique identifier, batch number, date, and company logo. Scannable barcodes and RFID chips both offer great ways of tracking samples and managing inventory. Each has its own unique advantages:

1D & 2D Barcodes

- Low start-up cost
- Barcodes can be printed using any printer
- Barcode scanners are inexpensive
- Can be scanned with phone applications
- Scan one barcode at a time, no mix-ups
- Adaptable to a large variety of applications

Radio Frequency Identification (RFID)

- Require a RFID printer and reader
- Tags can be scanned/read from a distance with minimal line of sight
- Remain readable even if label is defaced
- Multiple tags can be read simultaneously
- Monitor many assets consistently
- Tags can be re-encoded
- Higher data storage capacity
- Increased security
- Face stock can be printed with barcodes

Note: Most RFID labels function well at -80°C but are not recommended for storage in liquid nitrogen.

Integration

To achieve optimal integration, your cryogenic labels, printers, scanners, and printing software must work in harmony with your existing protocols and lab management software, like laboratory information management systems (LIMS) and electronic lab notebooks (ELNs).

Printers

Our labels are made to work with most brands of printers. The printer you choose should fit seamlessly into your lab's workflow alongside all other components. For laboratories who process high volumes of samples and/or depend on lab informatics software, like a LIMS, having a dedicated label printer (e.g. thermal-transfer) rather than a desktop printer is necessary to ensure workflow isn't compromised. **Thermal-transfer barcode printers** and **RFID printers** are available through LabTAG.

Software

Label software falls into one of two categories: label design software or informatics software.

Label Design Software

Label design software allows you to design, create, automate, and print labels. Specialized software, like **BarTender™** and **ZebraDesigner Professional 3**, allow you to connect databases to your template, encrypt documents, design 1D and 2D barcodes, perform variable data entry and barcode serialization, as well as encode RFID tags.

Informatics Software

Informatics software like laboratory information management systems, inventory management systems, and electronic witnessing systems manage patient and sample information. These software might include a label printing portion. If not, they can integrate with a label design software. We partner with several **informatics software providers** to have seamless integration with our labeling solutions.

Scanners

Scanners are available with different options and additional features. They can be handheld, with a button to emit light that scans the barcode, or stationary, which requires the container be held to the scanner to register the barcode. Handheld scanners can work online or offline, either sending data immediately to be processed by a computer or storing it in the scanner itself before downloading the information and relaying it to another system. These scanners can also be wireless or wired, depending on how much flexibility you require when scanning. Mobile app scanners can also be implemented, depending on the tracking method used (e.g. 2D barcodes can often be scanned with mobile apps).

Why You Should Consider LabTAG as Your Cryogenic Label Provider

As a worldwide leader in laboratory identification solutions, LabTAG offers complete identification solutions that keep sample identification in your lab error-free and efficient. Because our customer support and R&D teams have M.Sc. and Ph.D. degrees in life science, we understand the needs of your lab. With our custom manufacturing services, we can tailor every solution to your specific application and stringent requirements.

As an ISO-certified company, we implement stringent protocols to ensure we uphold high standards of quality in our products and services. We also offer free samples so that you can try our labels before buying to confirm that they will work seamlessly with your application's conditions.

With the widest selection of cryogenic labels available on the market, we will find the right solution for you. Our experts are always ready to assist you in product selection, solution development, and technical support. Give them a call and they can set you up with everything your lab needs to identify and track your samples and inventory, including labels, printers, software, and scanners.

Dedication to Quality

Rigorously tested high-grade materials and high-quality products

Business Continuity

Mitigated risk of service interruption from unexpected disruptions or disasters.

Scientific Label Experts

Deep understanding of industry-specific identification requirements.

Two Decades of Business

Continuously scaling, improving, serving, and delighting, with our customers in mind.

Product Innovation

In-house R&D team continuously innovates and creates unique, patented products.

Tailor-Made Solutions

Helping you realize your multifaceted projects with custom labels and creative solutions.

Worldwide Distribution

Strategically located warehouses reduce friction for international shipments.

Fast Order Fulfillment

Daytime and evening crews ensure short lead times so you can meet your project deadlines.

Satisfaction Guarantee

Easy returns and exchanges if total satisfaction is not met.

Free Samples

Generous, free sample service allows you to try products before purchasing.

ISO 9001:2015 Certified

We are committed to providing reliable products and services that meet customer and regulatory requirements, through our quality management system.

ISO 22301:2012 Compliant

Our ISO 22301:2012 business continuity management system allows us to prepare for and reduce the likelihood of unexpected disruptions so that we may continue to serve our clients.

Shop Our Labels Online at Labtag.com

- Discover a large selection of labels in many sizes and colors
- Find the right product by searching for keywords or item number
- Place your purchase orders (P.O.) online
- Use our live chat to get help from our support team

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