

Highlighting innovative design features  
and useful application information for  
**Thermo Scientific Controlled-Rate Freezers**

**Thermo**  
S C I E N T I F I C

# smart notes

design and innovation ▶ controlled-rate freezers



Q  
A

**What do I need to consider when preparing samples in bags using a controlled-rate freezer?**

Proper preparation is key for the long-term viability of all sample types stored in a bag matrix, such as cord blood or bone marrow that needs to be maintained at cryogenic temperatures. Controlled-rate freezers (CRF) are designed to keep samples safe during the freezing process, mitigating the impacts of nucleation and heat fluctuations when samples make the transition from a liquid to a frozen state.



# Sample preparation for controlled-rate freezing

## 1 ] Consider the vessel

When determining the best sample preparation, start with the storage vessel. In the case of a bag, make sure you are familiar with the bag's dimensions to better determine the proper freezing accessories.

## 2 ] Choose your accessories

Will you be freezing in presses or in canisters? Once the freeze is complete, do you have the right frames for your canisters? If you are freezing in presses, make sure you have the right press, canister and frame. If you are freezing in cassettes directly, make sure you have the freezing racks necessary to support the cassettes during the freezing process as well as the proper frames for post-freeze storage.

## 3 ] Pick the right volume CRF

How many bags will you need to process at one time? This will help determine the size CRF you'll need. A 0.6 cu. ft. chamber may work well for lower volume needs but a 1.7 cu. ft. chamber may be better if you are processing many samples at once.

## 4 ] Choose the right program

A proper freezing profile is critical for a successful freeze. Make sure you have a profile selected that includes the proper cooling rates pre- and post-nucleation. For samples in bags, this often means a slow ramp to the nucleation point, followed by a rapid plunge post-nucleation. We recommend a thorough review of the available techniques and profiles prior to beginning your process.

## 5 ] Control on the CRF

Make sure you have a CRF that provides the flexibility you need to manage your freezing profiles: at the unit or through an associated PC terminal. This flexibility will allow you to make changes to your programs or manage your information based on your preferences.



A variety of bag presses, canisters and racks are available to assist with your freezing protocols.

## ► Summary

*To ensure long-term viability, be sure to properly consider the vessel, accessories, volume, program and control when freezing samples in bags for long term storage.*

Find the best Thermo Scientific controlled-rate freezer solution for your application.

Learn more at [www.thermoscientific.com/cold](http://www.thermoscientific.com/cold)

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