

# Smart Notes



## Can Thermo Scientific Matrix ScrewTop 2D Barcoded Tubes withstand multiple capping/decapping cycles when subjected to cryogenic freezing conditions?

Yes. Thermo Scientific™ Matrix™ ScrewTop Tubes demonstrated 100% leak-proof performance when being subjected to 60 capping/decapping cycles under cryogenic conditions.

### Background

Screw cap storage tubes are commonly found in the laboratory and are used for the long-term storage and cryopreservation of many sample types. A properly designed screw cap closure system on a tube is paramount to successfully maintaining sample integrity especially during multiple freeze/thaw and capping/decapping cycles. Proper design can ensure that a sample is protected from contamination and evaporation.

To demonstrate the performance of Matrix ScrewTop Tubes a study including leak proof testing, 15 freeze/thaw cycles, and 60 capping/decapping cycles was performed. The tubes were subjected to cryogenic freeze-thaw conditions followed by leak tests to stress and demonstrate robustness of the seal. Seal integrity is especially critical in cryopreservation applications, where materials are stored for long periods of time at cryogenic temperatures.



Thermo Scientific™ Matrix™ ScrewTop 2D Barcoded Tubes

## How were the tubes tested?

The Matrix ScrewTop Tubes were filled to 80% working capacity with red-colored water, capped using the Decapper 500, placed in the storage rack and frozen at -176°C in the vapor phase of liquid nitrogen (VPLN). Tubes in racks (96 tubes in triplicate n = 288 tubes) were thawed to room temperature and the rack was placed on the Thermo Scientific™ Decapper 500 for decapping. During the first 10 freeze/thaw cycles, the tubes in racks were decapped each time for a total of 10 decapping events. During the subsequent 5 freeze/thaw cycles, the tubes in racks were decapped 10 times for a total of 50 decapping events. Taken together, the tubes in racks were decapped 60 times. For each decapping cycle, the tubes were visually inspected for any abnormalities and leak proof testing in a vacuum (at 5 in Hg for 15 min) was completed to ensure tube performance (Figure 1).

## What do the results show?

Matrix ScrewTop Tubes were successfully decapped 60 times without any failure in visual inspection or leak proof testing providing evidence that the tubes can maintain integrity after multiple decapping events including 15 freeze/thaw cycles.

## Summary

- Matrix ScrewTop Tubes can maintain tube performance and seal integrity after up to 60 decapping events.
- Matrix ScrewTop Tubes can maintain tube performance and seal integrity after up to 15 freeze/thaw cycles at -176°C in the vapor phase of liquid nitrogen.
- There were no failures (100% performance) in visual inspection or leak proof testing after capping/decapping and intermittent freeze/thaw cycles.

**Figure 1. Matrix ScrewTop Tubes tested using the Decapper 500 and results of the performance of the tubes**

Cat. No.	Volume	No. tubes tested	Visual inspection	Leak test
3741-BR	1.0 mL	288	PASS	PASS (100%)
3744-BR	0.5 mL	288	PASS	PASS (100%)
3748-BR	0.2 mL	288	PASS	PASS (100%)

Thermo Scientific Matrix ScrewTop 2D Barcoded Tubes and Decapper



Find out more at [thermofisher.com/storage tubes](https://thermofisher.com/storage tubes)

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