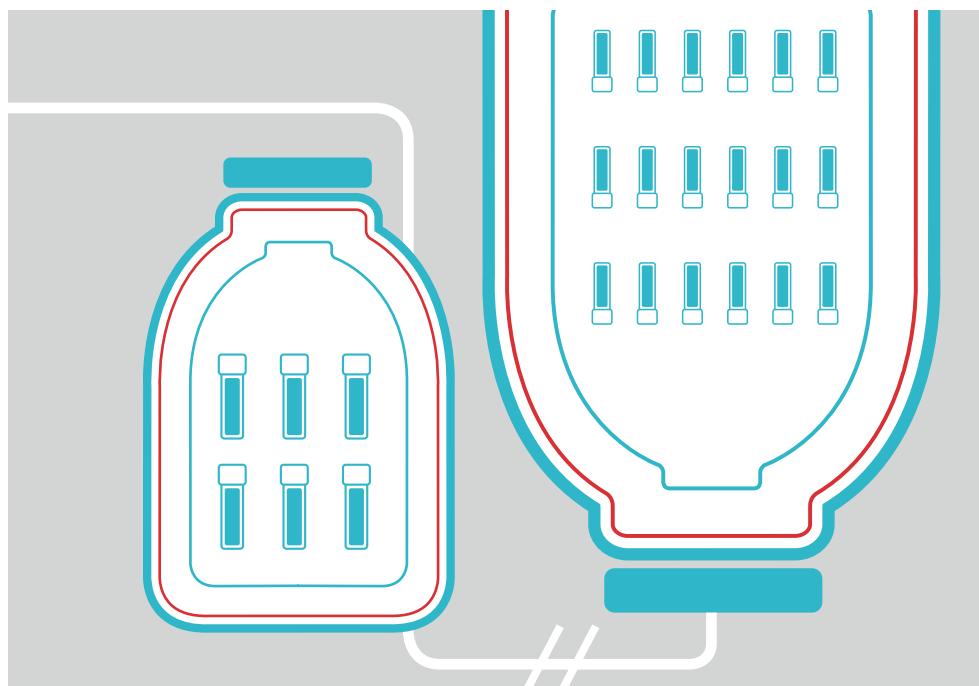


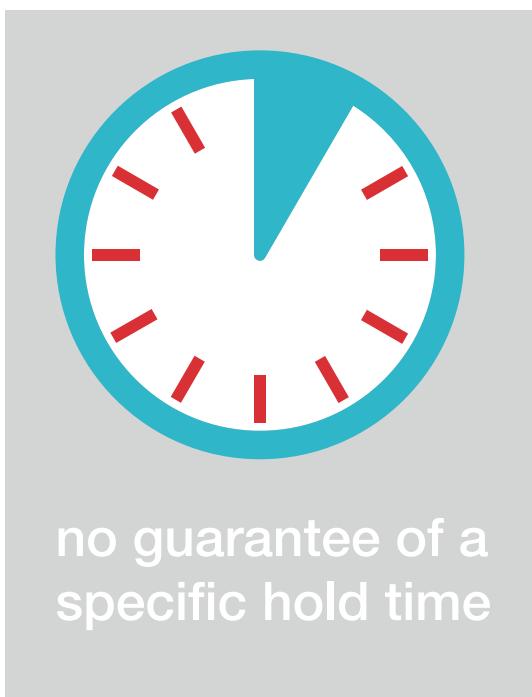
## 1 Not all dry shippers are created equal

There are wide variations in dry shippers with regard to size and temperature (static) hold times and you should select the shipper that best fits your application. Sizes can range from space for a dozen vials or canes to shippers that can hold 25,000 vials. Temperature hold times can vary from a few days to more than two weeks. Variations also exist in how well they hold temperature under different environmental and handling conditions.



## 2 Significant variations can occur among dry shippers of the same make and model

The manufacturers' spec is no guarantee of a specific hold time. While some units are better than others, even among the best, variations of up to 40% are not uncommon. This is particularly important if you plan to use the dewar for temporary storage. In addition, in shipping a dewar internationally, you should anticipate a complicated customs process or an unusually long transit time. Imagine a scenario in which you accounted for eight days maximum!



## 10 Things You Should Know About Dry Shippers Before Shipping High Value Biologics

### 4 Get usable results by evaluating the location of the data logger on a dry-shipper and how it is secured and protected

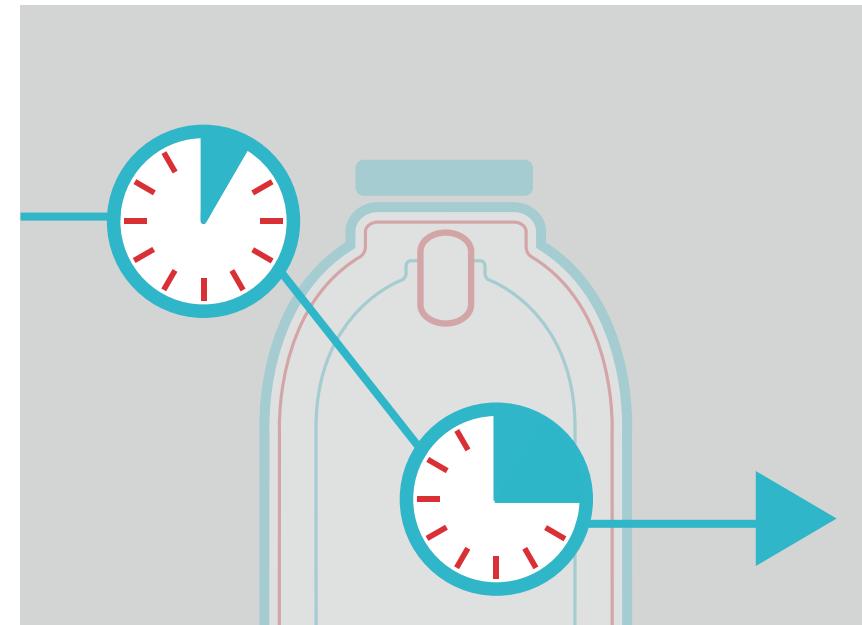
Data loggers are an aftermarket addition and the quality of their performance is contingent on how they are installed and protected during transit. Not all models work well in the same locations so pick the dry shipper and data logger combination that is best for your particular situation.

#### ✓ Locations



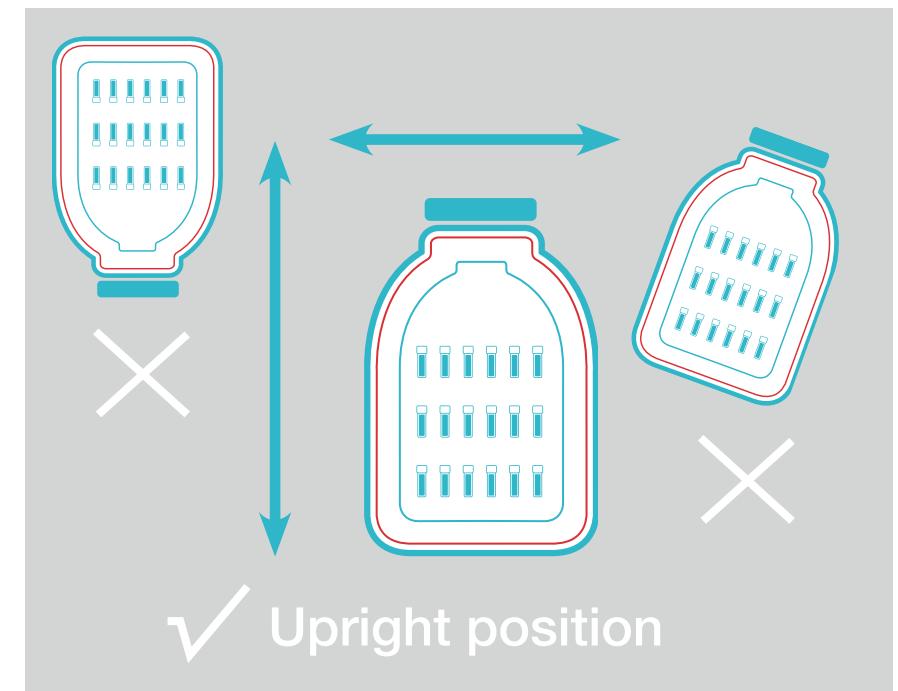
### 5 The ability of dry shippers to hold temperature decreases over time

While dry-shippers have no moving parts, they do have two components that deteriorate over time. The first is the vacuum between the inner and outer vessel. This vacuum is critical and diminishes with use. The other element is the absorbent material that traps the liquid nitrogen. A simple 24-hour evaporation test will allow you to determine if there has been significant deterioration in either or both.



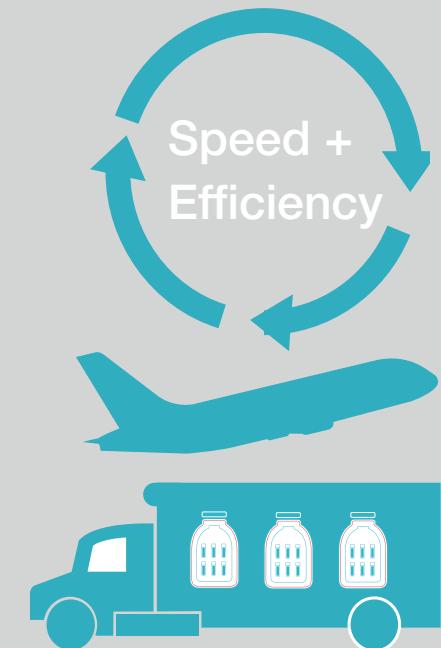
## 6 Orientation matters

While most organizations test their dry shippers before using them, the tests tend to be in an upright position with little or no movement. In transit the dewar can assume many different orientations ranging from upright to upside down and everything in between. This has a major impact on static hold time. A dry shipper on its side can lose as much as 60% of its hold time in a few hours. A large dry shipper transported upside down for even a few hours can go from days of hold time to hours.



## 7 There are no style points in the shipping business

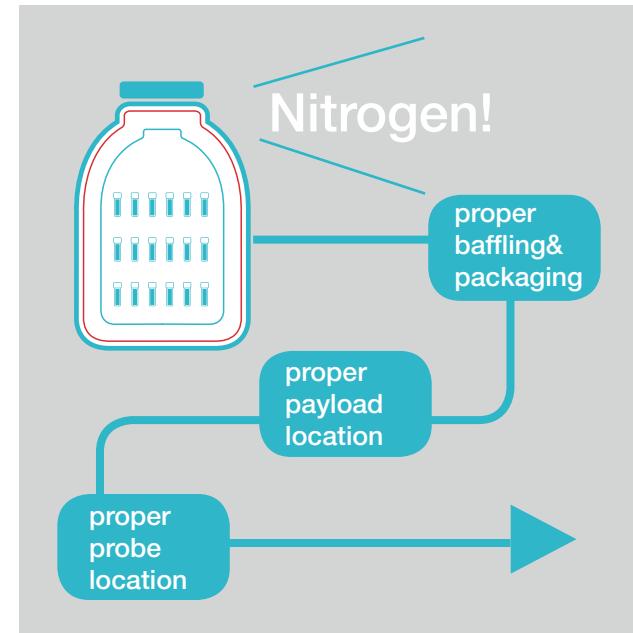
Moving material by air or truck is about speed and efficiency not handling. It does not matter which carrier or “white glove” service you use, the number of labels and warnings you affix or the assurances you receive. It does not matter if the dewar will be kept upright but how long will it be on its side or upside down.



# 10 Things You Should Know About Dry Shippers Before Shipping High Value Biologics

## 9 Avoid temperature excursions when shipping by air

Because nitrogen vents in small amounts from a dry-shipper it cannot be a sealed unit. Because it is not a sealed unit it is subject to in-gassing during cabin pressurization and depressurization. This creates two problems: First, you can jeopardize the integrity of the material being shipped or second, you can get temperature excursion alarms from your data logger. The solution is proper payload location, proper probe location and proper baffling and packaging.



## 10 If you are not familiar with shipping at cryogenic temperatures contact a specialist

I do this for a living and I still learn something new every day. A ten minute phone conversation can save you a great deal pain and suffering not to mention time and cost. I hope you have found these tips of value. As the use of dry shipper increases the more knowledge you have, the better prepared you will be to face shipping challenges in the present and future.

