How Do Your Freezing Choices Affect the Cost and Time To Freeze Your Drug Substance?



Growth in cold chain logistics

2024 To support biopharmaceutical manufacturers' increase in biologic drug production combined with the growing network of CMOs, spending on cold chain logistics, for drug substance and drug product, is forecast to grow to reach \$21.3 billion by 2024.

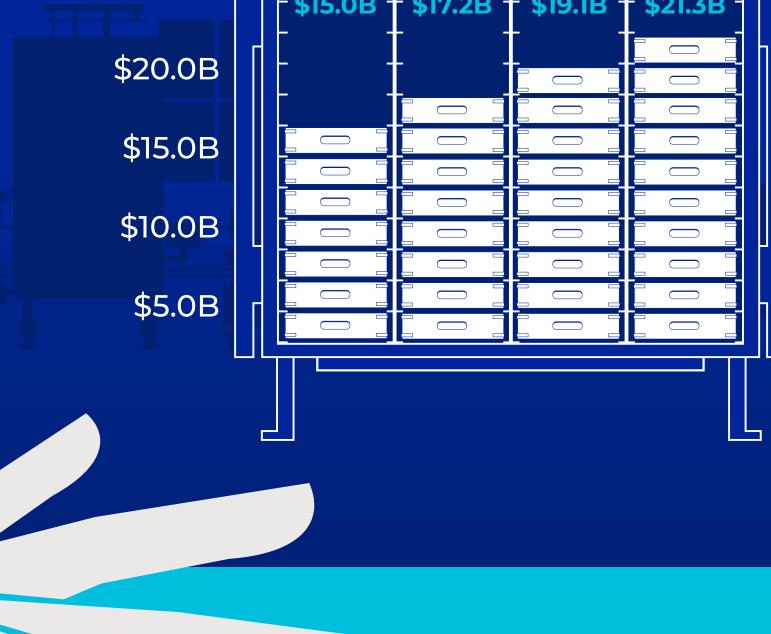
https://www.pharmaceuticalcommerce.com/view/sourcebook Pharmaceutical cold chain

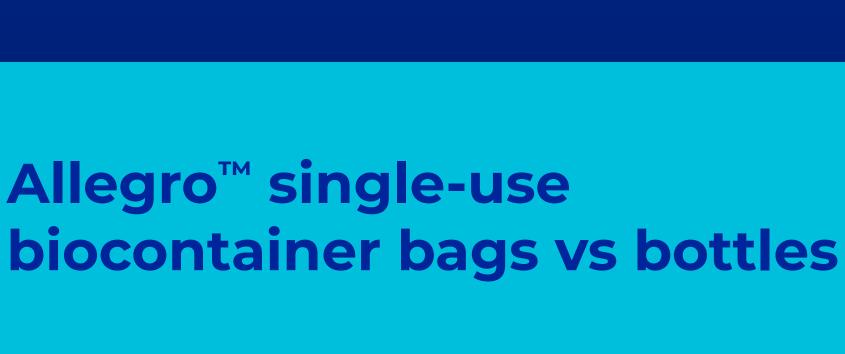
2018 2024 2020 2022

\$19.1B

spending heats up

Global biopharmaceutical cold chain spending, billions





Up to 5 times faster than blast freezer Homogeneity of drug substance is maintained Low

Automated biocontainer bag filling

biocontainer bags

RoSS' plate freezer

Allegro

Fast

Freezing rate

Operational effort

Closed system

Scalability

Control/

Risk of

product loss

predictability

Storage density

Yes Yes 50 mL to 20 L Scalable plate freezing system High

> High Small footprint Low platform RoSS shell

High degree of

Towards 0% with robust

reproducibility and uniformity



12%

Bottles

Slow

Blast freezer

substance either in bottles or single-use biocontainers/bags. **Higher storage density**

Desired

storage

for freezer

containers

Biologic production is expensive and

logistics of transporting valuable bulk

drug substance to locations around the

world typically involve freezing the drug

improvements

330 L/m³

Allegro single-use

biocontainer bags protected by RoSS shell

80 L/m³

Bottles



Costs of cold room storage Assuming that 1000 liters of bulk drug substance requires cold room/freezer storage, the annual cost savings when replacing bottles with single-use Bottles Allegro single-use biocontainer bags Allegro biocontainer bags protected protected by by RoSS shells are approx. \$48k.

ШШШ

Allegro Biocontainer bags protected by rigid RoSS shells reduce this risk towards 0% saving up to \$15m. Ref: Danaher Corporation, Unpublished Confidential Report, June 2020

1-5%

value loss of \$15m per year.

Product loss

Ref: Case study, Storage density, Single Use Support, 2018

Loss of high value drug substance due to breakages of frozen single-use biocontainer bags encased in clam shells is between 1-5%. For 500 biocontainer bags, each filled with drug substance worth \$2m, a loss of 1.5% would equate to a



RoSS shells



Typical end-market value of 1 L product

convetional freezing technologies

1.5%

Typical loss rate using

150 L **Average annual** product loss volume

(10,000 L x 1.5%)

Average market

value loss

(150 L x £100k)

Find out how Pall's Freeze & Go Solutions can reduce the costs of freezing, storage and transport of your drug substance. Watch our video and book a personalized virtual seminar.

Want to know more?

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Pall® Freeze & Go Solutions

Protected by

RoSS* technology

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All \$ figures stated are US\$