CORNING® VIRIDIAN™ VIALS

Performance Meets Sustainability

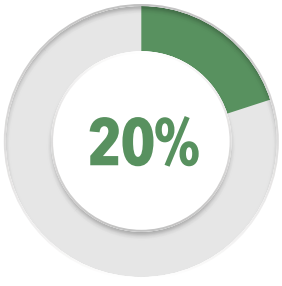
Reducing glass waste and manufacturing emissions to deliver a more sustainable choice.

SUSTAINABLE DESIGN

Less is More

Less glass means less raw material extracted from the environment and less material waste at end-of-life.

Viridian Vials have a positive impact on every stage of vial usage, from manufacturing to patient use.



Reduction in Material Waste

Reduction in CO_2e Emissions

Verified by 3rd Party Life Cycle Assessment (LCA)[1]

When it comes to sustainability claims, it's essential to verify your data. Our independent LCA by Sphera confirms Viridian Vials claims and highlights the impact it can have for the entire pharmaceutical industry.

Our data shows that even when compared to a conventional vial made with 100% renewable electricity, Viridian Vials can reduce emissions by 15%.

Raw Material ↓0.30g CO_2e	**Tubing** ↓6.20g CO_2e
Transportation ↓0.02g CO_2e	**Manufacturing*** ↓4.88g CO_2e

11.4g per vial reduction in CO_2e

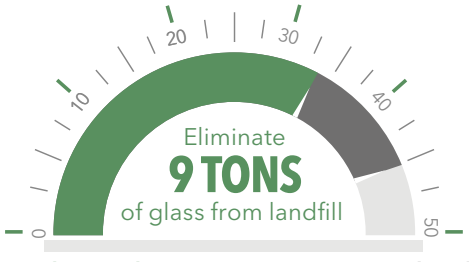
*Manufacturing = Conversion + Coating + Packaging

Extrapolated to 10 million vials

Viridian Vials could save up to 114,000 kg of CO_2e, which is equal to consuming >12,900 gallons (50,000 Liter) of gasoline.

A 2mL Viridian Vial weighs 3.5g, compared to a conventional 2mL vial that weighs 4.4g. This means that Viridian Vials would eliminate 9 tons of glass from going to landfill if 10 million vials are consumed.

Corning® Viridian™ Vials are a drop-in solution that can reduce manufacturing emissions by up to 30% and glass material waste by 20%, while enabling faster and safer fill-finish operations.



Viridian Vials
3.5g (35tn/10M)

Conventional Vials
4.4g (44tn/10M)

PERFORMANCE ACCELERANT & PROTECTING QUALITY

Patented External Coating

Corning's external coating technology is proven to reduce friction, damage, rejects, and glass particles, improving filling line efficiency and helping to reduce drug recalls.

Protected by our industry leading external coating, the breakage rate of Viridian Vials is as good or lower than conventional vials.

Improvement in Filling Line Efficiency

Reduction in Glass Particulates

Optima Line Trial[2]

In collaboration with a leading manufacturer of fill-finish equipment, we tested two vial types:

- Standard 2mL borosilicate vials (4.4g)
- Viridian Vials (3.5g)

The vials were run at 450 vials per minute and recirculated >120 times, simulating >200,000 vials processed for each group.

The trial showed:

No breakage observed in washing, depyrogenation, accumulation, singulation, or star wheels

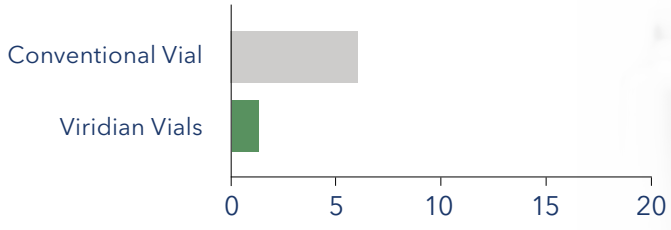
Lower tip over rate from Viridian Vials compared to conventional vials

No functional issues with washing or depyrogenation

No need for modification or fill-finish change parts

Tip overs per hour

Line trial for vial handling behavior



1. 20% less glass and 30% less emission is based on 30% reduction in wall thickness. . Results based on 3rd party Life Cycle Assessment of Corning Pharmaceutical Technologies conducted by Sphera Solutions Inc.
2. Dombrowski, et. al., Full Throttle For Vaccine Filling, Corning, Optima, ThermoFisher, 2021
3. Timmons, C. L, et al. Particulate Generation Mechanisms during Bulk Filling and Mitigation via New Glass Vial. PDA Journal of Pharmaceutical Science and Technology, September 2017, 71 (5) 379-392

FOR MORE INFORMATION, PLEASE VISIT **WESTPHARMA.COM/VIRIDIAN** OR CONTACT AN ACCOUNT MANAGER AT **WESTPHARMA.COM/SUPPORT/CONTACT-US.**