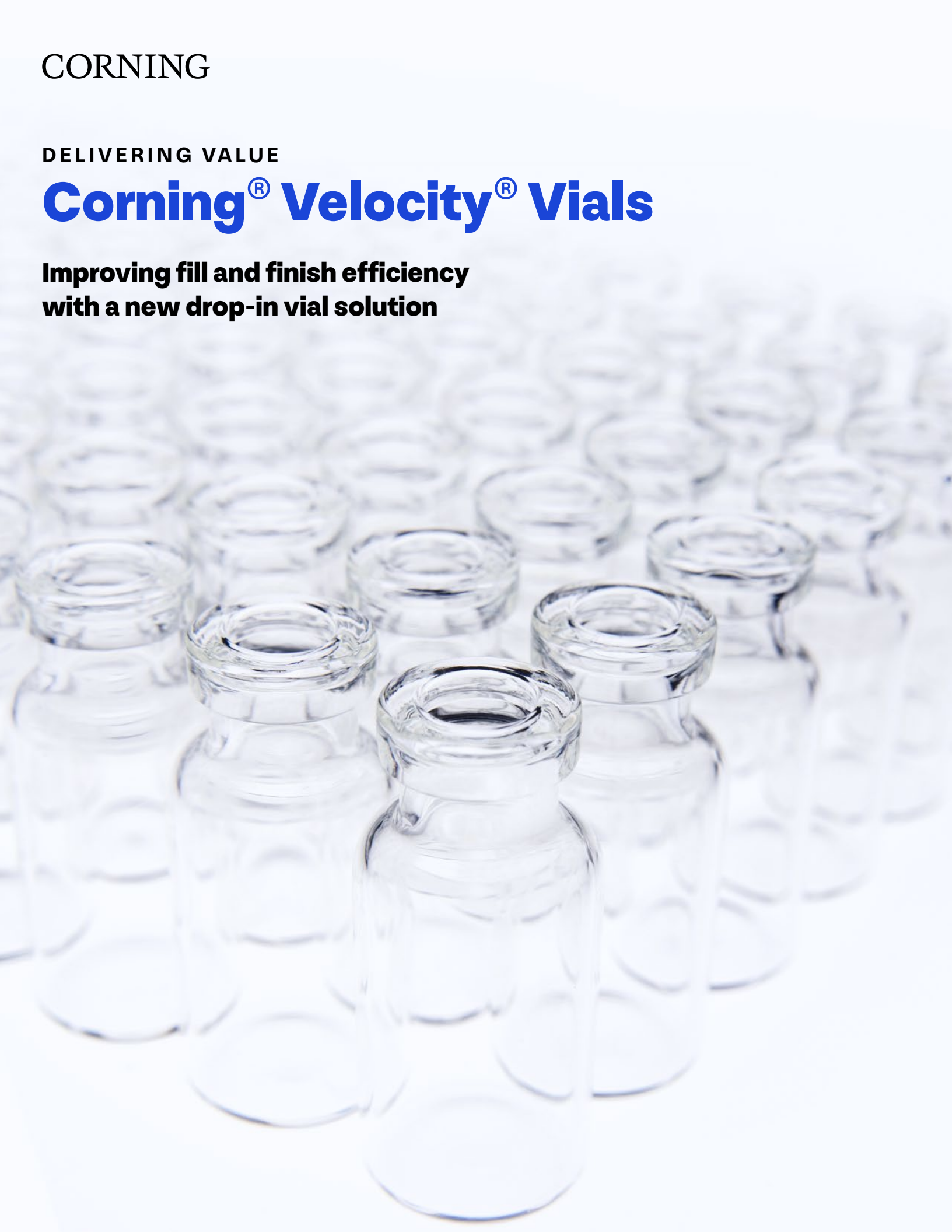
CORNING

DELIVERING VALUE

Corning® Velocity® Vials

Improving fill and finish efficiency with a new drop-in vial solution



Improve fill and finish efficiency by up to 50%

Corning® Velocity® Vials

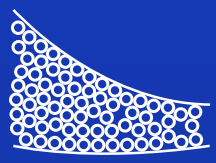
Friction created by glass-to-glass and glass-to-metal contact is a leading contributor to poor filling line efficiency and speed, causing vial jams and damage that can create particles, cracks, cosmetic rejects, and breaks.

Corning Velocity vials, Type I borosilicate vials with an external low coefficient of friction (COF) coating, can help reduce these issues, maximize filling line productivity and accelerating the delivery of critical pharmaceutical products.

By improving fill and finish performance, Velocity vials can enable lower manufacturing costs and enable increased throughput without sacrificing efficiency or yield.

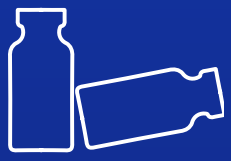
Designed to improve filling line performance

Corning's proprietary COF external coating enables:



Reduced Vial Jams

Reduced Damage



Reduced Tipovers

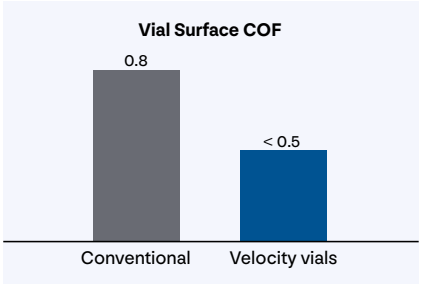
Scan to see Corning coated vials in action

USP Type I Packaging Designed for Speed and Efficiency

One of the fundamental concerns in fill-finish manufacturing is friction created by glass-to-glass and glass-to-metal contact. This resistance can limit filling line efficiency and speed, ultimately constraining throughput and slowing down the delivery of essential medications and treatments. The glass friction from conventional vials can also generate damage that leads to high particle counts, glass breakage, and cracks. These quality issues not only impact throughput, but can also impact sterility assurance of drug packaging, thereby increasing the risk of container closure integrity issues and leading to recalls or contaminated medications reaching the patient.

The COVID-19 pandemic intensified pharmaceutical supply chain constraints and fill-finish capacity shortages that have existed for many years, due in part to the limitations of conventional glass vials. Many have come to accept these limitations as a standard cost of doing business, but innovations in glass packaging are enabling a step-change in performance that shatters these old assumptions.

To meet the immediate need for a primary packaging solution that can improve yield and overcome quality issues as a drop-in solution, we introduced Corning® Velocity® vials, a USP Type I borosilicate vial externally coated with Corning's proprietary low coefficient of friction (COF) technology.



Velocity vials are engineered to deliver better economics, better quality, and a more environmentally sustainable design compared to conventional vials. Velocity vials can improve filling line efficiency by up to 20-50% while lowering packaging production costs, and can be implemented with a seamless regulatory process for marketed drugs. Compared to conventional vials, Corning's coated vials can also reduce damage that leads to particles, breaks, and cracks.

The increased efficiency and throughput of Velocity vials can help drive faster manufacturing of essential medications to meet rising global demand. Pharmaceutical companies and fill-finish contract manufacturers (CMOs/CDMOs) can leverage the improved efficiency as a drop-in solution to increase throughput, thereby producing more vaccines and other drug products in less time.

In a capacity constrained environment, Velocity vials create immediate fill-finish capacity, allowing pharmaceutical manufacturers to potentially delay capital investment for new capacity and reduce costs. When adopted broadly across an entire pharmaceutical filling system, Velocity vials could significantly improve productivity and quality, thus lowering manufacturing cost for pharmaceutical companies and Contract Manufacturing Organizations (CMOs).

Case Study

Corning® Velocity® Vials showed superior performance on customer filling line

In hopes of improving fill finish efficiency and lowering total cost of ownership,a leading pharmaceutical company reached out to Corning to adopt Velocity vials. Needing to quickly increase yield without implementing expensive capital projects, the pharmaceutical company was looking for a drop-in solution.

The company and its CMO filling partner knew that even well-designed filling lines encounter throughput constraints with vial handling due to the physical interactions between the machines and conventional glass vials. Stress and friction generated on turn tables, depyrogenation tunnels, tracks, and trays, can lead to jams, tip overs, glass breakage, and line interventions (which risks greater contamination of sterile environments). In addition, the pharmaceutical company and CMO wished to avoid direct lubrication of the filling equipment due to the potential for sterility and line maintenance issues.

Collaborating with the CMO, Corning collected batch data for over 66 conventional vial runs and 39 Velocity vial runs. Each batch run consisted of approximately 130,000 vials. As shown in Figure 1, Velocity vials reduced the average number of glass-related downtime events and downtime minutes, and average number of vial breakage events per lot. In this trial, Velocity vials demonstrated 35% improvement in filling line efficiency when compared to conventional glass vials.

After realizing the performance and value had been demonstrated within the first ~10 Velocity vial batch runs, the CMO concluded the trial period and proceeded with broad adoption of the Velocity vials.

Velocity vials demonstrated significant improvements over conventional vials for the customer's filling line operations.

81%
reduction in glass-related downtime events per lot

99%
reduction in glass-related downtime minutes per lot

No glass breakage events

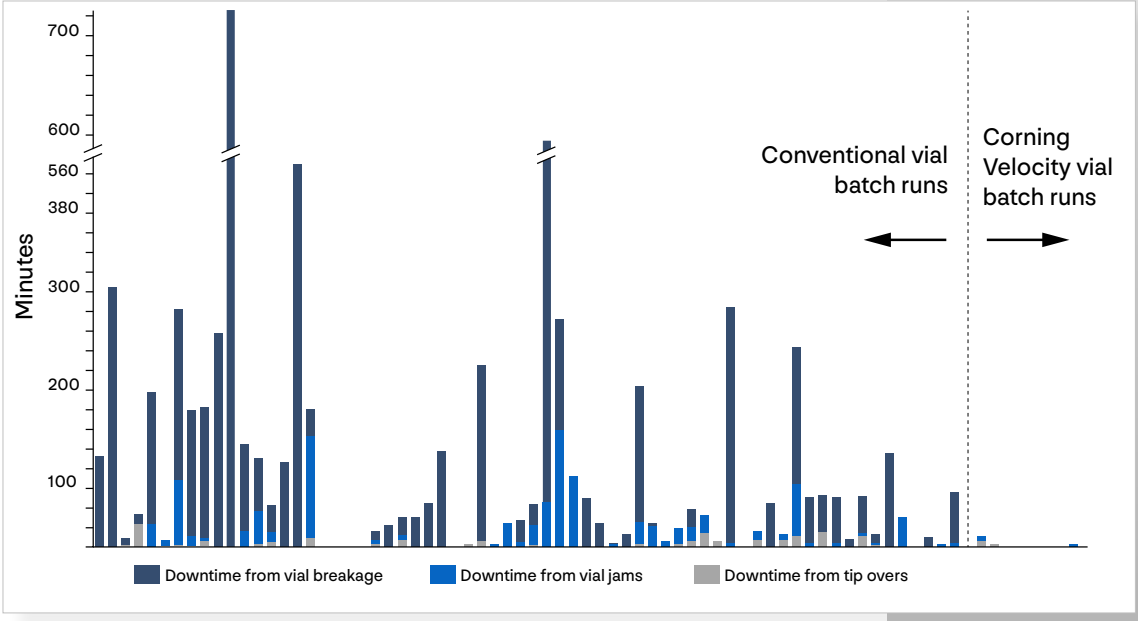


Figure 1. Per-batch glass-related downtime (minutes) for conventional uncoated vials versus when using Velocity vials. Batches were run sequentially over time.

Case Study

Corning® Velocity® vials demonstrated a 35% improvement in efficiency

	Conventional Borosilicate Vials (n = 66)	Velocity Vials (n = 39)	Percent Improvement
Average Line Efficiency (%)	54.0	72.8	34.8%

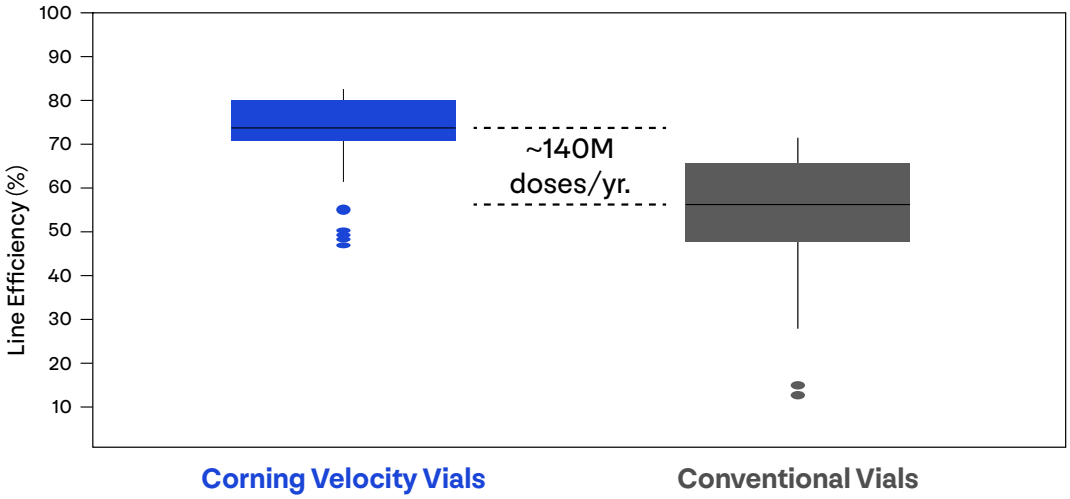
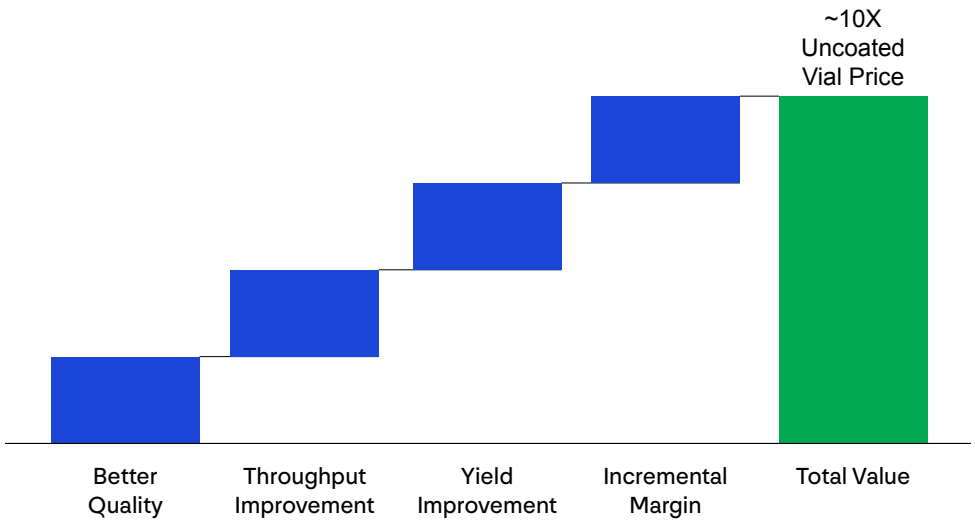


Figure 2. Run time efficiency is calculated as the *Effective Line Speed/Line Set Speed* x l00. Data from 39 Velocity vial runs and 66 Conventional borosilicate runs; data was found to be statistically significant through two-sample t-test (t(102)= 7.33, p=0).

Efficiency gain could translate to 10X value per vial for this customer



"Ensuring consistent production, high quality, and less downtime is essential as we work to keep pharmaceutical supply chains moving, and to this extent, Corning® Velocity® vials have already shown very promising results. Corning's Velocity vials demonstrated a significant improvement in efficiency when compared with traditional borosilicate vials on our fill-finish lines."

- CMO Vice President and General Manager

Corning® Velocity® Vials

Glass Packaging Designed for Speed and Efficiency

Corning Velocity vials can deliver better economics, and better quality compared with traditional pharmaceutical packaging.

Our externally coated borosilicate vials boost efficiency from manufacturing to delivery, increasing the production of life-saving drugs without sacrificing quality or value.

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