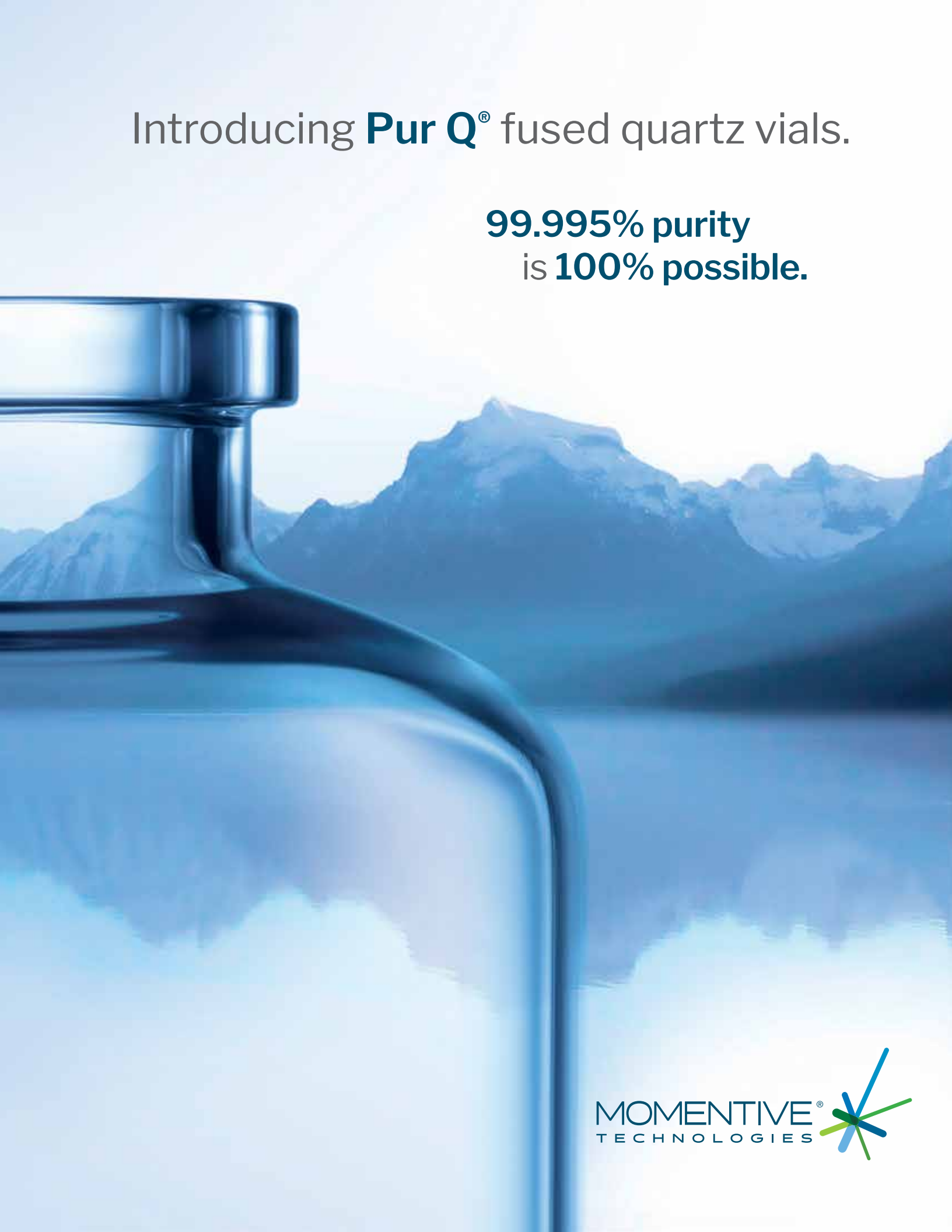

Introducing **Pur Q®** fused quartz vials.
99.995% purity
is **100% possible.**
MOMENTIVE®
TECHNOLOGIES

Your breakthrough belongs in ours.

You've invested countless hours and resources into developing your breakthrough drug. Ensuring its long-term stability is critical, yet traditional Type I vials made from multicomponent glass can put this stability at risk. They may be prone to reacting with their contents over time, which can alter drug formulations and reduce shelf life. Drug developers using Type I vials have had no choice but to tolerate such interactions — until now.

Introducing Pur Q fused quartz vials from Momentive Technologies, the first and only fused quartz vial available for pharmaceutical packaging. As the most inert solution available, Pur Q fused quartz vials help enable you to safely package, transport and store drug formulations while keeping them stable far longer than other vials.

Your discovery deserves packaging that's as revolutionary as the solution inside. Learn more about what makes Pur Q vials from Momentive Technologies so unique.

What's missing makes it remarkable.

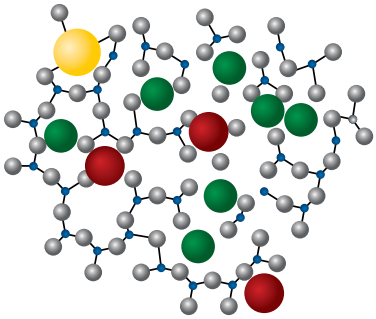
Unlike conventional Type I multicomponent glass vials, quartz vials are 99.995% pure silicon dioxide (SiO_2). This level of purity means Pur Q vials have an exceptionally inert, nonreactive surface that virtually eliminates any risk of interaction with your packaged drug formulation.

Conventional Type I vials in use today are typically only 75% to 80% SiO_2 with the remaining components comprised of both intentional and inadvertent additives, particularly from the boron, alkali and alkaline earth groups. These additives are prone to leaching ions into packaged drugs, leading to possible changes in pH, contamination and reduced shelf life.

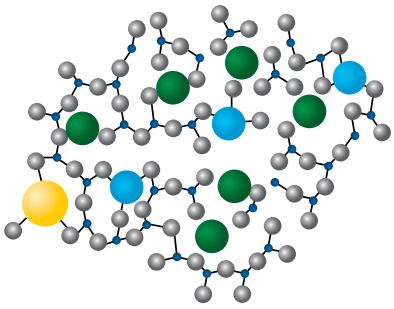
Trace Element	Typical ppm by weight (ICP-OES)
Aluminum (Al)	15
Calcium (Ca)	0.4
Copper (Cu)	<0.05
Iron (Fe)	0.2
Lithium (Li)	0.6
Magnesium (Mg)	0.1
Manganese (Mn)	<0.05
Potassium (K)	0.6
Sodium (Na)	0.8
Titanium (Ti)	1
Zirconium (Zr)	0.9

Detection limits 0.01-0.1ppm

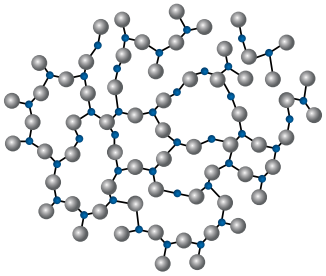
Pur Q vials deliver chemical purity that stands apart, with less than 30 ppm total cations and typical trace element compositions within very low — sometimes almost undetectable — ppm ranges. The above are typical trace element compositions; actual results may vary.



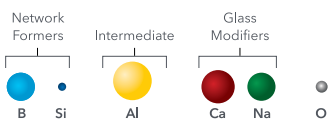
Soda Lime Silicate
(Type III Vials)
~75% SiO_2



Borosilicate
(Type I Vials)
~80% SiO_2



Fused Quartz
(Pur Q Vials)
>99.995% SiO_2



Chemical durability that's in a class of its own.

The exceptional purity of Pur Q vials ensures unparalleled chemical durability. With barely any impurities found in fused quartz, essentially only silicon dioxide (SiO_2) is present both in the drawn tubing and in the converted Pur Q vials.

When manufacturing conventional Type I vials, the boron and alkali glass modifiers tend to migrate, volatilize from the glass matrix, and redeposit on the glass surface. This is especially true if upper temperatures are not very tightly controlled during the vial conversion. Such migrations change the material's chemical structure which can result in tiny pits or voids in the glass surface, a decrease in corrosion resistance and the potential for delamination of the glass surface. The subsequent release of tiny flakes of glass would require the drug to be recalled. Pur Q vials not only eliminate the worry of delamination, they can also handle more aggressive chemistries and a wider pH range than conventional Type I vials.

USP 660 Surface Glass Testing of Hydrolytic Resistance

Vial Size	Fill Volume	EP 3.2.1.A <USP 660> Titration Pur Q vials	EP 3.2.1.A <USP660> Titration Upper Limit
ml	ml	ml of 0.01 M HCl/100 ml test solution	
2	3.2	≤0.1	1.3
20	24.8	<0.01	0.6
50	57.1	<0.01	0.5

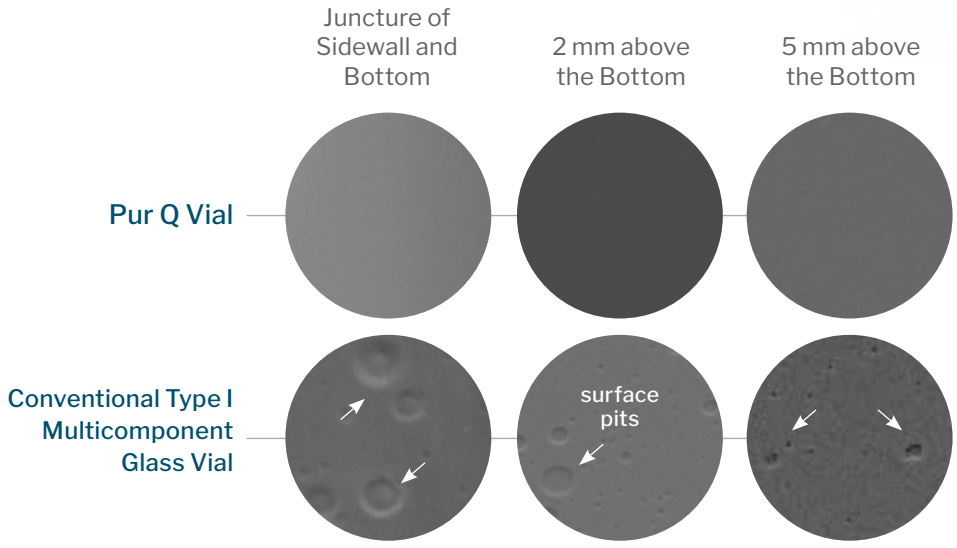
While conventional Type I multicomponent vial manufacturers often have trouble meeting the upper acceptable EP limits shown, Pur Q vials have EP levels that are far below these limits and nearly below detection.

Fewer imperfections. More liquid stability.

Protein adsorption and leaching from primary packaging are known to be root causes of reduced shelf life in sensitive formulations. The exceptionally inert surface of Pur Q vials can minimize a drug formulation's physical interaction with the vial surface, resulting in superior liquid drug stability and potential elimination of protein aggregation. Lacking the potential defects or pits of typical Type I vial surfaces, the packaged drug's contents will have less opportunity to physically interact with a Pur Q vial, helping to improve the stability of the medication.

This enhanced liquid stability could help eliminate the need to lyophilize a product that would otherwise become unstable in liquid form.

Surface Comparison @ 5000x SEM (after USP 660 Surface Glass Testing)



Micrographs of inner vial surfaces following USP 660 hydrolytic stability testing reveal that the Pur Q vial exhibits none of the features typically observed on conventional Type I vials.

A global leader in quartz.

Momentive Technologies is the largest quartz tubing manufacturer in the world, boasting a legacy of innovation that began with development of quartz tubing to enable the very first halogen lamps. Today, we're a global leader in quartz with unrivaled manufacturing capabilities, helping to ensure widespread product availability.

Momentive Technologies is a trusted supplier for the world's most demanding applications. Our ultra-high-purity quartz products help enable high-quality processing and production for a wide range of applications in the semiconductor, photovoltaic, lighting, water purification, consumer electronics and telecommunications industries.

Our stringent manufacturing processes follow cGMP principles. To ensure quality, we closely monitor and control every step in the quartz production process, from raw material purification to final packaging, including full lot traceability.

Momentive Technologies' fused quartz products have made the next generation of innovation possible. That includes our new, state-of-the-art process to mass-produce Pur Q fused quartz vials. This latest breakthrough from Momentive Technologies gives the pharmaceutical industry a true drop-in option to consider for drug storage and delivery, making it easier to deliver breakthrough formulations to the market.

A history of inventing possibilities.

1946 
Quartz tubing developed for GE Lighting

1963
Developed arc fusion process for quartz crucibles

1968 
Fused first 7,200-pound quartz ingot

1974 
First large-diameter semiconductor tubing produced

1980 
Developed quartz fiber optic applications

2005
Opened Wuxi, China, manufacturing facility

2007 
Created i21 ingot for leading-edge semiconductor applications

2017 
Introduced Pur Q vials: the world's first fused quartz vial for pharmaceutical packaging

2022 
Launched Pur Q fused quartz vials in SG EZ-fill® packaging technology*

*Photo courtesy of Stevanato Group

MOMENTIVE®
TECHNOLOGIES

Your discovery deserves a packaging solution as revolutionary as the product itself.

To learn more about Pur Q® fused quartz vials from Momentive Technologies, please contact us at **PurQ@momentivetech.com.**