

Creating Value Through Partnership

RICHLAND
G L A S S



Vial Sales Kit™

Tubular Glass Vial Market Information



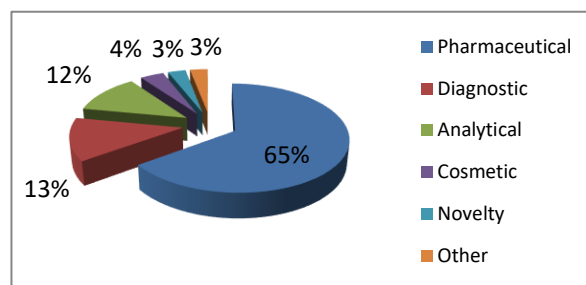
Are you getting your piece of the multi-billion dollar glass vial industry?

Packaging is one of the largest industry sectors in the world, worth several billions. Pharmaceutical packaging represents a larger percentage of this market. The North American tubular vial market is approximately 3.3 billion total units. Richland is your source to accessing that market to increase sales and profits.

Let us show you what you need to know to start getting results and increasing profits now!

Explore New Markets

Business is always changing. To maximize your business you have to *explore new markets* and expand your opportunities. A new market for business is a market with sustained demand and good prospects. Where there is a demand, there is a need for supply.



Statistics obtained from 2010 The Market for Drug Packaging
"A Market Intelligence Report"

Are you selling to any of the following markets?

Market	End Use Application
Diagnostic	Reagents, blood media and testing, urine analysis
Analytical	Chromatography, DNA testing, genome sequencing
Pharmaceuticals	Human injectable, oral liquid dosage, dry fill, animal health
Cosmetics	Perfume sampling, fragrance product launches, point of purchase cosmetic counter giveaways
Gas/Oil/Water	Municipal & private water testing, energy – oil industry, hydraulic fracturing (fracking)
Nutraceuticals	Dietary supplements, herbal medications
Novelty	Penny in a vial, promotional & marketing tools
Miscellaneous	Essential oils, liquid potpourri

Current Customer Base

Why sell more stuff to existing customers? It's easy, it's cheap and it's good for your business. Your existing customers already know and trust you to actually deliver the goods, because you have done so before. Your existing customers can be reached for free, even though the selling can be done for free, the creation of the "stuff to sell" is not without cost.

Information You Need to Get the Order!

Company _____ Contact Name _____

Address: _____

Email: _____ Ph: _____

SPECIFICATIONS:☐ Drawing Available☐ Samples Available

Glass Type:

☐ Type 1 Clear☐ Type 1 AmberDecorated: ☐ Yes ☐ NoBottom: ☐ Flat ☐ Round

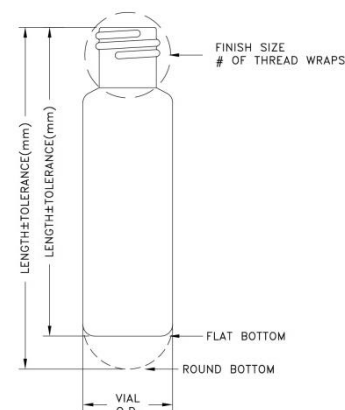
Size:

_____ OD (6mm up to 32mm)

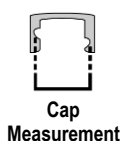
_____ Length (12mm up to 178mm)

_____ Wall Weight (0.70 up to 2.8mm)

_____ Fill Capacity(.5mL up to 100mL)

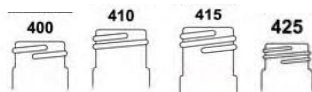


* A container and its corresponding cap must have matching finishes.

Cap: ☐ Metal ☐ plastic ☐ Lined ☐ Unlined ☐ Lining Material _____

Measure from one side of the inner wall to the opposite side to determine cap diameter. Calculate a bottle's neck finish by measuring the diameter of the outermost threads. Then, see how many times the threads pass one another to determine the finish. (ex. 20 mm dimension with 1.5 thread turns = 20/410 neck finish). ***A container and its corresponding cap must have matching finishes.**

Common Neck Finish:

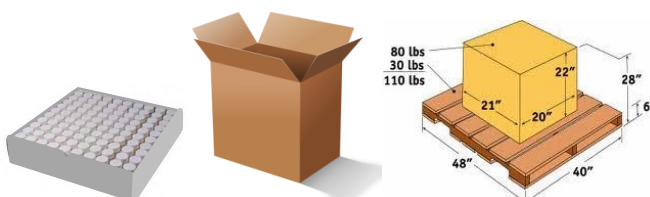


Other _____

BUDGET: _____ QUANTITIES: _____ END USE APPLICATION: _____

Quality plan or special considerations: _____

Additional comments: _____

PACKAGING: ☐ shrink wrap modules ☐ Tray Pack ☐ Cell Pack ☐ Carton ☐ Palletized

What we can provide

Materials




Richland Glass vials are made from the following materials:

ASTM and USP Type 1, Classes A and B borosilicate glass. Both ASTM and USP call for clear, 32-33 COE borosilicate glass for Type 1, Class A specifications. This describes a clear glass made from primarily pure silica with small percentage of Boron or Boric Oxide and a very small percentage, (less than 0.5%) of other compounds and very low contaminants and extractables. ASTM/USP Type 1, Class B refers to amber glass and clear glass with a coefficient of expansion of 48-56 COE.













Type 1 borosilicate glass has high chemical resistance as well as very low extractables. These types of glasses can handle temperatures over 200 Degrees C and are capable of handling any type of sterilization procedures. These glasses are compatible with all types of laboratory and packaging applications including both parenteral and non parenteral products as well as most reagents, buffers and chemicals. Type 1 borosilicate glass also has a very low pH shift when exposed to water and reagents and make it an ideal packaging medium.

Richland Glass offers vials with the following bottoms:

Bottom Design Diagram	Description
Flat Bottom 	Most vials are made with a flat bottom.
Round Bottom 	Rounded bottom. The round bottom is used in culture and media tubes.
Radius Bottom 	Headspace vials are also available in a radius bottom-design which allows for orienting the vials in racks.

Tooled and Untooled Vial Finishes

Richland Glass offers vials with the following finishes in various O.D.s and lengths *(some, not all listed below)*:

Finish Type Diagram	Description	Application
Shell Vial 	Shell Vial has a fire -polished neck. The vial opening has the same dimensions as the straight-sided wall.	Biotechnology Chromatography Cosmetic Pharmaceutical
Flat Crimp 	Crimp Finish is available in 8mm - 28mm.	Serum vials Biotechnology Pharmaceutical Reagent Packaging Aluminum Seals
Tapered Crimp 	Tapered Crimp Finish is available in both 20mm and 28mm.	Serum vials Biotechnology Pharmaceutical Reagent Packaging Aluminum Seals
Snap Neck Finish 	Snap Neck Finish vials are available in 11 mm to facilitate fitting into autosamplers.	Autosamplers Chromatography Snap in top Aluminum Seal
Screw Thread 	The 9mm Screw Thread Finish is designed for use with robotic autosamplers. The threads do not run down to the shoulder of the vial.	Chromatography
425 GPI Screw Thread Neck Finish 	The 8-425 through 15-425 screw thread finish has 2 complete wraps of thread and are designed for short skirted closures.	Sample vials Storage
400 GPI Screw Thread Neck Finish 	The 18- 400 through 33-400 screw thread finish has 1 complete wrap of thread and are designed for short skirted closures.	Environmental Reagent Packaging Sample Storage
410 GPI Screw Thread Neck Finish 	The 18-410 thru 28-410 screw thread finish has 1-1/2 wraps of thread and designed for long skirted closures	Sampling and Storage Reagent Packaging
415 GPI Screw Thread Neck Finish 	The 13-415 thru 28-415 screw thread finish has 2 thread turns and are designed for long skirted closures.	Sampling and Storage Reagent Packaging
24-414 Screw Thread Neck Finish 	The 24-414 screw thread finish vials are available for water testing and provide flexibility in closure and septa options.	Environmental

Use and Capacity

The following descriptions represent common vial size and dimensions.

Description	Dimensions (mm)	Finish	O.D (mm)
Dram Vials			
5/8 dram	15.0 X 26.5	13-425	14.75 ± 0.25
1 dram	15.0 X 45.0	13-425	14.75 ± 0.25
2 dram	17.0 X 60.0	15-425	16.75 ± 0.25
3 dram	19.0 X 65.0	15-425	18.75 ± 0.25
4 dram	21.0 X 70.0	18-400	20.75 ± 0.25
6 dram	23.0 X 85.0	20-400	22.75 ± 0.25
8 dram	25.0 X 95.0	22-400	24.75 ± 0.25
Water Vials			
20mL	27.75 X 57.5	24-400 or 414	27.50 ± 0.25
30mL	27.75 X 70.0	24-400 or 414	27.50 ± 0.25
40mL	27.75 X 95.0	24-400 or 414	27.50 ± 0.25
60mL	27.75 X 140.0	24-400 or 414	27.50 ± 0.25
Serum Vials			
2mL	15.0 X 32.0	13 A/S	14.75 ± 0.25
3mL	17.0 X 37.7	13 A/S	16.75 ± 0.25
5mL	21.0 X 38.0	13 A/S	20.75 ± 0.25
6mL	22.0 X 40.0	20 A/S	21.75 ± 0.25
10mL	24.0 X 50.0	20 A/S	23.75 ± 0.25
15mL	27.0 X 57.0	20 A/S	26.75 ± 0.25
20mL	29.0 X 62.0	20 A/S	28.75 ± 0.25
30mL	30.0 X 76.0	20 A/S	29.75 ± 0.25

Want to Reduce Waste... Get access to every drop?

High Recovery Vials are used to contain valuable and expensive products, such as pharmaceuticals, biopharmaceuticals, diagnostics, or any precious product available in limited quantities. The interior of the vial tapers to a conical bottom to allow maximum withdrawal of liquid contents using a pipette or syringe.



*Allows nearly 100%
retrieval of contents...*



Richland Glass designs and manufactures high recovery vials from tubular glass in your choice of Type 1, Classes A and B borosilicate glass (clear or amber). Vials are available in 4 standards sizes with a choice of screw thread or crimp seal neck finish.

Features and Benefits

- Borosilicate glass is chemical resistant and impermeable to oxygen
- Withstands temperatures up to 200°C, allowing for sterilization and autoclaving
- Optically clear for visual inspection systems and procedures
- Conical bottom allows complete withdrawal of vial contents
- Choice of narrow or wide conical bottom accommodates either pipette or syringe
- Available with a choice of crimp or screw thread.

Suitable for a wide range of applications such as analytical, cosmetics, diagnostic and pharmaceuticals.

Benefits of Tubular Vial Conversion over Molded Glass vials

1. Work with a U.S. manufacturer who is flexible and looks to develop partnerships that are dedicated to providing packaging solutions.
2. Reduced lead times and smaller economic order quantities.
3. No annual production campaigns to consider providing you better inventory management options.
4. No expensive mold costs for specialty designs allowing you to customize your packaging requirements.
5. Experienced in-house package design team.
6. Superior fill level consistency (do include the graphic)
7. Clarity verses glass and/or plastic molded containers facilitates vision system inspections.
8. Consistent and uniform bottom wall weight providing optimum lyophilization results.
9. Lighter per container weight reduces shipping costs.
10. Capacity range from 1mL to 60mL's.

Molded glass vials are formed using a process of injecting a 'glob' of molten glass into a mold, compressed air is used in the pre-forming process to fill the mold and then cooled after which the mold is removed revealing the glass vial. The molded vial is heavier than a tubular vial and has a visible seam in the body.

Tubular vials are converted using long tubing sections of glass that is made to a specific body OD and wall thickness, allowing for a more consistently produced vial in both appearance and fill capacity.

Sales and Customer Support Team

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Other Resources

- Flexibility
 - Specializing in custom design and new project development
 - Sample qualification lots through high volume production requirements
 - On site engineering and technical team dedicated to solve your packaging challenges quickly.
- Responsive service
 - prototype development thru the shipment of production orders that is necessary to stay competitive in the life science and analysis markets
- Custom printing
- Closures
 - **Aluminum**
 - **Phenolic** is a type of thermosetting plastic material known for its physical and molding properties. Phenolic caps have strength and durability with heat-resistant and insulating properties. Excellent resistance to chemical corrosion and low moisture absorption. Autoclaveable.
 - **Polypropylene (PP)** is a rigid plastic that is translucent or may be tinted to provide colored material. At room temperature, polypropylene exhibits excellent chemical resistance to acids, alcohols, and bases. Compatible with acetone, ethyl acetate, methanol, isobutyl alcohol, methanol, methylene chloride, and methyl ethyl ketone. Incompatible with cyclohexane, ethers, dichlorobenzene, pentanes, and trichlorobenzene. Gas, disinfectants or autoclave are recommended to sterilize products made of polypropylene. Maximum temperature use is 135°C.
 - **Polyethylene (PE)**, further classified as low-density, is a flexible translucent plastic. At room temperature, polyethylene exhibits excellent chemical resistance to acids, alcohol, and bases. Gas, radiation or disinfectants are recommended to sterilize polyethylene. Maximum temperature use 120°C.

Additional Technical Data

Benefits of Tubular Glass Vials

1. Clarity verses glass and/or plastic molded containers facilitates vision system inspection
2. No mold seam lines to impact processing in automated filling, labeling and washing lines
3. Consistent wall weight distribution providing high integrity package
4. Smoother and even bottom distribution facilitating improved lyophilization cycle results
5. Small footprint for equal capacity verses molded glass containers
6. Lighter weight per container reduces shipping costs
7. Impermeability, rigid and strong verses plastic
8. Chemically durable and accepts various sterility methods
9. No expensive mold costs for specialty designs or small production volume requirements
10. Realistic, manageable lead times and order quantities
11. Recyclable

Richland Glass Process Capabilities

1. Dimensional Range
 - a. Outside Diameter (O.D.) 6mm up to 32mm
 - b. Overall length 8mm up to 178mm
 - c. Wall weight 0.70 up to 3.2mm
 - d. Flat, round and custom developed bottom forming
 - e. Volume capacity .50uL up to 100mL – based on vial design
 - i. In-house engineering package design assistance available
 - ii. Dedicated sample production work center and technical team
2. Tooled Finishes
 - a. North American G.P.I. standards
 - i. 8-425 thru 33-400 screw thread finishes
 - ii. 11mm thru 28mm aluminum seal crimp finishes
 - iii. 13mm thru 20mm aerosol pump crimp finishes
 - b. European and DIN specialty finishes available
3. Raw Material
 - a. Type I amber
 - b. Type I borosilicate clear – 33 and 51 expansion
 - c. Multiple domestic & worldwide sources to facilitate competitive and continuous supply chain

4. Quality

- a. Documented ISO 9001 registered quality system.
- b. 100% of vial production lines equipped with electronic vision gaging for dimensional inspection
- c. Vials packed in environmentally controlled clear rooms for cleanliness of final packaging
- d. Drug Master File current with FDA for customer access
- e. In-house USP and EP Hydrolytic Resistance test certification
- f. Additional cGMP procedures in place to support pharmaceutical requirements

5. Service

- a. Realistic and manageable lead times of 8 - 10 weeks from receipt of purchase order to start of production
- b. Response to quotation requests by the end of the next business day with any necessary delays communicated accordingly
- c. E-mailed sales order acknowledgements confirming price, quantity and ship date
- d. Annual blanket purchase orders with scheduled releases not to exceed 12 months from date of initial shipment

Pharmaceutical Focused Quality Systems

- ✓ Documented ISO 9001 registered Quality System
- ✓ Additional cGMP procedures in place to support pharmaceutical requirements
 - Raw material traceability maintained for finished vials
 - Certificate of Conformance sent with each shipment
 - Ongoing procedural training and reinforcement updates
 - Comprehensive preventative maintenance system (MP2) in place
- ✓ Drug Master File (DMF #16826) on file with the FDA
- ✓ Systems in place for manufacturing, testing and certifying Hydrolytic Resistance Test “A”
 - Minimized delamination risk
- ✓ 100% in line inspection for vial dimensions
 - Insuring highest quality and lot to lot dimensional consistency.
 - Reduces end user down time and processing costs
- ✓ Clear rooms used to minimize contamination

Is Your Sample Safe?

- Make sure you are getting the correct glass containers.
- Glass being sold into the Environmental market from Asia does not meet EPA directive: OSWER9240.0-05A, 1992 or ASTM Type 1 Class A or B specification.
- Are you compromising your reputation by storing in heavy metal laden glass vials?
- Saving Pennies could cost you Dollars.

Why take a chance? Insist on the correct glass for your sample storage and be sure to get it right the first time.

Analysis of imported Type II suspect glass versus EPA directed Type I Borosilicate:

Expansion Type	Imported Product <u>67.6 X 10⁻⁷</u> II	Correct Product <u>33 X 10⁻⁷*</u> I Class A
ppm As (Arsenic)	456.32	2.10
ppm Cd (Cadmium)	0.13	0.60
ppm Cr (Chromium)	2.60	1.92
ppm Hg (Mercury)	3.34	0.14
ppm Pb (Lead)	20.06	2.08
ppm Sb (Antimony)	3.04	3.91
Total ppm	485.49	10.74

ASTM E438-92 Limit for combined sum of arsenic and antimony is 50 ppm for Type I Class A glass

*Expansion limits for Type I Class A = 30.5 - 34.5 X 10⁻⁷

**Expansion limits for Type I Class B = 46.0 - 58.0 X 10⁻⁷