



FLUOROPURE® CONTAINER SOLUTIONS FOR CHEMICAL APPLICATIONS

Maintain safety, reliability and chemical integrity



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Protect and Transport

For more than 37 years, Entegris—the industry experts for materials integrity management solutions—has been committed to protecting and transporting the critical materials that enable the world's leading technologies in the semiconductor and other high technology industries. Entegris provides solutions that help ensure your success in the semiconductor industry by helping you improve yields, lower costs, improve tool utilization and increase capacity.

Materials integrity management is not optional in today's marketplace and it starts with the chemicals that come into direct contact with every wafer and IC produced. Entegris provides the most comprehensive portfolio of materials management solutions to help you safely handle these high purity, microelectronic-grade chemicals from storage and transport to chemical distribution to point of use.

In response to the industry's drive toward smaller line widths and increased purity requirements, Entegris continues to develop new solutions that reduce our customers operating costs and improve the value of their chemistries.

Leading Edge Research Capabilities



Molecular contamination analysis of metals using an ICP mass spectrometer.



A wide variety of instrumentation allows fast and accurate materials characterization.

The Materials Technology Laboratory (MTL) provides polymer property testing services and investigates molecular contamination issues for Entegris' businesses and customers. It is the mission of the MTL to understand our customers' materials requirements and have programs in development to exceed them.

Dedication to Purity

Extensive chemical, mechanical and physical property analysis in Entegris' MTL ensures polymer materials and composites meet incoming resin specifications. In addition, specific products are monitored regularly for surface contaminants. Every week Entegris dedicates nearly 300 staff hours and more than 1000 instrument hours to resin and product evaluation.

Equipped with state-of-the-art mechanical, chemical and physical analysis instrumentation, the MTL occupies approximately 5000 square feet in Minnesota and 1500 square feet in Colorado. Two Class 10 cleanrooms and a Class 100 laminar flow hood are available for use in both locations.

Product Reliability and Safety

The Technology Characterization Laboratory (TCL) is committed to characterizing materials integrity management products and technologies to assure product performance, reliability and safety. This focus enables our customers to benefit from Entegris' continuous exploration of leading-edge technologies and assures ultimate product performance in their applications.

The analysis associated with this characterization provides greater understanding of all aspects of materials integrity management products and associated technologies, particularly in the areas of functionality, interoperability on process and material handling equipment, reliability, environmental robustness, ergonomics and purity. Whenever possible, this analysis is carried out in actual or simulated customer-use conditions, including semiconductor, data storage, microelectronics and biopharmaceutical conditions.

Ultimate Product Performance

Every week Entegris dedicates more than 400 technical staff hours and more than 2800 equipment hours to the functional evaluation of our products. Our continuous exploration of leading-edge technologies and product characterization assures ultimate product performance in customer applications.

Advanced Manufacturing Capabilities

Entegris has built a reputation as a leader in molding the most difficult materials to close tolerances. We can extrude, injection mold, rotomold, sheetline, blowmold, compression mold and machine more than 150 different materials. Each of our capabilities has been developed, tested and improved to create pure, durable, consistent and reliable products.

The electronic-grade chemicals that you produce or consume are only as pure as the containers in which they are packaged. Entegris understands this and has invested significantly in blowmolding process and assembly technology, which enhances the performance of our blowmolded HDPE drums in ultra high purity applications.



Entegris is committed to characterizing product functionality and assuring product performance.



To ensure continued compliance to stringent DOT/UN shipping regulations, drums are conditioned in our on-site environmental chamber, then transferred to the drop pad for drop testing.



Entegris precleans drum inserts in a Class 100 automated cleaning system.



In a Class 1000 cleanroom, Entegris ensures drum purity by utilizing automated assembly and test procedures.

Unmatched Purity Levels

Precleaning drum inserts and port components is standard procedure and is performed on-site with custom fully automated Class 100 cleaning equipment built specifically for this purpose. In addition, full robotic automation and testing ensure consistency and unmatched purity levels.

Our state-of-the-art manufacturing facilities include Class 100 and Class 1000 cleanrooms, controlled manufacturing environments, sophisticated process control equipment, computerized in-process inspections and highly trained personnel.

Quality Control, Safety Assurance

Entegris' global quality system uses the ISO 9001:2000 standard as its foundation. Along with this standard, Entegris puts into action other valued elements of the quality system including

continuous improvement, prevention and the measurement of customer satisfaction. In addition, statistical techniques are employed throughout the product development and manufacturing processes to ensure consistency, capability and predictability.

Per DOT/UN regulations, Entegris is required to conduct annual performance-based testing on our transport containers. One of these tests is particularly punishing and consists of filling our 55 gallon FluoroPure® HDPE drum, conditioning it to 0°F (-18°C) and dropping it from a height of 6.5 feet (2 meters) onto a metal/concrete floor. To pass, the container must not leak. Although DOT/UN regulations require this test once a year, as a quality control measure, Entegris chooses to conduct these tests routinely. In fact, in the last 12 months, we have conducted over 250 destructive drop tests. Why? Because we take your safety that seriously – every day.



Entegris routinely conducts on-site drop testing to ensure product reliability and safety.



Chemical Transport

Whether you are transporting chemical via ocean, land, rail or air, Entegris has a FluoroPure® packaging solution to meet your compatibility, purity and regulatory requirements. Purity and safety are maintained when transporting electronic-grade specialty chemicals in Entegris' HDPE or PFA composite drums, intermediate bulk containers, isotainers and tankers. In response to the industry's drive toward smaller line widths and increased purity requirements, Entegris continues to develop new solutions that reduce your operating costs and improve the value of your chemical product.

Blowmolded Drums

Purity and safety are maintained when transporting electronic-grade specialty chemical in FluoroPure® Advantage and Trilayer HDPE drums. Our multilayer blowmolding technology produces drums with higher purity, lower trace metals and fewer particles.

Sizes: 55 gallon (200 liter)

Materials: HDPE

Approvals: DOT/UN approved (1H1/Y2.0/170) to safely transport Group II and Group III chemicals

Styles: Single-use or multi-use

Composite Drums

In today's dynamic semiconductor industry, wafers are being etched with aggressive chemicals such as mixed acid etch (MAE) and nitric acid that quickly deteriorate polyethylene material. Entegris provides composite drums with PFA liners that are chemically resistant and provide a clean, safe way of transporting these aggressive acids or any Group II or III chemical. Entegris also provides composite drum solutions for transporting some Group I chemicals.

Sizes: 55 gallon (200 liter), 30 gallon (100 liter), 46 gallon (175 liter), 15 gallon (50 liter) and 5 gallon (19 liter)

Materials: PFA liner, blue PE (white PE for 5 gallon package) or stainless steel overpack

Approvals: DOT/UN approved for transporting Group II and III chemicals including chemicals with higher vapor pressures



FluoroPure® packaging solutions maintain purity and safety in chemical transport applications.



Entegris' Trilayer and Advantage Trilayer HDPE drums assure chemical integrity.



FluoroPure® PFA composite drums provide the ultimate in purity and corrosion resistance.



FluoroPure® IBCs provide an efficient solution for transporting high volume chemicals safely and efficiently.



Entegris pressure vessels allow direct chemical dispensing without the need for pumps.



Entegris provides PTFE and PFA lined transport and stationary containers.

Intermediate Bulk Containers (IBCs)

The FluoroPure® IBC container design optimizes cleaning, while the integral sump maximizes chemical retrieval over 99 percent. The polyethylene overpack with integral fork truck pockets provides a durable alternative to easily corroded metal cages. The IBC is also available with a polyethylene base pallet that allows four-way fork truck access.

Sizes: 500, 800 and 1200 liter

Materials: PFA or PE liner, blue PE overpack

Approvals: DOT/UN approved (UN31HH1/Y) to safely transport most Group II and Group III chemicals.

Pressure Vessels

FluoroPure® pressure vessels are designed for pressurization to allow direct chemical dispensing from the container without the need for pumps. This patented reusable composite design interfaces with the patented key-coded Quick Connect System to assure against unsafe chemical mixing.

Sizes: 5 gallon (20 liter) and 25 gallon (100 liter)

Materials: PFA liner, FRP filament wound shell with PE overpack

Approvals: DOT/UN approved [UN6HH1/X2.0/250 (20 liter) and UN6HH1/X2.0/330 (100 liter)] for packaging Group I, II and III chemicals.

Sheetlined Containers

Today, chemical manufacturers are capable of producing extremely pure chemicals. However, the integrity of these clean chemicals can be compromised during storage and transport. Because Entegris understands that maintaining chemical integrity starts with the resin, Entegris uses etched back PTFE sheets, which allow superior bonding strength to the inside of a rigid outer vessel. This process slows the negative effects of permeation and increases tank life—which lowers your cost of ownership.

Sizes: Up to 80,000 liters

Materials:

Shell: Stainless steel, coated steel or fiberglass reinforced plastic (FRP)

Lining: Etched-back PTFE, glass-back PTFE, glass-back PFA

Connections: ANSI flange, Flaretek®, PureBond®, sanitary clamp and NPT

Approvals: ISO, ASME, FMM, BV, ADR/RID, TIR, IMO1, US DOT IM 101, UIC, CSC, AAR 600, IMDG

Chemical Storage

Entegris understands your need to maintain purity while storing valuable microelectronic-grade chemicals. To extend to you the benefits of storing chemicals in bulk and maximizing your operation efficiency, Entegris offers a family of fluoropolymer sheetlined and rotomolded day tanks. Having developed expertise in polymer materials characterization enables Entegris to be a leader in the selection and development of ultrapure materials for use in all FluoroPure® containers. This translates to chemical storage solutions that maintain the utmost purity.

Custom Storage Tanks

Entegris offers expertise in the design, development and manufacture of process tanks, mixing or storage vessels and shipping containers, as well as a variety of custom storage, slurry and day tanks for use in storing or mixing of your ultrapure chemistries. Each vessel can be customized to your specifications.

Sizes: From 1 gallon (4 liters) to 1,057 gallons (4,000 liters) with wall thickness from 1/16" to 1/4"

Materials: PFA, PTFE or polyethylene



Entegris provides custom storage tanks for storing or mixing ultrapure chemistries.

Chemical Delivery

Entegris is the leader in providing clean, safe fluoropolymer chemical container solutions, including vessels customized to your specifications. In addition, Entegris provides the industry standard Quick Connect System that assures against unsafe mixing and minimizes human exposure to the chemical and fumes—for all chemistries.

Pressure Vacuum Vessels

Entegris' custom Pressure Vacuum Vessels (PVVs) eliminate the need for pumps in bulk chemical delivery equipment. Use of the PVVs ensures safe handling of corrosive fluids dispensed under pressure and prevents pressure surges and costly maintenance associated with standard pumps. Additionally, the PVVs allow for chemical mixing and metering as vessel volumes are designed around your specific needs.

Sizes: 4" and 6" diameter

Materials: PFA

Approvals: CE



Entegris' chemical delivery solutions ensure against unsafe mixing and maintain chemical integrity. Photo courtesy of Cypress Semiconductor Corporation.



Entegris provides tremendous flexibility in customizing PVVs to your dispensing needs.

Quick Connect Systems

Entegris offers three drum connection styles that provide a safe and reliable means of connecting a bulk chemical source to the chemical dispense unit. The Quick Connect system is the industry standard for interfacing FluoroPure® containers with bulk chemical delivery systems safely and conveniently. The patented design is key coded to assure against unsafe chemical mixing while guaranteeing dedicated clean service. One connection provides dispensing, venting and level detection/connection verification.

Materials (wetted):

Drum insert: PFA or polyethylene

Dispense head: PFA, PTFE, Kalrez® 4079 o-ring

The Single-use connection style provides dispensing and venting functions in a single connection. This connection style incorporates Entegris' patented Flaretek® sealing technology and results in a very reliable, high purity o-ring-free dispense connection without chemical key coding.

Materials (wetted):

Drum insert: Polyethylene

Dispense head: PFA

The Single Line Quick Connect performs dispensing and venting functions in two separate connections. This connection style is also based on Entegris' patented Flaretek® technology, resulting in o-ring-free dispense and vent connections without chemical key coding.

Materials (wetted):

Drum insert: Polyethylene

Dispense head: PTFE



Entegris' patented Quick Connect System is the industry-accepted means for connecting the drum to a chemical distribution system.



In addition to the standard Quick Connect, Entegris offers other connection styles including Single-use and Single Line Quick Connects.

Complementary Products

Process Tanks

Entegris provides single piece, injection molded, rotationally molded and fabricated open top process and rinse tanks. Custom vessels are available to meet your unique wet processing application needs.

Sizes: 3" (75 mm), 100 mm, 125 mm, 150 mm, 200 mm and 300 mm

Configurations: A variety of single and dual capacity, rectangular and round

Materials: PFA or PVDF



Process and rinse tanks can be customized for your wet processing applications.

Fluid Transfer Products

In addition to FluoroPure® packaging solutions, Entegris offers the broadest range of material handling solutions for ultrapure and corrosive applications, all designed to increase productivity and yields. These products include sensing and control, valves, fittings, tubing, pipe and related equipment. Contact your local Entegris representative for more information on fluid products.

To review our complete line of fluid handling products, log on to the Entegris Web site www.entegrisfluidhandling.com or contact Entegris Customer Service for your free *Fluid Handling Products* catalog on CD-ROM.



Entegris offers the broadest range of fluid handling systems designed to increase productivity and yields.

Terms and Conditions of Sale

WARRANTY – Entegris warrants each new product against defects in materials and workmanship for the following periods of time from shipment: Microelectronic products, Custom products – 90 days; Entegris® Cleaning Systems and AutoPod™ Wafer Carriers – 1 year; Fluid Handling products (except as separately identified below) including FluoroPure® Chemical Container products – 1 year; Sheetlined Chemical Container products and FluoroPure® PFA Liners (blistering, cracking or leakage only) – 18 months; FluoroPure® o-rings and gasket materials – 90 days. Entegris makes no warranty, express or implied, with respect to any components, products or services provided by any third party. With respect to products specially manufactured to Buyer's specifications, Entegris warrants only that such products have been manufactured, without testing, to Buyer's specifications but makes no other warranty, express or implied. Upon Entegris' confirmation of defects, Entegris agrees, as its **exclusive remedy** to repair or, in its discretion, replace defective product without charge. Entegris is not responsible for product damage resulting from accident, misuse, or lack of reasonable care. **IMPORTANT: No other warranty, written or verbal, is authorized by Entegris. Entegris is not liable for any special, incidental or consequential damages. Implied warranties of merchantability and fitness for a particular purpose are specifically disclaimed.**

For More Information

To learn more about Entegris' FluoroPure® chemical packaging solutions and how they maintain safety, reliability and chemical integrity, contact your local Entegris representative or Entegris, Inc.

To review Entegris' complete line of FluoroPure® products and our comprehensive line of fluid handling solutions see Entegris' *Fluid Handling Products* catalog, visit Entegris' Web site at www.entegrisfluidhandling.com or contact Entegris Customer Service for your free *Fluid Handling Products* catalog on CD-ROM.

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