Entegris

Clean Chemical Delivery Solutions

Reducing contamination and ensuring clean chemical delivery from manufacture through point of use

Introduction

For more than 50 years, Entegris has been a provider of critical products and materials used in advanced high-technology manufacturing. We focus on understanding your operations and sources of contamination to develop materials-enabled solutions that ensure the integrity of your processes. Controlling contamination begins with the chemicals that come into direct contact with every wafer; and increasing chemical purity is the first step in enabling process cleanliness and improving device yield. From our raw materials, to our internal processes, to our fluid handling systems, we are focused on delivering a higher level of purity and taking care to avoid introducing contaminants during chemical packaging, transport, and distribution.

From the moment materials are delivered to Entegris to the time they are converted into products and installed in our customers' production lines, we ensure they meet stringent purity specifications.

Clean Chemical Delivery

As mega-trends, such as artificial intelligence and robotics, smart homes and smart cars, and the Internet of Things evolve to meet growing needs for speed, scale, and reliability, they put pressure on integrated device manufacturers (IDM) to increase processor power efficiency and memory size. Device manufacturers striving to meet new worldwide consumer and business data demands at lower costs face significant challenges in terms of process control, yield, and economics.

As logic devices go to smaller line widths, 3D NAND architectures increase layers, and DRAM memory density increases, sensitivity to contamination and defects have a greater impact on device performance. To achieve optimum wafer yield and reliability, the microelectronics industry needs to address the increased materials consumption requirements and material purity challenges from chemical manufacture to point of use.

Mitigate Particle Contamination

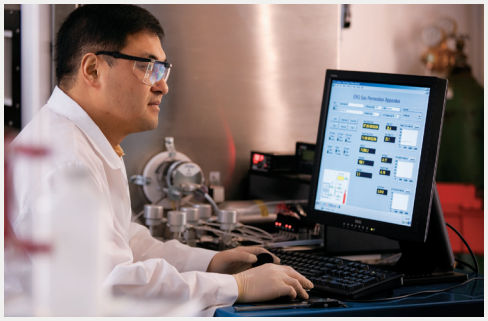
Not all components are the same in terms of particle cleanliness and contamination. We understand the importance of resin selection and continued testing, and how to employ process controls to control purity consistency. It is important to select suppliers, like us, who have a proven understanding of fluoropolymer processing and how to control potential sources of contamination. Investments in newer and purer materials enable us to provide the cleanest and most reliable polymer solutions to protect your overall process quality and efficiency. As technology advances, sensitivities to chemical contamination increase. Mitigate particle contamination by investing in our contamination-controlled solutions that are less prone to particle shedding, minimize dead legs and entrapment areas, reduce particles generated by moving parts, and employ advanced filter membrane technology.

We have a deep knowledge of materials science and analytics, advanced materials, microcontamination control, and an understanding of our customers' processes and process challenges.

Reduce Leachable Metallic Contamination

Semiconductor processes, such as photolithography and wet etch and clean, have become more metal sensitive at advanced process nodes. In all fluoropolymer delivery systems, metals leaching from material in components such as PFA tubing, valves, and purifiers impact device yield. It can take months for metal contaminants to leach out of materials. Reduce your risk by working with us. We are working to reduce contamination by researching ultraclean PFA materials, performing metals extraction testing on our products, and optimizing our processes to reduce contamination. We invest in identifying where impurities may be introduced, and take corrective actions to prevent them, which is a critical first step in contamination reduction efforts.

With our broad portfolio of microcontamination control, advanced materials handling, specialty chemicals, and engineered materials, we are uniquely positioned to help customers maintain a clean chemical delivery environment. Our contamination-controlled solutions work together to provide a reliable, single-sourced fluid system. These solutions include contamination-controlled chemical packaging, clean fluid management and process monitoring systems, and advanced filtration membrane technology that will increase product yield and reduce financial loss.



Material selection and integrity are assured by thorough inspection and analysis.

Contamination-controlled Chemical Packaging

Whether transporting, storing or dispensing chemical in bulk or to the point of use, our transport vessels, storage tanks, and quick connect systems are designed to maintain chemical integrity and not contaminate your process.

FLUOROPURE® HDPE BLOWMOLDED DRUMS

Rely on our FluoroPure HDPE blowmolded drums to maintain purity and safety when transporting large volumes of electronic-grade specialty chemicals. Our product portfolio of Advantage Trilayer and Trilayer drums has material options to meet all purity requirements around the globe. With higher purity, lower trace metals, and fewer particles compared to industry standard HDPE drums, our chemical packages help ensure clean chemical delivery.

FLUOROPURE INTERMEDIATE BULK CONTAINERS (IBC)

Don't risk contaminating your clean chemicals with dirty transport containers. Our FluoroPure IBCs provide a durable, high-purity alternative to easily corroded metal cages. Reusable 500, 800, and 1200 liter packages safely and efficiently transport chemicals in bulk, including chemicals with high vapor pressures.

SENTRY® QUICK CONNECT SYSTEMS

To maintain a clean chemical environment, it is important to invest in chemical packaging and connection systems designed to work together to maintain chemical integrity. Our Sentry QCIII quick connection system is the cleanest, safest, and most user-friendly connection system available for bulk chemical dispense. Designed for use with FluoroPure chemical containers, this reliable means for filling containers or connecting a bulk chemical source to the chemical dispense unit remains the industry standard for high-purity chemical dispense.

Contamination-controlled Chemical Packaging (continued)

NOWPak® LINER-BASED SYSTEM

Chemicals can be susceptible to particle contamination that may be introduced during chemical transport or transfer from bulk chemical containers to smaller drums or transportation packs. Mitigate this risk with our clean, contamination-controlled NOWPak liner-based bottle and canister system that helps protect valuable materials throughout the filling, transporting, and dispensing operations.

NOWPak LINER-BASED BOTTLE SYSTEM

The NOWPak liner-based bottle system is designed for applications that require containment and safe transport of liquids that have high-purity requirements and/or are sensitive to the environment.

NOWPak LINER-BASED CANISTER SYSTEM

Deliver your critical process materials safely and efficiently with our NOWPak liner-based canister system. The pressurizable, reusable canister system promotes ultraclean chemical dispensing without direct contact between the chemical and drive gas, minimizing the risk of microbubbles and wafer defects.

RUGGED AND EFFICIENT CLOSURES AND CONNECTORS

Avoid introducing contaminants into your clean chemical with our NOWPak closures. These reliable closures securely seal bottles after they are filled with clean chemical, maintaining purity and chemical integrity.

ErgoNOW™ key-coded connectors help ensure a safe, clean fluid path by providing mechanical and electronic misconnection prevention. The sealed delivery system ensures safe chemical delivery and helps prevent external contamination while reducing operating costs.

Clean Fluid Management

Investing in cleaner fluid systems to more comprehensively meet the leading-edge technology purity specifications is an important part of the contamination reduction effort. Without contamination-controlled fluid management systems, ultrapure chemicals are vulnerable to recontamination by particles, metals, and impurities.

Not all components are the same in terms of particle cleanliness and metals content. We have a proven understanding of fluoropolymer processing and regularly evaluate our fluid handling components to ensure they are the cleanest, best-performing components available to meet your stringent purity requirements.

FLUOROLINE® ULTRACLEAN PFA TUBING

As chemical is transported through miles of tubing or in re-circulation loops, it is vulnerable to leachable metallic contamination. Protect your valuable chemical from contamination with FluoroLine ultraclean PFA tubing, which has the lowest total metal extractables and the least amount of surface contamination.

REDUCE CONTAMINATION WITH FEWER ENTRAPMENT AREAS

Designed for use with corrosive chemicals, Integra® Plus WS valves provide unmatched purity in any fluid handling system. The weir-style design streamlines the flow path and eliminates dead volume, providing industry-leading flow performance while keeping the fluid path clean and free from contaminants.

HIGH-PURITY PFA CONNECTIONS MAINTAIN CHEMICAL PURITY

Extremely robust and clean, PrimeLock® tube fittings offer the most reliable connection technology on the market. The ultraclean, high-purity PFA design provides clean, non-contaminating reliability and safety within your system.

Clean Fluid Management (continued)

CONSTRUCTED FOR CONTAMINATION CONTROL

Precise, point-of-use chemical flow control is vital in ultrapure liquid chemical applications, and with DI water and slurry. It is imperative at the point of use, that contaminants are not introduced into the chemical and create defects on the wafer. Our InVue® integrated flow controllers, NT6510 and NT6520, are designed to minimize dead volume and fluid shear, reducing the possibility of process contamination. Fluorinated materials of construction protect chemical integrity, which helps to increase yield.

PROCESS MONITORING WITHOUT INTRUSION OR INTERRUPTION

Detecting metal and process excursions that lead to metallic contamination is critical to maintaining a clean, chemical environment. Our InVue concentration monitors watch for chemical excursions in BEOL, FEOL, and sub-fab delivery chemical systems. Early visibility to impurities increases wafer throughput, reduces chemical costs, and decreases scrap.

Advanced Contamination Control Technology

Through novel polymer design, diverse membrane manufacturing techniques, and advanced cleaning technologies, our liquid filtration and purification solutions enable you to tailor your contamination control based on the chemicals used, and the conditions required.

EFFECTIVELY REMOVE PARTICLE CONTAMINANTS

Filter membrane technology has advanced to enable sub-10 nm particle removal, which is vital to improving overall operating efficiency and enabling leading-edge technologies. Oktolex™ membrane technology tailors the Impact® 8G filter membrane to target specific contaminants and achieve maximum removal efficiency, which helps to maintain a clean chemical environment.

Advanced Contamination Control Technology (continued)

EFFECTIVELY REMOVE METAL CONTAMINANTS

Cleaning process tools and components like photoresist dispense pumps can reduce the impact of metallic contamination. At advanced logic nodes, gel defects and microbridged circuits are detrimental to device yield. The use of our Purasol™ SP/SN solvent purifiers can be especially effective at removing both dissolved and colloidal metal contaminants from a variety of ultrapure, polar, and non-polar solvents used in photoresist applications.

Clean Chemical Delivery from Manufacture Through Point of Use

Entegris is in a unique position to help you maintain a clean chemical delivery environment with contamination-controlled chemical packaging, filtration, pumps, and fluid handling products that will increase product yield and reduce contamination of process chemicals.

Our solutions are less prone to particle shedding and metallic ion contamination, and help you maintain a clean environment from chemical manufacture through point of use.

LIMITED WARRANTY

Entegris' products are subject to the Entegris, Inc. General Limited Warranty. To view and print this information, visit entegris.com and select the Legal & Trademark Notices link in the footer. Entegris does not warranty any failure in the case of customers using unapproved foreign components.

FOR MORE INFORMATION

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