VOLUME 2 • 2017

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VWR Single-Use Solutions enable biopharmaceutical manufacturers to implement single-use technologies that reduce contamination risk, improve resource efficiency, and lower labor and energy costs. Our solution provides product choice, services, and the expertise to help navigate through the various fluid handling challenges, component options, and quality and regulatory compliance constraints of the single-use world. At VWR, our goal is to help accelerate your scientific innovation by providing solutions that allow you to focus on your work and keep your production line running.

Through our single-use solutions, we can help solve unique problems in all areas of a biopharmaceutical manufacturing operation. Our custom single-use solution capabilities include:

- Tanks & Tank Liners
- Ported Pillow Bags & Bag Mixing Systems
- Bottle Assemblies
- Hose & Tubing Manifolds
- Specialty Connectors
- Standard & Custom Products
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VWR COLLECTION

designed for protection

VWR® CERTICLEAN® Class 100 Nitrile Gloves

- Ambidextrous
- Powder-free
- Feature a beaded cuff for strength and reduction of cuff roll down
- Strong, puncture-resistant construction
- Film thickness designed for comfort and tactile sensitivity
- Textured fingertips for a reliable grip
- 6.3 mil thick at fingers and 5.1 mil thick at palms, 25.4 cm (10") long
- Low particle count
- Color: white

Size	Cat. No.	Case of 1000
X-Small	**40101-220**	**544.69**
Small	**40101-222**	**544.69**
Medium	**40101-224**	**544.69**
Large	**40101-226**	**544.69**
Large+	**40101-227**	**544.69**
X-Large	**40101-228**	**544.69**

VWR® CERTICLEAN® Class 10 Latex Gloves

- Ambidextrous
- Powder-free, natural rubber latex
- Feature a beaded cuff for strength and reduction of cuff roll down
- Film thickness designed for comfort and tactile sensitivity
- Textured for a reliable grip
- Length: 30.5 cm (12")
- Color: natural

Size	Cat. No.	Case of 1000
Small	**40101-146**	**763.05**
Medium	**40101-148**	**763.05**
Large	**40101-150**	**763.05**
X-Large	**40101-152**	**763.05**

VWR® Glove Liners

Ergonomically designed glove liners are made from 15 denier, low-lint nylon knit fabric. Liners provide protection and comfort when used with latex, nitrile, and PVC gloves. Fully launderable for reusability and economy.

- Ambidextrous glove liners
- Reduces perspiration and wicks away moisture
- Sturdy, launderable, and reusable
- Color-coded cuffs indicate size
- Pre-laundered; will not shrink
- Color: White

Size	Cat. No.	Pack of 20	Case of 300
Half-Finger Liners			
Small	**94000-616**	**37.99**	**374.00**
Medium	**94000-618**	**37.99**	**374.00**
Large	**94000-620**	**37.99**	**374.00**
X-Large	**94000-622**	**37.99**	**374.00**
Full-Finger Liners			
Small	**94000-608**	**36.02**	**354.60**
Medium	**94000-610**	**36.02**	**354.60**
Large	**94000-612**	**36.02**	**354.60**
X-Large	**94000-614**	**36.02**	**354.60**
Full-Finger Liners, Extra Thick			
X-Large	**10124-750**	—	**630.66**

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Introducing the NEW Kimtech* A7 Certified Liquid Barrier Gown

Size	Cat. No.	Case of 100
Small/Medium	75870-726	388.97
Large/X-Large	75870-728	416.76
XX-Large	75870-730	444.54

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VWR® COLLECTION

designed for protection

VWR® Basic Protection SPP Lab Coats

VWR® Basic Protection SPP Lab Coats are manufactured from a spunbonded polypropylene (SPP) fabric that is strong, lightweight, and breathable. They may be used to protect against dirt, grime, and certain dry particulates in nonhazardous environments. These knee-length, general-purpose garments are ideal for less critical areas or pre-gowning entry rooms.

- Economical, disposable first-line barrier
- Maximum breathability
- Low linting
- Feature inset sleeves, snap front, and tapered collar
- Available with elastic cuffs or knit cuffs
- Serged seams

Size	Cat. No.	Case of
Elastic Cuffs, No Pockets		
Small	**414004-352**	25/ **143.35**
Medium	**414004-353**	25/ **143.92**
Large	**414004-351**	25/ **145.10**
X-Large	**414004-350**	25/ **144.89**
Knit Cuffs, Three Pockets		
Small	**414004-346**	30/ **150.91**
Medium	**414004-345**	30/ **151.16**
Large	**414004-344**	30/ **152.88**
X-Large	**414004-342**	30/ **153.39**

Additional sizes and styles available.
For a complete listing, visit **vwr.com**.

VWR® Basic Protection SPP Bouffant Caps

Caps are manufactured from a spunbonded polypropylene (SPP) fabric that is strong, lightweight, and breathable. They protect against dirt, grime, and certain dry particulates in nonhazardous environments. These general-purpose garments are ideal for less critical areas or pre-gowning entry rooms.

- Economical first line barrier
- Non-linting

Size, in.	Color	Cat. No.	Case of 1000
Latex-Free			
21	White	**89107-768**	**150.64**
24	White	**89107-770**	**164.01**
Pleated Cap Latex-Free			
21	White	**89522-670**	**149.42**
24	White	**89522-672**	**160.00**

Shop **vwr.com** for additional styles.

Quality Systems, Traceability and Documentation:

Factors to Consider when Choosing Cleanroom Garments

By Jennifer Galvin, Ph.D.

Given each cleanroom is unique, thorough risk assessments are undertaken to understand the needs of a facility, and to make sure that the garment system chosen matches with those needs. When evaluating protective garments for use in a cleanroom or controlled environment there are many aspects that factor into the decision-making process. These can include, but are not limited to, the following:

- Physical property performance: barrier, strength & particle shedding
- Cleanroom classification and gowning requirements
- Need for worker protection to hazardous substances
- Garment comfort, fit and available sizes
- Range of offering including coveralls & accessories that can cover a worker "head-to-toe"
- Single-use or reusable garment systems
- Quality systems, garment traceability and documentation

Quality systems evaluation

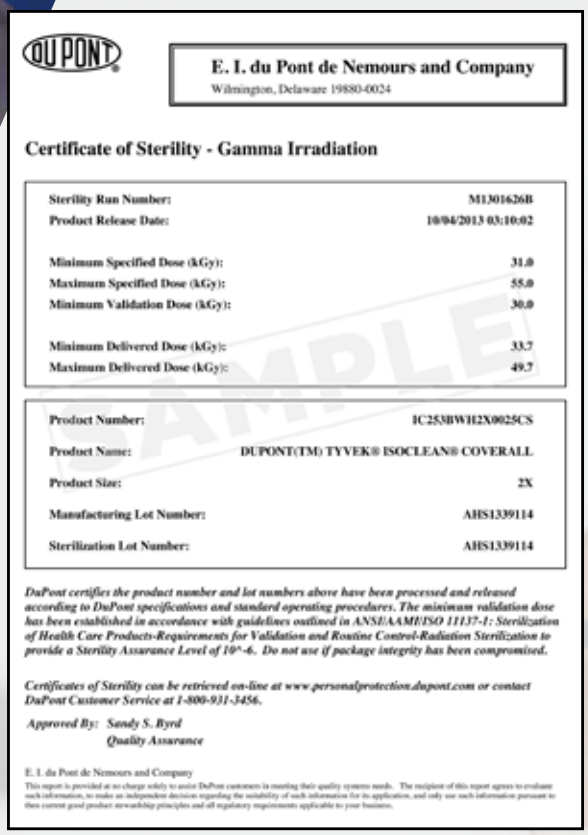
Quality system evaluation covers all phases of the garment selection process: garment evaluation, qualification, on-going garment assessment and control, as well as routine auditing and procedures. For industries, such as pharmaceutical or medical device manufacturing, quality system considerations for garment manufacture and supply can be especially important, as regulations may require that manufacturers evaluate the quality systems of their suppliers. Often, "paper" or physical audits are conducted to verify adequate systems are in place to control garment quality. The ability of the garment supplier to facilitate these audits and to provide requested information can be an important part of the garment selection process. Certification of the garment supplier quality management system to a third-party standard, such as ISO 9001, can also be a benefit.

Traceability through the life cycle

The ability to trace garments through their life-cycle is another factor in the cleanroom garment decision. For reusable garments, a system should be in place to track the number of laundering, and if appropriate, sterilization cycles the garment has received. Traceability, in this case, is often achieved by the use of bar-coding or radio-frequency identification (RFID) tags in individual garments. These can be important for understanding the garment life-cycle and to make sure that garments at the end of their life-cycle are removed from service promptly. They also aid in garment inventory control. For single-use garments, traceability is often via the garment production lot information, typically found on the garment packaging, or in the quality assurance documentation provided with the garments. During the gowning process, garment packaging material with lot information is typically disposed of, therefore additional information may be needed to trace the garment through its manufacturing process.

Figure 1: Example of a garment traceability number inside a Tyvek® IsoClean® sterile garment

Sterile garments and accessories in the DuPont™ Tyvek® IsoClean® line have a numeric stamp inside the garment that allows it to be traced back through the manufacturing process, even if the lot information from the packaging is unavailable (Figure 1).



E. I. du Pont de Nemours and Company
Wilmington, Delaware 19880-0024

Certificate of Sterility - Gamma Irradiation

Sterility Run Number:	M1301626B
Product Release Date:	10/04/2013 03:10:02
Minimum Specified Dose (kGy):	31.0
Maximum Specified Dose (kGy):	55.0
Minimum Validation Dose (kGy):	30.0
Minimum Delivered Dose (kGy):	33.7
Maximum Delivered Dose (kGy):	49.7
Product Number:	1C253BWH2X0025CS
Product Name:	DUPONT(TM) TYVEK® ISOCLEAN® COVERALL
Product Size:	2X
Manufacturing Lot Number:	AHS1339114
Sterilization Lot Number:	AHS1339114

DuPont certifies the product number and lot numbers above have been processed and released according to DuPont specifications and standard operating procedures. The minimum validation dose has been established in accordance with guidelines outlined in ANSI/AAMI/ISO 11137-1: Sterilization of Health Care Products-Requirements for Validation and Routine Control-Radiation Sterilization to provide a Sterility Assurance Level of 10^{-6}. Do not use if package integrity has been compromised.

Certificates of Sterility can be retrieved on-line at www.personalprotection.dupont.com or contact DuPont Customer Service at 1-800-931-3456.

Approved By: Sandy S. Byrd
Quality Assurance

E. I. du Pont de Nemours and Company
This report is provided at no charge solely to assist DuPont customers in meeting their quality systems needs. The recipient of this report agrees to evaluate such information, to make an independent decision regarding the suitability of such information for its application, and only use such information pursuant to then current good product stewardship principles and all regulatory requirements applicable to your business.

SAMPLE

Figure 2: Example of a Certificate of Sterility

Documentation

Documentation that is provided with the garments such as data sheets, instructions, catalogs or certificates, is another factor in garment choice. Data sheets summarize relevant information regarding garment performance, such as the environmental conditions in place during garment manufacture, and garment physical properties tested via standard methods. For sterile garments, it is important to make sure that the data sheets reference performance of garments that have been subjected to the sterilization method, as many commonly used sterilization methods may impact garment property performance, after a single exposure or multiple exposures.

Sterility Documentation

In pharmaceutical or other regulated applications, many end-users require documentation checks prior to allowing garments to be used in their facilities. This is especially true in the case of sterile garments. Sterile garments come with additional documentation typically added to the garment shipment, to demonstrate compliance with sterility assurance requirements. For garments sterilized by exposure to gamma radiation, both a certificate of irradiation and a certificate of sterility are often provided. The certificate of irradiation or certificate of processing is provided by the irradiator and will indicate batch, dose records, and performance specifications. Radiation dose limits should also be noted. Certificates of sterility show compliance with additional applicable procedures and limits, and verify that those were met. An example of a certificate of sterility is seen in Figure 2. If a sterilization method other than exposure to gamma radiation is used, the documentation that shows compliance to sterility assurance procedures may differ. The garment purchaser should work with the supplier to make sure they understand the provided documentation, and that it meets their needs. Availability of this information via an online web tool can also be an advantage, in case the certificate is misplaced.

To summarize, choosing garments for use in cleanrooms and controlled environments is a multi-faceted decision that can cover many criteria. Beyond garment performance, assessment of quality systems and documentation are an important aspect in the process.

Providing confidence in cleanroom environments.

DuPont™ Tyvek® Isoclean® sterile, single-use garments help bring a level of comfort and productivity to pharmaceutical, medical device, biotech and electronic settings. Whether you're manufacturing vaccines that protect human life or building communications devices that bring us all a little closer together, DuPont™ Tyvek® helps give you the confidence you need to do the work that matters.

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Ansell

TouchNTuff® 73-500

The TouchNTuff® 73-500 hand specific neoprene glove delivers superior sensitivity and comfort, in sterile, aseptic environments. Its neoprene formulation provides broad chemical splash resistance and its polyurethane inner coating enables easy donning with wet or dry hands. Manufactured without natural rubber latex or accelerators responsible for Type I and IV skin allergies. Ansell's SureFit Technology™ eliminates "cuff roll down".

This glove is suitable for Class 100 (ISO 5)/Grade A Cleanroom environments.
Also available in a non-sterile version (TouchNTuff® 73-300).

Compliance

Compliant with ASTM D 3577, Type II, Cat. III glove

Descriptions

- Ergonomically-designed hand specific neoprene gloves for enhanced fit, comfort, and reduced hand fatigue
- 5.0 mil palm and 5.5 mil finger thickness
- Ergonomically-designed hand specific to enhance fit and comfort, and to reduce hand fatigue and stress
- Manufactured without natural rubber latex or accelerators responsible for Type I and IV skin allergies
- Design and polymer thickness facilitate ease and comfort of double-gloving, while cream color is a good indicator of breach in double donning
- Length: 30.5 cm (12")

Industries

- Academic institutions and laboratories
- Biotechnology
- Medical device manufacturing
- Pharmaceutical

Applications

- Analytical testing / Measurements
- Blister packaging operations
- Maintaining equipment & instruments
- Pelletizing and tablet manufacturing
- Product handling - potential biological hazard
- Product handling - potential chemical hazard
- Vaccine / Injectable / Sterile operations
- Weighing & dispensing

US ONLY

Size	Cat. No.	Case of 200
5.5	10054-585	473.08
6	10054-587	473.08
6.5	10054-589	473.08
7	10054-593	473.08
7.5	10054-595	473.08
8	10055-023	473.08
8.5	10055-025	473.08
9	10055-027	473.08

These products are not available in Canada. Please contact your VWR Sales Representative to learn about easy access to similar options available in your region.

Enhancing Cleanroom Quality Control and Efficiency through Direct Dispense Technology

By Nandu Deorkar, Ph.D.
Vice President of Research and Development - Avantor

Biopharmaceutical manufacturing is a complex process that involves acquiring, storing and using precise amounts of materials, many of which are dry powders packaged and shipped from suppliers in bulk amounts. These materials are typically handled by trained personnel in cleanroom packaging suites following strict protocols to prevent cross-contamination and ensure consistent product quality.

Preparing buffer and cell culture materials in a cleanroom setting can be labor-intensive and requires substantial investment in facilities and resources, as well as repeated quality assurance testing as bulk materials are subdivided for individual process runs. In addition, time-consuming cleaning and sterilization is required between each batch of materials being processed.

New innovations in raw materials packaging can directly improve this process. Avantor's J.T.Baker® Direct Dispense packaging technology provides single-use, pre-weighed free-flowing delivery of products such as salts, buffers and other cell culture materials directly into production equipment. Materials delivered through the Direct Dispense system can essentially bypass the cleanroom – providing ways to make cleanroom operations more flexible and less of a potential "bottleneck".

Cleanrooms are Labor-Intensive

While pharmaceutical and biopharmaceutical producers are focused on quality, safety and drug efficacy, they are also continuously challenged to reduce costs and improve manufacturing efficiencies. One target for improvement is the cleanroom packaging operation, a necessary but labor-intensive process that can impede production flexibility and throughput.

Upstream biopharmaceutical processes consume raw materials such as cell culture media, carbohydrates, amino acids and buffers, typically supplied in powder form. The bioreactors and medium preparation tanks using these materials often operate around the clock: large-scale reactors with 10,000 L capacity can run continuously up to 35 days, while newer generation single-use production systems, with multiple 2,000 L bioreactors are often configured to operate in overlapping sequences to achieve similar or greater productivity.

Until recently, it was common for most of these materials to be delivered in bulk amounts from suppliers, either in 100 kg drums with one or two plastic liners, or smaller cardboard boxes with plastic liners holding 50 kg. These bulk materials end up making at least two (and sometimes up to five) trips through the cleanroom packaging suite:

- Initial receipt: To receive the material upon the shipment arrival, it needs to be sampled and properly identified. The bulk container is brought into a cleanroom packaging suite and opened to sample. This independently confirms via lab analysis that the quality, purity and characterization match what was ordered. The bulk container is then closed and properly resealed for transport to the warehouse for later use. Some manufacturers also choose to take extra samples for additional characterization tests or future reference.
- Subdivision: Once the material is ready for use, the container is brought back to the cleanroom environment where the appropriate amount is weighed and dispensed into interim packaging. If any material is unused from the original container, it often goes back to storage until needed and the subdivision process in the cleanroom is repeated.

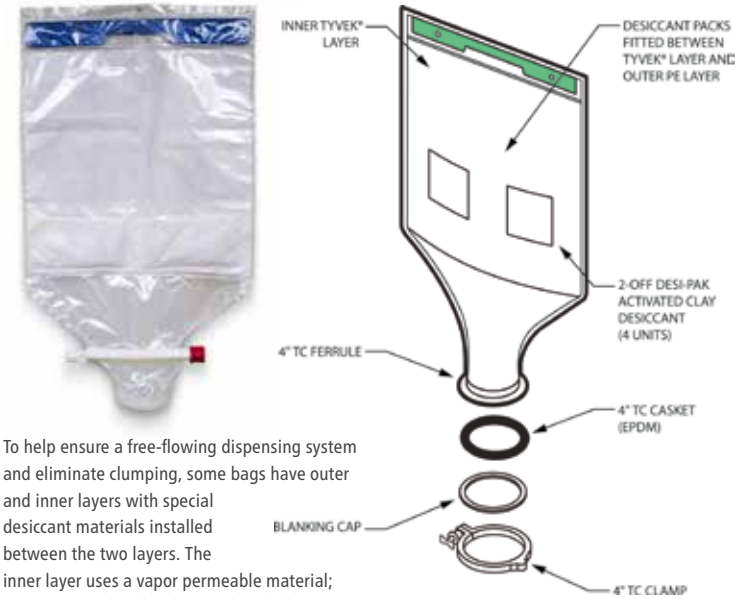
Both the sampling upon receipt and the multiple subdivision steps all make use of the cleanroom and its personnel; for a 2,000 L bioreactor, a manufacturer may need to subdivide a 100 kg drum of material between two and five times.

Cleanroom Processes

Cleanroom facilities and personnel are some of the most tightly scheduled resources in the biopharmaceutical production environment. Given the round-the-clock operations at these companies, manufacturers need to strike an extremely careful balance between stringent quality control and improving efficiency.

Consider the basic steps involved in conducting a standard subdivision of buffer materials:

- The bulk container exterior is typically cleaned of any particulates and brought into the cleanroom by fully gowned personnel. This is typically done one container at a time, to eliminate cross-contamination risks.
- Proper, step-by-step procedures need to be followed for opening each bulk container, hand-separating and weighing the material to be delivered to production.
- Since the bulk container is open throughout subdivision, some biopharmaceutical producers conduct multiple lab analyses of these drums, each time a new quantity of material is removed, to confirm that no issues have occurred.
- All devices and gloves used must fully comply with the cleanliness demands of the cleanroom and the work undertaken in the cleanroom. They must be cleaned, disinfected, or sterilized as appropriate for



To help ensure a free-flowing dispensing system and eliminate clumping, some bags have outer and inner layers with special desiccant materials installed between the two layers. The inner layer uses a vapor permeable material; any moisture that develops within the bag passes through this material and is controlled by the desiccant, to maintain the correct moisture levels.

the type of work being done and the risk they pose for contamination.

- Once subdivision is complete, both the bulk material container and the container holding the production buffers must be sealed and the exteriors sanitized once more before they are delivered to the warehouse or the bioreactors.
- Once this material is removed, full decontamination procedures need to be followed before the next material for subdivision is brought into the cleanroom packaging suite. And when changing materials, the personnel must exit the cleanroom and change gowns, masks and gloves before beginning the next subdivision process.

Some raw materials such as salts, buffers, amino acids and carbohydrates, have an intrinsic propensity to form clumps or cake in storage. Breaking up these clumps is an additional, time-consuming step that cleanroom personnel must complete to measure out the precise amounts needed for bioreactor processes.

All these procedures must be carefully documented according to cGMP standards. The personnel in cleanroom packaging suites need to be highly trained, since working in clean environments demands knowledge, discipline and motivation, as well as a thorough understanding of contamination risks among all personnel involved.

Direct Dispense Enables new Flexibility

Managing the flow of materials through these cleanroom packaging suites is a constant challenge. Avantor's J.T.Baker® Direct Dispense packaging technology offers ways to help streamline cleanroom operations, reduce risks and eliminate the potential for production bottlenecks.

This packaging option provides single-use, pre-weighed and free-flowing product in specially designed, transparent polymer bags that are available to pack up to 100 kg of material. These bags dispense salts, buffers and other cell culture materials directly into their media or buffer preparation tanks, in the exact amounts specified for a given process.

Materials in Direct Dispense packaging do not need to be processed through cleanroom packaging suites: They can be received directly into inventory, and then delivered to production as needed. While many products will still be supplied in bulk containers (requiring sampling upon receipt and then subdivision as needed), incorporating use of Direct Dispense packaging can "lighten the load" on cleanroom suites, enabling more flexibility in using these facilities.

The size, shape, sealing and seams of these bags are designed so that when they are inverted, they dispense virtually all the pre-weighed material into the bioreactor. An important consideration here is that pre-weighed and dispensing amounts are within a one-percent tolerance of the amount of material required. In addition, Direct Dispense bag systems are compatible with non-destructive identity-testing tools, such as contact-free Raman spectroscopy. There is no need to open the bag and take a physical sample to verify the product; the closed bag can be scanned and verified upon delivery, saving multiple testing steps.

Direct Dispense Systems: Time and Cost Savings

Expanding the use of Direct Dispense systems provides a flexible manufacturing technology designed to help biopharmaceutical manufacturers maximize the efficiency and utilization of cleanroom packaging suites. There are multiple efficiencies associated with the use of these systems:

- Labor: Eliminates the time and cost of personnel who need to weigh, subdivide and dispense materials from bulk containers.
- Cross-contamination: The risk of cross contamination—by trace elements not properly removed from the cleanroom after a prior subdivision step, or contamination from cleanroom personnel failing to follow antiseptic procedures—is essentially eliminated.
- Facilities: Use of Direct Dispense systems can eliminate the need for dedicated raw material clean room preparation areas, drum storage and handling equipment, and environmental (temperature and humidity) controls for those areas.
- Testing/validating: Use of Raman testing and tailgate samples greatly simplifies the testing identification step.
- Quality: Pre-weighed Direct Dispense systems eliminate the need to clean the weighing and dispensing area for another operation, thereby saving time and reducing cross-contamination risks.
- Material stability and efficient use: Reduced-clumping packaging design improves raw material yields by avoiding material non-conformities and inaccurate ingredient measurements from severely clumped materials.

Efficient Packaging Drives Productivity

Avantor is committed to offering packaging solutions like the J.T.Baker® Direct Dispense packaging platform—innovative technology engineered to match customers' specific usage, cost and operational requirements. While Direct Dispense technology may not fully replace the cleanroom packaging suite, it does offer a method to help increase cleanroom operational efficiency and enhance biopharmaceutical process productivity and quality.

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Largest Selection of USP/NF Chemicals in the Industry

Size	Packaging	Cat. No.	Each
Dehydrated Alcohol, 200 Proof, Undenatured, USP			
4 L	Amber Glass	**89085-244**	**462.80**
200 L	Drum	**89085-248**	**12,761.05**
Trolamine, NF			
4 L	Amber Glass	**95036-486**	**488.95**
200 L	Drum	**700006-960**	**6242.01**
Dimethyl Sulfoxide, USP			
500 mL	Amber Glass	**95032-948**	**448.05**
Alcohol, 190 Proof, USP			
20 L	Poly Drum	**75811-090**	**1901.30**
4 x 4 L	Amber Glass	**75811-092**	**1614.85**
Isopropyl Myristate, NF			
4 L	Amber Glass	**95033-736**	**395.75**
200 L	Drum	**89078-812**	**2442.24**
Polysorbate 20, NF			
4 L	Amber Glass	**95035-038**	**363.17**
200 L	Drum	**700011-048**	**6431.26**
Castor Oil, USP			
4 L	Amber Glass	**95032-462**	**424.30**
200 L	Drum	**700000-138**	**2444.26**

US ONLY

Size	Packaging	Cat. No.	Each
Glycerin, Synthetic, USP,EP,BP,JP			
4 L	Amber Glass	**95033-430**	**499.15**
200 L	Drum	**89050-420**	**6879.32**
Potassium Acetate, Crystalline Powder, USP			
125 g	Poly Bottle	**95035-068**	**77.80**
Strong Ammonia Solution, NF			
4 L	Poly-Coated Glass	**95031-434**	**211.35**
200 L	Drum	**89079-040**	**2743.24**
Calcium Chloride, Dihydrate, USP, EP,BP,JP			
500 g	Poly Bottle	**95032-248**	**162.24**
50 kg	Fiber Drum	**89050-408**	**3023.82**
Methylene Chloride, NF			
4 L	Amber Glass	**95031-334**	**505.50**
200 L	Drum	**89078-892**	**6673.50**
Isopropyl Alcohol, USP,EP,BP,JP			
4 L	Amber Glass	**700002-616**	**286.53**
20 L	Steel Pail	**700002-614**	**669.69**

This is just a small sample of our vast product offering. Multiple sizes and packaging options available. To see our full line of products, visit **vwr.com** and enter 'Spectrum Chemicals' in the search bar. These products are not available in Canada. Please contact your VWR Sales Representative to learn about easy access to similar options available in your region.

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designed for production

VWR Bioprocessing Chemicals and Excipients

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- Three-Lot Sample Availability
- Standard Pack Sizes for Convenience
- Analytical Laboratory Support
- Regulatory Support
- Management of Change
- Supply Chain Transparency and Audit Support of Raw Materials Manufacturers

EXCiPACT

EXCiPACT™ international excipients certification

Products manufactured at our manufacturing sites in Solon, OH and Aurora, OH are now EXCiPACT™ certified.

For further information, see vwr.com/excipact

NEWLY EXPANDED LINE

Description	CAS No.	Formula	Molecular Weight	Grade	Available Sizes	Cat. No.
Amino Acid Derivatives						
Asparagine, Anhydrous	70-47-3	$C_4H_8N_2O_3$	132.12	Bioreagent	100g, 1kg, 5kg, 25kg	**VWRB15005**
L-Cystine Dihydrochloride	30925-07-6	$C_6H_{12}N_2O_4S_2 \bullet 2HCl$	313.23	Bioreagent	100g, 1kg, 5kg, 25kg	**VWRB21502**
Hypoxanthine Disodium Salt	102-32-9	$C_5H_2N_4O \bullet 2Na$	180.11	Bioreagent	100g, 1kg, 5kg, 25kg	**VWRB31608**
Hypoxanthine Sodium Salt	45738-97-4	$C_5H_3N_4O \bullet Na$	158.11	Bioreagent	100g, 1kg, 5kg, 25kg	**VWRB31752**
L-Lysine Anhydrous	56-87-1	$C_6H_{14}N_2O_2$	146.19	Bioreagent	100g, 1kg, 5kg, 25kg	**VWRB42307**
L-Tyrosine Disodium, Dihydrate	122666-87-9	$C_9H_9NO_3Na_2 \bullet 2H_2O$	261.19	Bioreagent	1kg, 5kg, 25kg	**VWRB87058**
Biological Buffers						
HEPES Free Acid	7365-45-9	$C_8H_{18}N_2O_4S$	238.3	Bioreagent	1kg, 5kg, 25kg	**VWRB30487**
HEPES Sodium Salt	75277-39-3	$C_8H_{17}N_2O_4SNa$	260.3	Bioreagent	1kg, 5kg, 25kg	**VWRB30567**
PIPES Free Acid	5625-37-6	$C_8H_{18}N_2O_6S_2$	302.37	Bioreagent	1kg, 5kg, 25kg	**VWRB73007**
PIPES Disodium Salt	76836-02-7	$C_8H_{16}N_2O_6S_2Na_2$	346.33	Bioreagent	1kg, 5kg, 25kg	**VWRB73305**
PIPES Sequisodium Salt	100037-69-2	$C_{16}H_{33}N_4O_{12}S_4 \bullet 3Na$	670.69	Bioreagent	1kg, 5kg, 25kg	**VWRB73257**
TRIS Hydrochloride	1185-53-1	$C_4H_{11}NO_3HCl$	157.6	Bioreagent	1kg, 5kg, 25kg	**VWRB85827**
Tromethamine (TRIS)	77-86-1	$C_4H_{11}NO_3$	121.14	USP, EP, BP, JPC, Endotoxin Tested	500g, 2.5kg, 12kg, 50kg	**VWRB497**
Carbohydrates						
Dextrose, Anhydrous	50-99-7	$C_6H_{12}O_6$	180.16	USP, EP, BP, JP, Endotoxin Tested	1kg, 2.5kg, 12kg, 100lb, 200lb	**VWRBK876**
Chaotic Agents						
Urea	57-13-6	CH_4N_2O	60.06	USP, EP, BP, JP, Endotoxin Tested	500g*, 12kg, 50kg	**VWRB568**
Inorganic Salts						
Ammonium Sulfate	7783-20-2	$H_8N_2O_4S$	132.14	ACS, NF, Endotoxin Tested	500g, 2.5kg, 12kg, 100kg	**VWRB191**
Calcium Chloride, Dihydrate	10035-04-8	$CaCl_2 \bullet 2H_2O$	147.02	USP, EP, BP, JP, Endotoxin Tested	1kg, 12kg	**VWRB556**
Potassium Phosphate Monobasic, Anhydrous	7778-77-0	KH_2PO_4	136.09	NF, EP, BP, Endotoxin Tested	1kg, 12kg	**VWRB0781**
Sodium Chloride	7647-14-5	NaCl	58.44	USP, EP, BP, JP, Endotoxin Tested	1kg, 2.5kg, 12kg, 50kg, 350lb	**VWRB241**
Sodium Phosphate Dibasic, Anhydrous	7558-79-4	Na_2HPO_4	141.96	USP, EP, Endotoxin Tested	1kg, 12kg	**VWRB0404**
Sodium Phosphate Dibasic, Heptahydrate	7782-85-6	$Na_2HPO_4 \bullet 7H_2O$	268.07	ACS, USP, Endotoxin Tested	1kg, 12kg	**VWRB0348**
Sodium Phosphate Monobasic, Monohydrate	10049-21-5	$Na_2HPO_4 \bullet H_2O$	137.99	ACS, USP, BP, Endotoxin Tested	1kg, 12kg	**VWRB0823**
Sodium Sulfate, Anhydrous	7757-82-6	Na_2SO_4	142.04	USP, EP, Endotoxin Tested	500g, 2.5kg, 12kg, 100kg	**VWRB836**

*This specific product is not available in Canada. Please contact your VWR Sales Representative to learn about easy access to similar options available in your region.

For complete listing, go to **vwr.com/bioprocesschemicals**

VWR (BDH) CHEMICALS designed for research & analysis

VWR® RETURNABLE CONTAINER ADVANTAGE PROGRAM (ReCAP)

Your facility thrives off these vital factors, and with VWR ReCAP, you are optimizing all three in one simple solution.

Performance | Convenience | Safety

Built on the foundation of supply chain innovation, VWR's Returnable Container Advantage Program (ReCAP) reliably delivers performance, convenience, and safety for your high-purity solvents.

The program starts with your choice of sealed 200L stainless steel containers, filled with BDH high-purity Acetonitrile or Methanol (choose your specification). Once at your facility, solvent can be safely dispensed without risking product contamination, spillage, or personal exposure. When the container is almost empty, let us know and we will replace it with a full one so your work remains uninterrupted.

- Inert gas pressurizes container to smoothly dispense high-purity solvent
- High quality and safety with 304 stainless steel
- Tamper-evident seal for peace of mind
- Relief valve for pressure regulation
- Convenience through Swagelok® Quick-Connects
- Serialized containers for precise tracking
- Integrated fork channels for hassle-free transport

US ONLY

Description	Standard Containers Cat. No.
Acetonitrile HiPerSolv CHROMANORM® Super Gradient for HPLC	**BDH83639.201**
Acetonitrile HiPerSolv CHROMANORM® LC-MS	**BDH83640.201**
Acetonitrile HiPerSolv Ultra Low Water for Biopharma	**BDH85500.201**
Acetonitrile for DNA Synthesis	**BDH85501.201**
Acetonitrile HiPerSolv CHROMANORM® Ultra LC-MS	**BDH83642.201**
Methanol HiPerSolv CHROMANORM® Ultra LC-MS	**BDH85800.201**
Methanol HiPerSolv CHROMANORM® Super Gradient for HPLC	**BDH85681.201**
Methanol HiPerSolv CHROMANORM® Gradient for HPLC	**BDH20864.201**

Standard Containers are industry-standard, single-wall construction 304 stainless steel drums.

This ReCAP program is not available in Canada. Please contact your VWR Sales Representative to learn about easy access to similar options available in your region.

approximately 200 lbs of glass, cardboard, and foam inserts are eliminated by each 200L container

Contact your VWR Production Chemical Specialist for more information.

Decon Labs, Inc.

Decon's Peroxigen ST & Peroxigen 6% Hydrogen Peroxide

Peroxigen ST
Sterile, 6% Hydrogen Peroxide

Peroxigen ST from Decon Labs is the ONLY gamma-irradiate sterile peroxide solution available. It is a sterile, double-bagged, ready-to-use 6% Hydrogen Peroxide solution in a convenient trigger spray bottle.

- Made with Water-for-Injection (WFI)
- Lot Specific Documentation ships with each case
- Safe to use, does not leave residues and it breaks down into water and oxygen
- Low toxicity, non-flammable, and zero VOC profile helps to assist in VOC compliance
- Used for cleaning hard, non-porous surfaces in labs and production areas

Size	Cat. No.	Case of 12
16 oz.	**75853-810**	**325.00**

Peroxigen
6% Hydrogen Peroxide

Peroxigen is a ready-to-use 6% Hydrogen Peroxide solution in a convenient trigger bottle.

- Safe to use, does not leave residues and it breaks down into water and oxygen
- Low toxicity, non-flammable, and zero VOC profile helps to assist in VOC compliance
- Used for cleaning hard, non-porous surfaces in labs and production areas

Size	Cat. No.	Each	Case of 12
16 oz.	**75779-618**	**14.58**	**174.95**

VWR Seradigm LIFE SCIENCE

designed for discovery

VWR LIFE SCIENCE SERADIGM

VWR Life Science Seradigm is a fully-integrated supplier of animal sera, providing the cell culture community with access to the most reliable supply of high performance, exceptional quality Fetal Bovine Serum (FBS) and FBS alternatives, including:

Ultimate Grade FBS, Iron Supplemented Bovine Calf Serum (BCS)
Ultra Low IgG FBS, Premium Grade FBS , FB Essence, a cost-effective FBS alternative

Learn more today at **vwr.com/seradigm**

Description	Volume	Origin	Endotoxin	Hemoglobin	Cat. No.
VWR Life Science Seradigm Fetal Bovine Serum (FBS)					
Fetal Bovine Serum, Ultimate Grade	500 mL	U.S.A.	<10 EU/mL	<25 mg/dL	**97068-101**
Fetal Bovine Serum, Ultimate Grade, Heat Inactivated	500 mL	U.S.A.	<10 EU/mL	<25 mg/dL	**97068-107**
Fetal Bovine Serum, Premium Grade	500 mL	U.S.A.	<20 EU/mL	<25 mg/dL	**97068-085**
Fetal Bovine Serum, Premium Grade, Heat Inactivated	500 mL	U.S.A.	<20 EU/mL	<25 mg/dL	**97068-091**
VWR Life Science Seradigm Fetal Bovine Serum (FBS), Ultra Low IgG					
Ultra Low IgG Fetal Bovine Serum (FBS)	500 mL	U.S.A.	≤20 EU/mL	≤25 mg/dL	**10018-826**
Ultra Low IgG Fetal Bovine Serum (FBS), Heat Inactivated	500 mL	U.S.A.	≤20 EU/mL	≤25 mg/dL	**10018-830**
VWR Life Science Seradigm Bovine Calf Serum, Iron Supplemented					
Bovine Calf Serum, Iron Supplemented	500 mL	U.S.A	<20 EU/mL	<30 mg/dL	**10158-358**
Bovine Calf Serum, Iron Supplemented	1 L	U.S.A	<20 EU/mL	<30 mg/dL	**10153-134**
Bovine Calf Serum, Iron Supplemented, Heat Inactivated	500 mL	U.S.A	<20 EU/mL	<30 mg/dL	**10799-386**
Bovine Calf Serum, Iron Supplemented, Gamma Irradiated min 25 kGy	1 L	U.S.A	<20 EU/mL	<30 mg/dL	**10153-136**
VWR Life Science Seradigm FB Essence					
FB Essence, FBS Alternative	500 mL	U.S.A.	<20 EU/mL	<25 mg/dL	**10803-034**
FB Essence, FBS Alternative, Heat Inactivated	500 mL	U.S.A.	<20 EU/mL	<25 mg/dL	**10799-390**

Gamma Irradiation available upon request

S-Curve Technologies, Inc®

Dispensers for Controlled Environments

For Use in Cleanrooms, Laboratories, and Safety Applications

Organize and maintain your personal protection equipment and cleanroom supplies

- Designed to protect the cleanroom supplies from contamination
- Provide "ease-of-access" for the cleanroom workers
- Maximize space utilization for supplies in the production gowning room
- Available with wall mount brackets
- Multiple sizes and variations to cover every need
- All dispensers are also available in chemical resistant PETG material

To see our full line of products, visit **vwr.com** and enter 'S-Curve Technologies' in the search bar.

10828-388
Glove Dispensers

10703-476
Safety Goggle Dispensers

98106-922
Glove Dispensers

Custom Kits for Production Line Setup

VWRCATALYST Custom Packaging and Kitting can help you drive efficiency and reduce waste by delivering ready-to-use custom kits for production line setup, equipment maintenance, or change-out applications.

Let us manage the supply chain, inventory, labor, and logistics for your application:

- Exact parts, quantities, and packaging configurations to your specifications
- Packaging scaled to minimize storage in production environments
- Centralized part quality certifications
- Optional cleanroom kit assembly and sterilization

Email us today with your special requests at:
VWRKittingServices@vwr.com

Custom kit for managing O-ring replacement seals, critical for production equipment maintenance

VWR® CATALYST
We Enable Science Through Services

CONTEC®

PROSAT® *Sterile*™ Low Endotoxin Wipes

Contec PROSAT® *Sterile*™ Low Endotoxin Wipes are made from 100% knitted polyester Polynit Heatseal wipes, and presaturated with a blend of 70% IPA and 30% WFI. Each lot is tested before release and low endotoxin certified to less than <1EU/wipe.

The sealed edge wipe produces a very low level of particles and fibers and is ideal for use in product contact areas.

Double or triple bagged and validated sterile, these Low Endotoxin wipes are suitable for use in the most critical pharmaceutical cleanrooms.

W x L, cm (in.)	Packaging	Cat. No.	Case of
22.8 x 22.8 (9 x 9)	Triple Bagged: 10 Wipes/Pouch, 55 Pouches/Case	**75779-606**	550/ **896.59**
30.5 x 30.5 (12 x 12)	Triple Bagged: 10 Wipes/Pouch, 30 Pouches/Case	**75833-990**	300/ **1024.67**
30.5 x 30.5 (12 x 12)	Double Bagged: 30 Wipes/Pouch, 15 Pouches/Case	**52428-882**	600/ **1620.33**

CONTEC®

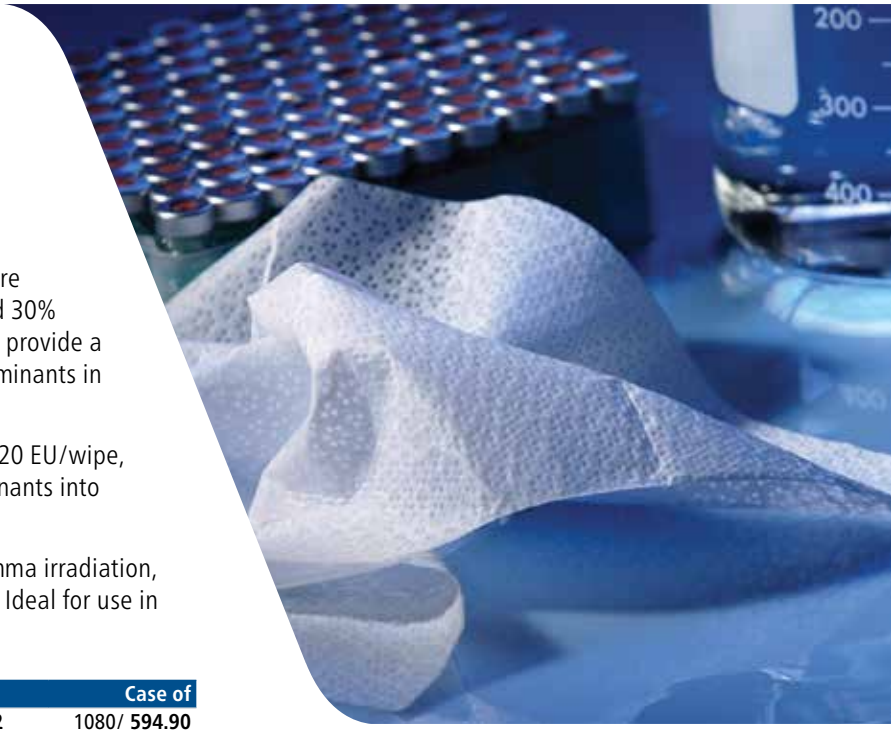
PROSAT® *Sterile*™ Polypropylene Low Endotoxin Wipes

Contec's PROSAT® *Sterile*™ Polypropylene Low Endotoxin wipes are presaturated with the optimal amount of 70% USP Grade IPA and 30% Deionized Water. The nonwoven meltblown polypropylene wipes provide a consistent release of solvent to thoroughly remove surface contaminants in critical environments.

Each lot is tested before release and low endotoxin certified to <20 EU/wipe, eliminating the risk of introducing endotoxins and other contaminants into product contact areas.

The resealable pouch reduces waste. Terminally sterilized by gamma irradiation, the wipes are Validated Sterile to a 10^{-6} Sterility Assurance Level. Ideal for use in aseptic processing areas.

W x L, cm (in.)	Packaging	Cat. No.	Case of
22.8 x 28 (9 x 11)	Double Bagged: 30 Wipes/Pouch, 36 Pouches/Case	**75833-992**	1080/ **594.90**



eShield™ Sterile Covers for smart devices

Access essential apps in your sterile research environment - Easily, safely, economically

eShield™ Sterile Covers are a Class II medical device and the only FDA-Approved sterile covers for tablets. Use eShield to access your software, update records, analyze findings, conduct supplemental research, communicate your thoughts, take photos - all within the sterile environment. Designed for use in pharmaceutical research, microbiology research, clinical applications, laminar flow hoods; any situation where sterility is important.

eShield creates a reliable barrier designed to keep contaminants on the device from contributing to cross-contamination.

NEW

eShield covers are:

- FDA Approved Class II Medical Devices
- Manufactured to meet ASTM F1671-13 Viral Penetration Guidelines
- Touch-screen compatible even with gloved hands
- Made of ultra-clear film to ensure clear photos when needed
- Single-use – Each cover comes packaged separately for maximum sterility
- Packed individually in dispensing cartons of 25 sterile covers
- Economical and easy to use

Description	Cat. No.	Case of 25
eShield™ Sterile Cover for Cell Phone	**10798-962**	**131.32**
eShield™ Sterile Cover for Digital Camera	**10798-964**	**262.66**
eShield™ Sterile Cover for Tablet	**10798-988**	**183.85**

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Whitney MEDICAL SOLUTIONS

OmniTop Assemblies, Pre-Sterilized Single-Use Sample Tubes

OmniTop Sample Tubes are a convenient device that can be used to obtain fluid samples. Each OmniTop tube comes with a pre-attached 0.2µm vent filter and 18" of tubing (C-Flex®, TYGON®, silicone or PharMed®).

- Customizable cap system
- Unique cap design allows for complete customization
- Ability to use different ID and OD tubing diameters
- Wide selection of tubing materials
- Easily configured with virtually any type of tubing
- Single-use
- Cost-effective
- Reduced assembly and installation time
- Eliminate cleaning validation
- Flexible manufacturing
- Design permits quick delivery on small lots
- Closure system can be used with various glass bottles
- Available individually packaged or configured in manifold
- Material: Polypropylene

These tubes are available with or without internal dip-tubes to facilitate removal of the fluid inside. OmniTop Sample Tubes are availble in a wide variety of standard configurations or they can be customized to suit your specific applications.

Description	Cat. No.	Pack of 10
15mL OmniTop Standard, PP	**75840-758**	**313.84**
50mL OmniTop Standard, PP	**75840-774**	**313.84**

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SterilEnz® VWR SINGLE-USE

SterilEnz®-II/AT: Pre-Gasketed Sanitary Fittings for Single-Use Systems

SterilEnz®-II/AT connectors come with a platinum cured, medical grade silicone gasket mechanically attached to the fitting face.

- Standard sanitary clamp fitting, per ASME BPE Specifications
- Class VI Compliant materials; certificate included
- Won't leak or blow-off like stepped barbs can
- Mono-Barb design
- Zero mold parting lines on all critical sealing surfaces
- Superior tooling
- Gamma-stable, 25 - 40 kGY
- For use in irradiated disposable systems
- Autoclaveable at 123°C for 30 minutes
- Certified free from any animal derived components or processes

Fittings are made rugged inert polypropylene suitable for either autoclaving or gamma-irradiation. The new II/AT series is available in seven fitting sizes.

SterilEnz®-II/AT Standard Sanitary Fitting with Gasket

Fitting Size, HB x TC, (in.)	Cat. No.	Pack of 10	Case of 100
¼ x 1	**75838-678**	**99.00**	**792.00**
¼ x Mini	**75838-676**	**99.00**	**792.00**
⅜ x 1	**75838-668**	**99.00**	**792.00**
⅜ x Mini	**75838-680**	**99.00**	**792.00**
½ x 1	**75838-672**	**99.00**	**792.00**
½ x Mini	**75838-670**	**99.00**	**792.00**
¾ x 1	**75838-674**	**99.00**	**792.00**

SterilEnz® VWR SINGLE-USE

SterilEnz®-II/EC: Pre-Gasketed Polypropylene End Caps

SterilEnz®-II/EC Polypropylene End Caps are the only End Caps that come equipped with a medical grade silicone gasket pre-attached to the fitting face. This feature prevents operators from misaligning or dropping gaskets during assembly.

- Standard sanitary clamp fitting per ASME BPE specifications
- Intended for single-use applications
- Built-in gasket eliminates gasket preparation
- Easy hold tab for easy on/off installation
- Gaskets cannot be misaligned
- No leaks or potential contamination issues
- Certified free from any animal derived components or processes
- Animal-free
- Gamma-stable, for use in irradiated disposable systems, 50kGy
- Autoclaveable at 123°C for 30 minutes
- Size: 1"
- Fitting size: 1½" Sanitary TC

TC End Caps with Silicone Gasket

Description	Includes	Cat. No.	Each	Pack of 10	Case of 100
Non-Sterile	Single Individually Double Poly Pouched	**75875-266**	**10.23**	—	—
Non-Sterile	Pack of 10 Bulk Double Poly Pouched	**75875-268**	—	**73.05**	**584.40**
Gamma Irradiated	Pack of 10 Individually Double Poly Pouched	**75875-270**	—	**127.84**	**1022.70**

Make the Right Container Choice

By Jonathan Foster, Senior Product Manager, Thermo Fisher Scientific

Containers used in critical environments need to conform with accepted standards of cleanliness in order to ensure the contained fluids remain integral and uncompromised. Even the smallest quantities of foreign materials can render batches unusable, resulting in significant time and cost implications. As such, it is vital that users understand the different cleanliness standards and select the best containers to meet the demands of their applications.

There are a number of factors to consider when selecting containers for use within a critical environment. In addition to selecting the best size and product contact surface, users must determine how they will achieve the desired level clean. Some users choose to process containers internally after procurement to assure clean conformity. While this can provide a significant level of control it can also be costly, time consuming, and resource distracting. Further, some organizations may lack the expertise to understand and identify the best clean container options. Outsourcing to a knowledgeable partner can often be a more efficient option.

The meaning of Clean

There are numerous definitions and requirements for clean that can make it challenging to ensure the desired level of compliance. Drivers behind selecting a particular product include low levels of particulates, pyrogens and endotoxin. Other factors also requiring clarification may include packaging for stepped introduction to clean environments, testing, and sterilization through either irradiating or autoclaving. Having clear expectations for these requirements is important for maintaining critical environment conditions. Different applications will often require different processes in order to achieve the required levels of cleanliness, as shown in figure 1.

The Importance of Validation

Developing clear requirements for process and product validation is a key in establishing confidence in the containers used within a critical environment. Process validations assure consistently yielded product of a predetermined quality, and facilitates the validation of product claims. Examples of process validations include autoclaving, irradiation and washing. Product validation can confirm a specific quantifiable product criteria can be reliably and repeatedly met. Examples of product claim sterility assurance levels and particulate levels. Ultimately, validation protocol should be selected based on the risks as they relate to the intended application.

Figure 1

USP <788> Can Provide Particulate Guidance

There is no monograph for particulate in empty bulk containers, such as bottles and carboys, entering a clean environment. However, USP <788> provided test methods and maximum allowable results for particulate matter in injectable solutions. The particulate levels in USP 788 can be a useful benchmark for bulk containers for at least three reasons. First, it defines what is allowable at the end of the bioproduction process. Second, it is based on particulate levels deemed acceptable for patient delivery. Third, it provides a consistent particulate level by which all containers used within a cleanroom environment can be validated.

Insourcing vs Outsourcing

Users must balance multiple factors in determining if insourcing or outsourcing of particle reduction is the best option for them. Some of these factors include: efficiency, cost avoidance, access to experts, focus on core competencies, available resources, risk perception and process control. If a user chooses containers produced and/or processed to be USP <788> compliant, there are several factors to consider and plan for, which include:

- Dedicated facility space
- Purchase, installation, validation and routine maintenance of equipment
- Protocol development
- Validation of report development
- Sourcing of base materials to be washed
- Revalidation and upkeep, as required
- Personnel to perform all processes

Outsourcing can provide all of the above without the need for investment or high levels of resource utilization.

(Continued on next page)

thermoscientific

Conclusion

Although understanding and implementing clean parameters can prove challenging, it is necessary to ensure product integrity is maintained. It is critical that equipment and materials used within critical environments are able to meet cleanliness requirements, such as those outlined in USP <788>.

The correct cleaning procedure, whether performed in-house or outsourced, can significantly reduce particulate levels in a container. A knowledgeable partner can help users select the container and processing that will most effectively meet their application needs.

Thermo Scientific™ Nalgene™ Certified Clean Containers

When Clean Becomes Critical

Working within a critical environment means high quality materials and equipment are a must. Foreign materials, even in microscopic quantities, can cause batches to be unusable, wasting precious time and money. It is essential any plastic bottles, vials, carboys, caps or other materials conform to the accepted standards of cleanliness, and reduce the possibility of anything in your containers other than your formulations.

The Thermo Scientific Nalgene multi-tiered storage portfolio enables you to choose the appropriate product quality for your application.

Users of our tiered portfolio benefit from:

- **Low Particulates:** USP <788> compliance helps reduce the chance of contamination; decreasing potential loss of high value contents
- **Improved Packaging:** Triple layer packaging facilitates ease of entry into clean room environments
- **Sterile and Ready-to-Use:** Reduced need for validation, washing, packaging and sterilization helps save resources

Our Nalgene leakproof* containers have been successfully serving labs for many years. And, now the product portfolio expansion offers improved user benefits with the new product tiers:

Certified Clean Containers

Low particulate carboys can improve production

Thermo Scientific Nalgene Certified Clean Biotainer Carboys can decrease potential for contamination, maintaining cleanroom and product integrity.

- Certified to meet USP <788> low particulate requirements
- Certified low endotoxin
- Can be supplied with forced extraction studies**, validation binders** and certificates

Certified Platinum Clean Containers

Maintain integrity with even the most sensitive products

As our top tier products, Thermo Scientific Nalgene Certified Platinum Clean HDPE Bottles and Carboys are manufactured, tested and supported for critical applications.

- Water washed containers that reduce particle load contribution
- Boasting even lower particulate counts than the Certified Clean products, they are certified to contain less than one third of that specified in USP <788>
- Can be supplied with forced extraction studies**, validation binders** and certificates

* Our guarantee for a leakproof seal is subject to our standard product warranty, as set forth in the Thermo Fisher Scientific Terms and Conditions of Sale. Our products are designed to be leakproof at ambient temperature and pressure when used with their corresponding closures. However, to ensure safe usage, customers are advised to test our containers and closures under conditions of their planned applications. Please contact technicalsupport@thermofisher.com if you need additional information about our products.

** Forced extraction studies and validation binders from Thermo Fisher Scientific, where available, are provided under a confidentiality agreement to assist customers in product selection. Customers are responsible for determining what studies are recommended for its specific applications. Forced extraction studies and validation binders may be requested by contacting us at ROCregSupport@thermofisher.com.

Capacity	Diameter, mm	Height, mm	Cap Size, mm	Cat. No.	Case of
Nalgene Certified Platinum Clean Carboys					
250 mL	61	133	24	**75834-416**	72/ **2269.64**
500 mL	72.6	170.4	28	**75834-412**	48/ **1613.85**
1 L	91.4	215.9	38	**75834-408**	24/ **1142.51**
10 L	250.2	389	83	**75835-976**	6/ **2889.57**
20 L	284.2	501.7	83	**75835-974**	4/ **2653.89**
30 mL	34.3	61	20	**75834-418**	72/ **4764.70**
33 L	381	546	83	**75835-972**	1/ **712.15**
Nalgene Certified Platinum Clean Widemouth Carboys					
250 mL	61	99.3	43	**75834-414**	72/ **3407.02**
500 mL	72.6	168.2	53	**75834-410**	48/ **2351.62**
1 L	91.4	199.2	63	**75834-406**	24/ **1711.21**

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VWR COLLECTION designed for production

VWR® Sterile Single-Use Bottle Assemblies

Sterile containers with weldable tubing provide the maximum amount of flexibility and reliability.

- Sterile bottles come individually bagged and process ready
- Multiple bottle sizes allow for process-specific flexibility
- Gamma irradiated to Sterility Assurance Level (SAL) 10^{-6}
- Tubing Material: C-Flex
- Assembled in an ISO Class 7 cleanroom and manufactured from USP Class VI materials
- Offered in a comprehensive size selection with tubing that is completely weldable/sealable

Polycarbonate

Capacity, mL (oz.)	Tubing Length	Cap Size	Tubing Connection	Tubing Size	Cat No.	Pack of	Case of
125 (4)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-302**	6/ **438.52**	24/ **1612.21**
250 (8)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-304**	6/ **448.80**	24/ **1637.58**
500 (16)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-306**	6/ **451.57**	24/ **1660.19**
1000 (32)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-696**	3/ **229.11**	12/ **844.63**
2000 (64)	Port 1: 12" Port 2: 3" Port 3: 12"	53B	Port 1: PP Tube Plug Port 2: 50mm PTFE Vent Filter Port 3: PP Tube Plug	Port 1: 3/8 x 1/2" Port 2: 1/4 x 3/8" Port 3: 3/8 x 1/2"	**10830-698**	2/ **317.62**	12/ **1727.79**

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PETG

Capacity, mL (oz.)	Tubing Length	Cap Size	Tubing Connection	Tubing Size	Cat No.	Pack of	Case of
125 (4)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-292**	6/ **432.86**	24/ **1589.23**
250 (8)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-294**	6/ **441.97**	24/ **1622.64**
500 (16)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-296**	6/ **446.03**	24/ **1637.58**
1000 (32)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**10830-298**	3/ **236.31**	12/ **867.58**
2000 (64)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: 1/8 x 1/4" Port 2: 1/8 x 1/4"	**75835-988**	2/ **251.86**	12/ **1405.24**
2000 (64)	Port 1: 12" Port 2: 3" Port 3: 12"	53B	Port 1: PP Tube Plug Port 2: 50mm PTFE Vent Filter Port 3: PP Tube Plug	Port 1: 3/8 x 1/2" Port 2: 1/4 x 3/8" Port 3: 3/8 x 1/2"	**10830-300**	2/ **319.47**	12/ **1749.75**

VWR COLLECTION designed for production

VWR® Sterile Polycarbonate Single-Use Flask Assemblies

Sterile polycarbonate flasks with weldable tubing provide the maximum amount of flexibility and reliability.

- Sterile flasks come individually bagged and process ready
- Multiple flask sizes allow for process-specific flexibility
- Gamma irradiated to Sterility Assurance Level (SAL) 10^{-6}
- Assembled in an ISO Class 7 cleanroom and are manufactured from USP Class VI materials
- Offered in a comprehensive size selection with tubing that is completely weldable/sealable

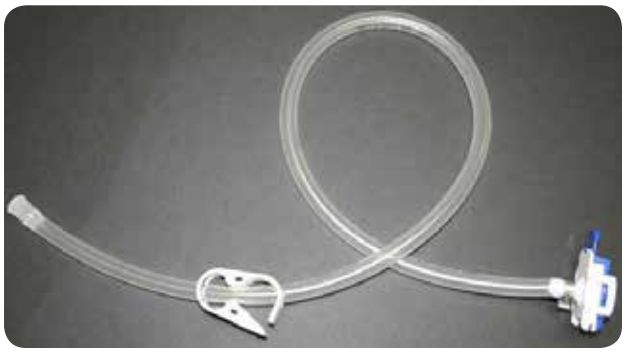
All product contact materials are animal-free or processed in accordance to EMEA/410/01. The assemblies are able to withstand temperatures from -20 to 65°C (-4 to 149°F) without losing integrity. All assemblies are individually double-bagged with product label located on inner bag.

Capacity, mL (oz.)	Tubing Length	Cap Size	Tubing Connection	Tubing Size	Cat No.	Pack of	Case of
125 (4)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: ⅛ x ¼" Port 2: ⅛ x ¼"	**10830-700**	6/ **453.05**	24/ **1663.35**
250 (8)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: ⅛ x ¼" Port 2: ⅛ x ¼"	**10830-702**	6/ **464.25**	24/ **1702.11**
500 (16)	Port 1: 24" Port 2: 3"	38-430	Port 1: PP Tube Plug Port 2: 25mm Hydrophobic PE Vent Filter	Port 1: ⅛ x ¼" Port 2: ⅛ x ¼"	**10830-278**	6/ **478.52**	24/ **1756.87**
1000 (32)	Port 1: 12" Port 2: 3" Port 3: 12"	53B	Port 1: PP Tube Plug Port 2: 50mm PTFE Vent Filter Port 3: PP Tube Plug	Port 1: ⅜ x ½" Port 2: ¼ x ⅜" Port 3: ⅜ x ½"	**10830-280**	3/ **466.96**	12/ **1707.36**
2000 (64)	Port 1: 12" Port 2: 3" Port 3: 12"	53B	Port 1: PP Tube Plug Port 2: 50mm PTFE Vent Filter Port 3: PP Tube Plug	Port 1: ⅜ x ½" Port 2: ¼ x ⅜" Port 3: ⅜ x ½"	**10830-290**	2/ **319.80**	12/ **1768.47**

VWR® Single-Use Tubing Assemblies

Unique features make these tubing assemblies a superior alternative to others. Assemblies have been designed with a broad spectrum of applications in mind, including life sciences and general lab use, environmental assays, and production and cleanroom applications.

- Manufactured in ISO Class 7 Cleanroom
- Supplied Gamma Irradiated to Sterility Assurance Level (SAL) 10^{-6}
- Offered with custom size and configuration capabilities
- Tubing is weldable/sealable
- Tubing Material: C-Flex



Description	Length	I.D x O.D	Cat. No.	Pack of	Case of
Single Drop PP TEE with Clamps	12"	⅛ x ¼"	**10830-692**	25/ **1052.50**	100/ **4210.00**
Two Drop Clamp PP TEE with Clamps	12"	⅛ x ¼"	**10830-694**	25/ **2010.25**	100/ **8040.94**
50' Roll with Clamps	50"	⅛ x ¼"	**10830-258**	6/ **551.70**	12/ **1103.40**
Mini TC Jumper	36"	⅛ x ¼"	**10830-260**	25/ **1707.00**	100/ **68.28**
C-Flex MPC Body Jumper	36"	⅛ x ¼"	**10830-262**	25/ **875.75**	100/ **3503.00**
MPC Insert Jumper	36"	⅛ x ¼"	**10830-264**	25/ **866.00**	100/ **3464.00**
3/4" TC Jumper	36"	⅛ x ¼"	**10830-266**	25/ **1884.75**	100/ **7539.00**

Description	Length	I.D x O.D	Cat. No.	Pack of	Case of
1½" TC Jumper	36"	⅜ x ½"	**10830-268**	25/ **1981.75**	100/ **7927.00**
MPC Body Jumper	36"	⅜ x ½"	**10830-270**	25/ **1081.23**	100/ **4324.87**
MPC Insert Jumper	36"	⅜ x ½"	**10830-272**	25/ **1011.75**	100/ **4047.00**
DAC Jumper	36"	⅜ x ½"	**10830-274**	25/ **2277.75**	100/ **9111.00**
AQG Jumper	36"	⅜ x ½"	**10830-276**	25/ **2372.88**	100/ **9491.46**

Shop **vwr.com** for a full listing of products and styles.

VWR COLLECTION designed for every day use

VWR® Pop Up Razor Blade Dispenser

The VWR Pop Up Razor Blade Dispenser offers easy dispensing with safe blade storage.

- Reduce injuries - easy to load and remove cartridge
- Flip-open front; in-use blade holder
- Heavy-duty design with nonskid, heavy bottom
- Reloadable

Refill Cartridges are packaged 10 cartridges per case. Each cartridge is labeled with a blade type detail ("CS" for carbon steel blades, "SB" for steel back blades, "W" for washed blades, or "3" for 3 facet blades). The clamshell packaging is cleanroom ready.

Description	Cat. No.	Each	Case of 5
Pop Up Razor Blade Dispenser	**10835-969**	**61.03**	**255.67**

VWR Pop Up Blade Dispenser Refill Cartridges

Blade Steel	Blade Size, in.	Coated Blade	Backing Material	Washed, Degreased	Cat. No.	Pack of	Case of 1,000
2 Facet Blades							
Carbon	.009	No	Steel	Yes	**10835-967**	100/ **28.61**	**216.53**
Carbon	.009	No	Steel	No	**10835-981**	100/ **15.34**	**115.75**
Carbon	.012	No	Steel	Yes	**10835-965**	90/ **24.80**	**187.71**
3 Facet Blades							
Stainless	.009	Yes	Steel	No	**10835-971**	100/ **37.46**	**283.44**
Carbon	.009	No	Steel	Yes	**10835-973**	100/ **35.40**	**267.90**
Stainless	.009	Yes	Steel	Yes	**10835-963**	100/ **45.64**	**345.34**
Carbon	.009	No	Steel	No	**10835-975**	100/ **23.84**	**180.44**
Stainless	.009	No	Steel	Yes	**10835-977**	100/ **42.56**	**322.03**
Stainless	.009	No	Stainless	Yes	**10835-979**	100/ **55.15**	**417.26**

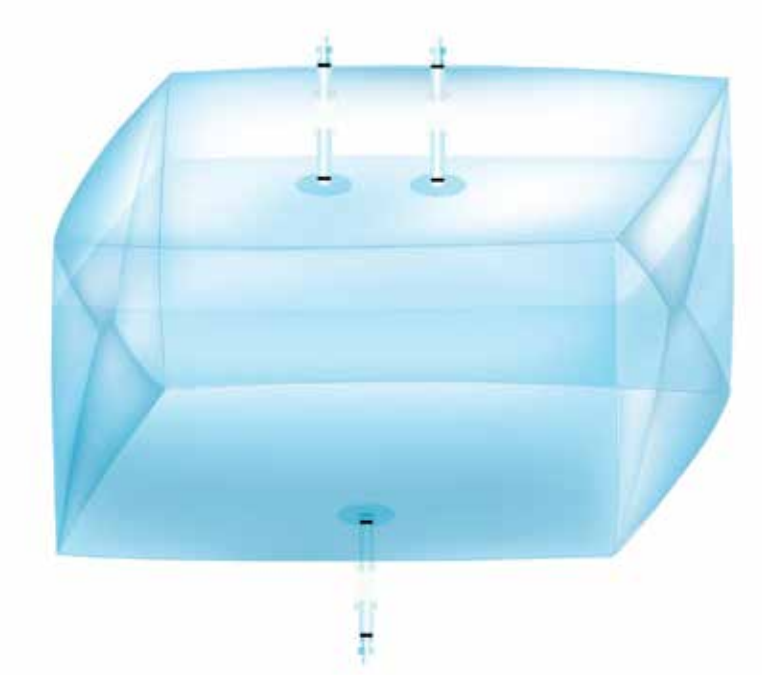
JM SEPARATIONS VWR Bioprocessing Division

JM BioConnect® 3D Cubic Bags

These 3D cubic bags can fit in existing support containers, but also delivered together with a matching version made of plastic or stainless steel. They are available in 200L and 500L volume with 2 ports on top of the bag. Both ports consisting of silicone platinum tubing with MPX-connectors. Made from proprietary JMS Flex Film, they feature a polyethylene inner and outer layer and a high oxygen barrier layer. JMS Flex Film has a high clarity and flexibility, and it is resistant to a wide range of chemicals.

Bags will be delivered gamma irradiated and ready-to-use.

Ordering Information: VWR® is also able to deliver customer-specific 3D Cubic Bags in all volumes up to 3.000 L. For more information about customization, please visit **vwr.com/single-use**.



3D Cubic Bags

Capacity, L (gal.)	Cat. No.	Case of
200 (52.8)	**75876-048**	5/ **997.70**
500 (132.1)	**75876-050**	4/ **953.04**

Support Containers for 3D Cubic Bags

Capacity, L (gal.)	Cat. No.	Each
Plastic, Cleanroom Version, Foldable		
500 (132.1)	**75876-056**	**2658.04**
200 (52.8)	**75876-052**	**998.14**
Stainless Steel, Cleanroom Version		
200 (52.8)	**75876-054**	**2530.00**
500 (132.1)	**75876-058**	**2840.20**

JM SEPARATIONS
VWR Bioprocessing Division

JM BioConnect® Pillow Bags

JM BioConnect® Pillow Bags are designed 2D-style and have hose barb ports heat-sealed into the bottom of the bag. The bags are available from 50mL to 50L volume. Pillow Bags are designed for hanging which facilitates complete fluid recovery and ease of handling.

JM BioConnect® Pillow Bags are made of high-quality JMS Flex Film, which consist of a ULDPE fluid contact layer and a LDPE outer layer. A high oxygen barrier layer (EVOH) is coextruded between both layers. The bag film has a high clarity and flexibility and is resistant to a wide range of chemicals.

VWR is also able to deliver customer-specific JM BioConnect® Pillow Bags or other bag designs like 3D Cubic Bags and Mixing Bags. For more information, please visit **vwr.com/single-use**.

Description	Capacity	Cat. No.	Case of
2-Port Pillow Bags			
2 Ports for Welding	50 mL (1.69 oz)	**75874-848**	50/ **847.00**
2 Ports for Welding	500 mL (16.9 oz)	**75874-850**	35/ **626.78**
2 Ports for Welding	1 L (33.8 oz)	**75874-354**	30/ **573.54**
2 Ports Luer	50 mL (1.69 oz)	**75874-364**	50/ **883.30**
2 Ports Luer	500 mL (16.9 oz)	**75874-366**	35/ **652.19**
2 Ports Luer	1 L (33.8 oz)	**75874-368**	30/ **588.06**
2 Ports MPC	50 mL (1.69 oz)	**75874-370**	50/ **1113.20**
2 Ports MPC	500 mL (16.9 oz)	**75874-372**	35/ **813.12**
2 Ports MPC	1 L (33.8 oz)	**75874-374**	30/ **726.00**

Description	Capacity	Cat. No.	Case of
3-Port Pillow Bags			
3 Ports for Welding	5 L (1.3 Gal)	**75874-356**	15/ **479.16**
3 Ports for Welding	10 L (2.6 Gal)	**75874-358**	15/ **559.02**
3 Ports for Welding	20 L (5.3 Gal)	**75874-360**	15/ **751.41**
3 Ports for Welding	50 L (13.2 Gal)	**75874-362**	10/ **595.32**
3 Ports MPC	5 L (1.3 Gal)	**75874-376**	15/ **515.46**
3 Ports MPC	10 L (2.6 Gal)	**75874-378**	15/ **595.32**
3 Ports MPC	20 L (5.3 Gal)	**75874-380**	15/ **787.71**
3 Ports MPC	50 L (13.2 Gal)	**75874-382**	10/ **619.52**

Shop **vwr.com** for port sizes and additional product information.

JM BioConnect® Single-Use Tank Liners

JJM BioConnect® Tank Liners are single-use bags with an open top, designed to fit in cylindrical vessels. These bags are used as liner into a vessel to avoid cleaning of the vessel after media and buffer preparation.

JM BioConnect® Tank Liners are made of a clean medical grade multi-layer film designed for bioprocess applications such as open-top Tank Liners. The fluid contact layer is a medical grade LLDPE.

The Tank Liners are available in both 2D and 3D style. The bags will be delivered gamma irradiated and ready-to-use.

VWR is also able to deliver customer-specific JM BioConnect® Tank Liners. The bags can be made for almost all vessels up to 1.500 L, optionally with bottom drain. For more information about customization, please visit **vwr.com/single-use**.

Capacity	Cat. No.	Case of
2D Tank Liners		
19 L (5 Gal)	**75874-384**	20/ **448.56**
38 L (10 Gal)	**75874-386**	20/ **466.14**
50 L (13.2 Gal)	**75874-388**	20/ **488.13**
100 L (26.4 Gal)	**75874-390**	20/ **562.89**
200 L (52.8 Gal)	**75874-392**	15/ **445.25**
300 L (79.2 Gal)	**75874-394**	15/ **514.51**
560 L (147.9 Gal)	**75874-396**	10/ **402.38**

Capacity	Cat. No.	Case of
3D Tank Liners		
50 L (13.2 Gal)	**75874-398**	20/ **571.68**
100 L (26.4 Gal)	**75874-400**	20/ **646.44**
200 L (52.8 Gal)	**75874-402**	15/ **514.51**
300 L (79.2 Gal)	**75874-404**	15/ **587.07**
560 L (147.9 Gal)	**75874-406**	10/ **452.94**

See **vwr.com** for additional product information.

Perfex TruCLEAN® Mopping Systems

TruCLEAN Mopping Systems work to capture and isolate contaminants, ensuring the delivery of unadulterated cleaning and sanitizing agents. TruCLEAN Disinfection systems are designed for fast, easy application of sterilants to floors, walls and ceilings. TruCLEAN components are constructed with high-grade stainless steel, entirely autoclavable, easy to maintain and guaranteed to deliver reliable cleaning results time after time.

- Compatible with gamma, ETO and autoclave sterilization
- Reduce the risk of cross-contamination
- Multiple color combinations available

Color	Cat. No.	Each
TruCLEAN Triple Bucket Mopping System*		
Red	**22940-012**	**2002.79**
White	**22940-015**	**1941.90**
Blue	**22940-014**	**2003.00**
TruCLEAN II		
Red	**89095-990**	**580.55**
Blue	**89095-992**	**580.55**

*Also available in green and yellow

TruCLEAN® Mops and Accessories

Designed for cleanrooms or sterile environments where contamination control is extremely critical. Low profile, stainless steel mop frame compatible with all TruCLEAN mops. Easily change mop heads with our quick squeeze release and frame-locking mechanism. Choose between our polymer adjustable handle and fixed length stainless steel handle. All TruCLEAN mops can be repeatedly laundered providing exceptional value.

- Excellent chemical and microbial resistance
- Low particle generation, excellent surface coherence
- Ideal for disinfection and sterilization procedures

Description	Cat. No.	Case of
TruCLEAN Clean Room Mop	**89096-038**	12/ **268.78**
TruCLEAN Microfiber Mop	**89096-040**	12/ **179.07**
TruCLEAN Anti-Microbial Mop	**89096-036**	12/ **211.98**
TruCLEAN Sponge Mop	**22940-023**	25/ **488.15**
TruCLEAN Mop Cover	**22940-191**	25/ **212.41**

VWR COLLECTION

designed for production

VWR® Spec-Wipe® 4 Wiper

Made of 100% double-knit polyester, delivering softness, high absorbency, strength, and abrasion resistance. Continuous-filament construction fortifies the fabric against breakdown.

- 100% double-knit polyester
- Continuous filament
- Textured yarn construction
- Clean-cut edges
- W x L: 22.9 x 22.9 cm (9 x 9")

W x L, cm (in.)	Cat. No.	Pack of 150	Case of 1200
22.9 x 22.9 (9 x 9)	**21912-046**	**65.50**	**459.60**

Compounding Pharmacies - VWR has the Answers you Need...

Our team of critical Environment Specialists are ready to provide expert advice, as well as consultative services to help your organization comply with USP 797 and USP 800 guidelines. We understand your need to maintain the sterility of your environment to ensure regulatory compliance and ultimately patient safety.

VWR® PureStep Adhesive Mats

Multi-layered contamination control mats remove and contain dirt and dust from foot traffic and equipment wheels.

- Mats consist of 30 or 60 sheets of 1.5mil low-density polyethylene film
- Each sheet has a 0.3mil thick acrylic-based, pressure-sensitive adhesive coating
- Numbered tabs ensure one-at-a-time sheet removal
- Antimicrobial agent protects against growth of bacteria, mold, and fungus

30-Layer Mats

L x W, cm (in.)	WEColor	Cat. No.	Case of
76.2 x 61 (30 x 24)	Clear	**89428-992**	20/ **218.45**
76.2 x 61 (30 x 24)	Blue	**87004-000**	4/ **153.47**
76.2 x 61 (30 x 24)	Clear	**87004-002**	4/ **160.49**
76.2 x 61 (30 x 24)	Gray	**87004-004**	4/ **153.47**
114.3 x 45.7 (45 x 18)	White	**87004-032**	8/ **256.44**
91.4 x 61 (36 x 24)	Blue	**87004-040**	8/ **240.43**
91.4 x 61 (36 x 24)	Gray	**87004-042**	8/ **240.43**
76.2 x 61 (30 x 24)	White	**87004-006**	4/ **153.47**
91.4 x 45.7 (36 x 18)	Blue	**87004-016**	8/ **212.02**
91.4 x 45.7 (36 x 18)	Gray	**87004-018**	8/ **212.02**
114.3 x 66 (45 x 26)	White	**87004-056**	8/ **333.21**

More sizes and styles available on **vwr.com**.

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We Enable Science Throughout the Process

VWR Life Science Seradigm

- Fetal Bovine Serum
- Calf Serum
- Assurance of Supply
- Quality Assurance Measures at the Source
- Multiple Lot Testing
- Fully Certified Supply Chain for Traceability by the International Serum Industry Association (ISIA)
- Consistent, Reliable Performance

Production Chemicals

- Biological Buffers
- Carbohydrates
- Inorganic Salts
- Media & Additives
- Proteins & Amino Acids
- Excipients
- VWR Custom Manufacturing Services
- Strategic Sourcing
- cGDP Compliant Warehousing

VWR Single-Use Solutions

- Standard & Custom Products
- Buffer & Media Transfer
- Sterile Filtration
- Bioreactor Feed & Harvest
- Bulk Drug Substance
- Aseptic Sampling & Filling
- 2D and 3D Bag Assemblies & Tank Liners
- Application Specific Connections
- Sampling Methods
- Mixing Vessels

Controlled Environment

- Protective Apparel
- Cleanroom Gloves
- Cleaning Systems
- Detergents & Cleaners
- Wipers
- Production Supplies
- Mats & Flooring
- Procurement & Supply Management Services
- **VWR**CATALYST Bioprocessing Facility Support