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FOCUS: PRODUCTION

VOLUME 3 ISSUE 1



Solutions for vaccine manufacturing

Vaccination represents a viable and attractive strategy for the prevention and therapy of infectious and non-infectious diseases as well as for immuno-oncology applications.

The challenges are still numerous: how to guarantee safety, efficacy, and quality assurance of the vaccine; achieve a sufficient immune response; and increase productivity while reducing the costs so that the vaccine is available to a broader population, at the time it is needed and for a reasonable cost.

As a trusted supplier for the top 20 biopharmaceutical companies, Avantor's portfolio and solutions address the complexity of vaccine manufacturing from the upstream process to downstream purification and final fill – maintaining the vaccine's integrity and activity throughout the entire process.



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VWR® MAXIMUM PROTECTION STERILE DUCKBILL MASK WITH TIES
A STERILE ALTERNATIVE OPTION FOR THE POPULAR CLEANROOM MAXIMUM PROTECTION LINE

- 3-ply masks, individually bagged
- Sterile 10-6, gamma sterilization
- Duckbill with ties configuration
- Natural, latex-free
- Low particle shedding

VWR® Maximum Protection sterile masks provide superior particle and bacterial filtration efficiency plus low particle shedding. These moisture-resistant cleanroom masks consist of three layers featuring a unique, lightweight inner layer of film for enhanced resistance.

Description	Color	Sterility	Cat. No.
Duckbill Mask with Ties	White	Sterile	76420-850



Superior particle and bacterial filtration

VWR® MAXIMUM PROTECTION STERILE DUCKBILL MASK WITH HOOD LOOPS
A STERILE ALTERNATIVE OPTION FOR THE POPULAR CLEANROOM MAXIMUM PROTECTION LINE

- 3-ply masks, individually bagged
- Sterile 10-6, gamma sterilization
- Duckbill with hood loop configuration
- Natural, latex-free
- Low particle shedding

VWR® Maximum Protection sterile masks provide superior particle and bacterial filtration efficiency plus low particle shedding. These moisture-resistant cleanroom masks consist of three layers featuring a unique, lightweight inner layer of film for enhanced resistance.

Description	Color	Sterility	Cat. No.
Duckbill Mask with Hood Loops	White	Sterile	76420-848



VWR® MAXIMUM PROTECTION STERILE MASK WITH EAR LOOPS
THE NEW STERILE EAR LOOP MASK EXPANDS UPON THE VWR® MASK TYPES IN THE POPULAR CLEANROOM MAXIMUM PROTECTION LINE BY PROVIDING A STERILE OPTION

- 3-ply masks
- Sterile 10-6, gamma sterilization
- Ear loop configuration
- Natural, latex-free
- Low particle shedding

VWR® Maximum Protection sterile masks provide high bacterial and particle filtration efficiency, while remaining breathable and fluid-resistant. Malleable noseband ensures a secure seal.

Description	Sterility	Cat. No.
Cleanroom Face Mask with Ear Loops	Sterile	76420-852



Ideal for use in production or research areas

VWR® CLEANROOM MASK WITH EARLOOPS, MADE IN USA
THE COMBINATION OF STRONG BFE AND PFE MAKE THESE MASKS IDEAL FOR USE IN PRODUCTION OR RESEARCH AREAS

- Protection against bacteria and particles
- 3-ply construction
- Nonsterile
- With earloops

Part of the VWR® Made in USA PPE line, these cleanroom masks with earloops are a core item of any solid garment program, offering the adjustability users desire.

Description	Color	Sterility	Cat. No.
VWR® Cleanroom Mask with Earloops	White	Nonsterile	76451-956



VWR® POWDER-FREE LATEX EXAMINATION GLOVES

ADVANCED NATURAL RUBBER LATEX FORMULATION FEATURES A FULLY TEXTURED SURFACE. GLOVES ARE PRODUCED IN ISO CERTIFIED FACILITIES

- Powder free
- Fully textured finish with beaded cuffs
- Ambidextrous
- Thickness: 5.5 mil (Finger), 4.5 mil (Palm), 4 mil (Cuff)
- Natural color

Textured surface for optimal grip, improved tactile sensitivity and elasticity to promote reduced hand fatigue, and excellent barrier protection from blood-borne pathogens.

Glove Size	Length	Glove Color	Cat. No.
Small	9.5"	Natural	76319-666
Medium	9.5"	Natural	76319-668
Large	9.5"	Natural	76319-670
X-Large	9.5"	Natural	76319-672

Hand protection solutions for production

WELLS LAMONT
Industrial

WELLS LAMONT INDUSTRIAL CRITICAL ENVIRONMENT GLOVE LINERS

Protect your hands, your environment, and your products with low-lint glove liners from Wells Lamont Industrial and Avantor. Whether you need cut resistance, sterility, or a barrier to increase comfort, we've got you covered.

- Low-lint, full-finger liner is reusable up to 30 times and tests at Category II for particulates
- Disposable sterile glove liner offers ANSI 1 cut resistance
- ANSI A2 sterile glove liner offers ANSI A2 cut resistance
- ANSI A4 sterile glove liner offers ANSI A4 cut resistance, is reusable, and tests at Category III for particulates



Description	Unit	Quantity	Cat. No.
Highly Reusable Low Lint Nylon Liner, S	Bag	20	32935-581
Highly Reusable Low Lint Nylon Liner, M	Bag	20	32935-583
Highly Reusable Low Lint Nylon Liner, L	Bag	20	32935-585
Highly Reusable Low Lint Nylon Liner, XL	Bag	20	32935-587
Disposable Sterile Glove Liner, S	Pack	20	80091-126
Disposable Sterile Glove Liner, M	Pack	20	80091-124
Disposable Sterile Glove Liner, L	Pack	20	80091-122
Disposable Sterile Glove Liner, XL	Pack	20	76302-800
ANSI A2 Cut Resistant Sterile Glove Liner, S	Pack	20	80091-132
ANSI A2 Cut Resistant Sterile Glove Liner, M	Pack	20	80091-130
ANSI A2 Cut Resistant Sterile Glove Liner, L	Pack	20	80091-128
ANSI A2 Cut Resistant Sterile Glove Liner, XL	Pack	20	80091-134
ANSI A4 Cut Resistant Low Lint Sterile Glove Liner, S	Pack	10	52428-890
ANSI A4 Cut Resistant Low Lint Sterile Glove Liner, M	Pack	10	52428-892
ANSI A4 Cut Resistant Low Lint Sterile Glove Liner, L	Pack	10	52428-894
ANSI A4 Cut Resistant Low Lint Sterile Glove Liner, XL	Pack	10	52428-896



The ideal balance of protection, durability, and comfort

TYVEK® ISOCLEAN® GARMENTS & ACCESSORIES

For a wide range of manufacturing industries, processes must be kept clean and uncontaminated. DuPont materials are used to create a variety of clothing for these controlled environments with different levels of protection, durability, and comfort in a variety of styles, including coveralls, lab coats, frocks, hoods, sleeves, and shoe and boot covers.

DuPont™ Tyvek® IsoClean® is a fabric-like material made from a patented flash-spinning process that creates an excellent barrier to dry particles, microorganisms, and non-hazardous liquids, and is offered in a wide range of design and processing options to protect the wearer and process from contamination.

Size	Case Count	Cat. No.
Tyvek® IsoClean® Hood, Bulk-Packaged		
Universal	100	89125-648
Tyvek® IsoClean® Coveralls, Bulk-Packaged		
Small	25	89129-656
Medium	25	89129-654
Large	25	89129-652
X-Large	25	89129-660
2X-Large	25	89129-640
3X-Large	25	89129-642
4X-Large	25	89129-644
5X-Large	25	89129-646
Tyvek® IsoClean® Sleeves, Bulk-Packaged		
Universal	100	89127-350

Other options including clean-processed & sterile available at vwr.com

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How to choose a cleanroom mask

By Damon Larkin, Kimberly-Clark Professional

When someone sneezes, particles exiting the nasal passages have been clocked at more than 100 miles per hour. That's just one of the reasons why selecting the right cleanroom face mask is so critical.



HERE ARE THREE SIMPLE STEPS TO HELP YOU CHOOSE:

- 1. Identify the work environment.** Do you need a mask for a pharmaceutical or biotech environment? For semiconductor, electronics or medical device manufacturing? Different environments require different protection. Your distributor or manufacturer can help you select the right mask for your needs.
- 2. Choose the appropriate style.** Traditional pleated masks fit close to the face and some offer exceptional breathability. However, if the mask touches your lips or gets wet, consider a pouch style. Pouch designs keep masks from getting damp. They also have a larger breathing chamber, which makes breathing easier, and a consistent seal to reduce fogging.
- 3. Determine the attachment.** For a secure fit that will reduce the risk of particles escaping, look for masks with durable, ultrasonically bonded ear loops and ties. Some masks also are available with knitted headbands or snaps to ensure a tight facial seal.

Damon Larkin is a category manager for the Kimberly-Clark Professional Global Scientific Business, which provides apparel, masks, gloves, wipers and eyewear for critical environments.

HOW TO DON A CLEANROOM MASK

In a cleanroom environment, the right mask is essential for preventing contamination from skin flakes, oils, perspiration and hair as well as for protecting the cleanroom operator from known and unknown risks.

Selecting the right cleanroom face mask is a crucial first step. After you've made your selection, **follow these steps to get a proper fit:**

- 1. Make sure the pleats or pouches point down,** to avoid picking up contaminants or debris.
- 2. Put the mask on with the shiny side on the outside and the softer material on the inside.**
- 3. Adjust the head attachment.** If you have trouble tying the mask behind your head, stand still and close your eyes while doing it.
- 4. Pinch the bridge of the mask.** This will help fit the mask to your face and minimize fogging if you are wearing goggles or glasses.
- 5. Last, remember to smile when wearing a mask.** Even if your coworkers can't see you, it will make you all feel better!



Economical, lightweight, flexible goggles offer comfort and protection

VWR® NONSTERILE SAFETY GOGGLES

ECONOMICAL NONSTERILE SAFETY GOGGLES ARE DESIGNED TO PROTECT FROM HAZARDS WITH A FLEXIBLE RIDGE AROUND A PVC FRAME

- Two ventilation options available
- Goggles fit over most prescription glasses
- Fully adjustable headband
- Provides 99.9% UV protection

Description	Lens Coating	Frame Material	Lens Material	Cat. No.
Indirect Ventilation	Uncoated	PVC	Polycarbonate	76017-902
Indirect Ventilation	Anti-Scratch	PVC	Polycarbonate	75982-624
Direct Ventilation	Uncoated	PVC	Polycarbonate	76017-944
Direct Ventilation	Anti-Scratch	PVC	Polycarbonate	75982-626



VWR® PROTECTIVE EYEWEAR WITH WRAPAROUND LENS

OFFERS STYLISH AND SECURE PERSONAL PROTECTION, WITH AN ARRAY OF COMFORT FEATURES TO ASSIST THE WEARER THROUGHOUT EXTENDED USE

- Lightweight design combines sleek appearance with rugged durability
- Rubberized temple tips and integrated nose piece for extra comfort
- Fits comfortably with half-mask respirators
- Impact-resistant, scratch-resistant polycarbonate lens
- Provides 99.9% UV protection

Super lightweight wraparound eyewear for men and women combines a sleek appearance with rugged durability. Eyewear features rubberized temple tips and an integrated nose piece.

Frame Color	Lens Coating	Lens Tint	Cat. No.
Blue	Anti-Scratch, Anti-Fog	Blue	76329-622
Black	Anti-Scratch, Anti-Fog	Smoke	76329-624
Black	Anti-Scratch, Anti-Fog	Mirrored	76329-626
Clear	Anti-Scratch	Clear	89187-986



9500 COMFORT SERIES N95 RESPIRATOR, MAKRITE®

Designed to protect workers from exposure to solid substances free of oil. This cone-style N95 mask is the most widely used mask in all work environments. These models have been designed to meet NIOSH's stringent approval requirements for breathing resistance and filtration efficiency.

- Exceptional interior filter for low breathing resistance
- Individually adjustable aluminum nose clip for excellent fit
- Ultrasonic welded head-straps for secure seal
- High density urethane foam nosepiece for great fit and comfort
- Approved by NIOSH

N95 particulate filter (95% filter efficiency level) is effective against particulate aerosols free of oil. Time use restrictions may apply.

Description	Color	Cat. No.
N95 Respirator with Nose Piece, without Valve	White	76413-598



Ideal for use in many environments

VWR® RATCHET HEADGEAR WITH FACE SHIELD

Provides full face protection from debris and splash hazards. Ideal for use in many environments ranging from the lab to industrial applications.

- Lightweight design
- Ratchet headgear features padded headband for better fit and comfort
- Face shield features universal slot design compatible with many different headgear styles
- Face shield thickness: 2.0 mm
- Fits comfortably with respirator or eyewear
- Impact-resistant, scratch-resistant polycarbonate shield

Face shields should be worn with ANSI approved eyewear.

Description	Thickness, mm	Cat. No.
Headgear and Shield	2.0	76336-850
Replacement Shield	2.0	76336-852

Reagents for oligonucleotide synthesis are available from Avantor

VWR CHEMICALS BDH® BIOSYNTHESIS GRADE REAGENTS

- High purity reagents with low water content formulated for DNA and RNA synthesis
- Manufactured at an ISO 9001:2015 certified facility
- Multiple formulations available of activators, oxidizers, capping reagent A, capping reagent B, and deblock
- Dry solvents also available

US
ONLY

Custom formulations and returnable containers available – contact your Avantor sales representative

Description	Reagent Type	Size	Cat. No.
0.20M BMT in Anhydrous ACN	Activator	4L*	BDH0601-4L
0.25M ETT in Anhydrous ACN	Activator	4L*	BDH0602-4L
0.30M BMT in Anhydrous ACN/NMI [99.5:0.5]	Activator	4L**	BDH0603-4L
0.5M ETT in Anhydrous ACN	Cap A	4L*	BDH0604-4L
20% NMI in Anhydrous ACN	Cap A	4L*	BDH0607-4L
8:1:1 THF/Lutidine/Acetic Anhydride	Cap A	4L*	BDH0612-4L
8:1:1 THF/Pyridine/Acetic Anhydride	Cap A	4L*	BDH0613-4L
9:1 THF/Acetic Anhydride	Cap A	4L*	BDH0614-4L
16% NMI in Anhydrous THF	Cap B	4L*	BDH0606-4L
20% NMI in Anhydrous THF	Cap B	4L*	BDH0608-4L
50:20:30 Anhydrous ACN/Acetic Anhydride/Lutidine	Cap B	4L*	BDH0611-4L
10% DCA in Anhydrous Toluene	Deblock	4L*	BDH0605-4L
3% DCA in Anhydrous DCM	Deblock	4L*	BDH0609-4L
3% TCA in Anhydrous DCM	Deblock	4L*	BDH0610-4L
0.02M Iodine in THF/Pyridine/Water [70:20:10]	Oxidizer	4L*	BDH0600-4L
Acetonitrile, anhydrous >99.9% for DNA Synthesis	Dry Solvent	4L*	BDH85501.400



These products are not available in Canada. Contact your Avantor sales representative to learn about similar options in your region.

Avantor portfolio of chemicals catalog

Delivering results from beaker to bulk

We enable research, development, manufacturing, and quality control. Now more than ever, chemicals remain critical to advancing human health, limiting our environmental impact, and enabling tomorrow's cutting-edge technologies.

Our laboratory chemical brands prove their value by helping solve the many challenges in biomedical research, environmental, and forensic work, as well as clinical diagnostics and materials science.

Our production chemical lines are key components in the manufacturing of life-saving medicines, novel biomaterials, critical diagnostic tools, and advanced technology products.

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Consistency is our standard



CERTIPUR® READY-TO-USE BUFFER SOLUTIONS

With certified pH values at both 20 °C and 25 °C, Certipur® pH buffer solutions from the Supelco® portfolio of analytical products meet your calibration needs. Our high standards match yours.

- pH Buffer solutions (20 °C)
- ISO Guide 34 Certified Reference Materials

Description	pH value	Size, L	Packaging	Cat. No.
Glycine, Sodium Chloride, Hydrochloric Acid	1.00	1	PE Bottle	EM1.09432.1000
		1		EM1.09433.1000
Citric Acid, Sodium Hydroxide, Hydrochloric Acid	2.00	4	PE Bottle Titripac®	EM1.09433.4000
		10		EM1.09433.9010
		1		EM1.09434.1000
Citric Acid, Sodium Hydroxide, Hydrochloric Acid	3.00	1	PE Bottle	EM1.09435.1000
		4		EM1.09435.4000
		10		EM1.09435.9010
Acetic Acid, Sodium Acetate	4.66	1	PE Bottle	EM1.07827.1000
Citric Acid, Sodium Hydroxide	5.00	1	PE Bottle	EM1.09436.1000
Citric Acid, Sodium Hydroxide	6.00	1	PE Bottle Titripac®	EM1.09437.1000
		4		EM1.09437.4000
Di-Sodium Hydrogen Phosphate, Potassium Dihydrogen Phosphate	6.88	1	PE Bottle	EM1.07294.1000
		1		EM1.09439.1000
		4		EM1.09439.4000
Di-Sodium Hydrogen Phosphate, Potassium Dihydrogen Phosphate	7.00	10	PE Bottle Titripac®	EM1.09439.9010
		1		EM1.09460.1000
		4		EM1.09460.4000
Boric Acid, Sodium Hydroxide, Hydrogen Chloride	8.00	1	PE Bottle Titripac®	EM1.09461.1000
		4		EM1.09461.4000
		10		EM1.09461.9010
Boric Acid, Sodium Hydroxide, Potassium Chloride	9.00	4	PE Bottle Titripac®	EM1.09461.4000
		10		EM1.09461.9010
		1		EM1.01645.1000
Di-Sodium Tetraborate	9.22	1	PE Bottle	EM1.01645.1000
Boric Acid, Sodium Hydroxide, Potassium Chloride	10.00	1	PE Bottle Titripac®	EM1.09438.1000
		4		EM1.09438.4000
		10		EM1.09438.9010
Boric Acid, Sodium Hydroxide, Potassium Chloride	11.00	1	PE Bottle	EM1.09462.1000



J.T.BAKER® BAKERBOND® PROchievA™ RECOMBINANT PROTEIN A, AFFINITY CHROMATOGRAPHY RESIN

OFFERS SUPERIOR DYNAMIC BINDING CAPACITY WITH EXCELLENT ALKALINE STABILITY LINKED TO AVANTOR'S PROPRIETARY LIGAND

- Available in 25 mL, 100 mL, 500 mL, 1 L and 5 L sizes, please contact your VWR representative for pricing on the larger sizes

The J.T.Baker® BAKERBOND® PROchievA™ protein A resin is designed for high-performance in the critical affinity chromatography step used in the purification of mAbs, FC-fusion proteins, and IgG antibody type molecules.



Description	Pack Size	Particle Size	Cat. No.
BAKERBOND® PROchievA™ protein A resin	25 ml	FIO (Target 68 - 78 µm)	JT7899-01
BAKERBOND® PROchievA™ protein A resin	100 ml	FIO (Target 68 - 78 µm)	JT7899-02
BAKERBOND® PROchievA™ protein A resin	500 ml	FIO (Target 68 - 78 µm)	JT7899-03
BAKERBOND® PROchievA™ protein A resin	1 L	FIO (Target 68 - 78 µm)	JT7899-04
BAKERBOND® PROchievA™ protein A resin	5 L	FIO (Target 68 - 78 µm)	JT7899-05



IPTG (ISOPROPYL-B-D-THIOGALACTOPYRANOSIDE) ≥98% (BY HPLC ON DRIED BASIS), BIOTECH REAGENT, CGMP-MANUFACTURED, J.T. BAKER®

Reduce risk in your bioprocessing applications with Avantor J.T.Baker brand cGMP manufactured IPTG.

CAS 367-93-1
C₉H₁₈O₅S
Boiling Pt:
Flash Pt:

M.W. N/A N/A
Melting Pt: 110...122 °C
Density:

Residual Isopropanol.....	≤5000 ppm
Residual Ethyl Acetate.....	≤5000 ppm
Total Aerobic Microbial Count.....	≤100 cfu/g
Total Yeast and Mold Count.....	≤100 cfu/g
Biological Induction Characterization (induction response @ 1mM)	

GMP Manufactured Product

Store and ship product between 2 and 8 °C

CAUTION: For manufacturing, processing or repackaging

Appearance (white to off-white solid).....	Passes Test
Identification (IR).....	Passes Test
pH of 5% Solution.....	5.00 - 7.00
Specific Rotation @ 25 °C.....	-34.5 - -28.5 Degree
Melting Point.....	110 - 122 °C
Water (H ₂ O), For Information Only	
Purity (by HPLC) (anhydrous basis).....	≥98 %
Assay (by HPLC) (anhydrous basis).....	98 - 102
Endotoxin Concentration, EU/g	
Residual Methanol.....	≤3000 ppm
Residual Ethanol.....	≤5000 ppm

Residual Solvents: The Class 3 solvents Ethanol, Isopropanol, Ethyl Acetate and the Class 2 solvent Methanol are likely to be present. These solvents are quantified and reported on each batch. No other

Class 1,2,3, or other solvents are used or produced in the production process. Dioxane was not used in the manufacturing process.

Bacterial Induction characterization: Test performed at 1 mM of IPTG (E. Coli. protein expression)

IPTG is highly hygroscopic. Allow packaging/container to equilibrate to room temperature before opening for analysis. Ensure sample is kept dry (such as in a desiccator) after opening.

Size	Packaging	Cat. No.
10 g	Wide mouth polyethylene bottle	JTV264-01
100 g	Wide mouth polyethylene bottle	JTV264-02
1 kg	Polyethylene pail, screw top	JTV264-05

VWR CHEMICALS BDH®, PH REFERENCE STANDARD BUFFERS

BDH PH BUFFERS ARE AVAILABLE AS EITHER COLORLESS OR COLORED SOLUTIONS

- Traceable to NIST Standards reference materials
- Calibrated in an ISO 17025 certified laboratory using certified standards
- Store at room temperature

For additional sizes please check vwr.com.



Size	pH Value	Color	pH Accuracy	Packed	Standard Reference Materials No.	Cat. No.
500 mL (16.9 oz.)	1.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5002-500ML
500 mL (16.9 oz.)	1.68	Colorless	±0.01	Poly Bottle	185, 186	BDH5006-500ML
4 L (1.1 gal.)	1.68	Colorless	±0.01	Poly Bottle	185, 186	BDH5008-4L
500 mL (16.9 oz.)	2.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5010-500ML
500 mL (16.9 oz.)	3.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5014-500ML
500 mL (16.9 oz.)	4.00	Red	±0.01	Poly Bottle	185, 186	BDH5018-500ML
500 mL (16.9 oz.)	4.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5024-500ML
4 L (1.1 gal.)	4.00	Red	±0.01	Poly Bottle	185, 186	BDH5020-4L
4 L (1.1 gal.)	4.00	Red	±0.01	Cubitainer	185, 186	BDH5022-4L
4 L (1.1 gal.)	4.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5026-4L
208 L (55 gal.)	4.00	Red	±0.01	Poly Drum	185,186	BDH0196-55GL
4 L (1.1 gal.)	4.45	Colorless	±0.01	Poly Bottle	185, 186	BDH5030-4L
500 mL (16.9 oz.)	4.63	Colorless	±0.01	Poly Bottle	185, 186	BDH5032-500ML
500 mL (16.9 oz.)	5.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5034-500ML
500 mL (16.9 oz.)	6.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5038-500ML
4 L (1.1 gal.)	6.00	Colorless	±0.01	Poly Bottle	185, 186	BDH5098-4L
500 mL (16.9 oz.)	6.86	Colorless	±0.01	Poly Bottle	185, 186	BDH5040-500ML
500 mL (16.9 oz.)	7.00	Yellow	±0.01	Poly Bottle	186, 191, 192	BDH5046-500ML
500 mL (16.9 oz.)	7.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5052-500ML
4 L (1.1 gal.)	7.00	Yellow	±0.01	Poly Bottle	186, 191, 192	BDH5048-4L
4 L (1.1 gal.)	7.00	Yellow	±0.01	Cubitainer	186, 191, 192	BDH5050-4L

Size	pH Value	Color	pH Accuracy	Packed	Standard Reference Materials No.	Cat. No.
4 L (1.1 gal.)	7.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5054-4L
208 L (55 gal.)	7.00	Yellow	±0.01	Poly Drum	186,191	BDH0192-55GL
500 mL (16.9 oz.)	7.38	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5058-500ML
500 mL (16.9 oz.)	8.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5060-500ML
500 mL (16.9 oz.)	9.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5062-500ML
4 L (1.1 gal.)	9.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5064-4L
500 mL (16.9 oz.)	9.18	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5066-500ML
500 mL (16.9 oz.)	10.00	Blue	±0.01	Poly Bottle	186, 191, 192	BDH5072-500ML
500 mL (16.9 oz.)	10.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5078-500ML
4 L (1.1 gal.)	10.00	Blue	±0.01	Poly Bottle	186, 191, 192	BDH5074-4L
4 L (1.1 gal.)	10.00	Blue	±0.01	Cubitainer	186, 191, 192	BDH5076-4L
4 L (1.1 gal.)	10.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5080-4L
208 L (55 gal.)	10.00	Blue	±0.01	Poly Drum	186,191	BDH0188-55GL
500 mL (16.9 oz.)	11.00	Colorless	±0.01	Poly Bottle	186, 191, 192	BDH5084-500ML
500 mL (16.9 oz.)	12.00	Colorless	±0.02	Poly Bottle	186, 191, 192	BDH5086-500ML
4 L (1.1 gal.)	12.00	Colorless	±0.02	Poly Bottle	186, 191, 192	BDH5088-4L
500 mL (16.9 oz.)	12.45	Colorless	±0.02	Poly Bottle	186, 191, 192	BDH5092-500ML
4 L (1.1 gal.)	12.45	Colorless	±0.02	Poly Bottle	186, 191, 192	BDH5094-4L
500 mL (16.9 oz.)	Buffer Set	Assorted	±0.01	Poly Bottle		BDH5100-PK



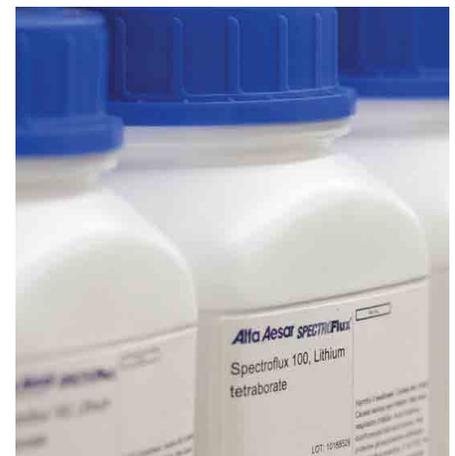
Alfa Aesar bulk and specialty chemical services

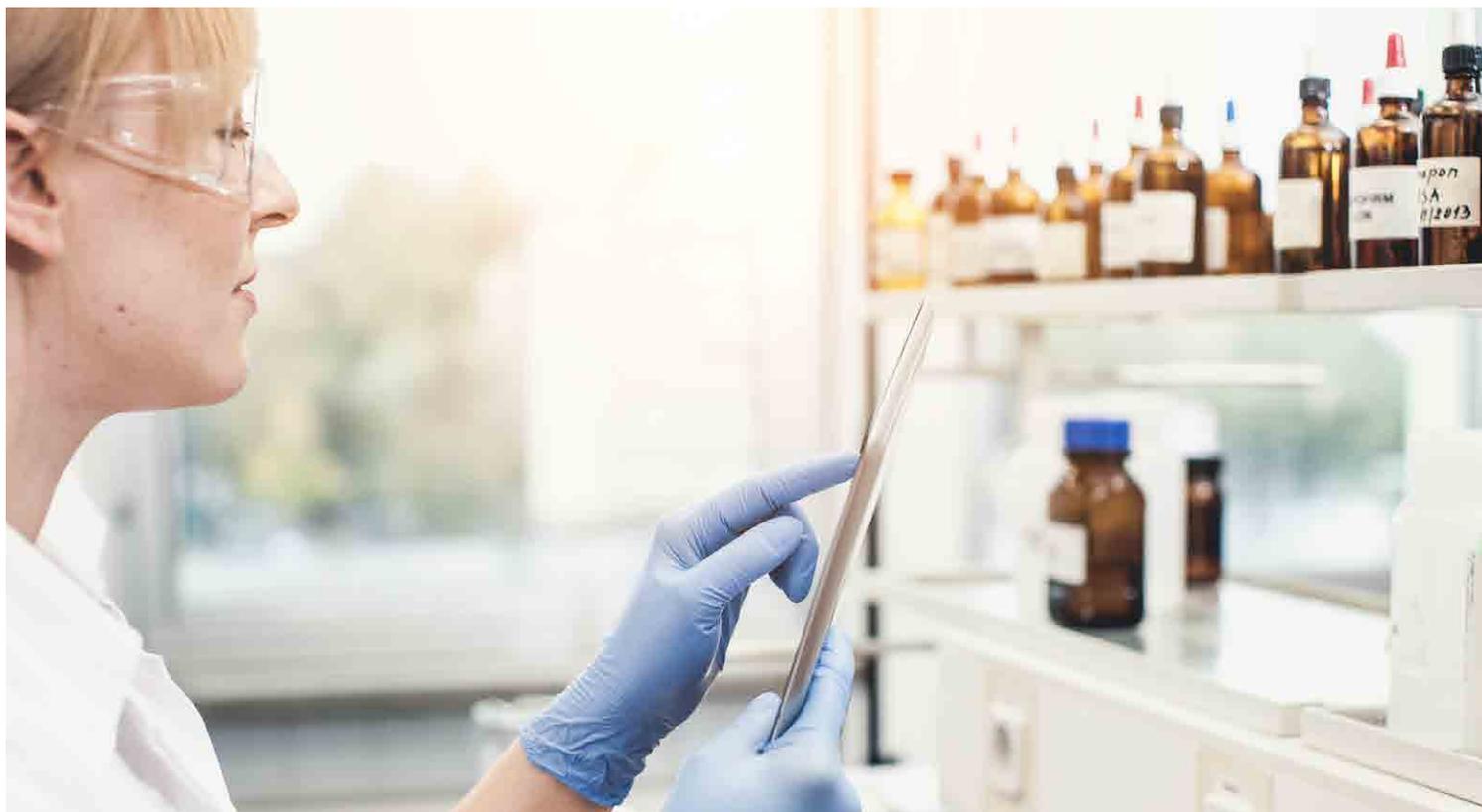
The specialty and bulk services team has a vast amount of experience meeting customers' requirements. We have a proven track record in providing customers with products in special pack size and bulk quantities. Our bulk stock is available for immediate shipment on most products.

Bulk and specialty services include:

- Fast quote turnaround
- Supply chain management and transparency
- Competitive pricing
- Blanket order capabilities
- Special packaging
- Custom manufacturing capabilities

To request a quote for your specialty and bulk needs, please visit vwr.com/alfa-bulk
Please contact your Avantor sales representative for more information.





Chemical management

To manage the chemical needs of your business, you need to handle multiple issues:

- Development of chemicals customized for your processes
- cGMP chemical manufacturing from small batches to full production volumes
- Global distribution and delivery to multiple sites with different operating procedures
- Onsite management of inventory, safety, and disposal

Our Chemical Management Solutions provide the personnel, processes, technology, and expertise to fully manage these challenges for you. The result: We help you reduce costs, improve safety and efficiency, and comply with regulations around the world.

Simply select and customize the services you need to support your goals for peak efficiency, quality, and compliance. Backed by the latest cutting-edge tools, our cloud-based and globally networked services are scalable to meet your specific requirements.

You can select and customize the services you need:

- Custom chemical development
- cGMP chemical manufacturing
- Distribution
- Digitally driven onsite service
- Disposal

For more information visit www.vwr.com/chemicalmanagement



Ideal for spill cleanup

Absorbent pads and rolls are ideal for spill cleanup; fast-wicking dimpled design absorbs liquids quickly to leave area clean and dry for improved safety

VWR® GENERAL-PURPOSE, OIL-ONLY, AND HAZMAT PADS AND ROLLS

- Soak up leaks and spills fast, keeping floors at your workplace clean, dry, and safe
- High-capacity absorbents stay on the job longer and are perfect for stocking spill kits
- Can be incinerated after use to reduce waste
- Absorbents soaks up oil, water-based liquids, petroleum products, and solvents
- Hazmat absorbents soak up aggressive fluids such as acids, caustics, and bases

General-purpose pads and rolls absorb water-based liquids, petroleum products, and solvents for everyday maintenance and cleanup. Oil-only pads and rolls absorb oils but repel water. Hazmat pads and rolls are designed for aggressive fluids such as acids, caustics, and bases.

Description	W x L	Color	Cat. No.
Hazmat Socks	7.6dia. x 122L cm (3 x 48)	Yellow	89169-000
Hazmat Pillows	5.7W x 20.3L x 5.1D cm (18 x 8 x 2)	Yellow	89169-002
General-Purpose Pads	38.1 x 48.3 cm (15 x 19)	Gray	82028-028
General-Purpose Roll	76.2 x 45.7 m (30 x 150')	Gray	82028-018
Oil-Only Pads	38.1 x 48.3 cm (15 x 19)	White	82028-020
Oil-Only Roll	76.2 x 45.7 m (30 x 150')	White	82028-022
Hazmat Pads	38.1 x 48.3 cm (15 x 19)	Yellow	82028-024
Hazmat Roll	76.2 x 45.7 m (30 x 150')	Yellow	82028-026

Designed for use in controlled environments



DISPENSERS TO ORGANIZE AND PROTECT YOUR PPE AND CLEANROOM SUPPLIES

Organize and maintain your personal protection equipment and cleanroom supplies. To see our full line of products, visit vwr.com and enter "S-Curve" in the search bar.

- Designed to organize supplies and protect from contamination
- Maximize space utilization in gowning room and production areas
- Keep supplies easily accessible and identifiable with clear dispensers
- Easy wall mounting and removal for cleaning
- All dispensers are available in chemical-resistant PETG material

Description	Cat. No.
4-Compartment Glove Dispenser	98106-922
4-Compartment Dispenser with Front Tray	10693-272
2-Compartment Bulk Item Dispenser	10828-380



- 1 Four-compartment glove dispenser
- 2 Four-compartment dispenser with tray
- 3 Two-compartment bulk item dispenser



VWR® SILICONE TUBING

Low-volatile grade, platinum-cured silicone tubing is produced in a certified ISO Class 6 (FED-STD-209E Class 1000/M4.5) cleanroom for use in critical pharmaceutical, biomedical, laboratory, food, and cosmetic applications.

- Non-contaminating
- Extremely flexible
- Resistant to temperature changes
- Chemically resistant
- Free of animal-derived ingredients

It is also ideally suited for single use/disposable research and development and production processes.

I.D. x O.D.	Wall thickness	Cat. no.
0.250 x 0.438"	0.094"	89068-454
0.375 x 0.500"	0.063"	89068-456
0.375 x 0.563"	0.094"	89068-458
0.500 x 0.688"	0.094"	89068-460
0.062 x 0.125"	0.032"	89068-468
0.125 x 0.250"	0.063"	89068-474
0.188 x 0.313"	0.063"	89068-478
0.188 x 0.375"	0.094"	89068-480
0.250 x 0.375"	0.063"	89068-482
0.250 x 0.500"	0.125"	89068-484
0.313 x 0.500"	0.094"	89068-488
0.375 x 0.625"	0.125"	89068-490
0.500 x 0.750"	0.125"	89068-492
0.625 x 0.875"	0.125"	89068-494





Optimizing output in vaccine production

Efficient vaccine manufacturing requires effective, efficient cleaning protocols in place for the production facility. This protocol is a key factor in controlling bioburden and contamination, which minimizes down time and optimizes output. Choosing the right cleaning system for a vaccine facility is a critical part of the production process. Below are the essentials for selecting the right cleaning system.

- **Performance (Cleaning Efficacy)** – third-party lab cleaning efficacy testing with $\geq 99.99\%$ reduction in surface bacteria
- **Minimizes potential for cross contamination** – wetting systems and hardware designed to eliminate cross contamination during the cleaning process
- **Reduced time to clean** – efficient cleaning and disinfecting to boost production output
- **Decreases disinfectant residues** – mechanical removal of contamination (including previous cleaning residues) and laying down disinfectant in a one-step cleaning cycle
- **Sustainability** – minimizes disinfectant and WFI consumption and disposal
- **Ergonomic** – lightweight components together with “smart” features allows less effort to clean
- **Versatility** – one system for floors, walls and ceilings. Ability to get into tight, hard-to-reach spaces while also quickly covering large areas

CE Duo™ CleanTech® has been proven to effectively and efficiently clean and disinfect vaccine production facilities.



CE DUO™ CLEANTECH® SYSTEM

System Benefits:

- Cleans and removes contamination with unique microfiber/foam mop head
- Reduces risk of cross-contamination with pre-prepared wetting system and color coding
- Minimizes cleaning solution required and decreases time to clean
- One system to clean floors, walls and ceilings
- Lightweight & easy to use

Mops:

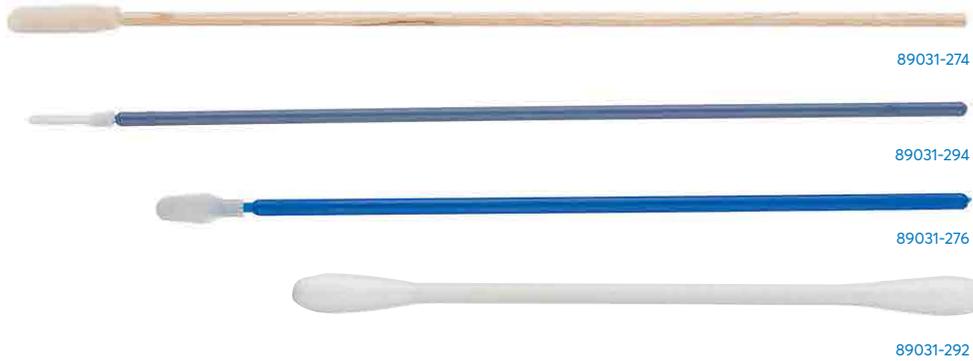
- Patented mop heads include engineered foam base for maximum absorbency, disinfectant application and microfiber overstretch for superior removal capability
- Third-party lab testing demonstrates 99.99% reduction in surface bacteria
- Double-sided flat mop for 2X surface coverage
- Validated sterile version of mop heads available
- Available in handheld sponge for hard-to-reach areas

Equipment:

- Ergonomic and light weight, easy to use
- Compatible with all common CE disinfectants and cleaners
- Completely autoclavable
- Touchless removal of mop heads from frame



Description	Color	Sterility	Cat. No.	Unit
CleanTech™ Duo Microfiber Mop	Blue and White	Nonsterile	89413-086	Case of 50
SanTech™ Duo Polyester Mop	White	Nonsterile	89413-084	Case of 50
CleanTech™ Duo Microfiber Mop	Blue and White	Sterile	10746-446	Case of 45
SanTech™ Duo Polyester Mop	White	Sterile	10746-448	Case of 45



89031-274

89031-294

89031-276

89031-292

Ideal for use in controlled environments

VWR® CRITICAL SWAB® SWABS

Precisely formulated in three unique materials:

Foam, cotton, and foam-over-cotton

Foam Head Swabs

- Withstand most widely used solvents
- Non-abrasive

Cotton Head Swabs

- Highly absorbent, USP-grade cotton
- Lintless formulations reduce contamination
- Economical

Swabs	Head, W x L, mm (in.)	Handle, W x L, mm (in.)	Swab Length, mm (in.)	Cat. No.
100ppi Open-Cell Polyurethane Foam Head and 100% Virgin Polypropylene Handle				
Large, Rectangular	13.5 x 25.4 (0.531 x 0.999)	5 x 130 (0.195 x 5.100)	152.3 (5.996)	89031-286
Paddle-Shaped, Flexible	4.8 x 15.1 (0.188 x 0.594)	3.1 x 152 (0.120 X 5.995)	167.4 (6.591)	89031-276
100ppi Polyurethane Foam Head and Wood Handle				
Medium	4.8 x 17.4 (0.188 x 0.687)	2.5 x 152 (0.100 x 5.974)	166.7 (6.563)	89031-274
Reticulated Foam Head and Extra-Rigid, Glass-Filled Polypropylene Handle				
Cone-Shaped	3.9 x 17.5 (0.154 x 0.688)	2.5 x 83 (0.100 x 3.260)	100.3 (3.949)	89031-282
Extended Length	3.6 x 25.4 (0.140 x 1.000)	2.5 x 82.8 (0.100 x 3.260)	108.2 (4.260)	89031-284
Two Lintless Cotton Tips and Paper Handle				
Double	4.4 x 15 (0.173 x 0.591)	2.5 x 78 (0.100 x 3.071)	93.0 (3.661)	89031-290
Double, Slim	3.2 x 14 (0.126 x 0.551)	1.5 x 75.5 (0.059 x 2.972)	89.5 (3.524)	89031-292
Cotton Tip and Wood Handle				
Small	4.8 x 15.9 (0.188 x 0.624)	2.5 x 152 (0.100 x 6.000)	162.9 (6.413)	89031-270
Large	5.9 x 17.4 (0.234 x 0.687)	2.5 x 152 (0.100 x 5.995)	164.5 (6.476)	89031-272

Shop vwr.com for additional sizes and more information.



VWR® SOFTCIDE®-NA HAND SOAP

OFFERS AN EXTRA-MILD, FREQUENT-USE FORMULA WITHOUT THE ANTIMICROBIAL AGENT

- Extra-mild cleansing
- Frequent-use formula
- pH balanced for skin

This extra-gentle soap helps replenish natural oils that are rinsed away from the skin during frequent washing.

Size, mL (oz.)	Packaging	Cat. No.
946 (32)	Pump Bottle	56700-144

Description	Cat. No.
Accessories	
Wall Bracket for 473 mL (16 oz.) Bottle	56614-422
Wall-Mounted Dispenser for 800 mL (27 oz.) Bag-in-a-Box	56700-138



VWR® ALCOSCRUB® INSTANT ANTISEPTIC HAND CLEANSER

FAST-ACTING ANTIMICROBIAL GEL IS DESIGNED FOR USE WHEN WATER IS NOT AVAILABLE TO SUPPLEMENT HAND WASHING

- Fast-acting antimicrobial gel for use when water is not available
- Ideal for reducing bacteria count on hands prior to donning gloves and entering aseptic environment
- Dries quickly and leaves no sticky residue
- Emollients help moisturize hands and keep them chap-free
- Contains 62% ethyl alcohol

Gel dries quickly and leaves no sticky residue. Emollients help moisturize hands and keep them chap-free. Contains 62% ethyl alcohol and is highly effective against a broad spectrum of microorganisms.

Size, mL (oz.)	Packaging	Cat. No.
473 (16)	Pump Bottle	56700-116
946 (32)	Pump Bottle	56700-148

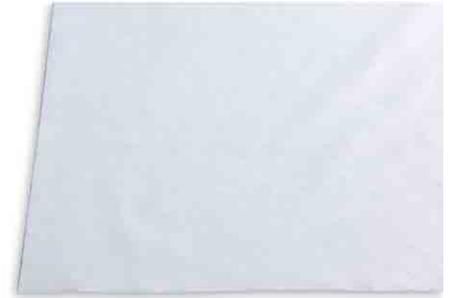
Description	Cat. No.
Accessories	
Wall Bracket for 473 mL (16 oz.) Bottle	56614-422
Wall-Mounted Dispenser for 800 mL (27 oz.) Bag-in-a-Box	56700-138

Incorporate sustainability without compromising quality



CONTEC® REFIBE WIPES

Contec's ReFIBE wipes, now available sterile, are made from 100% recycled plastic bottles making them a sustainable single-use polyester option for the most critical environments. The revolutionary recycling process converts post-consumer plastic to 100% continuous filament polyester, the same substrate used in many of Contec's standard polyester wipes and mops for critical cleanroom environments. ReFIBE wipes are exceptionally clean and compatible with a wide range of cleanroom solutions and disinfectants. ReFIBE wipes can be used in place of traditional polyester to incorporate sustainability without compromising quality or performance.



- Made from recycled post-consumer plastic bottles
- Sustainable single use polyester option for critical manufacturers
- Compatible with a wide range of solvents
- Low in particles and fibers
- Low in extractables

Description	Material	W x L, cm (in.)	Packaging	Case of	Cat. No.
Sterile ReFIBE Wipes, flat stacked	Polyester	23x23 (9x9)	25/Bag, 48 Bags/Case	1200	76468-272
Sterile ReFIBE Wipes, flat stacked	Polyester	30x30 (12x12)	25/Bag, 40 Bags/Case	1000	76468-274
ReFIBE Wipes, flat stacked	Polyester	23x23 (9x9)	75/Bag, 24 Bags/Case	1800	76417-116
ReFIBE Wipes, flat stacked	Polyester	30x30 (12x12)	75/Bag, 10 Bags/Case	750	76417-118



Excellent for wipedown of isolators, cabinets, laminar flow hoods

VWR® STERILE 70% ISOPROPANOL

FILTERED TO 0.2MM AND INDUCTION SEALED TO ASSURE STERILITY

- Contains 70% USP grade isopropanol and 30% USP grade deionized water
- Double-bagged and gamma-irradiated to a Sterility Assurance Level of 10⁻⁶
- Ideal for use with sterile cleanroom wipers

Description	Size, mL (oz.)	Cat. No.
Bottle	3.8 L (1 gal.)	89108-162
Trigger Spray Bottle	473 (16)	89108-160
Trigger Spray Bottle	946 (32)	89499-420



Simple, effective storage system

STARSYS UNDERCOUNTER ANTIMICROBIAL STORAGE CARTS

The Starsys Mobile Undercounter Cart is a polymer-based, highly adaptive storage cart, that enhances productivity and space efficiency by empowering the end user with the ability to easily relocate, reposition, and transport stored contents as needed. This ability helps to create a more flexible workspace and to meet your changing workflow demands.

- Durable easy-to-clean, polymer enclosures will not chip, peel, or rust
- PIN Lock has 20 programmable codes
- Robust and stable structure accommodates even the most sensitive equipment
- Microban Antimicrobial Protection
- Tucks under tables and task stations
- Height: 28"

Description	Cat. No.
Non-Locking Undercounter Storage Cart with Drawers	76463-288
Key Locking Undercounter Storage Cart with Drawers	76463-286
Undercounter Storage Cart with Electronic PIN Lock and Drawers	76463-290



Creates an impermeable barrier

VWR® STERILE BUCKET LINERS.

- Sterile with Sterility Level of Assurance (SAL 10⁻⁶)
- LDPE/nylon blend fabrication
- Provide an impermeable barrier against strong disinfectant solutions

This additional step ensures the integrity of the disinfectant blend. Item 89495-436 can be used for transport of sterile equipment.



Description	Cat. No.
Fits 1 gal. Buckets, Sterile	89495-436
Fits 6 gal. Buckets, Sterile	89495-438
Bucket Liners, 31x19", Bulk Pack	76304-356

Trust the Plus!



SAFEPLUS™ MICROFIBER WIPE DISPENSING SYSTEM

Routinely cleaning “high touch surfaces” is recommended to limit transmission of surface borne viruses and bacteria. That is why we offer the most hygienic and safe cleaning solutions for surface cleaning and disinfection in the SafePlus™ System. Making it easy to clean these sensitive areas!

- Excellent cleaning results have been independently proven
- Single-use microfiber cloth for effective cleaning, disinfecting, and reducing cross contamination
- Hygienic and innovative dispenser with antibacterial and self-closing flexible lid
- Preparation is easy, use a cleaning agent or disinfectant of your choice
- Dispensers are certified hygienic storing of prepared wipes for up to 31 days



Description	Case of	Cat. No.
SafePlus™ MicronRoll MINI - Blue	10	76437-386
SafePlus™ MicronRoll MAXI - Blue	6	76437-392
SafePlus™ MicronRoll MINI - Yellow	10	76437-388
SafePlus™ MicronRoll MAXI - Yellow	6	76437-394
SafePlus™ Dispenser MINI	4	76437-390
SafePlus™ Dispenser MAXI	4	76437-396



VWR® PURESTEP ADHESIVE MATS



MULTILAYERED CONTAMINATION CONTROL MATS REMOVE AND CONTAIN DIRT AND DUST FROM FOOT TRAFFIC AND EQUIPMENT WHEELS

- 0.3 mil thick acrylic-based, pressure-sensitive adhesive coating
- Antimicrobial agent protects against growth of bacteria, mold, and fungus

Mats consist of 30 or 60 sheets of 1.5 mil low-density polyethylene film. Each sheet has a 0.3 mil thick acrylic-based, pressure-sensitive adhesive coating. Numbered tabs ensure one-at-a-time sheet removal. Mats can easily be removed during routine floor maintenance. Some sizes are available with high-tack adhesives. Mat frames fit mats of sizes specified. Frames provide added stability with nonskid backing and allow use on surfaces that are not ideal for tacky mats.

L x W, cm (in.)	Color	Cat. No.
30-Layer Mats		
76.2x61 (30x24)	Blue	87004-000
76.2x61 (30x24)	Clear	87004-002
76.2x61 (30x24)	Gray	87004-004
76.2x61 (30x24)	White	87004-006
61x91.4 (24x36)	Blue	87004-040
91.4x45.7 (36x18)	Blue	87004-016
91.4x45.7 (36x18)	Gray	87004-018
91.4x45.7 (36x18)	White	87004-020
91.4x61 (36x24)	Gray	87004-042
91.4x61 (36x24)	White	87004-044
91.4x91.4 (36x36)	Blue	87004-064
91.4x91.4 (36x36)	Gray	87004-066
91.4x91.4 (36x36)	White	87004-068
114.3x45.7 (45x18)	Blue	87004-028
114.3x45.7 (45x18)	Gray	87004-030
114.3x45.7 (45x18)	White	87004-032
114.3x66 (45x26)	Blue	87004-052
114.3x66 (45x26)	Gray	87004-054



How single-use technology will be critical to the commercialization of cell and gene therapies

By Timothy Korwan, Director, New Product Introduction, Avantor

Scaling up cell & gene therapies from research and development to commercialization is creating a new set of challenges for manufacturers.

With the urgent demand of speeding up the market reach for these life-altering innovative therapies, a high risk is inherent to implement inefficient workflow processes. This article will demonstrate how adopting innovative single-use solutions for in-process sampling can have a tremendous effect on efficiency and effectiveness in the workflow. Single-use solutions continue to provide productive strategies in effectively scaling up these processes while reducing risks and costs.

Cell and gene therapies are an effective modality for treating and even curing complex diseases, with rapid advancements in therapy development that have resulted in significant regulatory approvals in recent years. The first CAR-T therapies, tisagenlecleucel (Kymriah® from Novartis) for pediatric acute lymphoblastic leukemia and onasemnogene abeparvovec-xioi (Zolgensma® from AveXis) for spinal muscular atrophy with children under the age of 2, are two examples of treatment and curative options that were not available with API drugs¹. With more than 1,000 clinical trials in cell and gene therapy applications ongoing in this space, over the next few years a

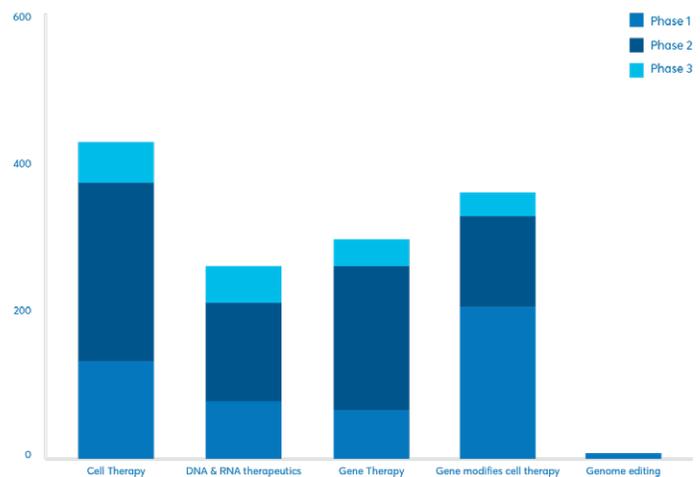


Figure 1. Clinical activity for cell and gene therapies in terms of trial phase.²

large number of these products are likely to come to market (see Fig. 1-2).²

When compared to the production and delivery of monoclonal antibodies (mAb) therapies, moving novel cell and gene therapies from process development and clinical stages to

When compared to the production and delivery of monoclonal antibodies (mAb) therapies, moving novel cell and gene therapies from process development and clinical stages to commercial, large scale manufacturing has introduced a host of new challenges.

commercial, large scale manufacturing has introduced a host of new challenges. Bringing a new product to market will always present a multitude of challenges with logistics, infrastructure, and finding highly skilled labor. Additionally, safety and efficacy of the therapy are always going to be a concern for the manufacturer, but the challenges facing these manufacturers is resulting in new solutions having to be developed and designed to overcome these new obstacles to commercialization.

These obstacles are becoming increasingly complex, due to the nature in which cell and gene therapies are produced and

delivered to patients. Dr. Scott Gottlieb, M.D., former commissioner of the U.S. Food and Drug Administration (FDA), spoke about this issue in 2019, saying: "In contrast to traditional drug review, some of the more challenging questions when it comes to gene therapy relate to drug manufacturing and quality."³ Autologous therapies indeed present a greater challenge during production scale-up due to the personalization of these medicines – that is, one batch for each patient. Each manufacturing lot is unique and every therapy starts with material from the patient that is then processed through the manufacturing workflow and transported back to that patient for administration.

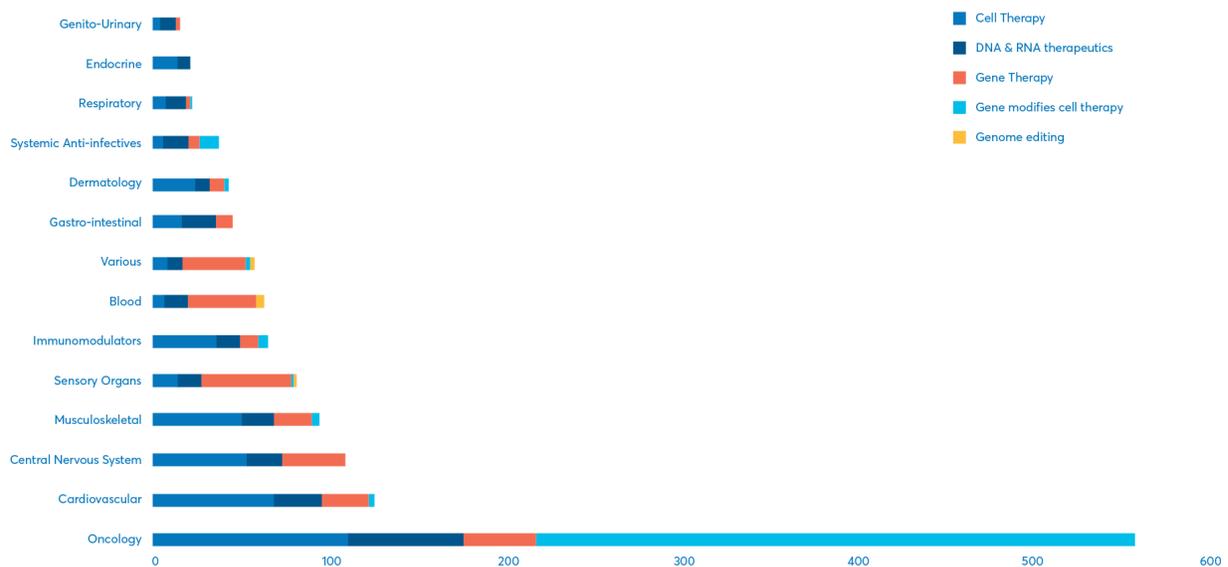


Figure 2. Clinical activity for cell and gene therapies in terms of trial phase.²

Single-use solutions are one of the most efficient strategies in effectively scaling up these therapies by improving workflows and reducing system risks and costs.

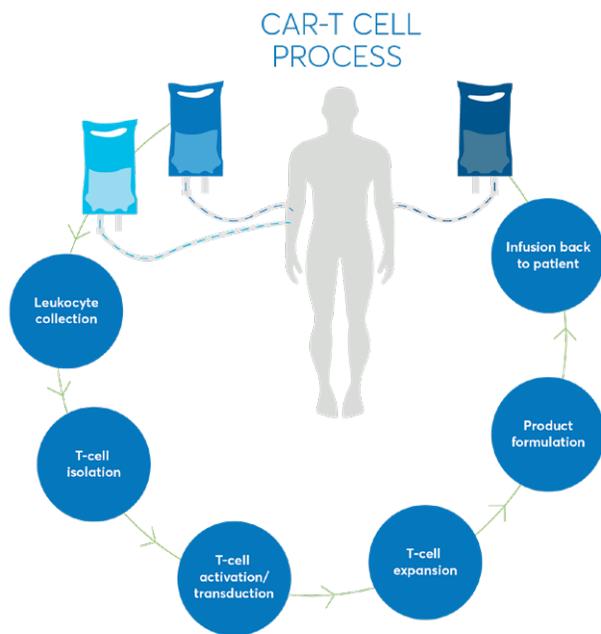


Figure 3. Generic workflow for CAR-T therapy.

There are a multitude of issues to be concerned with when scaling a drug manufacturing process normally and the life-altering potential of these therapies has only created more momentum.⁴ The demand for reducing the time that a therapy reaches the market is pushing manufacturers to implement rudimentary, lab scale processes into commercialization level that are neither efficient nor effective in the long run. In the case of an autologous cell therapy and some gene therapy process, the batch sizes (working volumes) can be quite small with poor yield. Understanding this early in process development can be critical in how the processes are scaled in a production setting (for example, identifying manual operations that are being performed inside a biological safety cabinet.) Designing new fluid pathways to move

liquid from unit operations while still maintaining sterility and integrity will be critical to scale-up success.

IMPLEMENTING SINGLE-USE SAMPLING METHODS IN CELL AND GENE MANUFACTURING

Personalized therapies are unique in that the entire manufacturing process and each of its inputs are the product itself – as it is often said, “the process is the product.” Many of these processes cannot be sterile filtered prior to formulation and fill finish, so all inputs into that process are the product that will be administered. In a low yield process, being mindful of areas of loss can improve overall yield, and controlling the amount of fluid sampled for in-process measurements can have a dramatic effect on final yield.

Single-use technology (SUT) are offering a more flexible, cost-effective and safer approach to sterile fluid handling in cell and gene therapy manufacturing when compared to traditional methods in place today. While sterile and efficient sampling at each stage of the process is one of the more critical steps in every biopharma manufacturing workflow, cell and gene manufacturing requires small batch sampling under aseptic conditions to preserve the limited material from and for the intended patient – all while complying to regulatory standards and facilitating scientifically sound and representative results. Single-use solutions are one of the most efficient strategies in effectively scaling up these therapies by improving workflows and reducing system risks and costs.

SYSTEM-RELEVANT RISK REDUCTION: OPEN VS. CLOSED SYSTEMS

Many current cell and gene manufacturing processes are manual and labor intensive, particularly around fluid management and sampling, with an estimate of three-times more hands-on operations than for traditional biologic manufacturing.⁵ Many operations are performed in an open-system workflow that is inherited from the clinical stage and carried into the commercialization stage, or adapted from traditional methods of sampling. The conical tube, for example, is a staple product found in virtually every laboratory and production setting, used in a traditional way by removing the cap it is commonly used for taking open samples from a process.

The Omnitop Sample Tubes® AVSS enables manufacturers to collect the exact volume sample required for testing while eliminating volume loss typically associated with sampling due to line losses or pre-flush requirements.

Open, manual (and therefore, variable) manipulations are often conducted in biologic safety cabinets within a Class 10,000/Grade B cleanroom, an isolator, or glove box. These methods share a common increased risk of contamination and batch loss as they are all exposed to the production environment with the potential for human variability and error. This is especially critical in cell and gene therapy manufacturing as many sampling steps are needed. Final filtration/sterilization steps cannot be used as the cells are not able to withstand terminal sterilization methods and – most importantly – there is no back-up if the process is contaminated. Moreover, open processes can not only have the potential for inaccurate results about a process and its parameters, but an operator relying on this data may then make misinformed choices about the batch in production, further putting the process at risk.

Closed-system solutions enabled by single-use technology provide an aseptic alternative to these otherwise open processes. Sampling platforms like the Avantor OmniTop Sample Tubes® system offer a new alternative choice to help ensure accuracy in these sampling process steps when using conical tubes. The OmniTop Sample Tubes® system provides a means to draw liquid into the conical tube without removing the cap, ensuring a closed system solution for sampling in both monoclonal antibody and vaccine production, where sampling volumes are not limited by the overall volume of the process. By reducing the risk of contamination by removing exposure to the production environment, the sampling process becomes more secure and efficient, with benefits that include improved material robustness and reproducibility, sterility assurance, and an easier pathway for introducing sampling automation.

INCREASING YIELD: EXACT VOLUME SAMPLING

Cell and gene therapy manufacturing is divided in autologous (therapy that relies on cells from the patient) and allogenic (therapy that relies on a single source of cells to treat many different patients). Immunotherapy approaches, such as CAR-T technology, are autologous and thus supply chains and manufacturing are driven batch-to-batch by a small starting volume and a high number of sampling requirements. Because



Figure 4. The Avantor Omnitop Sample Tubes® AVSS Adjustable Volume Sampling System, designed to pull exact volume samples and eliminate fluid line losses, for the most critical applications.

sampling is a net negative process, any volume removed will have a negative effect of the overall yield.

A method to remove an exact sampling volume necessary for analytical testing can reduce the amount of any excess volume removed, thereby increasing the overall product yield. Systems such as the Avantor Omnitop Sample Tubes® sampling platform with an adjustable volume sampling system (AVSS) are especially beneficial in critical small sampling scenarios like cell and gene manufacturing for the precision and control that they offer in drawing the sample. The Omnitop Sample Tubes® AVSS enables manufacturers to collect the exact volume sample required for testing while eliminating volume loss typically associated with sampling due to line losses or pre-flush requirements. The system is driven by two pre-attached syringes that are sterilized with

the sample collection vessel, allowing for simple manipulation of fluid flow. An adjustment tool allows users to move the adjustable dip tube within the Omnitop Sample Tubes® system to the collection volume needed, to as little as 0.5 mL.

CONCLUSION

Cell and gene therapies are providing unprecedented methods of treatment and curative medicines, however working with living cells is much more complex than other protein-based therapeutics, such as monoclonal antibodies (mAbs). Autologous cells as the starting material mean a significant batch-to-batch variation, adding complexity to the process. It is therefore critical that the sampling methodology is consistent and does not provide any additional process variation.

Cell and gene manufacturers are benefitting from collaborating with suppliers to tailor single-use systems and technology to the individual manufacturing requirements in the sampling process, giving way to custom-designed pathways with a wide variety of components and available connections that allow efficiency and process security in these workflows. With the precision and security of single-use sampling solutions, some of the main challenges in cell and gene manufacturing can be improved with the implementation of closed-system processing using ready-to-use sterilized solutions to mitigate contamination risk and enable automation, and low-volume sample management systems that help to increase product yields by reducing over-volume sampling and line losses.

Continuous investment in innovation and collaboration is required and suppliers to the industry can make valuable contributions to cell and gene therapy production based on their existing expertise, technology capabilities and commitment to providing solutions. This is the fundamental goal of scalability and, with a continuous commitment to innovation and collaboration across the industry, the life-changing, life-saving potential of cell and gene therapy can be realized.

Visit us at [vwr.com/single-use](https://www.vwr.com/single-use)

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Essential cleaning tools for critical environments

PERFEX TRUCLEAN MOPPING SYSTEMS

TruCLEAN Mopping Systems effectively capture and isolate contaminants, ensuring the delivery of pure cleaning agents. High-quality, stainless steel components and temperature resistant polypropylene buckets suitable for large and small area cleanrooms of any grade. Designed to be easy to use and maintain while delivering the cleaning performance you expect, time and time again.

- Prevent dangerous cross-contamination with multi-bucket mopping systems
- Compatible with gamma, ethylene oxide, and autoclave sterilization

Description	Cat. No.
TruCLEAN Triple Bucket Mopping System	
Red	22940-012
White	22940-015
Blue	22940-014
TruCLEAN 2	
Red	89095-990
Blue	89095-992

Also available in green and yellow.



22940-012

PERFEX TRUCLEAN SPONGE AND FIBER MOPS

Designed for use in cleanroom environments with ultra-low particulate level requirements. TruCLEAN Sponge Mop is ideal for applying cleaning and disinfecting agents to floors, walls, and ceilings. TruCLEAN Sponge and Fiber Mops combine performance with high-absorption for superior cleaning capabilities.

- Excellent surface coherence, abrasion and tear resistant
- Compatible with gamma, ethylene oxide, and autoclave sterilization
- Chemical and microbial resistance

Description	Cat. No.
TruCLEAN clean room mop	89096-038
TruCLEAN microfiber mop	89096-040
TruCLEAN anti-microbial mop	89096-036
TruCLEAN sponge mop	22940-023
TruCLEAN mop cover	22940-191



The ultimate hand sanitizer for cleanrooms

NOVACLENZ HAND SANITIZER WITH MICRODISPENSER

BUY 3 CASES OF NOVACLENZ HAND SANITIZER, GET ONE VWR TOUCH-FREE DISPENSER FOR FREE

PROMO CODE 5722

Hand hygiene has become a critical concern in today's world; especially in the work environment. Using VWR's Touch-Free Microdispenser system with a waterless sanitizer or soap will help reduce cross contamination and maintain a healthier work place. Micronova would like to help by offering one VWR Touch-Free Dispenser at no-charge with purchase of 3 cases of NovaClenz Hand Sanitizer.

- 65% minimum ethanol
- FDA registered
- FDA audited cGMP facility
- Made in the USA
- Moisturizes and sanitizes
- Fragrance free
- Use with touch-free dispenser
- Saddle pump included



Description	Cat. No.
VWR Touch-Free Soap Dispenser with Stand	76470-484
VWR Touch-Free Soap Dispenser	89128-812
NovaClenz 500 mL Hand Sanitizer, Micronova	*68400-031

To purchase your 3 cases of Novaclenz Hand Sanitizer, visit vwr.com, contact your VWR Sales Rep, or call 1.800.932.5000 between January 1st and June 30th, 2021. To redeem for your free product, visit vwr.com/promotions and search for **Promo Code 5722**. Fill in the online form before July 30th, 2021. Allow up to 8 weeks to receive your free product.

*Not available in Canada. More option available at vwr.com.

Building a new lab or updating an existing one?



LABLINK SURFACE METAL RACEWAY

LET PG LIFELINK HELP WITH OUR LABLINK PRODUCTS

LabLink Connection Products are used for the containment and connectivity of power and data and are installed wherever raceway connectivity is required.

PG LifeLink specializes in providing design options to meet your requirements. Versatile and functional, LabLink products are pre-cut, pre-wired, and pre-assembled. This saves you valuable installation time while offering significant labor savings and eliminating on-site material scrap.

- Surface Metal Raceways provide a way of having electrical or electrical and data in one unified system
- Raceway is made from anodized extruded aluminum with a clear satin anodized finish
- Standard 12-inch hardwired pigtailed for easy field connection
- Commonly installed along a wall but can be installed on a lab bench or workstation



Description	Size	No. of Outlets	Cat. No.
Double Channel Raceway, 4'	2-1/4 x 5-1/4 x 48"	2 Cover Mounted Spec Grade Duplex Receptacles and 1 Data Holder with 2 Cat5e Jacks, Not Wired	89422-938
Double Channel Raceway, 5'	2-1/4 x 5-1/4 x 60"	2 Cover Mounted Spec Grade Duplex Receptacles and 1 Data Holder with 2 Cat5e Jacks, Not Wired	89422-940
Double Channel Raceway, 6'	2-1/4 x 5-1/4 x 72"	3 Cover Mounted Spec Grade Duplex Receptacles and 1 Data Holder with 2 Cat5e Jacks, Not Wired	89422-942
Double Channel Raceway, 7'	2-1/4 x 5-1/4 x 84"	3 Cover Mounted Spec Grade Duplex Receptacles and 1 Data Holder with 2 Cat5e Jacks, Not Wired	89422-944
Double Channel Raceway, 8'	2-1/4 x 5-1/4 x 96"	4 Cover Mounted Spec Grade Duplex Receptacles and 2 Data Holders with 2 Cat5e Jacks, Not Wired	89422-946
Double Channel Raceway, 9'	2-1/4 x 5-1/4 x 108"	4 Cover Mounted Spec Grade Duplex Receptacles and 2 Data Holders with 2 Cat5e Jacks, Not Wired	89422-948
Double Channel Raceway, 10'	2-1/4 x 5-1/4 x 120"	5 Cover Mounted Spec Grade Duplex Receptacles and 2 Data Holders with 2 Cat5e Jacks, Not Wired	89422-950



Absorbent and economical

VWR® PRODUCTION STRING MOPS

With three fabric choices there is a production string mop for every type of manufacturing site, from semiconductor and pharmaceutical to food and beverage.

- Polyester microfiber string mops feature 100% micro denier polyester looped strands
- Polyester microfiber string mops have very low particle levels, and are available irradiated
- Tufted microfiber string mops feature 80% polyester, 20% polyamide looped strands
- Tufted microfiber string mops are the most absorbent, durable, and may be used wet or dry
- Polycellulose string mops feature 50% polyester, 50% cellulose flat strands
- Polycellulose string mops are the most economical, and offer a clean alternative to cotton or yarn mops

Ideal for large surface areas, and excellent at cleaning around tank or work center table legs. Use with standard string mop handles, such as 68400-002 and 68400-202, or with stainless steel handle, 68400-304.

Description	Material	Color	Packaging	Weight	Cat. No.
Tufted Microfiber String Mop	Microfiber, 80% Polyester/20% Nylon	Blue	2 Mops/Bag	-	76382-804
Irradiated Polyester Microfiber String Mop	Microfiber, 100% Microdenier Polyester	White	Individually Bagged	12 oz.	76220-938
Polyester Microfiber String Mop	Microfiber, 100% Microdenier Polyester	White	Individually Bagged	12 oz.	89214-778
Polycellulose String Mop	Polycellulose, 55% Polyester/45% Cellulose	White	Individually Bagged	-	76382-806



76382-804

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