

Water analysis measurement
parameters for the food &
beverage industry
Pages 4-6

Delectable pastries made
simpler with improved loss
on drying
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F&B FOCUS

VOLUME 5 ISSUE 2



Simplify your supply chain complexity

We understand that the demand for increased quality, productivity, and speed-to-market has never been greater. By leveraging our global strengths, we can help provide reliable and transparent supply chain solutions to decrease the complexity of your processes.

TO LEARN MORE, VISIT
VWR.COM/INDUSTRIAL



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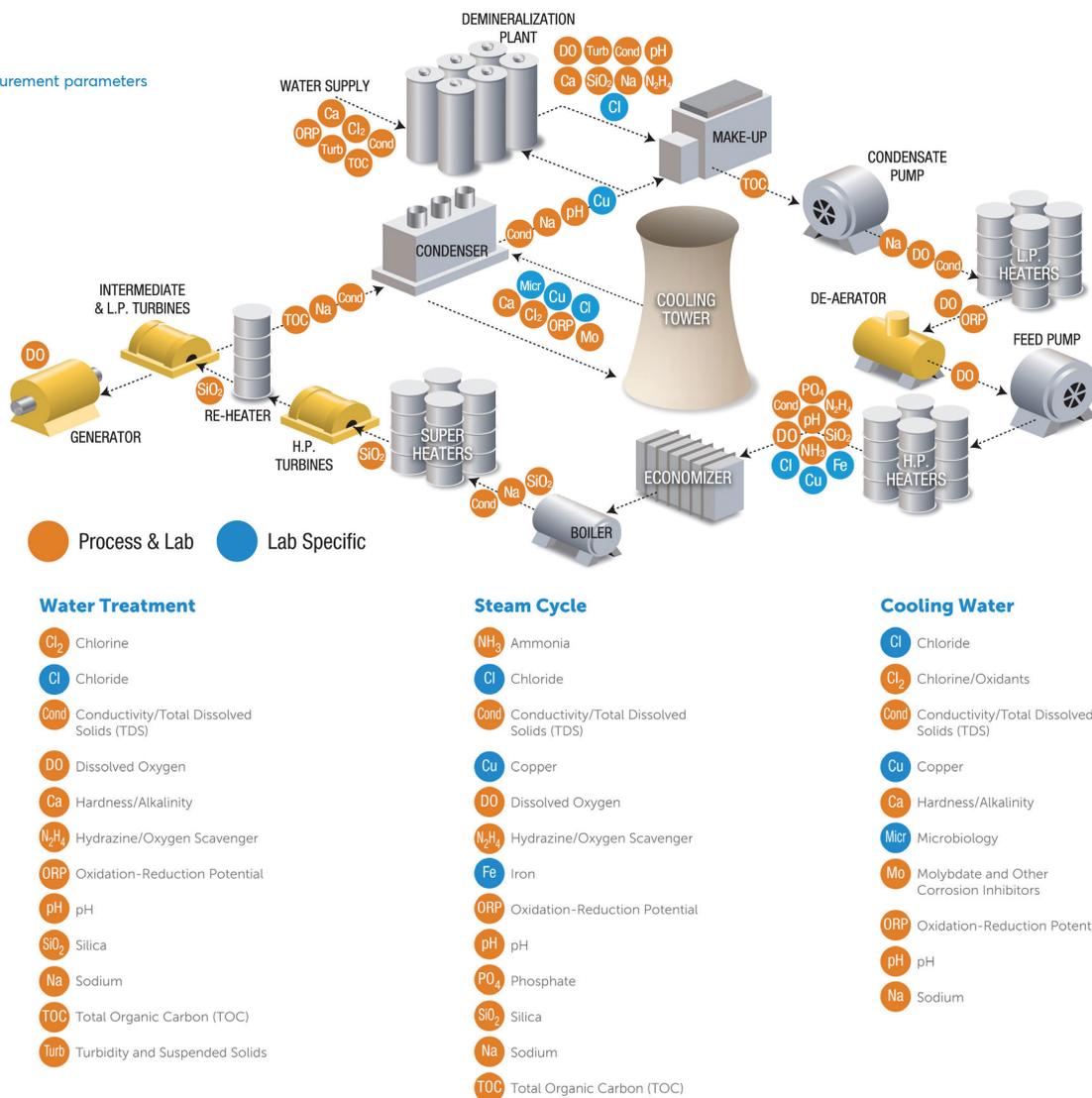
Water analysis measurement parameters for the food & beverage industry

Pat Walsh, Hach Company

For food & beverage manufacturing, the importance of ensuring the highest levels of product quality, consistency, and safety can not be underestimated. Optimizing water quality testing protocols in applications such as plant influent, boiler feedwater, product loss reduction, and effluent water treatment is a critical part of any effort in reducing supply chain complexity. Whether your goal is to maintain permit compliance, prevent product loss, or optimize water treatment, Hach offers both the expertise and comprehensive solutions to help you succeed.



FIGURE 1. Key measurement parameters



KEY PARAMETERS FOR INFLUENT WATER TREATMENT

Chlorine

Excessive chlorine harms membrane-based filtration systems and alters taste. Too little chlorine creates an opportunity for microbiological growth. Close monitoring of chlorine levels preserves filtration membranes and prevents the formation of harmful bacteria. Many disinfection programs employ a chlorine, chlorine dioxide or ozone strategy to prevent microbiological growth. Whether raw water, process water, rinse water, or effluent water, constant monitoring of disinfection parameters helps ensure that processes meet product safety, consistency and environmental regulations.

Conductivity/Total Dissolved Solids (TDS)

Conductivity or TDS, the most widely used control parameter for clean-in-place (CIP) applications, measures caustic or acidic solution strength. Conductivity also monitors process completion to identify product variation and control chemical additives.

Inductive conductivity, sometimes referred to as electrodeless or toroidal, remains the industry's primary choice due to sanitary 3A design standards. Conductivity also determines filtration media efficiency by gauging the dissolved, ionic constituents before and after the filtration process.

pH / ORP

pH and ORP commonly measure control processes throughout a facility. pH adjustment prior to filtration prevents precipitation of dissolved materials such as silica and calcium carbonate that clog filters. Maintaining proper pH also ensures maximum effectiveness and minimizes the costs of chemical additives, such as disinfectants. ORP monitors the effectiveness of chlorine removal (activated carbon filtration) and controls dechlorination chemical addition, protecting upstream RO units and reducing chemical costs.

Turbidity

Depending on the water source, turbidity varies dramatically.



Often, filtration systems remove excess turbidity and other minerals. While conductivity also monitors dissolved solids, on-line turbidity measurement is the preferred method to monitor filtration efficiency and control backwashing cycle frequency.

KEY PARAMETERS FOR EFFLUENT & WASTEWATER TREATMENT

pH

The continuous monitoring of pH plays an important role in alerting a facility of necessary process adjustments well in advance of violation. Additionally, pH monitoring at various stages within the wastewater treatment process is critical for maintaining bugs' health, optimizing chemical usage, and preventing corrosion to control costs.

Dissolved Oxygen (DO)

The aeration and activated sludge processes require a steady supply of oxygen to function effectively. Insufficient oxygen results in process inefficiency, producing foul-smelling intermediate products and incomplete reactions. Too much oxygen results in excessive energy loss. Since aeration and activated sludge processes constitute up to 70% of a wastewater plant's energy costs, precise monitoring and control of oxygen allows effective and efficient functionality.

Turbidity and Total Suspended Solids (TSS)

Turbidity and TSS measurements are commonly used for wastewater discharge reporting. They also control dissolved air flotation systems, dewatering equipment, and clarifier influent. When applied to polymer feed systems, the additional control often results in significant polymer savings. On-line monitoring and regular sampling protocols reduce the potential of putting excessive solids into the wastewater stream and help prevent permit violations and associated fines.

Nitrogen removal

Nitrogen enters wastewater treatment plants as Ammonia and is typically removed biologically. Using aeration, the nitrification stage utilizes aerobic bacteria to turn Ammonia into Nitrite and then Nitrate. Nitrogen removal happens as bacteria consume the Oxygen from Nitrate turning it into Nitrogen gas that escapes into the atmosphere. Aeration can account for 70% of operating costs because most wastewater treatment plants run their blowers full speed 24 hours a day, 7 days a week in order to meet permit limits. Using Real-Time control solutions to adjust blowers based on Nitrite and Nitrate levels can significantly reduce energy costs.

Phosphorus removal

Phosphorus does not have a gaseous form, so it must be converted from soluble form to particulate form for removal. Chemical phosphorus removal uses iron or aluminum compounds to combine with and precipitate out phosphate. Over treating water with these chemicals, while an effective method for ensuring

permit compliance, will result in wasted chemical spend and increased sludge production. This parameter is easily controlled in real-time, meaning that chemical dosing is based on the volume of phosphorus present and not a single set point.

Dissolved Air Flotation (DAF)

In food processing plants, a DAF is often used to reduce loadings and clarify wastewater. Tiny air bubbles are released into the tank causing small particulates to float to the top where they are skimmed off. To remove larger suspended solids, coagulant is dosed into the feed water—this helps to speed up clumping and settling. Typically, chemical is dosed to the DAF based on flow rate, but dosing based on flow ignores the solids concentration. This leads to under- and over-dosing which could waste chemicals, increase hauling costs, and result in fines. Real-time data helps facilities dose coagulant based on solids concentrations, eliminating over treating and reducing total costs.

Organics

In wastewater with high organic loads, a facility uses chemical treatment and physical processing to reduce load levels to those acceptable for either re-use or discharge into the environment. Efficient management of organics typically involves Biological Oxygen Demand (BOD) for reporting purposes. However, since the test takes 5 days, surrogates such as Chemical Oxygen Demand (COD), Total Organic Carbons (TOC), and Spectral Absorption Coefficient (SAC) may be used. These offer quicker test results and early detection of upsets or spills for reduced operational and maintenance costs. COD, a relatively simple lab procedure, reduces testing time to 2 hours. On-line TOC monitoring provides results every 7 minutes and on-line UV254 (SAC) monitors continuously for real-time control.

KEY PARAMETERS FOR PRODUCT LOSS REDUCTION

Organics

Lost product reduction has been a high-ranking objective in the food industry for a long time. Losing otherwise salable product down the drain adds significant cost beyond the product loss itself in the form of higher energy, water, and treatment costs. Using real-time organics monitoring specifically designed for these harsh applications as a management tool allows plants to view and quantify the product in process streams and wastewater, allowing for more informed process control and incident response ultimately leading to reclaimed profit that would have otherwise been lost.

To learn more about the comprehensive line of product solutions and services Hach has to offer, visit vwr.com/hach or contact your VWR Sales Representative today.



designed for research and analysis



VWR® RETURNABLE CONTAINER ADVANTAGE PROGRAM (ReCap)

The ReCap program starts with your choice of sealed 200L stainless steel containers, filled with VWR Chemicals 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.



Visit vwr.com to learn more.

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
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

Double-Wall Containers are also available; visit vwr.com. These specific products are not available in Canada. Please contact your VWR Sales Representative to learn about easy access to similar options available in your region.

designed for every day use



VWR® 2D BARCODED EXTERNAL THREAD CRYOVIALS

Store biological material, human, or animal cells at a temperatures as low as -196 °C (-321 °F). The black 2D insert at the bottom of the vial can be read by standard 2D barcode readers.



- External thread and silicone washers
- Sterilized by gamma radiation to SAL 10⁻⁶; certified DNase-, RNase-, Pyrogen-, and DNA-free

Also available in 81-place resealable storage boxes; visit vwr.com

Description	Packaging	Cat. No.	Case of 500
2D Barcoded External Thread Cryovials with Silicone Washer, 2 mL	Bulk: 100 Vials/Tamper-Evident Resealable Bag	75852-324	451.16

designed for precision



VWR® SYMPHONY™ BENCHTOP METER KITS

Step-by-step on screen prompts enable both new and seasoned users to operate the meter easily and effectively, resulting in consistently accurate measurements.



- Configurable to each user's unique needs
- Simple to operate and maintain

Meter Kit	Probe	Includes	Cat. No.	Each
B10P pH Meter	pH	B10P Meter (89231-662) and Refillable Glass pH Electrode (89231-580)	89231-664	1278.53
B20PI pH/ISE Meter	pH	B20PI Meter (89231-692) and pH Probe (89231-580)	89231-694	2067.22
B30PCI pH/Conductivity/ISE Multimeter	pH, Conductivity	B30PCI Meter (89231-696), pH Probe (89231-580), and Conductivity Probe (89231-614)	89231-698	2522.35
B10C Conductivity Meter	Conductivity	B10C Meter (89231-676) and Conductivity Probe (89231-614)	89231-678	1789.25
B40PCID Multimeter	pH, DO	B40PCID Meter (89231-684), pH Probe (89231-580), and DO Probe (89231-624)	89231-704	3197.34
B40PCID Multimeter	DO	B40PCID Meter (89231-684) and Dissolved Oxygen Probe (89231-624)	89231-670	2883.70
B40PCID Multimeter	pH, DO, Conductivity	B40PCID Meter (89231-684), pH (89231-586), Conductivity (89231-618), and DO (89231-624) Probe	89231-686	3957.20

These specific kits are not available in Canada, but pre-calibrated kits are. Search VWR Cat. No. series '75838-252' at ca.vwr.com.

designed for precision



VWR® ADVANCED DRY BLOCK HEATERS

- Exceptional temperature uniformity and stability
- Heated lid model reduces condensation in sample lids
- Holds interchangeable, modular heating blocks



SPECIFICATIONS

Temperature range	5° above ambient to 120 °C (248 °F)
Temperature stability	±0.1 °C

Description	Temperature Uniformity*	Cat. No.	Each
1 Block	—	75838-270	740.60
2 Block	±0.1 °C	75838-282	845.57
2 Block, with Heated Lid	±0.1 °C	75838-278	1269.86
4 Block	±0.2 °C	75838-294	1165.04
6 Block	±0.3 °C	75838-306	1510.14

*Across similar blocks @ 37°C

Hide and seek- not with us!



Not too long ago, a very well-known manufacturer of chocolate bars decided to recall a wide range of products when somebody found a small plastic part in one of their candies. The manufacturer chose a range of best before dates of more than six months for their recall. It is probable that besides the obvious financial damage, there was also a loss in reputation even when the long period they requested back proves that the safety of their customers had the highest priority.

As a result, Burkle decided to complement their range of disposable FDA and EU food compliant scoops, spoons, spatulas and scrapers with a selection of blue products to support manufacturers keeping their products easily free of unwished parts. Blue, a color that naturally does not exist in any food stuff, can easily be found by visual inspection. This characteristic helps to work according to HACCP/IFS foreign object management and reduces the risk of product recalls considerably.

Visit vwr.com today to learn more and get to know these new products!



Description*	Length mm (in.)	Cat. No.	Pack of
Scoop, 25 mL (0.84 oz.)	141 (5.55)	75836-562	10/ 24.35
Scoop, 50 mL (1.6 oz.)	160 (6.30)	75836-564	10/ 25.11
Scoop, 100 mL (3.38 oz.)	205 (8.07)	75836-566	10/ 25.89
Scoop, 150 mL (5 oz.)	216 (8.50)	75836-616	10/ 26.53
Scoop, 250 mL (8.4 oz.)	232 (9.13)	75836-618	10/ 32.47
Scoop, 500 mL (17 oz.)	280 (11.02)	75836-620	10/ 57.41
Scoop, 1,000 mL (33.8 oz.)	332 (13.07)	75848-664	10/ 86.88
Spatula, 13 mL (0.4 oz)	263 (10.35)	75836-570	10/ 21.91
Spoon, 2.5 mL (0.08 oz.)	127 (5.00)	75836-572	100/ 52.63
Spoon, 10 mL (0.3 oz.)	170 (6.69)	75836-622	100/ 55.84
Scraper	200 (7.87)	75876-068	10/ 25.27

*SteriPlast® Blue, Polystyrene, Sterile



Simplify food and beverage sampling



COMPACT DRY™

Organism-specific and total count tests are packaged in a sophisticated, sturdy cassette.

- Efficiently perform high throughput colony counts on food, beverage, cannabis, cosmetic, environmental, meat, and raw material samples
- Rigid transparent frame with removable lid keeps your colonies intact when subculturing
- Self-diffusing dry media transforms into gel with the 1mL sample – no need for an extra step

Description	Application	Cat. No.	Pack of 100*
CompactDry EC	EC, E. coli and Coliforms	10145-954	251.21
CompactDry ETB	ETB, Enterobacteriaceae	10753-986	256.47
CompactDry LS	Listeria spp	10789-408	333.07
CompactDry X-SA	X-SA, Staphylococcus aureus	10145-970	303.67
CompactDry YM	YM, Yeast and Mold	10145-972	282.53
CompactDry YMR	YMR, Yeast and Mold Rapid	76076-714	325.15
CompactDry SL	Salmonella spp	10789-458	264.30
CompactDry TC	TC, Total Plate Count	10145-968	197.44

DILUCUP™ ELEGANCE

Prepare your own dilution vials with this automated vortexing system.



US ONLY

- Maximize lab efficiency with pre-filled, sterile, ready-to-use dilution cups
- The Dilushaker™ uses orbital rotations to make sure each diluent is thoroughly vortexed the same way, every time
- Reduces the occurrence of repetitive motion injuries with its ergonomic design

Description	No. Trays	Cat. No.	Each
Dilucup Elegance, 9 mL Fill Volume			
NaCl, 7x3 Cups	32	75860-412	488.30
NaCl, 7x6 Cups	16	75860-414	488.30
BPW, 7x3 Cups	32	75860-416	514.86
BPW, 7x6 Cups	16	75860-418	514.86
MRD, 7x3 Cups	32	75860-406	488.30
MRD, 7x6 Cups	16	75860-408	500.15
Dilushaker III Digital, LED			
3 Rows, 21 Cups, 7 x 3	–	75860-388	2144.79
6 Rows, 42 Cups, 7 x 6	–	75860-392	2306.10

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

Perform single- or multi-step reactions and filtrations in the same vessel



BENCH SCALE JACKETED FILTER REACTORS

Jacketed Base Systems include:

- Jacketed reactor body w/O-Ring (capacities ranging from 150mL through 6,000mL)
- Head and clamp
- Bearing, stir shaft, and agitator
- Ace-Thred™ bottom adapter w/O-Ring
- Filter support and screen
- Bottom drain valve

Pressure Version adds:

- Condenser
- Addition funnel
- Standard taper joints replaced with Ace-Threds



Description	Capacity For Flask, mL	Bottom Style, mm	Connection, Ace-Thred Adapter	Flange Size	Cat. No.	Each
Standard Filter Reactors						
Jacketed Filter Reactor System	1,000	180	#80	2 ⁹ / ₁₆ Ball Joint	89054-152	3650.47
Jacketed Filter Reactor System	6,000	350	#80	2 ⁹ / ₁₆ Ball Joint	89054-158	5426.39
Pressure Filter Reactors						
Jacketed Filter Pressure Reactor System	600	185	#50	#11 Ace-Thred	10767-270	5327.97
Jacketed Filter Pressure Reactor System	6,000	350	#80	#15 Ace-Thred	10767-768	9251.04

Designed around your application



Hach's AT1000 Series of potentiometric titrators include pre-set application packs and compatible instruments that measure the parameters that are important to you. Once operational, your AT1000 system will enable anyone in the lab to quickly perform titrations that maintain compliance, prevent product loss, and optimize production.

- 3-element system: application package, instrument, reagents
- Simple set-up; fast execution
- Comprehensive documentation



Step 1: Choose the desired application package(s):

Step 2: Choose the relevant AT1000 Model for your application:

Food & Beverage Application Packages	Compatible Titrator(s)	Cat. No.	Each
Determination of pH and Total Acidity in Food & Beverages	AT1102, AT1112, AT1122, AT1222	10662-158	926.00
Determination of pH, Total Acidity, and Salt in Food & Beverages	AT1222	10662-200	1547.03
Determination of Salt in Food Products	AT1112, AT1122, AT1222	10662-162	709.75
Determination of pH, Total Acidity, and Free & Total SO ₂ in Wine	AT1222	10662-204	1707.83
Determination of Free & Total SO ₂ in Wine	AT1122, AT1222	10662-202	826.18

AT1000 Automatic Titrators	Titration Model	Cat. No.	Each
AT1000 Potentiometric Titrator, 1 Burette	AT1102	10662-252	2861.16
AT1000 Potentiometric Titrator, 1 Burette, 1 Pump	AT1112	10662-254	3238.23
AT1000 Potentiometric Titrator, 1 Burette, 2 Pumps	AT1122	10662-256	3626.36
AT1000 Potentiometric Titrator, 2 Burettes, 2 Pumps	AT1222	10662-258	4081.06

For a full list of application packages and AT1000 instruments visit vwr.com/hach

Delectable pastries made simpler with improved loss on drying

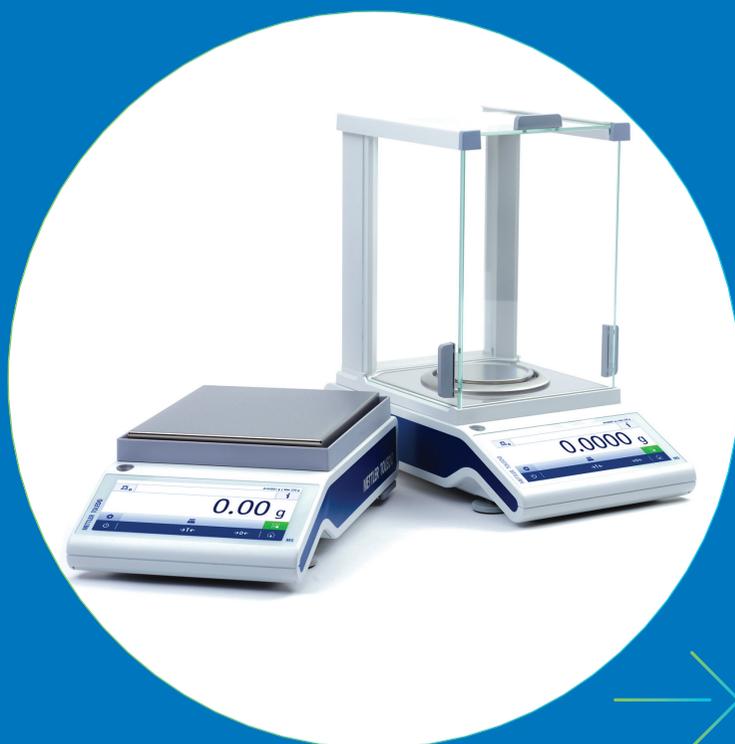
by Michael Jucker, Product Manager, METTLER TOLEDO

A large Swiss pastry manufacturer has improved its sample handling and data management using the differential weighing application on a METTLER TOLEDO MS-TS analytical balance.

Moisture content is an important quality parameter. In food production, it can affect both final product quality and overall costs, as ingredients are most often purchased by weight.

Yet the reference method, loss on drying (LoD), is time-consuming with a drying oven. The full method includes preconditioning of tare containers, then drying samples in an oven and cooling them in a desiccator. Moreover, it is error-prone due to the number of manual operations involved, particularly when working with multiple samples from different products.

Yet as a Swiss pastry manufacturer has learned, the new differential-weighing application on MS-TS analytical balances from METTLER TOLEDO can save a significant amount of processing time while simultaneously reducing opportunities for manual errors. This application is fully compliant with baked-goods regulatory standards and greatly simplifies sample preparation and data handling for a streamlined, more secure LoD process.



METTLER TOLEDO



KEEPING SAMPLES ORGANIZED

The manufacturer uses an MS204TS analytical balance in combination with a P-56 thermal printer and a barcode reader to test up to ten ingredients during goods-in inspection on a daily basis. Three samples, each weighing 5-10 grams, are prepared from each ingredient, such that operators process up to 30 samples every day. Crucibles are labeled with barcodes and placed on the balance. Once samples are added, the balance records crucible IDs, tare weights, and initial weights. Crucibles are then placed into a drying oven for four hours, after which they are cooled in a desiccator and reweighed.

SIMPLIFYING DATA MANAGEMENT

The balance records final sample weights and calculates the moisture percentage for each sample, which is identified by the crucible ID. Weight values are automatically saved against the corresponding ID so sample and data handling are simplified.

Final results, including test method, user information, and time/date are printed out and archived in the laboratory logbook. The company also has the option of saving results to a .csv or .txt file and transferring them via USB to a PC for additional recordkeeping.

OPERATOR SUPPORT, TRUSTED RESULTS

Perhaps most importantly, the balance supports the operator through the entire differential-weighing application by providing step-by-step instructions on the balance display. This semi-automated process is much less prone to error, giving quality-control managers a greater degree of confidence in their moisture-analysis results.

Learn more today by visiting vwr.com/mettlertoledo

designed for
research and analysis



VWR CHEMICALS BDH REFERENCE STANDARD BUFFERS

- Calibrated in an ISO 17025 certified laboratory using certified Standards
- Traceable to NIST Standard Reference Materials



pH Value	Color	pH Accuracy	Traceable to N.I.S.T. (SRM) No.	Cat. No.	Each
1	Colorless	±0.01	185, 186	BDH5004-20L	246.40
2	Colorless	±0.01	185, 186	BDH5012-20L	246.20
3	Colorless	±0.01	185, 186	BDH5000-20L	298.47
4	Red	±0.01	185,186	BDH0198-20L	215.29
4	Colorless	±0.01	185, 186	BDH5028-20L	193.07
5	Colorless	±0.01	185, 186	BDH5036-20L	204.44
6.86	Colorless	±0.01	185, 186	BDH5042-20L	221.29
7	Yellow	±0.01	186,191	BDH0194-20L	250.13
7	Colorless	±0.01	186, 191, 192	BDH5056-20L	277.18
9.18	Colorless	±0.01	186, 191, 192	BDH5068-20L	220.56
10	Blue	±0.01	186,191	BDH0190-20L	209.98
10	Colorless	±0.01	186, 191, 192	BDH5082-20L	277.18
12	Colorless	±0.02	186, 191, 192	BDH5090-20L	247.83
12.45	Colorless	±0.02	186, 191, 192	BDH5096-20L	411.56

designed for precision



VWR® ADVANCED MELTING POINT APPARATUS

Used to determine the purity of a sample and is optimized to quickly and efficiently heat up to three samples at one time. Microprocessor controlled units maintain precise temperature control from ambient +5 °C to 400 °C.



- Audible alarm when set temperature is reached
- On-board memory records up to 1,000 tests (4 temperatures per test)
- Extendable arm allows user to adjust height and angle of viewing window

Description	Cat. No.	Each
Melting Point Apparatus	75840-112	2389.89
Melting Point Apparatus, with NIST Traceable Certificate	75840-014	3061.76

designed for research and analysis



VWR® ION CHROMATOGRAPHY (IC) POLYVIALS FOR DIONEX AUTOSAMPLERS

- Ion chromatography analysis of environmental, water/wastewater, pharmaceutical, and research samples
- Filter cap vials provide in-line filtration, reducing sample treatment and overall cost
- Made of high-grade polypropylene



IC Conical Tube Vials for Metrohm-Peak Autosamplers are also available; visit vwr.com

Capacity, mL	For Use With	Cap Type	Cat. No.	Pack of
7	Dionex AS-50/AS-AP	Pierceable Polyethylene	10571-308	250/ 161.56
5	Dionex AS-40/AS-DV	40-60 µm Porous Filter	10571-344	250/ 137.84
0.5	Dionex AS-40/AS-DV	40-60 µm Porous Filter	10571-348	250/ 137.84
5	Dionex AS-40/AS-DV	Sample Pack	10799-706	10/ 7.96
5	Dionex AS-40/AS-DV	Cap - No Filter	10571-346	250/ 91.37

designed for discovery



VWR® 96-WELL POLYPROPYLENE PLATES

- Round, conical, and flat bottom formats are available
- Virgin polypropylene microplate construction
- Interchangeable covers are available in multiple materials and thicknesses



Description	Well Volume	Cat. No.	Pack of 10
Deep Well, Round Bottom	2.0 mL	89237-526	69.07
Deep Well, Conical Bottom	2.0 mL	89237-522	69.07
Medium Well, Round Bottom	500 µL	89237-510	65.09
Shallow Well, Flat Bottom	350 µL	89237-504	54.27
Shallow Well, Conical Bottom	350 µL	89237-508	54.30

Do you have special applications?



Simplify your workflow with our pH test strips for special requirements, like testing turbid samples or meat.



MCOLORPHAST™ TEST STRIPS WITH SAFETYEDGE BOX

- Tamper-proof seal ensures that the box has not been opened
- Flip-top corner prevents strips from falling out!

Description	pH Measuring Range	Graduation	Cat. No.	Each
pH Indicator Strips, Universal Indicator	0 - 14	0-1-2-3-4-5-6-7-8-9-10-11-12-13-14	EM1.09535.0001	54.75
pH Indicator Strips	0 - 6.0	0-0.5-1.0-1.5-2.0-2.5-3.0-3.5-4.0-4.5-5.0-5.5-6.0	EM1.09531.0001	54.75
pH Indicator Strips	5.0 - 10.0	"5.0-5.5-6.0-6.5-7.0-7.5-8.0-8.5-9.0-9.5-10.0"	EM1.09533.0001	54.75
pH Indicator Strips	7.5 - 14.0	7.5-8.0-8.5-9.0-9.5-10.0-10.5-11.0-11.5-12.0-12.5-13.0-13.5-14.0	EM1.09532.0001	54.75
pH Indicator Strips	2.0 - 9.0	"2.0-2.5-3.0-3.5-4.0-4.5-5.0-5.5-6.0-6.5-7.0-7.5-8.0-8.5-9.0"	EM1.09584.0001	54.75
pH Indicator Strips, Special Indicator for pH Measurements in Turbid Solutions	2.0 - 9.0	2.0-3.0-4.0-5.0-6.0-7.0-8.0-9.0	EM1.09502.0001	32.72

No. of Strips: 100

Solutions to solve any puzzle

METTLER TOLEDO

With a full range of best-in-class solutions that produce extraordinary results, METTLER TOLEDO has you covered

From balances and titrators to pH meters and UV/VIS spectrophotometers, each solution is user-friendly and extremely accurate, providing you an experience that can only be defined as truly amazing.

Learn more today by visiting
www.com/mettlertoledo



See what reliable, reproducible, and accurate results can do for your work

**thermo
scientific**

THERMO SCIENTIFIC™ ORION STAR™ T900 SERIES AUTOMATED TITRATORS

The analysis capabilities of these titrators combined with their simplicity make them an ideal partner for your expanding laboratory.

- Increase laboratory productivity by automating titrations
- Offer easy-to-use navigation from setup to live titration analysis to data transfer
- Showcase onscreen instructions, help menus and titrations on large color graphic touchscreen
- Create and save up to ten custom user-defined methods or use preprogrammed protocols

Orion Star T900 Series Laboratory Titrator Family:

- Orion Star T910 pH Titrator
- Orion Star T920 Redox Titrator
- Orion Star T930 Ion Titrator
- Orion Star T940 All-in-One Titrator



money saving offers

designed for your space



VWR® C-LEG MANUAL PRE-CONFIGURED WORKSTATIONS

BUY A VWR® 4-LEG WORKSTATION AND GET A FREE 48" DUAL MAGNETIC LED LIGHT!

OVER \$300 VALUE

Manually height adjustable from 25.6"-35.4", includes table frame, work surface, uprights, and 1 shelf. Magnetic Let Light (Cat. No. 89524-524).



Description	Cat. No.	Each
32% x 45½ in., Phenolic 48 in. Shelf	89524-438	1425.03
32% x 60% in, Phenolic 60 in. Shelf	89524-440	1690.30
32% x 72 in, Phenolic 72 in. Shelf	89524-442	1945.92

Visit vwr.com/promotions and search **Promo Code 5173**. Offer expires 3.31.2019.

designed for every day use



VWR® PREMIUM LINE DISPOSABLE SEROLOGICAL PIPETS

BUY 10 CASES OF THE SAME SIZE SEROLOGICAL PIPETS AND GET ANOTHER CASE OF THE SAME SIZE FREE!

VALUE UP TO \$440!



- DNase/RNase-free, non-pyrogenic, non-cytotoxic, non-haemolytic
- Color-coded according to volume
- Sterile pipets are sterilized by gamma irradiation; SAL of 10⁻⁶ (ISO11137)

Visit vwr.com/promotions and search **Promo Code 5215** for a complete listing of qualifying pipets. Offer expires 3.31.2019.

PURELAB LABWATER SYSTEMS



BUY AN ELGA LABWATER SYSTEM AND GET A FREE 2ND PURIFICATION PACK!

FREE PURIFICATION PACK

Qualifying Systems include our comprehensive range of pure and ultrapure water (Type I, II, III) purification.

*These items come together



System	Cat. No.	FREE 2nd Purification Pk
PURELAB Chorus	10034-540, 10034-542, 10034-544, 10034-546, 10034-548, 76048-804, 76048-806, 76048-808, 76048-810, 76048-796, 76048-798	10035-894, 10035-890, 76048-854, 76048-852
	89204-072, 89204-074, 89204-076, 89204-078, 89204-080, 89204-082, 89204-084, 89204-086	89204-376
PURELAB Classic	89204-088, 89204-092, 89221-838, 89221-840, 89221-842, 89221-844, 89221-848, 89221-852, 89221-856, 89221-860	89204-392, 89204-404
	89204-016, 89204-018, 89204-024, 89204-026	89204-348
PURELAB Option Q	89204-000, 89204-002, 89204-008, 89204-010	89204-308
PURELAB Option R	89203-984, 89203-986, 89203-992, 89203-994	89204-308
PURELAB Option S	89204-040, 89204-042	89221-822
PURELAB Pulse	89221-862	89221-822 & 89204-392*
PURELAB Pulse, Flex 2	89204-052, 89204-054, 89204-056, 89204-058, 89204-060, 89204-062, 89204-064, 89204-066, 89204-068, 89204-070	89204-368, 89204-370, 89204-372, 89204-374
PURELAB Ultra		

Visit vwr.com/promotions and search **Promo Code 5188**. Offer valid on listed ELGA LabWater PURELAB Systems purchased between 1.1.2018 through 12.31.2019. Customer must purchase 1st purification pack with order to receive the 2nd free through online redemption.

PIG® GRIPPY® ABSORBENT MATS



PURCHASE ANY GRIPPY FLOOR MAT AND GET A FREE PIG SNOUT HAT!

FREE HAT!

Prevent slips, trips and falls in your high traffic areas. Try it today!



Dimensions	Absorbency	Packaging	Cat. No.	Price
36" x 100'	8 Gal./Roll	1 Roll	10811-188	305.13
36" x 5'	4 Gal./Roll	10 Mats/Roll	10811-218	180.30
36" x 10'	4 Gal./Roll	5 Mats/Roll	10811-220	180.30

Visit vwr.com/promotions and search **Promo Code 5186**. Offer expires 12.31.2019.

High-purity chemicals dollar match offer



BUY BETWEEN \$250 AND \$1000 OF AVANTOR HIGH-PURITY CHEMICALS AND GET AN EQUAL AMOUNT FREE!

VALUE UP TO \$1,000!

Avantor's J.T.Baker® and Macron Fine Chemicals™ brand products set the standard for analytical transparency and efficiency in the world's most demanding laboratory applications.

Order products between May 1, 2018 - December 31, 2018. For more information and to redeem, visit vwr.com/promotions and search **Promo Code 5241** before January 31, 2019.

designed for reliability



VWR® VORTEX MIXERS

BUY 3 VWR VORTEX MIXERS AND GET 1 FREE!

VALUE UP TO \$668!

- Available in Fixed Speed, Analog, Digital, and Pulsing models
- Two modes of operation
- Best in class 5-year warranty



Description	Cat. No.	Each
Fixed Speed Vortex Mixer	10153-834	417.96
Analog Vortex Mixer	10153-838	434.19
Digital Vortex Mixer	10153-842	515.80
Pulsing Vortex Mixer	10153-812	668.18

Visit vwr.com/promotions and search **Promo Code 5092**. Offer expires 12.31.2019.

Advanced analytics chemicals



BUY A MINIMUM OF \$500 ADVANCED ANALYTICS PRODUCTS, AND WE'LL MATCH YOUR PURCHASE WITH FREE PRODUCTS!

VALUE UP TO \$1,500!

MilliporeSigma Advanced Analytics Products - Any Solvents, Inorganics, or Chromatography products.

Value of FREE product will be based on list price with a cap of \$1,500. Free product may not exceed purchased amount.

Visit vwr.com/promotions and search **Promo Code 4169**. Offer expires 3.31.2019.

designed for protection



VWR AQUAHOL™ SANITIZER

BUY 3 CASES OF SANITIZER AND GET A FREE DISPENSER!

OVER \$1,000 VALUE

US ONLY

Buy 3 Cases of VWR Aquahol Gamma-Irradiated Isopropyl Alcohol Sanitizer and get a free VWR® Touch-Free Soap Dispenser.

- Kills wide range of gram-positive and gram-negative bacteria
- Complies with OSHA, CDC, and ADA requirements



Description	Size	Cat. No.	Case of 6
AquaHol Sanitizer	500 mL	68400-440	273.65
VWR Touch-Free Dispenser	-	89128-812	FREE

Visit vwr.com/promotions and search **Promo Code 5252**. Offer expires 12.31.2019.

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

designed for reliability



VWR® BEAD MILL HOMOGENIZER

BUY A VWR BEADMILL HOMOGENIZER AND GET 2 PREFILLED BEAD KITS!

FREE BEAD KITS



Description	Cat. No.	Each	
VWR® 4-Place Mini Bead Mill	10158-558	2254.68	
VWR® Bead Mill	75840-022	7519.00	
Volume	Material	Cat. No.	Pack of 50
Choose Two FREE Pre-Filled Bead Kits			
1.5mL	1.4mm Ceramic	10158-600	190.06
1.5mL	2.8mm Ceramic	10158-602	190.06
1.5mL	2.4mm Metal	10158-598	190.06
2mL	0.5mm Glass	10158-606	190.06
2mL	1.4mm Ceramic	10158-610	199.56
2mL	2.8mm Ceramic	10158-612	199.56
2mL	2.4mm Metal	10158-604	190.06

Visit vwr.com/promotions and search **Promo Code 5170**. Offer expires 12.31.2019.

designed for protection



Ideal for tissue block trimming and grossing

VWR® POP UP RAZOR BLADE DISPENSER

- Reduce injuries
- Heavy duty design
- Easy to load/remove cartridge
- Flip open front
- Non-skid, heavy bottom
- In-use blade holder
- Reloadable



Description	Cat. No.	Case of 5
Pop Up Razor Blade Dispenser	10835-969	289.49

VWR® Pop Up Blade Dispenser Refill Cartridges

Blade Steel	Blade Size, in.	Coated Blade	Backing Material	Washed, Degreased	Cat. No.	Pack of	Case of
2 Facet Blades							
Carbon	.009	No	Steel	Yes	10835-967	100/ 31.26	1,000/ 236.64
Carbon	.009	No	Steel	No	10835-981	100/ 15.80	1,000/ 119.22
Carbon	.012	No	Steel	Yes	10835-965	90/ 26.31	1,000/ 206.47
3 Facet Blades							
Stainless	.009	Yes	Steel	No	10835-971	100/ 40.82	1,000/ 308.97
Carbon	.009	No	Steel	Yes	10835-973	100/ 38.68	1,000/ 292.75
Stainless	.009	Yes	Steel	Yes	10835-963	100/ 49.85	1,000/ 377.30
Carbon	.009	No	Steel	No	10835-975	100/ 26.04	1,000/ 197.02
Stainless	.009	No	Steel	Yes	10835-977	100/ 46.24	1,000/ 349.90
Stainless	.009	No	Stainless	Yes	10835-979	100/ 59.93	1,000/ 453.61
Carbon	.009	No	Steel	No	76209-668	-	4,000/ 708.23
Stainless	.009	No	Steel	Yes	76209-670	-	4,000/ 1631.52



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.

designed for reliability



VWR® ULTRA LOW TEMPERATURE UPRIGHT FREEZERS

- Temperature Range: -86 to -50 °C (-123 to -58 °F)
- Microprocessor temperature control system
- Advanced monitor/alarm system
- Automatic voltage compensator
- Non-CFC, non-HFCF, nonflammable refrigerants



Visit vwr.com to find many available package options!

Volume	Electrical	Cat. No.	Each
368 L (13 cu. ft.)	120V, 60Hz	10160-724	16270.60
368 L (13 cu. ft.)	208/ 230V, 60Hz	10160-726	16270.60
490 L (17.3 cu. ft.)	120V, 60Hz	10160-728	16,489.13
490 L (17.3 cu. ft.)	208/ 230V, 60Hz	10160-730	16,489.13
651 L (23 cu. ft.)	120V, 60Hz	10160-732	16,855.11
651 L (23 cu. ft.)	208/ 230V, 60Hz	10160-734	16,855.11
793 L (28 cu. ft.)	208/ 230V, 60Hz	10160-736	17, 588.24

designed for every day use



VWR® STERILE SAMPLE BAGS

Transport and store solids, semisolids, and liquids for environmental and carcass sampling, quality assurance procedures, and food industry applications

- Pliant, highly resistant virgin polyethylene sterile tubing with no side seals
- Wire closure insures airtight seal, and wide-sealed bottoms provide added leakproof protection



Capacity, mL (oz.)	Thickness, mil	Marking Area	Cat. No.	Pack of	Case of 1,000
450 (15)	2.5	Yes	82007-706	500/ 192.34	322.06
650 (22)	3	No	82007-698	500/ 189.24	329.07
650 (22)	3	Yes	82007-708	500/ 232.29	388.94
1650 (55)	3	Yes	82007-726	250/ 146.32	508.53

Optimum cleaning system for food processing



Food processing/handling has processes within its manufacturing flow that require stringent contamination control. Many juices, broths and other foodstuffs are now manufactured through an aseptic process which calls for a similar regimen of cleaning control dictated in biopharmaceutical and other regulated industries.

The challenge is for quality teams and risk managers to find the optimum cleaning system - effective, flexible and economical. While larger areas within food production may have a standard cleaning regimen - often a hose down of walls and floors between shifts or fills - specific machines, fill lines and surrounding equipment call for special attention to ensure and maintain cleanliness.

GEL STAINLESS STEEL CLEANER

Advanced no-drip technology to eliminate streaks and drips when applied to stainless, metal, and other hard surfaces.

- NSF rated spray gel clings on contact and glides over most surfaces with minimum effort
- Handles rouging and residue build up
- Not atomized in ambient air and contains no phosphorous or VOCs; has only biodegradable surfactants

PREMIUM FLEXBRUSH

Ideal for cleaning of residue build up in tanks and powder residue on piping, this flexible 12-inch brush has a selection of covers in Polyester or Microfiber to guard against flaking or broken bristles.

- Flexibility of the head allows user to 'shape' it for custom cleaning applications
- Can be used alone or with an ACME threaded handle for extended reach for coving or complex equipment cleaning

NOVAHOL™

Offers a combination of low-ionic detergent and Isopropanol to cut through residue where fill lines and equipment are sheathed with vinyl curtains or screened with plexiglass - without impacting the clarity of the vinyl or plexiglass being cleaned.

STERILE BUCKET LINERS

LDPE/Nylon blend bags create a sterile barrier between disinfectant and bucket which lessens the need to remove and clean buckets at each shift or fill. They can also be utilized for storage and transportation of equipment and raw materials in testing and aseptic areas.

MEGASORB™ MOPS

Ideal for support areas in food production that may be unclassified, where daily cleaning may be to simply steam or saturate surfaces with the desired detergent or disinfectant. Quickly absorbs excess moisture in production areas, holds up to autoclaving and gamma-irradiation.

Description	Size	Cat. No.	Price
Stainless Steel Cleaner	15.89 oz.	89208-418	Cs. 6/ 110.07
Premium FlexBrush	12 in.	10126-342	Ea./ 61.66
NovaHol, Spray Bottle	32 oz.	68400-684	Cs. 8/ 477.81
NovaHol, Refill Bottle	1 gal.	68400-682	Cs. 4/ 419.83
Sterile Bucket Liners, Fits B-7 Series Buckets	31 x 19 in.	68400-780	Cs. 24/ 197.75
MegaSorb Mop Head, Blue	-	89140-706	Cs. 50/ 1216.76

designed for protection



VWR® basic protection industrial garments and accessories

This product line can be used for a variety of areas including industrial, food and beverage, production, and visitors. It's an excellent basic barrier with a wide choice of color options to use in color coding. Ideal for everything from mitigating risk in a food safety program, to managing critical control points or differentiating various production areas.

- Economical, disposable garments designed for mitigating food contamination risk
- First line barrier made from lightweight, breathable fabric
- Color coding facilitates management of critical control points

VWR® BASIC PROTECTION INDUSTRIAL COVERALLS

- Lightweight basic barrier
- Tapered Collar
- Snap Front



Size	S	M	L	XL	2X	3X	4X
Body (A)	66"	67"	68"	69"	70"	71"	72"
Chest (B)	25"	26"	27"	28"	29"	30"	31"
Leg (C)	28"	29"	30"	30"	31½"	32½"	33"

Size	Cat. No.	Case of 25
White		
Small	75874-030	43.61
Medium	75874-032	43.61
Large	75874-034	45.81
X-Large	75874-036	45.81
Blue		
Small	75874-044	43.61
Medium	75874-254	43.61
Large	75874-256	45.81
X-Large	75874-258	45.81

Size	Cat. No.	Case of 25
Green		
Small	75874-266	43.61
Medium	75874-268	43.61
Large	75874-270	45.81
X-Large	75874-272	45.81
Red		
Small	75874-280	43.61
Medium	75874-282	43.61
Large	75874-284	45.81
X-Large	75874-286	45.81

VWR® BASIC PROTECTION INDUSTRIAL BOUFFANT CAPS

- Non-woven durable fabric
- Single-use barrier



Size	Color	Dia., Relaxed/Stretched, in.	Cat. No.	Case of 1,000
Pleated Bouffant Caps				
Small	White	8 / 21	76008-514	27.91
Large	White	8½ / 24	76008-516	33.18
Small	Blue	8 / 21	76008-518	27.91
Large	Blue	8½ / 24	76008-520	33.18
Small	Green	8 / 21	76008-530	27.91
Large	Green	8½ / 24	76008-532	33.18
Small	Red	8 / 21	76008-522	27.91
Large	Red	8½ / 24	76008-524	33.18
Small	Yellow	8 / 21	76008-526	27.91
Large	Yellow	8½ / 24	76008-528	33.18

Traditional fit options also available on vwr.com.

VWR® BASIC PROTECTION INDUSTRIAL APRONS

- Fluid Impervious polyethylene
- Easy to don



Size	Universal
Body (A)	47¼"
Width (B)	27½"

Color	Cat. No.	Case of 1,000
White	76008-556	107.66
Blue	76008-558	107.66

VWR® BASIC PROTECTION INDUSTRIAL CPE SHOE COVERS

- Durable
- Two color options



Size	Universal
Length (A)	16"
Height (B)	6"

Color	Cat. No.	Case of 1,000
White	76008-560	42.85
Blue	76008-562	42.85

Higher level of protection against harmful exposures



MICROFLEX 93-850

Microflex® 93-850 Nitrile Disposable Gloves represent the ultimate barrier against harmful exposures. These durable gloves stand up to tough jobs while significantly reducing workers' risk of exposure to hazardous materials. Made using a breakthrough polymer bonding technique*, they offer 2X more chemical splash resistance† and the highest known standard for barrier quality and consistency.

- Highest known standard for barrier quality and consistency (Low 0.40 AQL)
- Made with TNT™ Chemical Splash Resistance Technology, for soft durable protection against a wide range of chemicals
- Silicone-free formulation for product protection

Size	Cat. No.	Box of	Case of
X-Small	76169-908	100/ 23.32	1,000/ 227.37
Small	76169-910	100/ 23.32	1,000/ 227.37
Medium	76169-912	100/ 23.32	1,000/ 227.37
Large	76169-914	100/ 23.32	1,000/ 227.37
X-Large	76169-806	100/ 23.32	1,000/ 227.37
2X-Large	76169-808	90/ 26.32	900/ 227.37

Length: 240 mm (9.5") Packaging: 100/Box, 10 Boxes/Case

* Patent pending polymer bonding technique. Based on EN 374 and ASTM F739 chemical permeation test data, when compared to performance of disposable nitrile gloves of a similar weight. Visit www.ansell.com/Microflex93-850chemtest to view chemical permeation test data. Microflex® 93-850 0.40 AQL is lower than the AQL of other known industrial and medical grade disposable gloves. Ansell® and™ are trademarks owned by Ansell Limited.

designed for protection



VWR® STERILE SLEEVES

- Gamma irradiated to a Sterility Assurance Level (SAL) of 10⁻⁶
- Lowest level of particle shedding: Level I Helmke Drum Classification
- Durable fabric with excellent breathability and water vapor transmission rate
- 99.9% bacterial filtration efficiency



Size	Cat. No.	Case of 300	Pallet of
Sleeves without Thumb Loop			
Universal	414004-510	554.09	4,800/ 8873.59
X-Large	414004-511	617.47	3,600/ 7416.39
Sleeves with Thumb Loop			
Universal	76169-446	612.96	-
X-Large	76169-448	682.23	-

designed for protection



VWR® PURETOUCH CUT-RESISTANT GLOVE LINERS

Comfortable barrier enhances safety while reducing perspiration and wicking moisture during extended use. Prevents skin irritation without diminishing tactile sensitivity and limits wear and tear.

- 13-gauge white nylon with HPPE
- Color-coded for visual size identification
- Sturdy, launderable, and reusable



Size	Cuff Color	Cat. No.	Bag of 20 pr.	Case of 200 pr.
Small	Green	76102-378	215.39	1914.57
Medium	Orange	76102-380	215.39	1914.57
Large	Blue	76102-382	215.39	1914.57
X-Large	Red	76102-384	215.39	1914.57

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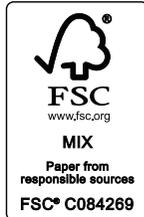

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