

F&BFOCUS

SERVICING THE FOOD & BEVERAGE MARKET

Volume 1 | Spring 2014

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In this issue, we highlight different products used in Quality Assurance environments and examine exciting new advances in *Listeria* spp. monitoring within the food industry.

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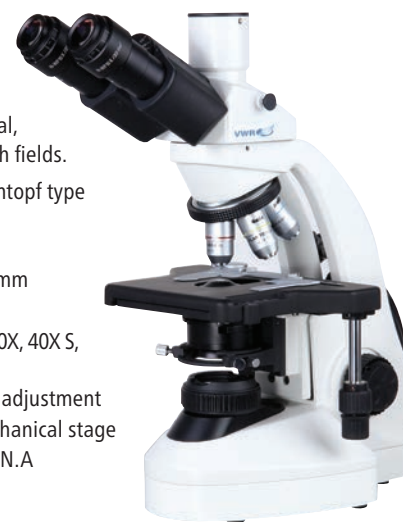


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ACTERO™ *Listeria* Enrichment Media for One Step *Listeria* spp. Recovery Granted AOAC PTM Status

From Claveau, D., Olishevskyy, S., Maduro, L., Giuffre, M., and Martinez, G., (2013) *Inside Laboratory Management* 17(4), pp28-31, AOAC INTERNATIONAL, Gaithersburg, MD, USA

FoodChek Systems Inc. has recently developed new original medium ACTERO *Listeria* Enrichment Media (ACTERO *Listeria*) which, in contrast to a majority of the traditional double-step enrichment media, allows to recover and to enrich *Listeria* spp. from environmental samples after 24 hour single-step incubation. Thus, ACTERO *Listeria* can be considered as an excellent tool for *Listeria* spp. monitoring in the food industry. AOAC Research Institute ("AOAC") Performance Tested MethodsSM (PTM) status was awarded on November 14, 2012.

Summary of Validated Claims

ACTERO *Listeria* broth is a selective medium developed for a single-step recovery and enrichment of *Listeria* spp. from environmental and food samples. It is available as a powder in two formats: a 500g bottle and a box of 20 individual packs, each containing 4.9 g of powder medium. ACTERO *Listeria* broth was validated and certified according to the PTM program by AOAC as an effective medium to recover and to enrich *Listeria* spp. from food-contact surfaces, particularly from stainless steel and plastic. Furthermore, robustness, sensitivity and specificity, lot-to-lot consistency as well as stability of the prepared ACTERO *Listeria* were proven in the validation study.

Principle

ACTERO *Listeria* combines a nutritive base with ingredients necessary to improve cell resuscitation and to provide optimal growth of *Listeria* spp. after 24 hours of incubation at 29°C. Furthermore, the selective agents in the ACTERO *Listeria* are optimized to efficiently target a wide range of competing flora without affecting the growth of *Listeria* spp.

Summary of AOAC PTM Validation

The following AOAC PTM validation studies were conducted in the laboratories of Maxivet Inc., a wholly owned subsidiary of FoodChek Systems Inc., Calgary, Alberta, Canada, according to the AOAC INTERNATIONAL Methods Committee Guidelines for Validation

Assay parameter	Standard protocol	Test range
Incubation temperature	29°C	28°C 30°C
Incubation time	24h	22h 28h

Table 1. Robustness variables and ranges tested.

of Qualitative and Quantitative Food Microbiological Official Methods of Analysis. The ACTERO *Listeria* method was compared to the USDA-FSIS reference culture procedure for detection of *Listeria* spp. (MLG 8.07, 2008).

The validation consisted of two main parts: internal and independent studies. Internal testing included ruggedness, inclusivity/exclusivity, lot-to-lot consistency and stability study. In addition, the method comparison study using environmental samples from stainless steel food-contact surfaces was performed. Independent laboratory testing included the method comparison study for another type of food-contact surfaces – plastic, and has been conducted in collaboration with an accredited external testing laboratory under the AOAC supervision. Results were analyzed using the Probability of Detection (POD) statistical model.

Results - Robustness Testing

The purpose of the robustness study was to evaluate the effects of minor perturbations in two method parameters (Table 1) on the ACTERO *Listeria* performance. No significant differences were observed between the extreme conditions (Figure 1), indicating that the ability of the ACTERO *Listeria* to recover *Listeria* spp. was not affected by the temperature and time ranges tested.

Inclusivity/Exclusivity Study

The inclusivity/exclusivity study was aimed to test the ability of the ACTERO *Listeria* to enrich selectively a variety of *Listeria* spp. and to discriminate target microorganisms from non-target closely related microorganisms (Table 2).

Fifty four (54) *Listeria* strains, representing species most frequently isolated from food with an emphasis on the human pathogen *L. monocytogenes* (33 isolates belonging to the 8 most prevalent serotypes), were able to grow within 24 h at 29°C using ACTERO *Listeria*. In contrast, none of the 30 non-*Listeria* strains reported a positive result after enrichment using the ACTERO *Listeria* media.

Lot-to-Lot Testing

Three independently manufactured lots of

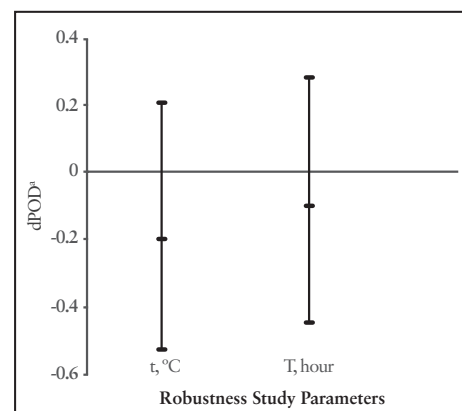


Fig. 1. Actero *Listeria* Method Robustness Results. *Results presented as the difference (dPOD) between the POD values of the extreme conditions of parameter tested. If the 95% CI of a dPOD value does not contain zero, then the difference is statistically significant at the 5% level.

the ACTERO *Listeria* were tested to establish the inter-lot variability and reproducibility. The POD analysis, with 95% confidence interval (Table 3), confirmed a good consistency between different lots of the ACTERO *Listeria*.

Stability Study

Stability study has been performed to measure the performance of the prepared ACTERO *Listeria* over a storage period of six weeks at 4°C in dark conditions. The performance of the ACTERO *Listeria* was tested at zero (freshly prepared), two, four and six weeks of storage. The values obtained at each time point were compared to those obtained at a zero time point as well as with values of other time points tested. No significant differences were determined between any of the storage time points of the prepared ACTERO *Listeria*. These results indicate that it can be stored at 4°C in the dark for 45 days after preparation without any significant changes in the performance.

Method Comparison Study

The matrix study was performed to evaluate the ability of the ACTERO *Listeria* to recover *Listeria* spp. from stainless steel and plastic food contact surfaces after single-step enrichment in comparison with the reference USDA-FSIS method MLG 8.07.

Type of microorganisms	Genus	Species	# of strains	Positive result #
Target microorganisms	<i>Listeria</i>	<i>monocytogenes</i>	33	33
		<i>ivanovii</i>	3	3
		<i>innocua</i>	5	5
		<i>grayi</i>	4	4
		<i>seeligeri</i>	5	5
		<i>welshimeri</i>	4	4
Total:	1	6	54	54
Non-target microorganisms	<i>Alcaligenes</i>	<i>faecalis</i>	1	0
	<i>Bacillus</i>	<i>cereus</i>	2	0
		<i>subtilis</i>		
	<i>Campylobacter</i>	<i>jejuni</i>	1	0
	<i>Candida</i>	<i>albicans</i>	1	0
	<i>Carnobacterium</i>	<i>divergens</i>	2	0
		<i>mobile</i>		
	<i>Enterobacter</i>	<i>aerogenes</i>	2	0
		<i>cloacae</i>		
	<i>Enterococcus</i>	<i>faecalis</i>	2	0
		<i>faecium</i>		
	<i>Escherichia</i>	<i>coli</i>	1	0
	<i>Hafnia</i>	<i>alvei</i>	1	0
	<i>Kocuria</i>	<i>rhizophila</i>	1	0
	<i>Lactobacillus</i>	<i>acidophilus</i>	3	0
		<i>casei</i>		
		<i>plantarum</i>		
	<i>Lactococcus</i>	<i>lactis</i>	1	0
	<i>Leuconostoc</i>	<i>mesenteroides</i>	1	0
	<i>Proteus</i>	<i>mirabilis</i>	1	0
	<i>Pseudomonas</i>	<i>aeruginosa</i>	3	0
		<i>fluorescens</i>		
		<i>putida</i>		
	<i>Rhodococcus</i>	<i>equi</i>	1	0
	<i>Salmonella</i>	<i>typhimurium</i>	1	0
	<i>Staphylococcus</i>	<i>aureus</i>	4	0
		<i>epidermidis</i>		
		<i>saprophyticus</i>		
		<i>xylosus</i>		
	<i>Streptococcus</i>	<i>agalactiae</i>	1	0
Total:	19	30	30	0

Table 2. Inclusivity/Exclusivity Study.

Summarized results of the ACTERO *Listeria* method comparison study are presented in **Table 4**. Fifteen (15) of 20 sponge samples obtained from artificially *Listeria*-contaminated stainless steel surfaces were confirmed as positives using the ACTERO *Listeria* protocol. In contrast, only 5 similarly contaminated samples were confirmed positive using the reference method protocol. Thus, a significant difference in performance was demonstrated between the two methods, where the ACTERO *Listeria* method was superior in the recovery of *L. monocytogenes* from a stainless steel surface as compared to the reference method.

Based on the POD analysis, there was no significant difference in performance between the ACTERO *Listeria* protocol and the reference method protocol for the recovery of *L. innocua* from plastic food contact surface. Furthermore, in the overall comparison of ACTERO *Listeria* with the

reference method, no false negative or false positive outcomes were reported.

Conclusions

A new selective medium, ACTERO *Listeria* Enrichment Media, was evaluated according to the AOAC PTM program and the protocol developed using ACTERO *Listeria* was compared to the USDA-FSIS reference method. The medium is able to specifically enrich a variety of *Listeria* species after 24 hours of incubation at 29.0°C inhibiting the growth of non-*Listeria* strains.

No false negative or false positive results were found after testing environmental food-contact samples using the ACTERO *Listeria* indicating the high accuracy of the

Level of inoculum, CFU/sample	N ^a	Lot 1			Lot 2			Lot 3			dPOD (CB) ^f	95% CI ^g
		x ^b	POD (A) ^c	95% CI	x	POD (B) ^d	95% CI	x	POD (C) ^e	95% CI		
0.7	10	3	0.3	(0.108, 0.603)	4	0.4	(0.168, 0.687)	2	0.2	(0.057, 0.510)	-0.2	(-0.521, 0.187)

^aN – number of test portions;
^bx – number of positive test portions;
^cPOD(A) – lot 1 positive outcomes divided by the total number of trials;
^dPOD(B) – lot 2 positive outcomes divided by the total number of trials;
^ePOD(C) – lot 3 positive outcomes divided by the total number of trials;
^fdPOD(CB) – difference between extreme POD values (lot 3 POD values and lot 2 POD values);
^g95% CI – 95% confidence interval (if the 95% CI of a dPOD value does not contain zero, then the difference is statistically significant at the 5% level).

Table 3. Actero *Listeria* lot-to-lot study results.

Environmental matrix type	Target strain	Statistic	I, CFU/ test sample	Candidate method (C)			Reference Method (R)			C vs R
				N ^b	x ^c	dPOD(C)	N	x	dPOD(R)	dPOD (C, R)
Stainless steel food contact surface	<i>L. monocytogenes</i> HPB 5949	Estimate	0.00	5	0	0.00	5	0	0.00	0.00
		LCL ^g				0.00			0.00	-0.43
		UCL ^g				0.43			0.43	0.43
		Estimate	1.50	20	15	0.75	20	5	0.25	0.50
		LCL				0.53			0.11	0.19
		UCL				0.89			0.47	0.70
Plastic food contact surface	<i>L. innocua</i> MAX-L-3	Estimate	0.00	5	0	0.00	5	0	0.00	0.00
		LCL				0.00			0.00	-0.43
		UCL				0.43			0.43	0.05
		Estimate	6.20	20	7	0.35	20	6	0.30	0.05
		LCL				0.18			0.15	-0.23
		UCL				0.57			0.52	0.32


^aI – level of the inoculum, CFU/sample;
^bN – number of test samples;
^cx – number of positive test samples;
^dPOD(C) – candidate method confirmed positive outcomes divided by the total number of trials;
^ePOD(R) – confirmed reference method positive outcomes divided by the total number of trials;
^fdPOD(C, R) – difference between the candidate method result and the reference method result POD values;
^gLCL and UCL – is a 95% confidential interval for the appropriate POD value.

Table 4. Summary of results obtained by comparison of the ACTERO *Listeria* and USDA-FSIS reference methods.

FoodChex
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protocol developed. Moreover, significantly higher performance of ACTERO *Listeria* was achieved with the stainless steel sponge samples as compared to the reference double-step enrichment method.

The results of this study prove that the ACTERO *Listeria* can be used effectively in replacement of the two-step enrichment suggested by the reference method without affecting the recovery of *Listeria* spp. from environmental samples.



ACTERO <i>Listeria</i> Enrichment Media	Size	Cat. No.	Each
Dehydrated, Yields 9L	500g	97068-830	379.28
Rehydrated Media			
Liquid MediaBox	5L	89522-706	190.77
Liquid MediaBox	10L	89522-708	340.51

Analysis of 2- and 4-Methylimidazole Using a Bonded Zwitterionic HILIC Column and UV Detection

Jeffrey Lei and Patrik Appelblad

EMD Millipore Corporation, Billerica, MA, USA

2- and 4-methylimidazole (2-MI and 4-MI), figure 1, are heterocyclic compounds derived from imidazole through substitution of the hydrogen in either position 2 or 4 by a methyl group. Both 2-MI and 4-MI are known animal carcinogens and they may form when carbohydrates and amino-containing compounds react during browning of food, but also in certain fermentation processes, and in types of caramel coloring produced with ammonia or ammonia and sulfites based processes. High levels of 4-MI have been found in many cola soft drinks including Coca-Cola, Pepsi-Cola, Diet Coke, and Diet Pepsi. Additionally, it has been found in roasted foods, grilled meats, and coffee. Dark beers and common cola soft drinks may contain more than 100 µg of 4-MI per 12-ounce canister. In February 2011, the Center for Science in the Public Interest (CSPI) petitioned the United States Food and Drug Administration (US FDA) to withdraw its authorization for caramel colorings that contain 4-MI, and in the interim to change the name of the additive to "ammonia-sulfite process caramel coloring" or "chemically modified caramel coloring" for labeling purposes. California has added 4-MI to its list of probable carcinogens, and for this reason leading manufacturers of cola soft drinks declared in March 2012 to change their recipes to avoid a cancer warning label in compliance with California law. In the Spring of 2013, a large quantity of soy sauce products were seized in Taiwan that contained excessive amounts of heterocyclic organic chemicals including 4-methylimidazole. The European Food Safety Authority has concluded that exposure to 4-MI from caramel coloring is

not of concern. Although the issue is controversial, it is sensible to take precautions, especially for excessive exposure of heterocyclic organic chemicals. Therefore, quantitative analytical methods are needed that can be used for exposure assessment.

HILIC has been proven as an attractive technique for separation of small polar molecules but it has primarily been considered as a MS friendly technique using volatile acetate or formate buffers in the mobile phase, conditions preventing analysis at low UV wavelength. However, bonded zwitterionic stationary phases such as the SeQuant ZIC-HILIC columns can be used with inorganic buffers like phosphate, despite the limited solubility

of potassium phosphate in high acetonitrile eluents. Use a premixed mobile phase to avoid separate bottles for acetonitrile and buffer to minimize risk with precipitation. Also keep in mind that precipitation of salt generally occurs when using over 80 volume-% acetonitrile in the mobile phase; though at low buffer strengths 85% is the absolute maximum.

This application note presents a simple yet rugged analytical procedure for direct analysis of 2- and 4-MI using hydrophilic interaction liquid chromatography (HILIC) and UV detection.

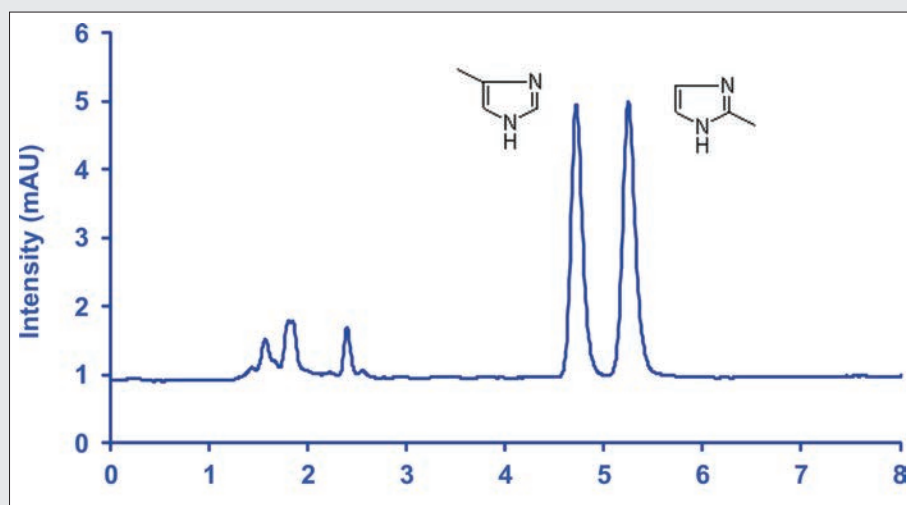


Figure 1. Chromatogram showing the separation of a standard solution containing 0.5 ppb (0.5 µg/mL) of each 2- and 4-methylimidazole in diluent (acetonitrile and Milli-Q water 70:30 v/v) on a SeQuant® ZIC®-HILIC, 5 µm/200 Å, 150 x 4.6 mm column using a mobile phase containing (75:25 v/v) of acetonitrile and potassium phosphate 20 mM pH 6.0, hence 5 mM total ionic strength in mobile phase. 20 µL samples were injected and analyzed at 1.0 mL/min on an Agilent 1260 HPLC system equipped with UV detector set at 214 nm.

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0-14	600	EM1.09535.0007	117.93	—
Intermediate Range				
2.0-9.0	1,000	EM1.09450.0010	261.59	5/ 1255.77
0-6	100	EM1.09531.0001	44.26	—
2.0-9.0	25,000	EM1.09450.0013	3301.23	—
0-6	600	EM1.09531.0007	117.91	—
2.0-9.0	100	EM1.09584.0001	45.18	—
2.0-9.0, Turbid Solutions	100	EM1.09502.0001	26.90	480/ 12,366.53
7.5-14	100	EM1.09532.0001	45.18	—
5.0-10.0	100	EM1.09533.0001	45.18	—
5.0-10.1	600	EM1.09533.0007	117.91	—
Narrow Range				
0-2.5	100	EM1.09540.0001	45.18	—
2.5-4.5	100	EM1.09541.0001	45.18	—
4.0-7.0	100	EM1.09542.0001	45.18	—
4.0-7.0	600	EM1.09542.0007	117.91	—
6.5-10.0	100	EM1.09543.0001	45.18	—
6.5-10.1	600	EM1.09543.0007	117.91	—
11.0-13.0	100	EM1.09545.0001	45.18	—

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MQuant Test Strips

	Sensitivity Range	No. of Strips	Cat. No.	Each	Case of 200
Peroxide	0.5-2.5-10-25mg/L H ₂ O ₂	100	EM1.10011.0001	63.60	12,743.55
Nitrate	10-25-50-100-250-500 mg/L NO ₃	100	EM1.10020.0001	63.88	—
Cyanide, with Auxiliary Reagents	1-30 mg/L	100	EMD-10044-1	122.15	—
Chlorine	0-0.5-1-2-5-10-20 mg/L Cl ₂	75	EM1.17925.0001	52.86	10,046.58
Peroxide	1-3-10-30-100 mg/L H ₂ O ₂	100	EM1.10081.0001	68.15	13,675.90
Sulfate	200-400-800-1200-1600 mg/L SO ₄ ²⁻	100	EM1.10019.0001	68.72	13,830.33
Iron	3-10-25-50-100-250-500 mg/L Fe ²⁺	100	EM1.10004.0001	63.99	12,880.87
Nitrite	2-5-10-20-40-80 mg/L NO ₂ ⁻	100	EM1.10007.0001	63.99	12,880.87
Chloride	500-1000-1500-2000-≥3000 mg/L Cl ⁻	100	EM1.10079.0001	57.36	11,551.01
Ammonium, with Auxiliary Reagents	10 to 400 mg/L	100	EMD-10024-1	85.62	—
Copper	10-30-100-300 mg/L Cu	100	EM1.10003.0001	60.67	12,164.80
Peracetic Acid	100-150-200-250-300-400-500 mg/L	100	EM1.10001.0001	74.64	14,993.17
Nitrite	0.1-0.3-0.6-1-2-3 g/L NO ₂ ⁻	100	EM1.10022.0001	63.60	12,743.55
Nickel	10-25-100-250-500 mg/L Ni	100	EM1.10006.0001	60.67	12,164.80
Formaldehyde, with Auxiliary Reagents	10 to 100 mg/L	100	EMD-10036-1	80.68	—
Calcium, with Auxiliary Reagents	10 to 100 mg/L	60	EMD-10083-1	91.80	—
Total Hardness	<3->4->7->14->21°d \<4->5->9->18->26°e \<5->7->12->25->37°F	100	EM1.10025.0001	60.67	12,164.80
Sulfite	10-40-80-180-400 mg/L SO ₃ ²⁻	100	EM1.10013.0001	66.54	12,735.77
Ascorbic Acid	50-100-200-300-500-700-1000-2000 mg/L	100	EM1.10023.0001	60.70	—
Cobalt	10-30-100-300-1000 mg/L Co ²⁺	100	EM1.10002.0001	63.42	12,726.40

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- Back-pressure at least half that of particular columns
- Minimum 30% longer column lifetime compared with particle-packed columns

Description	I.D. x L, mm	Cat. No.	Each	Case of
Chromolith HighResolution RP-18e Column	4.6 x 25	EM1.52020.0001	504.01	30/ 15,120.36
Chromolith® HighResolution RP-18e Column	4.6 x 50	EM1.52021.0001	492.47	10/ 4924.70
Chromolith HighResolution RP-18e Column	4.6 x 100	EM1.52022.0001	974.97	—
Chromolith HighResolution RP-18e Guard Column, Set of Three	4.6 x 5	EM1.52025.0001	239.25	10/ 2392.51
Chromolith HighResolution RP-18e Guard Column Kit, One Holder and Three Guard Columns	4.6 x 5	EM1.52024.0001	329.85	10/ 3298.50

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Sample Preparation for the Determination of Vitamin C in Orange Juice by HPLC and UHPLC

Susan Barker, Marketing Modality Leader for GE Healthcare Life Sciences



**Time and cost saving
sample preparation**

Vitamin C or ascorbic acid is usually determined by HPLC in contract labs and the quality control labs of fruit juice manufacturers. Juice samples are often filtered prior to injection in order to remove any particles that may damage or block the columns or instrument. The adoption of UHPLC by many QC labs has increased the importance of filtration of both samples and mobile phase. It is important to consider that the size of the frits and particles contained within UHPLC columns are much smaller than on regular HPLC packings. UHPLC columns with sub $<2\mu\text{m}$ packings create a smaller interstitial radius (the space between particles in the UHPLC column) creating the potential for high backpressure and filter clogging.

The most commonly used method for analyzing juice is to filter samples for HPLC or UHPLC using a syringe filter that incorporates a membrane filter ($0.2\mu\text{m}$ or $0.45\mu\text{m}$).

Challenge: Orange juice is hard to filter

Orange juice contains a large amount of pulp and insoluble particulates which may lead to rapid clogging of the syringe filters used to prepare samples for HPLC or UHPLC. In order to reduce this risk, a centrifugation step is often added before filtration. Some labs use a series of syringe filters with different pore size membrane filters or several syringe filters in order to obtain enough sample for the analysis.

The combination of these additional processes is time-consuming and leads to increased cost of consumables.

The solution from GE Healthcare: Whatman™ GD/X™ all-in-one filter

- Saves time by reducing the number of steps in the sample preparation process
- Reduces costs by reducing the number of consumables used

The GD/X syringe filter device is ideal for use with hard to filter samples such as juice products.

Three pre-filtration layers prevent premature membrane clogging and enable the processing of three to seven times more sample volume compared to single layer filters.



GE Healthcare

How does it work?

GD/X consists of multiple layers, which allows efficient serial filtration resulting in higher capture efficiency.

Larger particles are retained in the upper level of the pre-filter, preventing premature clogging of the membrane surface that can occur with standard syringe filters.

The specific combination of this high efficiency glass fiber pre-filter with a membrane of either 0.2 or 0.45µm pore size, speeds up and simplifies sample preparation.

GD/X is already a reference for hard to filter samples

GD/X filters are widely used for fruit juices, fermentation products, and in environmental testing and pharmaceutical industries.

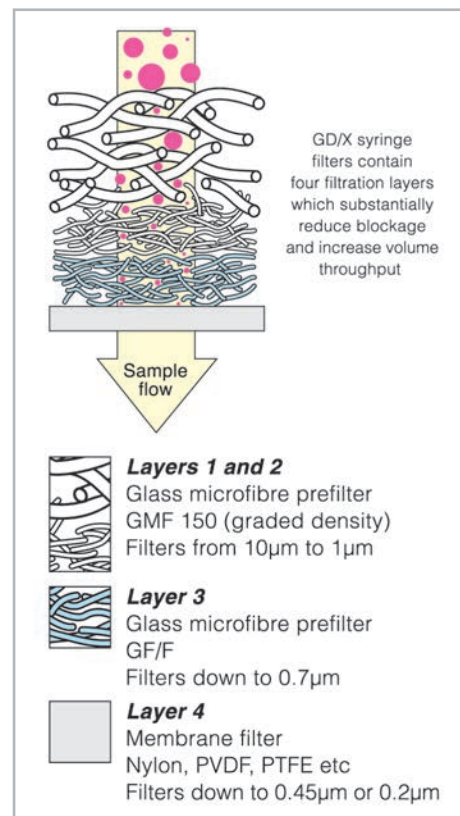
They only need to filter their sample through GD/X and often don't need centrifugation or the use of several filters.

Flexible membrane choice

GD/X is available with a variety of filtration membranes, with pore sizes of 0.2µm or 0.45µm.

GD/X can effectively be used for any hard to filter samples.* Supplied in packs of 150.

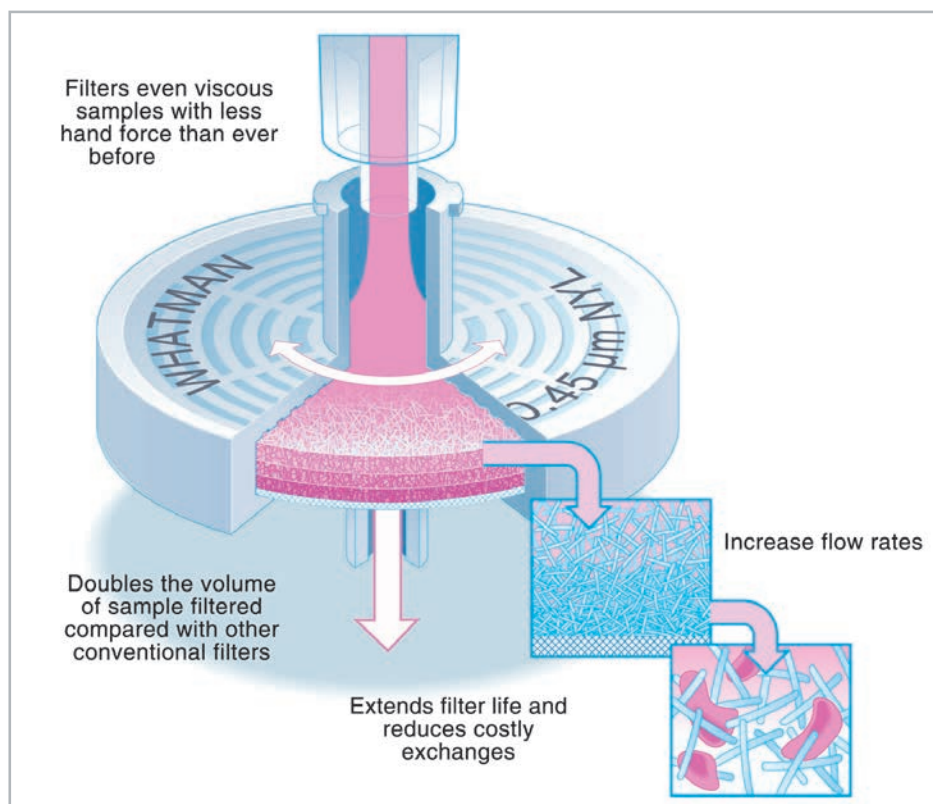
**Not suitable for aqueous solutions. GD/X is available with different membrane types, sterile, and in 13 and 25mm versions.*



GD/X 25 Syringe Filters

Diameter, mm	Pore Size, µm	Cat. No.	Pack of
13	0.2	28138-102	150/ 458.57
13	0.45	28138-104	150/ 461.01
13	0.45	28138-142	1500/ 3302.28
25	0.2	28138-154	150/ 581.87
25	0.2	28138-192	1500/ 3619.23
25	0.45	28138-156	150/ 581.87
25	0.45	28138-194	1500/ 3534.70

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VWR® Forced Air and Gravity Convection Incubators

Forced Air provides an optimal environment for samples by offering a higher degree of temperature uniformity and stability than gravity convection. Forced air can also be used for drying samples at higher temperature in place of an oven.

Gravity Convection provides a gentle airflow preventing the drying out of samples. Most commonly used for samples in open plates or containers.

- Stainless steel interior with smooth, rounded corners makes cleaning simple
- Use electrical equipment inside unit with a standard access port that also allows for independent data logging
- View samples without disruption through internal glass door



Specifications

Temperature Range	Ambient +5°C - 75°C
Electrical	120V-60Hz

Volume, cu. ft.	Uniformity at 37°C	Stability at 37°C	Exterior Dimensions, H x W x D, in.	Perforated Shelves Supplied*/Max	Cat. No.	Each
Forced Air						
2.3	± 0.2°C	± 0.1°C	28 x 21 x 22	2/13	89511-424	2190.00
3.6	± 0.3°C	± 0.1°C	32 x 25 x 22	2/16	89511-426	2890.00
6.3	± 0.4°C	± 0.1°C	36 x 25 x 29	2/19	89511-428	3250.00
13.4, Free-standing	± 0.3°C	± 0.2°C	61 x 29 x 31	2/39	89511-430	5950.00
Gravity Convection						
2.6	± 0.6°C	± 0.2°C	28 x 21 x 22	2/13	89511-418	1710.00
4	± 0.6°C	± 0.2°C	32 x 25 x 22	2/16	89511-420	2190.00
6.85	± 0.6°C	± 0.2°C	36 x 25 x 29	2/19	89511-422	2490.00



VWR® Forced Air and Gravity Convection Ovens

Offering reliable, consistent conditions for all of your applications, our efficient design maximizes space while reducing energy consumption to as low as 194W (2.3 cu.ft. gravity convection model at 150°C).

Forced Air provides faster heating up and drying and a higher degree of temperature uniformity and stability than gravity convection.

Gravity Convection provides a gentle airflow for heating and drying of delicate samples. Powders and light samples will not be blown away by active air movement.

- Stainless steel interior with smooth, rounded corners makes cleaning simple
- Control air exchange for drying or heating with the damper
- Bench space saving footprint doesn't compromise volume



Specifications

Temperature Range	50 to 250°C
Electrical	120VAC; 60Hz

Volume, cu. ft.	Uniformity at 150°C	Stability at 150°C	Exterior Dimensions, H x W x D, in.	Wire Shelves Supplied/Max	Cat. No.	Each
Forced Air						
2.3	± 3.3°C	± 0.4°C	28 x 21 x 22	2/13	89511-410	1890.00
3.65	± 3.5°C	± 0.4°C	32 x 25 x 22	2/16	89511-412	2290.00
6.3	± 3.5°C	± 0.3°C	36 x 25 x 29	2/19	89511-414	2690.00
Gravity Convection						
2.3	± 4°C	± 0.4°C	28 x 21 x 22	2/13	89511-404	1670.00
3.75	± 4.5°C	± 0.4°C	32 x 25 x 22	2/16	89511-406	1990.00
6.2	± 5°C	± 0.4°C	36 x 25 x 29	2/19	89511-408	2290.00



Rediship Purifier® Logic® + Class II Biosafety Cabinets Designed for the HUMAN Experience

These Biosafety Cabinets raise the bar for not only safety, but comfort, too. They were designed for the human body and our habits. We call it Inclination™ Technology — features that reinforce what humans are inclined to do. We believe the more comfortable you are, the safer you will be. Features include:

Performance: Constant Airflow Profile™ (CAP) technology works with the ECM for precise airflow control

Safety: MyLogic™ OS visible on a large, color LCD display; NSF-listed

Comfort: Features include true line-of-sight display, curved inlet grille for forearm support, and flush-mounted electrical receptacle covers with dampened hinges for easy opening and closing

Sustainable Design: Contributes toward a building's energy use reduction LEED points; has 94.9% recyclable content when the cabinet's lifetime is completed.

Description	Dimensions, in.	Cat. No.	Each
3' with Stand, 10" Sash	42.3 x 36.5 x 13.6	89413-124	9935.00
4' with Stand, 10" Sash	54.3 x 48.5 x 19.9	89413-128	11,195.00
5' with Stand, 10" Sash	66.3 x 60.5 x 26.9	89413-132	12,470.00
6' with Stand, 10" Sash	78.3 x 72.5 x 32.9	89413-136	13,795.00





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Request a FREE Sample of a GE GD/X™ Syringe Filter

Promo Code 4037

Free Filters!



Whatman
Part of GE Healthcare

Available in 13 and 25mm diameter and either sterile or non-sterile, these filters feature a range of membrane types and pore sizes.

Whatman GD/X Syringe Filter range is specifically designed for high particulate-loaded samples. Constructed of a pigment-free polypropylene housing with a prefiltration stack of Whatman GMF 150 (graded density) and GF/F glass microfiber media, these filters allow you to filter even the most difficult samples with less hand pressure. Whatman GD/X syringe filters can process three to seven times more sample volume than standard syringe filters.

GD/X 25 Syringe Filters

Diameter, mm	Pore Size, µm	Cat. No.	Price
13	0.2	28138-102	FREE
13	0.45	28138-104	FREE
13	0.45	28138-142	FREE
25	0.2	28138-154	FREE
25	0.2	28138-192	FREE
25	0.45	28138-156	FREE
25	0.45	28138-194	FREE

Request a FREE Sample of VWR® Flexible Safety Caps

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Now there's a safe, economical way to cap and recap blood collection tubes and disposable glass culture tubes, regardless of manufacturer. Flexible Safety Caps are available for a wide range of biomedical and industrial applications and fit six different sized tubes. Flexible Safety Caps come in a variety of colors for coding samples.



Free Samples

Flexible Safety Caps liquid-tight seal ensures sample integrity and prevents spillage of serum samples.

Sample packs consist of one each color: blue, green, grey, lavender, natural, red, yellow.

Color	Cat. No.	Pack of 500
Blue	89499-998	42.36
Green	89499-996	42.36
Grey	89500-000	42.36
Lavender	89499-994	42.36
Natural	89499-990	42.36
Red	89499-992	42.36
Yellow	89500-002	42.36



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- First certified ergonomic exam glove
- Excellent tactile sensitivity
- Improved formulation offers increased strength and durability
- Powder-free
- Textured fingertips and beaded cuff
- Ambidextrous
- Nonsterile

Cat. No.: 89174-542

Free Pack!



EMD Millipore Lab Essentials Products

Promo Code 3831

Buy \$750 of EMD Lab Essential Products and receive either a **FREE Multi-Purpose Spill Kit**, or **FREE products** equal to the value of your purchase!



Free Products



Choose Safety

Multi-Purpose Spill Kit	Cat. No.	Each
2 x 1kg SpillSolv Acid Neutralizer, 2 x 0.9kg SpillSolv Caustic Neutralizer, 2 x 0.5kg SpillSolv Volatile Adsorbent Powder, 1 pr. splash goggles w/ventilation, 1 pr. nitril gloves A15, 6 H.D. disp. bags 14 x 20in. x 4 mil, 4 disp. plastic scoops & scrapers, big sponge for residue clean up, & treatment guide.	EM-SX1300-1	FREE (\$663 Value)

Or Choose Value

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- Value of free product based on list price
- Free product may not exceed purchased amount

Free Reflectoquant® Test Strips

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Buy RQflex® 10 or RQflex® 10 Plus and get **2 FREE** boxes of Reflectoquant test strips.

Use RQflex 10 for the evaluation of Reflectoquant test strips, and the RQflex 10 Plus for the evaluation of Reflectoquant test strips and solutions, and when more sensitivity is required.

up to
\$150 Value



RQflex 10 includes test strip adapter and recalibration set, double optical system (option for evaluation for two reaction zones), memory for five methods, memory slots for 50 results (date/ time/parameter/result), interface to PC, batch-specific calibration function (bar-code technology), battery operation with 4 AAA batteries, and detailed manual for reflectometer and tests. RQflex 10 Plus includes all above, as well as a cell adapter and eight empty cells.

Description	Cat. No.	Each
RQflex 10 Reflectometer	EM1.16970.0001	886.00
RQflex 10 Plus Reflectometer	EM1.16955.0001	706.71

Purchase an Automatic TitrLab Analyzer and Get A FREE Printer

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Ultimate Analytical Performance Accuracy



Free Printer!

- Fast titration results
- Push-button operation
- Minimal training required
- Compact setup



To see Hach's complete product offering, visit vwr.com/hach.

Purchase one of the following TitrLab Analyzers:			
Titrant	Cat. No.	Each	
Free & Total SO ₂ in Wines	I2 0.01M	89427-690	3112.25
pH and Acidity in Brine	NaOH 0.5M	89427-696	2157.48
pH and Acidity in Milk	NaOH 0.1M	89427-692	2157.48
pH and Acidity in Tomato Sauces	NaOH 0.1M	89427-694	2157.48
pH and Total Acidity in Wines	NaOH 0.5M	89427-698	2157.48
Salt in Brine	HNO ₃ 1M	89427-704	2690.25
Salt in Dairy Products	HNO ₃ 1M	89427-700	2690.25
Salt in Tomato Sauces	HNO ₃ 1M	89427-702	2690.25
Salt in Water	HNO ₃ 1M	89427-706	2690.25
Volumetric KF Moisture Analyzer	KT Titrant 5	89427-708	4218.94
Get a FREE Printer			
Thermal Printer with Cable	—	10062-796	FREE

Request a FREE Sample pair of KIMTECH PURE® A8 UNITRAX® Shoe Covers

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Apply Grippy Mat to floors, counters and work surfaces to catch leaks, drips, and spills in your lab and storage areas. Eight layers of polypropylene soak up everyday liquids while they cushion instruments, and a tough, spunbond top holds up under foot traffic and long-term use.

- Won't rip, fray, or move around like typical bench pads
- Specially formulated Grippy adhesive peels up easily for quick changeouts without residue

Dimensions	Cat. No.	Price
6'L x 16"W	89212-350	FREE

Introducing the New BDH® High Purity Solvents

Promo Code
3908 & 3909



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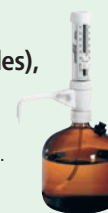
Choose red, 56608-970; white, 56608-975; or black, 56608-980. Promo Code 3908.

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Offer #2: Buy Four Cases of BDH HPLC Solvents (16 4L bottles), and get a FREE Jencons Zippette™ Bottle Top Dispenser

Cat. No. 53409-978. Zippette Classic is compatible with the following solvents: ACCN, DMF, EA, IPA, Methanol, and Water. Promo Code 3909.



Over \$500 Value

Description	Cat. No.	Case of 4
Acetonitrile	BDH83639.400	902.00
Dichloromethane (DCM)	BDH23373.400	547.54
Hexane	BDH24575.400	558.04
Isopropyl Alcohol (IPA)	BDH20880.400	575.76
Methanol	BDH20864.400	350.98
Water	BDH23595.400	305.47

Visit www.vwr.com/bdh for complete specifications, Certificates of Analysis, and SDS's.

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Terms and conditions

Purchase must be on a single purchase order/invoice. Offer expires 6 /30/ 2014; or until supplies last.

VWR COLLECTION

VWR® Vacuum Filtration Systems

VWR's Vacuum Filtration systems are designed for the preparation of buffers, tissue culture media, microbiological media, and other biological fluids and feature large diameter Pall membranes for guaranteed performance and maximum throughput.



VWR COLLECTION

Comprehensive Solutions for your Electrochemistry Applications

The VWR Collection offers a comprehensive line of meters, electrodes, chemistries, and accessories for all your testing and measurement needs.

- **Simplicity** – Intuitive user interface for easy meter operation and maintenance
- **Consistency** – Step-by-step on screen prompts enable both new and seasoned users to operate the meter easily and effectively for accurate and reliable measurements
- **Variety** – Wide range of electrodes (pH, conductivity, ISE, dissolved oxygen, ORP redox, temperature, reference, and multi-parameter) and comprehensive selection of solutions configurable for your research lab and/or field work needs
- **Reliability** – VWR three-year warranty



Full Assembly Membrane Filters	Cat. No.	Each
With 0.1 µm PES Membrane		
15 mL Conical	89220-708	183.84
50 mL Conical	89220-714	183.84
250 mL	89220-694	117.45
500 mL	89220-696	149.08
1 L	89220-698	189.81
With 0.2µm PES Membrane		
15 mL Conical	89220-716	183.84
50 mL Conical	89220-710	183.84
250 mL	97066-200	94.10
500 mL	97066-202	138.92
1 L	97066-204	180.29
With 0.45 µm PES Membrane		
15 mL Conical	89220-718	183.84
50 mL Conical	89220-712	183.84
250 mL	97066-206	94.10
500 mL	97066-208	138.92
1 L	97066-210	180.29

Description	Cat. No.	Each
B10P Kit with pH Probe, Includes: B10P Meter (89231-662) and Refillable Glass pH Electrode (89231-580)	89231-664	853.71
B10P Meter Only	89231-662	726.12
Epoxy Body Temperature Electrode	89231-652	204.14
pH Electrode; Non-refillable (Gel) Ag/AgCl Double Junction Reference; Epoxy Body; Porous Pin Junction; Integrated Temp. Sensor	89231-602	306.21
pH Electrode; Non-refillable (Gel) Ag/AgCl Reference; Single Junction; Epoxy Body; Porous Pin Junction; No Temp. Sensor	89231-604	139.22
pH Electrode; Refillable (sat. KCl) Red Rod Reference; Single Junction; Glass Body; Porous Pin Junction; No Temp. Sensor	89231-580	231.97
Electrode Stand	89236-596	147.73
Electrode Stand, with Stirrer	89236-594	350.61



VWR® Hazmat Spill Response Kit

- Includes 20 pads, three socks, one pair nitrile gloves, one pair safety goggles, and one water-resistant yellow bag with tie
- Supports compliance with 40 CFR 263.30(a) safety standard

Absorbency	Cat. No.	Each
Up to 34.1 L (9 gal.) of Acids, Caustics, and Bases	89168-998	63.87



VWR® Broken Glass Disposal Cartons

- Safe, convenient disposal of broken glassware
- Packed flat to save space; easy to assemble

Disposable cardboard receptacles with 2mil thick polypropylene liner safely contain broken glass and residual liquids. Entire unit may be disposed of as a whole once safety cap is pulled into place. Optional, reusable carton cover (for floor model only) provides a wider opening 20.3 x 24.1cm permitting safer and more sanitary deposit of wastes into the container. Opens quickly and easily by pressing the built-in release tab - no batteries required! Features a smooth 10.1 x 10.1cm area on top for applying labels. Autoclavable lid is color-coded for easy identification.



Description	Dimensions, L x W x H, cm (in.)	Cat. No.	Pack of 6
Benchtop Disposal Carton	20.3 x 20.3 x 25.4 (8 x 8 x 10)	56617-804	45.04
Floor Disposal Carton	30.5 x 30.5 x 68.5 (12 x 12 x 27)	56617-801	66.90



VWR® Lens Cleaning Wipes and Lens Cleaning Station

Pre-moistened Lens Cleaning Wipes clean safely and effectively without streaks, residue, or scratching. Heavy-duty, biodegradable wipes also fight fog buildup. Wipes help lenses stay clean longer and resist static. Not for use on contact lenses or specially coated optical lenses (e.g. anti-glare coatings).

Lens Cleaning Station includes one bottle of special antifog, antistatic solution and one pack of heavy-duty lens-cleaning tissues. Solution cleans and coats the lens, and will not leave any excess liquid on the lens surface.

Ordering Information: Lens Cleaning Wipes are individually foil packed and pre-saturated with lens cleaning solution. Lens Cleaning Station contains one 3.5-ounce bottle of lens cleaning solution and one pack of 15.2x12.7cm (6 x 5") heavy-duty lens cleaning tissues.



Description	Cat. No.	Price
Pre-Moistened Lens Cleaning Wipes, 7 x 5in.	89203-550	Pk. 120/ 20.85 Cs. 960/ 142.79
Lens Cleaning Station, Disposable	89203-548	Ea./ 23.82 Cs. 24/ 457.26

ERGOMAT® Ergonomic Floor Mats for Food & Beverage

The **Ergomat Hygiene** is molded from premium grade virgin rubber. It is silicone and latex free, and comes in four colors to eliminate cross-contamination issues. The Hygiene tolerates caustic cleaning and can be safely pressure washed, cleaned in a dishwasher, or autoclaved (in 2' x 3' size) for sterilization in critical environments. Its surface profile stimulates circulation to eliminate fatigue associated with prolonged standing, its underside pattern provides additional grip in wet environments, and it is always beveled on each side to eliminate trip hazards.

The **ERGOMAT Super Safe Ergo** incorporates all the desirable qualities of the Hygiene, plus an anti-microbial additive for additional resistance to bacteria and suction cup grips on the underside to eliminate the risk of hydroplaning on extremely wet floors.

Color	W x L, cm	Cat. No.	Each
Hygiene			
Blue	61 x 91.4	22231-150	176.96
Green	61 x 91.4	22231-138	172.48
Grey	61 x 91.4	22231-144	172.48
Red	61 x 91.4	22231-156	172.48
Super Safe Ergo			
Blue	60 x 90	10030-690	149.00
Green	60 x 90	10030-664	149.00



Ergomat Hygiene



Ergomat Super Safe Ergo

Extreme Environments Require Specialized Solutions to Ensure Eye Safety

By David Iannelli, Product Marketing Manager for Eye & Face Products, Honeywell Safety Product

A forklift operator at a major frozen foods company navigates his vehicle from the frigid environment of a giant freezer out to the loading docks in the blazing Florida sunshine as pallets of frozen juice are loaded on semis for delivery to retail outlets. His safety glasses are exposed to an extreme variation in temperature and humidity. The result is inevitable: fog, in the form of water condensation, appears on the lens surface. When this occurs, performing any task is made more difficult, and often more dangerous, because vision is obscured. Move north to grain elevators in Duluth, Minnesota, where the outside temperatures can drop to more than 30 degrees below zero as the wind whips in off of Lake Superior. Inside the grain elevators, the temperature rises as workers go from this bitterly cold environment to warmer locations within the plant. Although these two operations are nearly 1,700 miles apart, they share the same challenge: ensuring the safety of their workers in extreme environmental situations.

Safety managers know the importance of keeping safety eyewear in place when fog and condensation may begin to obstruct vision. The last thing they want is for any of their workers to remove their safety glasses to wipe the lenses. This could lead to situations that not only expose the eyes to danger, but could potentially cause an accident. Lens fogging presents a major challenge in having workers comply with eyewear safety regulations.

Technology provides solutions.

Fortunately, the technology is available to minimize the effects of fogging and condensation, thus enabling workers in extreme environments to perform their jobs safely, efficiently, and without interruption. In both locales, employees rely on eyewear with anti-fog coatings to counteract these conditions.

When an uncoated or hard coated lens is exposed to extreme moisture or humidity, minute water droplets build up on the lens which causes fogging. By using specialized anti-fog coatings on the lens, condensation is controlled to help keep vision clear. This is the desired effect. If workers don't have to remove their glasses to wipe them, their eyes remain protected at all times.

Chemical exposure is an extreme condition that requires special treatment.

The safety issues associated with fogging are just part of a long list of safety eyewear challenges encountered in food-processing and manufacturing applications. In addition to being able to withstand impact from flying objects, safety eyewear must provide durability and scratch resistance from wood particles, metal projectiles, and a

host of abrasive airborne materials. Chemical splash resistance in the form of biological materials, solvents, and petroleum products is another key property of protective eyewear.

To offer additional protection in these areas, companies should look for eyewear with lens coatings that are designed to significantly reduce scratching from airborne particles and protect eyewear lenses from the harmful effects of chemical exposure, thereby adding longer life to the lens. For situations where workers are subject to chemical splash, the highest degree of chemical resistance is required.

New coating technology delivers specialized protection and longer lens life.

In environments where one finds a combination of heat, humidity, dust, abrasives, and chemicals, workers need specialized eyewear that offers protection from both fogging and particulates or chemicals. Safety eyewear is now available with dual coating technology that delivers scratch- and chemical-resistant hard coating on the exterior surface of the lens and high-performance anti-fog coating on the interior. For the first time, the wearer is able to keep the interior of the lens free from fogging while protecting the outside from scratches and the effects of chemicals. Because the lens surfaces are customized to provide maximum performance and protection, dual coated lenses can last longer than those with traditional anti-fog coatings on both sides. And because the lenses last longer and need to be replaced less frequently, cost of ownership is lowered.

Tints aren't for looks; they're for improving productivity and preventing accidents.

Specialized tints can be used to solve specific lighting challenges. For example, when intense yellow or sodium vapor lighting is present, a light blue lens filter can be used to overcome the effects. Vermilion—or pink-colored lenses—can reduce glare from fluorescent and halogen lighting and will also increase contrast for inspection processes.

Choosing the correct lens tint can be critical to worker safety. For typical indoor work, or certainly in a dimly lit work area, clear lenses would be recommended. Outdoor conditions can jeopardize safety through visibility-compromising glare, making the best lens choice a sunglass tint. However, if the worker needs to go frequently from indoors to outdoors, a light mirror-coated lens that offers good light transmission while protecting against glare when outdoors is a good choice.

If it's not comfortable and doesn't look good, it won't be worn.

There is one more aspect of eye protection that is essential to having workers comply with safety regulations. If it's not comfortable and doesn't look good, it won't be worn. It is vital for a company to offer protective eyewear that is specifically designed for comfort and adjustability to help improve compliance. Eyewear that is strictly functional is not enough in today's complex work environments. Fashion, style, and comfort are a must for safety eyewear that protects against hazards, can be worn for hours on end without fatigue, and looks good on the wearer.

Essentially, workers must be provided with eyewear that protects, provides visual clarity, and increases productivity. Fortunately, innovative technological advancements have met that challenge with eyewear products and coatings that ensure compliance and help keep large and small industries safe and productive.

Honeywell

Safety Products

Uvex Ignite™ Safety Eyewear, Sperian Protection



This eyewear features a lightweight, wraparound, frameless design that permits 180° of unobstructed and distortion-free vision. Hardcoat and Uvextra® AF antifog coatings provide scratch and chemical resistance while performing under the most extreme conditions.

Description	Cat. No.	Each	Pack of 10
Frameless with Black & Silver Temple, Clear Lens	89041-710	11.45	84.19

A700 Series Protective Glasses with Fog-Ban® Treatment



Both economical and sporty, these glasses provide a stylish fit for the everyday wearer. The lightweight design is equipped with sport temples and soft temple tip pads that offer a secure, wraparound fit.

Description	Cat. No.	Each	Pack of 10
Clear Frame, Clear Lens	89020-074	4.75	34.94

UVEX Stealth® Safety Goggles



This safety goggle combines modern design, technology, materials, and high-performance lens coatings to create the highest levels of worker comfort and acceptance.

Description	Cat. No.	Each	Case of 50
Gray Frame, Clear Lens	33000-751	22.30	822.54

Uvex Bionic® Face Shield

Face shields feature a clear polycarbonate visor that provides increased visibility and secondary protection from airborne debris. The visor has a secure attachment with dual position choices and is easily replaceable. Lightweight, balanced, ergonomic design permits extended use and a comfortable fit with most goggles and respirators.



Description	Cat. No.	Each	Case of 4
Black Matte Finish, Clear Visor	33002-536	72.62	213.65

Fendall® Pure Flow 1000® Emergency Eyewash Station

This highly visible green station delivers purified, contaminant-free saline solution from a sealed, integrated delivery module. Portable or wall-mountable, the unit is easily installed with no plumbing required.

Description	Cat. No.	Each
Eyewash Station, Meets ANSI Z358.1 Standards	56611-106	675.29

North Food Service First Aid Kit

Specialized kit contains supplies for treating common food processing environment injuries. Latex free. Contains 57 pieces which can be ordered separately for replacement.



Description	Cat. No.	Each	Case of 10
Food Service First Aid Kit	82030-878	147.12	862.73

SAF-T-FIT™ Plus N1125 Disposable Respirators

Offering latex-free N95 protection from particulate aerosols free of oil, these respirators feature an adjustable boomerang nose seal for a secure fit and added comfort. Equipped with an exhalation valve for ease of breathing and exceptional comfort during extended wear. Nose seal is color-coded for easy size recognition.



Description	Cat. No.	Box of 20
Small, Red Nose Seal	89013-600	58.07
Medium/Large, Green Nose Seal	89013-602	58.07

Howard Leight SmartFit® Reusable Earplugs

Ideal for applications requiring constant hearing protection over extended periods of time, these earplugs use Conforming Material Technology™ to adapt to the contours of the ear canal, providing exceptional comfort and a better fit the longer they are worn.



Description	Cat. No.	Pack of 100	Case of 1000
Reusable Earplugs, each with HearPack Plastic Storage Holder	82007-557	167.69	1274.55

Howard Leight Max® Disposable Earplugs

Pre-shaped foam earplugs feature a smooth outer skin for maximum user comfort and are nonirritating and nonallergenic.



Description	Cat. No.	Pack of 100	Case of 1000
Earplugs, Corded	55533-008	100/ 49.70	1000/ 377.80
Earplugs, Uncorded	55533-002	200/ 52.52	2000/ 399.13

North Nitriguard Nitrile Gloves

These flexible 11 mil. thick gloves feature a straight cuff edge for good tear resistance. High nitrile buna rubber (NBR) content offers superior resistance to cuts, snags, abrasion, and punctures. Case hardened for easy donning and added toughness. Comply with USDA and FDA regulations, 21CFR, for use in food processing.



Size	Color	Cat. No.	Pack of 12	Case of 144
9	Blue	32888-254	27.99	328.94
7	Green	32888-240	27.99	328.94
11	Green	32888-248	27.99	328.94

Servus® CT™ Seamless Molded Knee Boots

These 16" high, economy black knee boots are ideal for food processing environments. They feature a specialized PVC rubber compound that prevents ozone deterioration.

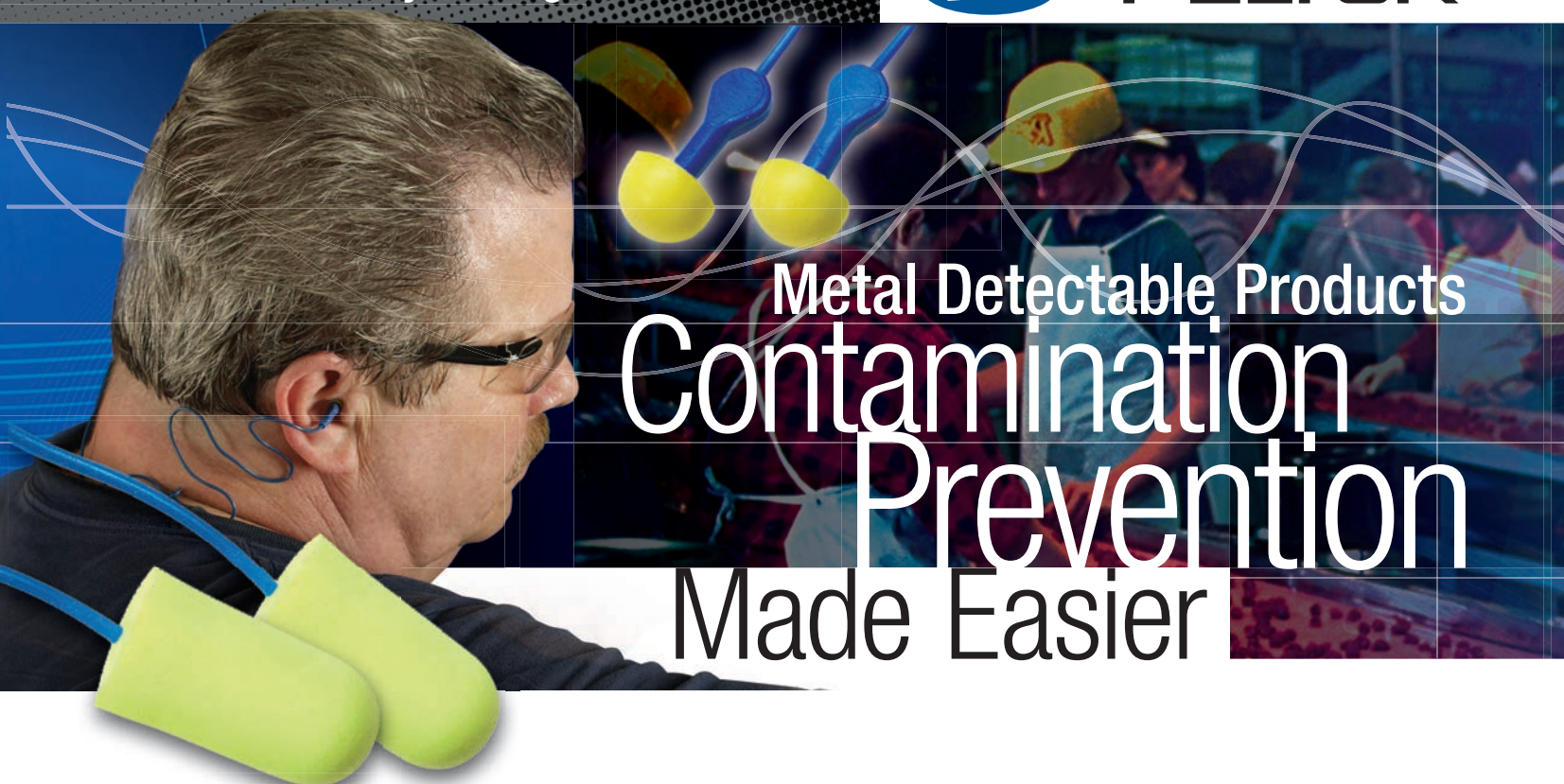


Size	Cat. No.	Each
8	300009-684	18.46
10	300009-681	18.46
12	300009-683	18.46

3M™ Food Industry Hearing Protection



PELTOR™



Metal Detectable Products Contamination Prevention Made Easier

Metal detectable earplugs and hygienic earmuffs are ideal for use when contamination prevention is critical. 3M hearing protectors offer comfortable choices to meet most wearer preferences and environmental needs.

- Comfortable, easy-to-use designs
- Designed to be detectable by metal-sensing systems
- Encased surgical-grade, stainless-steel bead
- Cords formulated with metal particles for detection
- Earplugs are test compatible with the 3M™ E-A-Rfit™ Validation System



Leading the Advancement of Hearing Conservation™





Metal Detectable Classic™ Plus Earplugs

- Made with proprietary foam for a low-pressure, in-the-earcanal fit
- 20% longer than the 3M™ E-A-R™ Classic™ to fit deeper into the earcanal for increased noise reduction
- Metal detectable cord
- Resistant to water absorption



NRR 33 dB*

Metal Detectable UltraFit™ Earplugs

- Premolded to fit quickly with no rolling
- Smooth, pliable material for in-ear comfort
- Triple-flange design fits a wide range of earcanal sizes
- Washable and reusable
- Metal detectable cord available in 400 PR case only



NRR 25 dB*

Metal Detectable E-A-Rsoft™ Yellow Neons™ Earplugs

- Tapered shape and smooth textured foam conforms to the unique shape of each earcanal
- Bright color
- Metal detectable cord



NRR 32 dB*

Metal Detectable EXPRESS™ Pod Plugs™ Earplugs

- The original push-to-fit earplug
- Advanced foam formulation for comfortable noise reduction
- Quick and easy fitting with "paddle" style stems



NRR 25 dB*

Metal Detectable Push-Ins™ Earplugs

- Ready-to-use, no roll-down design for easy and hygienic fitting
- Advanced foam formulation for comfortable noise reduction
- Metal detectable cord



NRR 28 dB*

3M™ Peltor™ Food Industry Earmuff

- Engineered to meet the stringent hygiene demands of the food industry
- Smooth, non-porous headband
- Two-point suspension system for added comfort
- Lightweight earcups
- Washable and replaceable components



NRR 26 dB*

Ordering Information

Description	Cat. No.	Price	
Classic Plus Metal Detectable Earplugs, Coded	300065-578	Pk. 200/	120.47
E-A-Rsoft Metal Detectable Earplugs, Coded	89006-808	Pk. 200/	152.68
Push-Ins Metal Detectable Earplugs, Coded	10027-362	Pk. 200/	188.91
EXPRESS™ Pod Plugs™ Metal Detectable Earplugs, Coded	89006-788	Pk. 50/	236.80
UltraFit Metal Detectable Earplugs, Coded	89006-784	Pk. 100/	281.24
UltraFit Metal Detectable Earplugs, Coded	10027-358	Pk. 200/	215.39
E-A-Rsoft SuperFit™ Metal Detectable Earplug, Coded	10027-364	Pk. 200/	91.19
Peltor Food Industry Earmuff	10027-366	Ea./	31.14
		Pk. 10/	307.64

* Note: Research suggests that many users will receive less noise reduction than indicated by the NRR due to variation in hearing protector fit, fitting skill, and motivation of the user. It is recommended that the NRR be reduced by 50% to better estimate typical workplace protection.

Don't Take the Fall

Stand firm with
KIMTECH PURE[®] A8
UNITRAX[®] Shoe Covers

Over
540,000
slip-fall injuries per year
in North America¹

the average cost of a fall is
\$28,000



THE SAFER SOLUTION

SEAMLESS BOTTOM
for more comfort

LOW LINT
reduces the chance
of contamination

3 SIZES
for a custom fit

Don't Slip Up

Create a safer environment
with **KIMTECH PURE[®] A8**
UNITRAX Shoe Covers

KIMTECH[®]
BRAND

Ten Tips for Protecting Workers Against Slip and Fall Injuries

By *Damon Larkin, Senior Category Manager,
Scientific Business, KIMBERLY-CLARK PROFESSIONAL^{*}*

Workers in food and beverage manufacturing laboratories, production and processing areas are exposed to many potential hazards, including wet floors, spills and clutter, which can lead to slips, trips, falls and other injuries.

Slips can occur when there is too little traction or friction between a shoe or shoe cover and the walking surface. Trips can occur when someone's foot contacts an object in his or her way or drops to a lower level unexpectedly, causing him or her to be thrown off-balance. A trip most often results in a person falling forward, while a slip generally results in a backward fall. A fall occurs when someone is too far off-balance¹. Whatever the cause, the resulting injuries can affect the health, safety and productivity of workers as well as a company's bottom line.

The Occupational Safety and Health Act of 1970 (OSH Act) requires employers "to do whatever is necessary to protect lab and other workers from harm." The Occupational Safety and Health Administration (OSHA) also requires that employers implement appropriate protective measures to assure the safety of workers, including minimizing slip, trip and fall hazards. It offers guidance via standard 29 CFR 1910.

Here are some tips to help reduce the risk of slip, trip and fall injuries in these settings:

1. Work to keep floors clean and dry. In addition to being a slip hazard, continually wet surfaces promote the growth of mold, fungi and bacteria, which can cause infections.
2. Provide Warning (Caution) signs for wet-floor areas.
3. Where wet processes are used, maintain drainage. Also provide false floors, platforms, mats or other dry standing places where practical, or supply appropriate waterproof footwear.
4. Choose footwear and shoe covers that offer the best possible traction on slippery surfaces. Look for shoe covers with extra grip and a range of sizes for a custom fit.
5. Keep aisles and passageways clear and in good repair. Make sure there are no obstructions across or in aisles.
6. Provide floor plugs for equipment. This way, power cords won't run across pathways.
7. Report and clean up spills immediately.
8. Eliminate cluttered or obstructed work areas.
9. Promote safe work practices, even in cramped spaces.
10. Eliminate uneven floor surfaces.

Make sure to take the necessary precautions to protect lab workers. It's not only the right thing to do, it's the law.

Damon Larkin is Senior Category Manager, Scientific Business, KIMBERLY-CLARK PROFESSIONAL. For more information on how to avoid slip and fall injuries, visit www.kimtech.com.



¹Source: University of Wisconsin-Milwaukee, Safety & Health, Accident Prevention: Slips, Trips and Falls



Exceptional
Workplaces™

Personal Protection from KIMBERLY-CLARK PROFESSIONAL*

STERLING® Nitrile and STERLING NITRILE-XTRA® Exam Gloves

Powder-free, ambidextrous latex-free gloves provide the protection of nitrile with sensitivity comparable to natural rubber latex. Excellent tactile sensitivity allows easy handling of delicate instruments.

- Textured fingertips and beaded cuff
- Thickness: 3.5mil (finger), 3.1mil (palm), 2.8mil (cuff)
- Color: Gray



Size	Length, cm (in.)	Cat. No.	Pack of	Case of
NITRILE				
X-Small	24.1(9½)	89140-816	200/ 39.56	2000/ 345.52
Small	24.1(9½)	89140-818	200/ 39.56	2000/ 345.52
Medium	24.1(9½)	89140-820	200/ 39.56	2000/ 345.52
Large	24.1(9½)	89140-822	200/ 39.56	2000/ 345.52
X-Large	24.1(9½)	89140-824	170/ 33.69	1700/ 314.44
NITRILE-XTRA				
X-Small	30.5 (12)	94023-906	100/ 38.48	1000/ 286.25
Small	30.5 (12)	94023-908	100/ 38.48	1000/ 286.25
Medium	30.5 (12)	94023-910	100/ 38.48	1000/ 286.25
Large	30.5 (12)	94023-912	100/ 38.48	1000/ 286.25
X-Large	30.5 (12)	94023-914	100/ 38.48	1000/ 286.25

KIMTECH SCIENCE® KIMWIPES® Delicate Task Wipers

Introduced over 60 years ago, these wipers have been the market leader for wiping surfaces where delicate wiping is required. The one-ply creped surface picks up and holds oil, dust, and liquids from glass, plastic, metal, and wood surfaces. Handy, space-saving POP-UP™ dispenser box dispenses wipers one at a time to reduce waste.

- 100% virgin fiber; extra-low-lint, low-extractable
- Wipe clean without scratching or leaving any residue
- Anti-static dispensing reduces lint



Size, L x W, cm	Cat. No.	Case of 30
21.3 x 11.2	300053-964	113.22

KIMTECH PURE A8 UNITRAX Shoe Covers

Don't take the Fall! The NEW KIMTECH PURE® A8 UNITRAX™ Shoe Covers for clean manufacturing areas feature extra grip for less slip. Seamless bottom for better comfort, three sizes for a custom fit, and low linting for less chance of contamination.

Size Estimator

	Small/Medium	Universal	XL/2XL
Female	5-7.5	8-10.5	11-14
Male	6.5-8.5	9-11	12-14

Size	Cat. No.	Case of 300
Small/Medium	89428-642	121.30
Universal	89428-606	121.30
X-Large/XX-Large	89428-608	134.05

JACKSON SAFETY® G80 Nitrile Chemical Resistant Gloves

Approved for food contact in the U.S. and Canada, these gloves offer protection against acids, caustics, bases, solvents, and other aqueous solutions. Manufactured from a modified nitrile formulation for increased durability and enhanced chemical resistance.

- Textured palm and fingertips for an enhanced grip
- Consistent cotton flock lining ensures added comfort
- Length: 33cm, Thickness 15 mil



Ordering Information: Environmentally responsible packaging utilizes 96% fewer poly bags. Gloves are supplied in five bulk-packed poly bags, with twelve pairs per bag for a total of 60 pairs (120 gloves).

Size	Cat. No.	Case of 120
Small (7)	89135-402	194.87
Medium (8)	89135-404	194.87
Large (9)	89135-406	194.87
X-Large (10)	89135-408	194.87
XX-Large (11)	89135-410	194.87

WYPALL® L30 Wipers

Economical wipers with a cloth-like feel are great for light-duty cleanups, maintenance wiping, and process-line wiping and cleaning. The DRC process gives WYPALL L30 Wipers high surface softness, while a reinforced grid provides strength for wet-surface wiping, cleaning, and scrubbing.



Size, L x W, cm	Cat. No.	Color	Pack of	Case of
24.9 x 25.4	89002-986	White	—	1200/ 79.26
24.9 x 41.7	21905-005	White	100/ 32.61	800/ 187.08
24.9 x 41.7	14002-650	White	—	720/ 82.92
24.9 x 41.7	89002-994	Blue	—	800/ 117.28

Packaging: POP-UP™ Box

WYPALL® X80 Wipers

These durable and economical wipers are constructed of HYDROKNIT™, a hydroentangled material manufactured without adhesives or chemical binders. Long lasting, reusable wipers will not scratch skin or delicate surfaces, and will not fall apart when wet. They maintain strength even in solvents.



Ordering Information: BRAG™ Box-packaged wipers are supplied 160 per box; POP-UP™ Boxes each contain 80 wipers.

Size L x W, cm	Color	Packaging	Cat. No.	Case of
42.7 x 31.8	Blue	BRAG Box	89003-004	160/ 33.58
42.7 x 31.8	White	BRAG Box	89003-008	160/ 33.58
42.7 x 23.1	Red	POP-UP Box	89003-002	400/ 95.48
42.7 x 23.1	White	POP-UP Box	89000-634	400/ 98.05



VWR® Basic Protection SPP Lab Coats

- Economical, disposable first line barrier
- Maximum breathability
- Low-linting

Elastic cuffs, Inset sleeves, snap front, and tapered collar; no pockets. Visit vwr.com for many additional options and sizes.

Size	Cat. No.	Case of 25
Small	414004-352	132.03
Medium	414004-353	132.91
Large	414004-351	133.64
X-Large	414004-350	133.07

VWR® Advanced Protection Anti-Skid Shoe Covers

- High coefficient of friction provides excellent traction
- Non-Linting
- Serged Seams

Manufactured from a specially formulated blue PP/PE (polypropylene/polyethylene) microporous film, these shoe covers provide excellent fluid and barrier protection.



Size	Cat. No.	Case of 300
X-Large	414004-650	140.16
XX-Large	414004-651	148.80
Universal	414004-649	133.82
X-Large, Static Dissipative	414004-645	234.02
Universal, Static Dissipative	414004-644	240.87

VWR® Basic Protection SPP Bouffant Caps

- Economical First Line Barrier
- Non-Linting

Manufactured from a spunbonded polypropylene (SPP) fabric that is strong, lightweight, and breathable. These caps protect against dirt, grime, and certain dry particulates in nonhazardous environments.



Description	Diameter, cm	Color	Cat. No.	Case of 1,000
Latex-Free	53	White	89107-768	135.64
Latex-Free	53	Blue	89131-620	143.81
Latex-Free	61	White	89107-770	147.98
Latex-Free	61	Blue	89131-622	142.20
Latex-Free	71	White	89186-064	148.99
With Latex	53	White	89107-772	109.42
With Latex	61	White	89107-774	129.72

VWR® Soft Nitrile Examination Gloves

- Ambidextrous gloves protect hands from biohazards and a broad range of chemicals
- Made from premium nitrile for high quality and consistency
- Fully textured fingers and rolled, beaded cuff

Ideal for all industrial and laboratory tasks, these powder-free gloves provide superior tactile sensitivity and comfort. Composition is 100% latex-free to eliminate adverse reactions associated with natural rubber latex proteins.

Size	Cat. No.	Pack of 100	Case of 1,000
X-Small	89038-267	19.21	156.74
Small	89038-268	19.21	156.74
Large	89038-272	19.21	156.74
Medium	89038-270	19.21	156.74
X-Large	89038-274	19.21	156.74

VWR® Protective Eyewear

- Impact-resistant, scratch resistant polycarbonate lenses
- Offer 99.9% UV protection
- Meet current ANSI Z87.1 Standards

Eyewear with adjustable temples provides a unique custom fit. Features soft PVC nosepads and antifog lenses. Eyewear with wraparound lens features rubberized temple tips and an integrated nosepiece. Fits comfortably with half-mask respirators. Visitor specs are designed to fit over most prescription eyeglasses, with a contoured brow guard and molded-in comfort nose bridge.



Description	Frame Color	Cat. No.	Pack of 12	Case of 144
Eyewear with Adjustable Temples	Black	89187-984	89.62	768.87
Eyewear with Wraparound Lens	Clear	89187-986	27.82	285.78
Visitor Specs	Clear	89187-988	30.24	259.43

Food & Beverage Hand Solutions

Whizard® Metal Mesh Hand Gloves

- Stainless steel, ergonomically designed gloves
- Exclusive self-adjusting tensioning system on wrist allows for an easy fit with no straps or buckles to fasten
- Micro plasma welded rings have no gaps to trap soil that can feed bacterial growth
- Made with 4mm ring using 0.5mm wire
- Ambidextrous
- **Applications:** Food processing, meat & poultry processing, and restaurant operations



Size	Cuff Color	Cat. No.	Each
XSmall	Green	80091-048	170.79
Small	White	80091-050	175.36
Medium	Red	80091-052	170.79
Large	Blue	80091-054	170.79
XLarge	Orange	80091-056	170.79
XXLarge	Red	80091-058	170.79

Whizard Handguard II® Cut-Resistant Gloves

- Exclusive combination of high performance fibers and stainless steel provides exceptional protection against cuts and slashes
- CFR 21 – approved for food contact
- ANSI Level 5, 5.5 Gauge
- Ambidextrous, prewashed, and preshrunk
- **Applications:** Food processing, meat & poultry processing, and blade changing



Size	Cat. No.	Each
XSmall	32935-178	31.92
Small	32935-138	32.67
Medium	32935-140	32.67
Large	32935-142	32.67
XLarge	32935-182	32.67

VS 10 Medium-Duty Cut-Resistant Gloves

- Knitted with SpectraGuard™, a high performance fiber for cut and abrasion resistance
- CFR 21 – approved for food contact
- ANSI Level 4, 10 Gauge
- Ambidextrous; prewashed, and preshrunk
- **Applications:** Food prep, cutting, and handling knives



Size	Cat. No.	Each
XSmall	80090-850	18.17
Small	80090-852	18.17
Medium	80090-854	18.17
Large	80090-856	18.17
XLarge	80090-858	18.17

GuardTec® Gloves with Foam Latex Palm

- Exclusive GuardTec yarn technology that provides protection from lacerations and cuts
- Unique foam latex palm coating
- Outstanding fit and comfort
- ANSI Cut Level 3
- **Applications:** Box opening, can sorting, recycling, and receiving



Size	Cat. No.	Pack of 24
XSmall	89208-349	110.68
Small	89208-351	110.68
Medium	89208-353	110.68
Large	89208-355	110.68
XLarge	89208-357	110.68
XXLarge	89208-359	110.68

2-40 Sleeve

- Constructed from a combination of high-performance Spectra®, fiberglass, wire, and polyester fibers
- Unique knit structure allows breathing
- Available in standard wide top
- Reversible
- Clip allows you to attach to clothing
- ANSI Level 5
- **Applications:** Food processing and meat & poultry processing



Length	Cat. No.	Each
22"	80090-818	45.90



BDH® Chemicals Here We G-R-O-W Again!



EXPERIENCE | VALUE | RESULTS

Introducing BDH HiPerSolv CHROMANORM Solvents for HPLC Ideal for Food Quality Control Applications

Key Food QC areas which use HPLC include:

- Testing meat products for residues of veterinary medication: Antibiotics are among the most prevalent
- Testing food products for mold or fungi: Mycotoxins are a real public health issue which affect many foods, including wheat, rice, nuts, and other staples
- Food authentication: Verifying that a food product contains only the products that it claims to contain on its label, such as assessing the fruit content in a jar of jam
- Testing of food additives: Food coloring and preservatives used to enhance the appearance of food products are stringently monitored



VWR is proud to introduce the newest addition to the exclusive family of high-quality, competitively-priced BDH Chemicals - high purity solvents for HPLC applications. Manufactured at a state-of-the-art European ISO 9001 - ISO 14001 solvent production facility, the initial range of six of the most popular HPLC solvents provides an unparalleled combination of performance and price for even the most demanding liquid chromatography applications.

- Meet demanding HPLC and UV/Vis analytical and quality control requirements
- Tamper-evident caps for added peace of mind
- Packed in fully-recyclable, environmentally-friendly corrugate/pulp case inserts

Description	Cat. No.	Each	Case of 4
Acetonitrile	BDH83639.400	237.36	902.00
Dichloromethane (DCM)	BDH23373.400	144.09	547.54
Hexane	BDH24575.400	146.85	558.04
Isopropyl Alcohol (IPA)	BDH20880.400	151.52	575.76
Methanol	BDH20864.400	92.36	350.98
Water	BDH23595.400	80.38	305.47

Products listed are packaged in 4L amber glass bottles.

To learn more about VWR's comprehensive BDH Chemical Portfolio visit www.vwr.com/bdh today!