

LAB REPORTER

Innovative Products and Science News
NO. 3, 2018



THE EVOLUTION OF LABORATORY SAFETY: A CAUTIONARY TALE

Also in This Issue:
Chemical Safety in the Workplace
The BPA Controversy
Lithium-Air Battery Takes Charge
The Guac Is Extra, But Is It Safe?

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CONTENTS



18

18 **FEATURED ARTICLE**
The Evolution of Laboratory Safety:
A Cautionary Tale



4

4 **CHEMICALS**
Chemical Safety in
the Workplace



8

8 **CONSUMABLES**
The BPA Controversy



20

20 **LAB EQUIPMENT**
Lithium-Air Battery Poised
to Take Charge



28

28 **LIFE SCIENCES**
We Know the Guac Is Extra,
But Is It Safe?



32

32 **SAFETY**
Taking Ownership of
Facility Safety

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Supplier/Product Guide

CHEMICALS

Fisher Chemical FisherPak Delivery Systems.....	5
Hamilton Company Chromatography Syringes	7
Honeywell Fluka Hydranal Products	6
MilliporeSigma TLC Plates.....	6
Thermo Scientific Chromatography Columns	7

CONSUMABLES

BRAND accu-jet <i>pro</i> Controllers	12
BRAND Dispensette S Bottle Top Dispensers.....	12
Corning Reusable Plastics	11
DWK DURAN YOUTILITY Bottles	9
Sartorius Microbiology Filtration Products	10
Sonoco ThermoSafe Packaging Products.....	10

fisherbrand	
Fisherbrand Bead Mills.....	15
Fisherbrand Cleanroom and ESD Seating	17
Fisherbrand Glassware	13
Fisherbrand Lab Furniture	14
Fisherbrand Maxima Vacuum Pumps	17
Fisherbrand Sonic Dismembrators	16
Fisherbrand Ultrasonic Cleaners	23

LAB EQUIPMENT

AirClean Systems Enclosures	22
Heidolph Vortex Mixers.....	25
KNF Neuberger Vacuum Pump Systems	24
Labconco Biosafety Cabinets.....	27
Labconco Fume Hoods	26
Laxco SeBa Microscopes and Refractometers	21
Mettler Toledo pH Meters	25
OHAUS Moisture Analyzers	23
Plas Labs Glove Boxes.....	24
Thermo Scientific Genesys Spectrophotometers	27

LIFE SCIENCES

Analytik Jena UVP ChemStudio <i>touch</i>	30
BioTek Instruments	31

SAFETY

3M TR 300+ PAPRs	36
Ansell Microflex Chemical Resistant Gloves	33
Ansell Microflex Nitrile Gloves.....	39
Ansell Microflex XCEED Nitrile Exam Gloves.....	44
Brady Spill Control Products	34
Cardinal Health Cleanroom Gloves	37
Decon Labs Peroxigen.....	38
DuPont Protective Lab Aprons	35
Hourglass Nitrile Gloves	42
Justrite Sure-Grip EX Safety Cabinets	39
Kimberly-Clark Professional Cleanroom Apparel.....	40
MAPA Temp-Dex Gloves	42
MCR Safety Gear	36
PIP MaxiFlex Industrial Nitrile Gloves	41
Wells Lamont Impact Gloves	38
Youngstown Barrel & Drum Spill Containment Products	41

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CHEMICAL SAFETY IN THE WORKPLACE

By Kylie Wolfe

Chemical safety goes beyond goggles and gloves. It requires proper planning and execution of general safety and emergency response procedures. Whether you work with chemicals directly or indirectly, it's important to understand the risks and take the necessary steps to reduce chemical hazards and increase overall safety. Chemicals can be inhaled, absorbed, or injected, and planning for all of these possibilities will lead to a safer workplace.

Plan Ahead to Stay Ahead

Proper training for new employees and regular retraining sessions will help to ensure that all employees are aware of the company's safety and evacuation procedures. Use this time to educate employees about overall chemical safety, and to show them how to respond to fires, chemical spills, or medical emergencies.

Storage and Safety

Improved organization of the chemical storage areas can also help to prevent

chemical mishaps. All chemicals, including storage and waste containers, should be properly labeled, and any damaged, illegible, or mislabeled containers should be reported and addressed. Clean any chemical storage areas regularly to avoid the accumulation of unneeded or hazardous chemicals.

Store chemicals in a cool, dry area with appropriate ventilation and drainage. Since toxic vapors and gases can mix in the air of the storage room, be cautious and follow all storage guidelines. Space shelves appropriately, and organize chemicals to minimize the risk of unexpected reactions due to spills. Flammable or combustible chemicals should be well labeled, kept out of direct sunlight, and stored in the appropriate types of safety cabinets.

Gear Up for Safety

Employers must make Safety Data Sheets (SDS) and well-maintained personal protective equipment (PPE) readily accessible. They must also teach employees

how to properly use eyewash stations, safety showers, fire extinguishers, and required PPE.

Employees must comply with rules for wearing properly fitting goggles, respirators, gloves, and other PPE, and are also responsible for reviewing the applicable SDS to learn about potential risks before handling any chemical.

Keep workstations clean and organized to help prevent spills. Contaminated clothing should be placed in a designated location and should not be worn outside the workplace. Store any food or drinks outside the chemical workspace in a clean area that is equipped with a hand-washing sink.

By focusing on these specific areas in workplaces where chemicals are used, you can help to prevent emergency situations, facilitate efficient emergency responses, and increase overall safety for your employees and facility.

Designed to Fit Your Bulk Need

Our stainless-steel Fisher Chemical FisherPak Solvent Delivery Program is the ideal choice for transporting high-purity solvents.

From lab to production scale, the FisherPak solution delivers solvents with enhanced safety and improved productivity. The Fisher Chemical FisherPak Container is a refillable dispensing system that protects solvent purity and reduces solvent spills. The reusable 316 stainless-steel container is pressurized with an inert gas to deliver the solvent, so the system remains closed and the solvent remains pure.

Top 5 Solvents in FisherPak:

Acetonitrile, THF, Acetone, Hexane, Methanol

Protecting Purity

The FisherPak Solvent Delivery System protects solvent purity throughout shipment, delivery, installation, and dispensing.

- Cleaned and pressure-tested Type 316 stainless-steel containers
- Stainless-steel cover
- Tamper-evident closure
- Closed system eliminates contamination of solvent during dispensing
- Delivered with a low-density polyethylene (LDPE) sleeve to maintain dust-free connection components, ensuring high-purity solvents

Enhancing Safety

A unique combination of mechanical and manual controls protects the lab and the environment.

- Bottle-free, closed system eliminates glass breakage and reduces the risk of spills and exposure to vapors
- Unique horizontal vapor venting for superior fire safety
- Additional secondary safety feature for pressure relief incorporated into the FPakgasket prevents pressure build up beyond 15psi
- Available secondary auto shut-off valves can be incorporated into the quick-connect hardware to help eliminate the possibility of spills
- Color-coded connectors help to prevent improper hookups (optional)
- Meets Department of Transportation and NFPA 30 standards

Key Features

- Custom solvents blended and/or tested to your specific requirements
- Customizable to your needs with our extensive list of accessories
- ASME-approved containers available for operating pressures over 15psi
- Integrated fork channels are available for larger sizes

Available Sizes: 19L, 28L, 50L, 115L, 200L, 1350L

FisherPak horizontal venting system recognized by National Fire Protection Association (NFPA) as a safer alternative to solvent dispensing systems with vertical venting configurations.

Improving Productivity

The FisherPak Solvent Delivery System increases lab efficiency while reducing lab operating costs by:

- Reducing solvent testing
- Eliminating bottle rinsing
- Cutting disposal costs

Promoting Environmentally Friendly Practices

Using the FisherPak System will reduce the amount of solid waste generated in your laboratory and keep it out of the environment.

- A reusable 200L FisherPak container replaces 50 four-liter bottles and packing material; that is almost 200 lb. of glass, cardboard, and foam inserts eliminated
- Flammable or toxic solvent liquids and vapors are not released into the surrounding air



Type 316 Stainless Steel, also known as surgical grade steel, better resists common forms of corrosion compared to the type 304 stainless steel used in other returnable drums

Internal electropolishing decreases any micro-trace levels of solvent-steel interaction

External electropolishing enhances the corrosion resistance

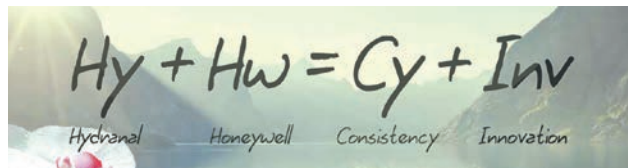


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The Original Karl Fischer Reagents

Honeywell
Hydranal Products from Honeywell Research Chemicals

As the original reagents for Karl Fischer titrations, Hydranal products are trusted for their high quality and consistency. They're backed by dual accreditation (ISO/IEC 17025 and ISO Guide 24) and include pyridine-free and ethanol-based KF reagents as well as a wide range of standards and related products.



Description	Mfr. No.	Cat. No.	Quantity
Reagents for Coulometric KF Titrations			
Coulomat AG Reagent, anolyte, for cells with/without diaphragm	34836-500ML-US	60-006-45	500mL
	34836-6X1-US	60-006-44	1L 6 x 1L
Coulomat AG-H Reagent, anolyte for long-chained hydrocarbon titrations, for cells with/without diaphragms	34843-500ML-US	60-006-46	500mL
Coulomat AG-Oven Reagent, anolyte, for cells with/without diaphragms	34739-500ML-US	60-006-47	500mL
Coulomat AK Reagent, anolyte for ketone titrations, for cells with diaphragms	34820-500ML-US	60-006-48	500mL
	34820-6X500-US	60-046-473	6 x 500mL
Reagents for One-Component Volumetric KF Titrations			
Composite 2 Reagent (methanol free)	34806-6X1-US	60-025-66	1L
			6 x 1L
Composite 5 Reagent (methanol free)	34805-6X1-US	60-025-63	1L
			6 x 1L
Water Standards			
Standard 0.1, (0.1mg/g = 0.01%)	34847-40ML	60-006-81	10 x 4mL
Standard 1.0, (1mg/g = 0.1%)	34828-40ML	60-006-82	10 x 4mL
	34828-6X40ML	60-050-007	6 x 10 x 4mL
Standard 10.0, (10mg/g = 1.0%)	34849-80ML	60-006-83	10 x 8mL

Rediscover

Thin Layer Chromatography from the world leader

MilliporeSigma is the first and largest global manufacturer of TLC plates. Our TLC portfolio comprises over 170 high-quality products — each setting new standards in quality, efficiency, and utility. Our journey of continuous innovation is seen year after year. Now is the time to rediscover our dedication to you!

With 108 years of expertise in TLC, our extensive database provides optimum separation solutions for various applications.



The life science business of Merck KGaA, Darmstadt, Germany, operates as MilliporeSigma in the U.S. and Canada.

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Better Intact mAb and mAb Fragment Analysis

Thermo Scientific MAbPac RP Columns are designed for the reversed-phase HPLC/MS separation and characterization of:

- Monoclonal antibodies (mAbs)
- Fragments
- Variants
- Antibody drug conjugates (ADCs)
- PEGylated proteins
- Bispecific proteins

These columns have been optimized for use in the reversed-phase (RP) mode, for both HPLC and LC/MS instrumentation.



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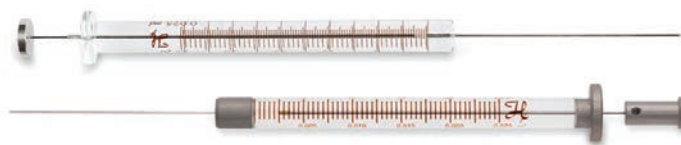
Great for Everyday Use



Hamilton CTC PAL GC Autosampler S-Line Syringes

Hamilton Company S-Line Syringes provide a cost-effective solution for use in CTC PAL Autosamplers for Gas Chromatography.

- Each syringe is handcrafted for exceptional value
- Precise plunger-to-barrel fit produces minimal drag force and optimal wear characteristics



Model	Syringe Type	Needle Gauge ¹	Needle Point Style	Volume	Mfr. No.	Cat. No.
Gas Chromatography						
75 N	Microliter	26s	AS ²	5µL	6743601	14-818-130
701 N	Microliter	23s	AS ²	10µL	6744001	14-818-133
701 N	Microliter	26s	AS ²	10µL	6743801	14-818-132
1701 N	Gastight	23s	AS ²	10µL	6745401	14-818-131
1702 N	Gastight	23s	AS ²	25µL	6743001	14-818-134
1710 N	Gastight	23s	AS ²	100µL	6743401	14-818-135
Liquid Chromatography						
1701 N	Gastight	22s	3 ³	10µL	6744401	14-818-136
1702 N	Gastight	22s	3 ³	25µL	6744601	14-818-137
1705 N	Gastight	22	3 ³	50µL	6745001	14-818-138
1710 N	Gastight	22s	3 ³	100µL	6745201	14-818-139
1725 N	Gastight	22	3 ³	250µL	6744201	14-818-140
1750 N	Gastight	22	3 ³	500µL	6744801	14-818-141

¹The "s" indicates a thick-walled version of the needle.

²Special conical non-coring point

³Blunt needle point for sample pipetting and HPLC injection valves

THE BPA CONTROVERSY

By Nancy H. Pitts

The controversial safety status of BPA has long been the subject of a debate between academic scientists, industrial scientists, and regulators.

What Is BPA?

Bisphenol A, abbreviated as BPA, is a synthetic organic compound used as an ingredient in the production of polycarbonate and other plastics. BPA-containing polycarbonate has the attractive properties of being clear, tough, and shatter-resistant. It's often used in food and beverage containers and liners.

Although the FDA has deemed BPA safe when consumed at very low levels, it's hard to ignore two important facts:

1. BPA leaches out of plastic into the content of the containers. It is released from the plastic significantly faster when it is used or exposed to high temperatures during cooking, food processing, dishwashing, and microwaving.
2. When it is ingested, BPA mimics estrogens, binding to the same receptors as natural female hormones. (This was first documented in 1933. Studies to date have also shown that the human body does not retain BPA for long periods of time.)

BPA Is Ubiquitous

The carbon atoms found in organic compounds are key components of life on earth, and the use of organic compounds in manufacturing makes them a major part of daily life in the developed world. Due to the frequent use of polycarbonate containers, people are concerned about the BPA they're ingesting and its effect on the human body, its endocrine, and other functional systems. Numerous studies of health and reproduction have demonstrated the presence of BPA in breast milk and urine. In fact, a 2003 study conducted by the CDC found detectable levels of BPA in 93% of 2,517 urine samples from people six years and older.

With concern mounting, the FDA banned the use of BPA in baby bottles, sippy cups, and infant formula packaging in 2012. Numerous states have gone further and banned BPA in other types of food and beverage containers.

In February 2018, the FDA released preliminary findings from a new and wide-ranging project on the health effects of BPA. In the press release, Stephen Ostroff, MD, Deputy Commissioner for Foods and Veterinary Medicine, stated, "Overall, the study found "minimal effects" for the BPA-dosed groups of rodents" and "...our initial review

supports our determination that currently authorized uses of BPA continue to be safe for consumers." He said further study of the project's findings is warranted. The final project report is scheduled for release in October 2018.

Endocrinologists and others in the medical research community describe the FDA's preliminary pronouncement as premature. The BPA controversy is fueled by differing points of view among FDA, academic, and industrial scientists. At the tip of the opposing arguments are the test procedures, guidelines, and protocols that are used to conduct valid research. Generally, academic researchers feel that the provenance guidelines are outdated and do not recognize much more nuanced technology capabilities available for research today. Industry and the government follow "GLP," or Good Laboratory Practice, protocols that have been in use for more than 40 years. Not surprisingly, academic researchers feel that only results from GLP-based research are considered to be "best in class," while less-scripted academic research results remain in second place or are disregarded.

As the controversy continues, you can try to avoid BPA by reducing your use of canned goods, buying BPA-free products, and heating or storing liquids and foods in glass, porcelain, or stainless-steel containers.

Award-Winning Design

Duran Youtility GL 45 Laboratory Bottle System

The DURAN YOUTILITY Bottle System is a new generation of glass laboratory bottles. The updated design includes an improved ergonomic bottle shape and dedicated accessories for better handling, sample identification, and ease of use. The GL 45 bottles have a defined labelling area and an integrated retrace code for full traceability.

Bottles

- Slimmer shape with gripping zones
- DURAN borosilicate 3.3 pharmacopeia type 1 neutral glass
- Pouring ring and closure included

Screw Caps (GL 45)

- Ergonomically shaped, polypropylene (blue)
- Grooved and ridged

Autoclave Indicator Labels

- Accept copier, printer, ballpoint, and technical markers and inks
- Usable temperature range: -40°C to +150°C
- Chemical- and tear-resistant white matte polyester
- Each pack includes one roll each of the bottle and cap labels (200/roll)
- Self-adhesive; peel to remove
- Each pack contains 100 (1.5 x 3 in.) labels

Pour Rings (GL 45)

- Smooth, no-drip performance
- Autoclavable hydrophilic polypropylene (blue)

Bottle Tags (GL 45)

- Made of silicone, available in eight colors



Description	Mfr. No.	Cat. No.	Quantity
YOUTILITY Clear Bottles			
125mL Capacity	218812854	09-841-065	4/Case
250mL Capacity	218813653	09-841-066	4/Case
500mL Capacity	218814452	09-841-067	4/Case
1000mL Capacity	218815457	09-841-068	4/Case
YOUTILITY Amber Bottles			
125mL Capacity	218862859	02-900-100	4/Case
250mL Capacity	218863658	02-900-101	4/Case
500mL Capacity	218864457	02-900-102	4/Case
1000mL Capacity	218865453	02-900-103	4/Case
YOUTILITY Bottle Accessories			
Screw Caps (GL 45)	292292802	09-841-069	10/Pack
Pour Ring (GL 45)	292412808	09-841-070	Each
Labels, Autoclave Indicator	294010006	09-841-072	400/Case
Labels, Self-Adhesive	294010203	09-841-315	100/Pack
Bottle Tags, 8 Colors	292432904	09-841-071	16/Pack

Food Safety Made Easy



Sartorius Microbiology Testing Products

Sartorius makes ensuring the safety of food products simple by providing your lab with a complete solution for everyday testing needs.

Equipment

- Combisart and Combi.jet Stainless Steel Filter Manifolds for microbiological analysis and particle counting
- Microsart e.jet Vacuum Pump with innovative quick connections

Filtration

- Microsart Disposable Polypropylene Funnels with click-fit closures (reusable options available)
- Microsart Membranes in 100 or 250mL funnel sizes
- Biosart 100 Monitors with incorporated membrane filter, cellulose pads, and sterile funnels

Media

- Microsart Media Advanced System for agar and membrane transfer
- Biosart 100 Nutrient Media in sterile media ampules
- Nutrient Media Pads in Petri dishes with matching membrane filters



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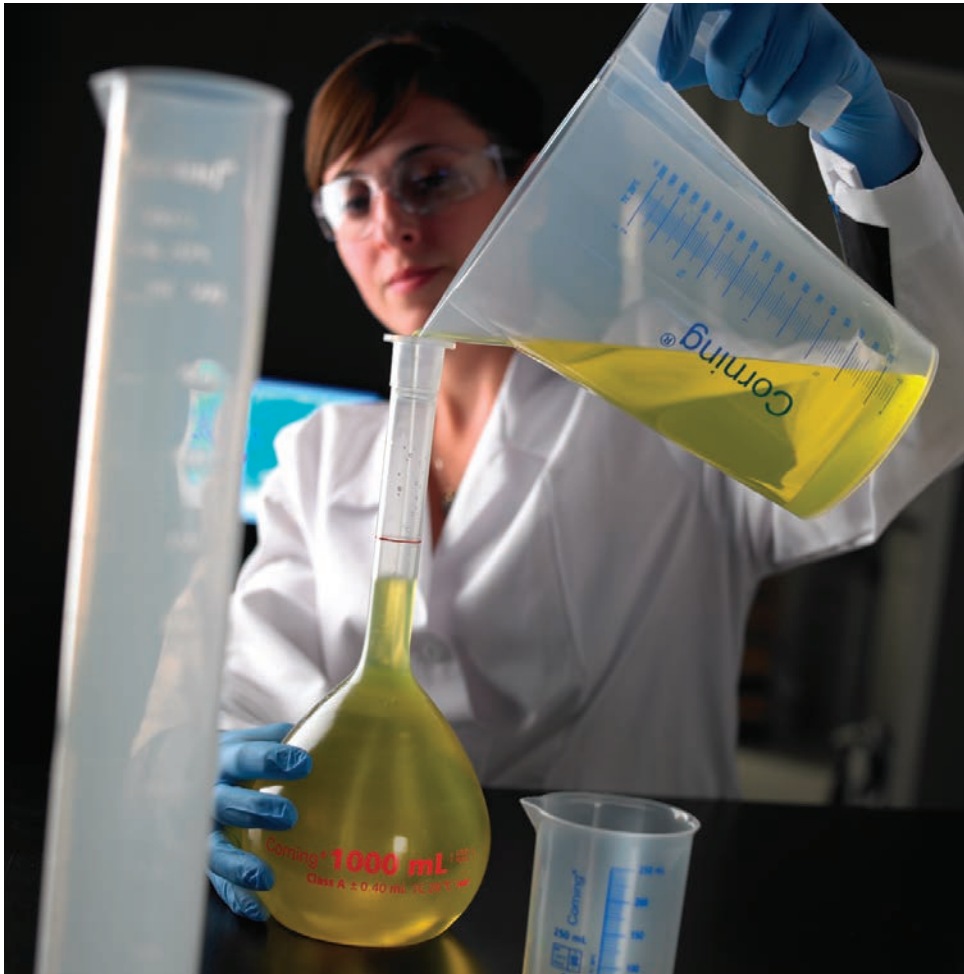
Visit fishersci.com/sonoco to find the right protection for your temperature-sensitive samples.



A Durable Alternative to Glassware

Corning Reusable Plasticware

Try Corning reusable plastic labware, a virtually unbreakable alternative to glassware. Labware is available in a variety of materials and capacities to safely meet all your measuring and liquid handling needs.



Description	Capacity	Material*	Cat. No.	Quantity
Corning Griffin Low Form Beakers	100mL	PP	10-210-660	12/Case
Corning Graduated Beakers with Handles and Spouts	250mL	PFA	10-210-671	12/Case
Corning Wash Bottles, PP* Caps	250mL	LDPE	07-202-100	12/Case
Corning Reagent Bottles	250mL	PP	07-202-106	20/Case
Corning Graduated Cylinders with Single Metric Scale, To Contain	100mL	PP	10-210-653	12/Case
Corning Erlenmeyer Flasks	100mL	PP	07-202-111	6/Case
Corning Volumetric Flasks, Class A	100mL	PMP	07-202-116	6/Case
Corning Volumetric Flasks, Class B	100mL	PP	10-210-640	6/Case
Corning Volumetric Flasks, Class A	250mL	PP	10-210-633	6/Case
Corning Volumetric Flasks, Class A	250mL	PFA	10-210-648	5/Case
Corning Plain Funnels	100mm	PP	07-202-124	12/Case

*Materials:

LDPE: Low-Density Polyethylene, PFA: Perfluoroalkoxy, PP: Polypropylene, PMP: Polymethylpentene

Visit fishersci.com/corning to see all Corning reusable plastic products.

Precise Meniscus Control

BRAND *accu-jet pro* Pipet Controller

With an insulated motor for quiet, vibration-free pipetting, the BRAND *accu-jet pro* provides precise, sensitive control that helps to reduce meniscus jumping — even with low-volume pipets.

- Lightweight with a contoured grip that fits small and large hands
- Pressure-sensitive buttons for speed control
- Up to eight hours of continuous pipetting per charge
- Available in four colors



Description	Mfr. No.	Cat. No.
Dark Blue	26330	03-840-310
Magenta	26331	03-840-311
Green	26332	03-840-312
Royal Blue	26333	03-840-313

Improved Safety, Greater Convenience

BRAND *Dispensette S* Bottletop Dispensers

Make dispensing laboratory reagents even safer and more convenient with newly redesigned BRAND *Dispensette S* Bottletop Dispensers.

- Easier volume selection
 - Faster priming
 - Lower pipetting forces
 - Improved safety valves
 - Less solvent waste (recirculating valve)
- Options**
- “S” model: suitable for most applications
 - “S Organic” model: for difficult solvents and concentrated acids
 - “S Trace Analysis” model: for high-purity reagents and hydrofluoric acid
 - Fixed-volume models also available



Capacity	Cat. No.	Cat. No.
Dispensette S Analog Models	Standard Valve	Recirculating Valve
0.1 to 1mL NEW SIZE!	13-689-019	13-689-012
0.2 to 2mL	13-689-020	13-689-013
0.5 to 5mL	13-689-021	13-689-014
1 to 10mL	13-689-022	13-689-015
2.5 to 25mL	13-689-023	13-689-016
5 to 50mL	13-689-024	13-689-017
10 to 100mL	13-689-025	13-689-018
Dispensette S Digital Models	Standard Valve	Recirculating Valve
0.1 to 1mL NEW SIZE!	13-689-006	13-689-000
0.2 to 2mL	13-689-007	13-689-001
0.5 to 5mL	13-689-008	13-689-002
1 to 10mL	13-689-009	13-689-003
2.5 to 25mL	13-689-010	13-689-004
5 to 50mL	13-689-011	13-689-005

Visit fishersci.com to see *Dispensette S* Organic and Trace Analysis Models.

Buy a Stirring Hotplate, Get a Pack of Glassware at No Additional Cost

When you buy a Fisherbrand Isotemp Stirring Hotplate, you'll receive a pack of select Fisherbrand glassware at no additional cost. Simply visit fishersci.com/hotplateglass and complete a redemption form for each hotplate you purchase.

Isotemp and Isotemp Advanced Hotplates deliver reliable performance, advanced safety, and operational simplicity. In addition to the digital display and heat protection features of Isotemp models, Advanced models offer temperature limit settings, temperature calibration, a timer, and other options.



Isotemp Stirring Hotplates

Description	Surface Material	Surface Area	Cat. No.
Stirring Hotplate	Ceramic	4.25 x 4.25 in.	SP88854200
Stirring Hotplate	Ceramic	7.25 x 7.25 in.	SP88857200
Stirring Hotplate	Aluminum	7.25 x 7.25 in.	SP88857204
Stirring Hotplate	Ceramic	10.25 x 10.25 in.	SP88850200
Advanced Stirring Hotplate	Ceramic	7.25 x 7.25 in.	SP88857290
Advanced Stirring Hotplate	Aluminum	7.25 x 7.25 in.	SP88857294



Fisherbrand Glassware

Description	Capacity	Quantity	Cat. No.
Erlenmeyer Flasks	125mL	12/Pack	FB500125
	250mL	12/Pack	FB500250
	500mL	6/Pack	FB500500
Griffin Beakers	50mL	12/Pack	FB10050
	100mL	12/Pack	FB100100
	150mL	12/Pack	FB100150
	250mL	12/Pack	FB100250
	400mL	12/Pack	FB100400
	600mL	6/Pack	FB100600



Excludes healthcare customers. See page 44 for details.



Everything You Need to Furnish Your Lab

Choose new Fisherbrand furniture solutions that maximize your budget and ship within 10 days of ordering.

Our comprehensive line of lab furniture includes:

- Wall and tall casework
- Shelving systems
- Lab workstations
- And much more



Visit fishersci.com/fisherbrandlabfurnishings or fishersci.ca/fisherbrandlabfurnishings to shop the collection.

Rapid Tissue Homogenization

Fisherbrand Bead Mills and Tubes

Fisherbrand Bead Mills and Tubes are designed for grinding, lysing, and homogenizing biological samples in preparation for molecular extraction. Their unique tube carriage motion, coupled with tissue-specific abrasive materials, helps to achieve complete homogenates for DNA/RNA extraction, enzyme isolation, and protein purification.

Bead Mill 4 Homogenizer

- Simultaneously processes 4 x 0.5mL, 4 x 1.5mL, 4 x 2mL, or 1 x 7mL samples
- Offers everything from gentle mixing to high-force homogenization
- Saves space with a small footprint
- Includes Bead Mill 4 Motor Drive; integrated 0.5mL, 1.5mL, and 2mL tube carriage; 7mL tube carriage; tool kit; and instruction manual

Bead Mill 24 Homogenizer

- Simultaneously homogenizes up to 24 x 0.5mL or 2mL tubes
- Saves space with its small footprint
- Includes convenient front-loading tube holder
- Offers non-stop processing with no cooldown required between runs
- Features run times from 1 to 99 seconds

Bead Mill Tubes

- Disposable, helping to reduce the risk of cross-contamination
- Reinforced to prevent breaking
- Paired with screw caps
- Free of RNase and DNase



Fisherbrand Bead Mills

Description	Cat. No.
Bead Mill 4 Homogenizer	15-340-164
Bead Mill 24 Homogenizer	15-340-163

Fisherbrand Bead Mill Tubes

Application	Capacity	Bead Size (Material)	Cat. No.	Quantity
Hard Tissue Grinding	2mL	2.4mm (Metal)	15-340-151	50/Pack
Soft Tissue Homogenizing	2mL	1.4mm (Ceramic)	15-340-153	50/Pack
Hard Tissue Homogenizing	2mL	2.8mm (Ceramic)	15-340-154	50/Pack
Hard Tissue Grinding	7mL	2.4mm (Metal)	15-340-155	50/Pack
Soft Tissue Homogenizing	7mL	1.4mm (Ceramic)	15-340-156	50/Pack
Hard Tissue Homogenizing	7mL	2.8mm (Ceramic)	15-340-157	50/Pack

Direct and Indirect Sonication

Fisherbrand Sonic Dismembrators

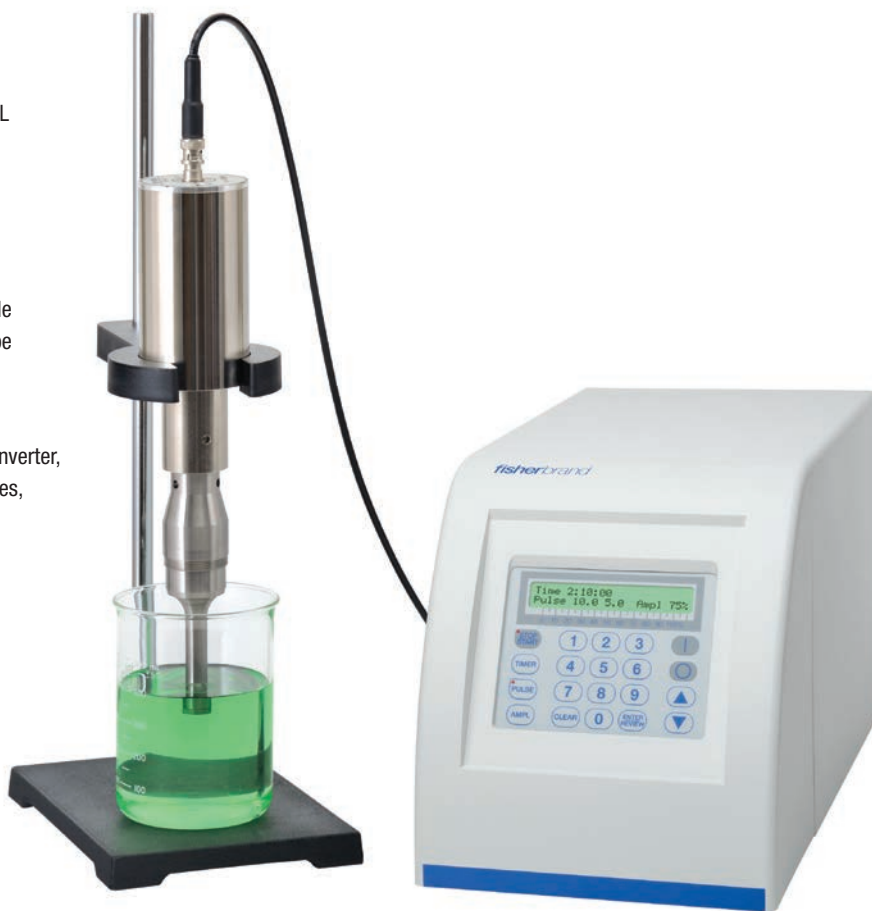
Fisherbrand Sonic Dismembrators create energy that is transmitted through a titanium probe into a liquid sample to create cavitation (the implosion of micro-bubbles with high shear forces).

Sonic dismembrators can be used with various accessories to process small (μL) to 1L sample volumes.

- Use any of the four models to process samples smaller than 50mL
- Choose a programmable unit for sample temperature control
- Use a 500w or 700w unit for samples larger than 50mL
- The 700w model is required for high throughput, extended programming times, and sample temperature monitoring

For direct sonication, immerse the probe directly into the sample vessel. Indirect sonication (using the cup horn accessory) can be performed with sealed tubes or vials since there is no contact between the probe and the sample.

Each Fisherbrand Sonic Dismembrator includes a generator, converter, cables, wrench set, and one probe. Other probes and accessories, including the stand and clamp shown here, are sold separately.



Applications	Model	Power	Capacity	Cat. No.
<ul style="list-style-type: none"> • Basic Cell Disruption 	50	50w	0.2 to 50mL	FB50-110
<ul style="list-style-type: none"> • Cell Disruption • Protein Extraction • DNA Shearing/ChIP 	120	120w	0.2 to 50mL	FB120-110
<ul style="list-style-type: none"> • Cell Disruption • Nanoparticle Dispersion • Homogenization/Mixing 	505	500w	0.2 to 1000mL	FB505-110
<ul style="list-style-type: none"> • Cell Disruption • Protein Extraction • DNA Shearing/ChIP • Nanoparticle Dispersion • Homogenization/Mixing • Sonochemistry 	705	700w	0.2 to 1000mL	FB705-110

Comfortable Seating for the Lab or Cleanroom

Fisherbrand Chairs

Sit comfortably in chairs that have a five-legged aluminum base to eliminate tipping. All chairs have a 15-year warranty on parts, a lifetime warranty on the pneumatic lift, and a five-year warranty on upholstery.



Description	Cleanroom	ESD	Height Range	Material (Color)	Cat. No.
Sit/Stand Lab Chair	N/A	No	21 to 31 in.	PE (Black)	14-360-724
Cleanroom Chair	Class 100	No	22 to 29 in.	Vinyl (Blue)	14-360-524
Cleanroom Chair	Class 10	No	18 to 23 in.	Vinyl (Burgundy)	14-359-916
ESD/Cleanroom Chair	Class 100	Yes	22 to 29 in.	Vinyl (Black)	14-360-649
ESD/Cleanroom Chair	Class 10	Yes	22 to 32 in.	PE (Black)	14-360-629

Protective Coating, Functional Accessories

Fisherbrand Maxima Rotary Vane Vacuum Pumps

Fisherbrand Maxima Rotary Vane Vacuum Pumps are durable and have superior vapor handling capability. Use these pumps for vacuum furnace evacuation, rotary evaporation, vacuum sterilization, mass spectrometry, freeze drying, vacuum centrifugal applications, vacuum distillation, and other processes that require a reliable vacuum. An exhaust filter, funnel, and hose clamp are included. A U.S. 115V cord is provided with 115V models.

The need to service these pumps is reduced by:

- Enhanced, corrosion-resistant coatings to protect from aggressive chemicals
- A large oil reservoir that dilutes harsh chemicals
- A cooling system that helps the pump to run 10°C cooler than standard rotary vane pumps, which reduces chemical activity and slows the rate of oil consumption



Model	Displacement (Flow Rate) at 60Hz	Ultimate Vacuum	Dimensions (L x W x H)	Shipping Weight	Cat. No.
M4C	2.7 CFM (78L/min.)	5 x 10 ⁻⁴ torr (4 x 10 ⁻⁴ mbar)	18.2 x 6.1 x 9.1 in. (46 x 16 x 23cm)	63 lb. (29kg)	01-184-202
M6C	4.2 CFM (118L/min.)			63 lb. (29kg)	01-184-203
M8C	5.6 CFM (158L/min.)			65 lb. (30kg)	01-184-204
M16C	12.8 CFM (363L/min.)	3 x 10 ⁻⁴ torr (2 x 10 ⁻⁴ mbar)	22.4 x 8.1 x 11.4 in. (57 x 21 x 29cm)	200 lb. (91kg)	01-184-205
M24C	18.3 CFM (519L/min.)			103 lb. (47kg)	01-184-206
M30C	22.1 CFM (627L/min.)			106 lb. (48kg)	01-184-207

THE EVOLUTION OF LABORATORY SAFETY: A CAUTIONARY TALE

By Nancy H. Pitts

Safety has been difficult to achieve throughout the history of modern science, even when it has been defined as a primary goal.

Many scientists have been driven by a desire for discovery that has at times outstripped their concern for lab safety. This was especially true in years past, when incurring injuries was simply accepted as one of the personal costs of making a difference in chemistry.

From Checkered Past to Challenging Present Day

Consider the case of Robert Bunsen (1811 to 1899), developer of the eponymous Bunsen Burner. The price he paid for the many sophisticated discoveries credited to him included serious injuries that resulted from numerous incidents, chief among them a laboratory explosion that blinded him in one eye.

An even more dramatic example was the sacrifice made by Marie Curie (1867 to 1934), who received the Nobel Prize for discovering radium and coined the term “radioactivity.” Her contributions to humanity and healthcare were immense, but she was careless in her work with the

element long after learning of its health hazards. Both Curie and her chemist daughter died of blood diseases resulting from exposure to radioactivity. And her laboratory notebooks — which remain radioactive to this day, and will remain so for another 1,600 years — are still stored in a lead-lined box in France.

Even today, risks abound. Of the 126 million known chemicals, for instance, 80,000 are commonly used, yet only 300 have been adequately tested for safety. Factor in the vagaries of human behavior, including bad habits and practices and knowledge limitations, along with a lack of incentives and just plain bad luck, and the challenge of managing safety in the chemical laboratory becomes increasingly clear.

Modern Safety Measures on the Rise

After the U.S. Occupational Safety and Health Administration (OSHA) mandated the Chemical Hygiene Plan (CHP) in 1990, industrial laboratories across the United States instituted more rigorous safety programs, and commercial enterprises appointed dedicated safety officers to help monitor lab safety practices. Hazard Communication Standard guidelines, issued

in part in response to the HIV/AIDS epidemic, were then followed by the Bloodborne Pathogen (BBP) Standard in 1992.

While European countries instituted and now follow similar guidelines to those of the United States, these precautions are often absent from labs in developing countries — where practices like “mouth pipetting,” which exposes technicians to corrosive, toxic, or biological substances, still persist.

These developments notwithstanding, major incidents have occurred within the last decade. A U.S. student was severely injured in a laboratory accident in 2010, and two U.S. university students lost their lives in separate lab incidents in 2008 and 2011, respectively.

In the 2008 case, the City of Los Angeles filed criminal charges against the University of California Board of Regents and against the individual chemist in charge of the lab. Shortly thereafter, employers in academia and the chemical industry reportedly increased their efforts to safeguard students and workers.

Lapses in biosecurity allowed the virus that causes foot-and-mouth disease to escape from a lab in the United Kingdom in 2017.



And in 2014, vials containing a virulent form of live smallpox virus were discovered abandoned in a storage room at the U.S. National Institutes of Health.

The Rapid Pace of Recent Progress

In a 2011 report, the U.S. Chemical Safety and Hazard Investigation Board (CSB) stated that it was “greatly concerned about the frequency of academic laboratory incidents in the U.S.” The report asked why, after large numbers of hazard evaluation guidelines had been produced



for and followed by industrial laboratories, similar guidelines had not been developed for academic laboratories. The reasons, the board concluded, came down to differences in focus and types of research, organizational hierarchies, and financial incentives.

The CSB has not been alone in its concern. Three major corporate safety leaders observed in a 2013 letter that researchers are 11 times more likely to get hurt in an academic lab than in an industrial lab. After the National Academies initiated a study of lab safety in nonindustrial institutions in May of that same year, subsequent reports were produced by both the American Chemistry Society (ACS-9/2013) and the prestigious National Research Council of the National Academies (NRC-7/2014).

The latter report, issued just four years ago, revealed positive as well as chilling findings:

Safety is emerging as a priority and a core value of many academic institutions and of individual laboratories. A strong, positive safety culture is more beneficial than a compliance-only culture.

Universities often do not provide sufficient incentives to promote a strong, positive safety culture. In some cases they may create barriers or disincentives.

Citing its expectation that federal funding agencies would start to hold universities accountable for “their ability to ensure that research can be conducted on campus in a safe and reliable manner,” the Association of Public & Land Grant Universities (APLU) formed a task force in 2015 to determine how to implement recommendations from the ACS and NRC reports.

The APLU Task Force issued its guidelines in 2016 and, to align with them, U.S. academic institutions are currently instituting and prioritizing safer practices in laboratories. As that process unfolds many new technologies are being designed to support these advances, promising even more progress to come in laboratory safety.

LITHIUM-AIR BATTERY POISED TO TAKE CHARGE

By Kevin Ritchart

Researchers from the University of Illinois-Chicago and Argonne National Laboratory have designed a new type of lithium-air battery that works in a natural air environment and continues to function after 750 charge/discharge cycles.

Their findings were published earlier this year in the academic journal *Nature*.

“Our lithium-air battery design represents a revolution in the battery community,” said Amin Salehi-Khojin, assistant professor of mechanical and industrial engineering and co-author of the paper. “This first demonstration of a true lithium-air battery is an important step, but we have more work to do in order to commercialize it.”

Building a Better Battery

For years, researchers have been trying to perfect the design of the lithium-air battery, which can potentially hold up to five times more energy — and operate more safely — than the lithium-ion batteries that currently power cell phones, laptops, and electric cars.

The Federal Aviation Administration (FAA) does not prohibit lithium-ion batteries, but recommends that devices

containing lithium-ion batteries be kept in carry-on baggage. Most major airlines don't permit lithium-ion batteries in checked baggage.

According to the FAA, there were 46 incidents relating to lithium ion batteries in 2017, an increase from 31 in 2016. The FAA issued a safety alert in 2016 noting that its battery fire testing highlighted a “potential risk of catastrophic aircraft loss due to damage resulting from a lithium battery fire or explosion.”

How They Work

Lithium-air batteries theoretically function by oxidizing lithium at the anode (to produce lithium oxide) while reducing atmospheric oxygen at the cathode to create an electrical current that runs across an electrolyte.

So far, lithium-air battery designs have not operated successfully due to a number of technical issues. Aqueous electrolytes typically react with the lithium metal.

During discharge/recharge, lithium salts may precipitate onto the anode, eventually creating a barrier and blocking the reaction. And chemical changes in solid-electrolyte interfaces produce varying

chemical composition and therefore varying output. The cathode can also be compromised by the formation of insoluble lithium oxides.

Improved Design

The UIC-Argonne team was able to prevent anode oxidation and buildup of byproducts on the cathode by utilizing a unique combination of anode, cathode, and electrolyte materials. They coated the anode with a thin layer of lithium carbonate that acts as a filter, selectively allowing lithium ions to reach the electrolyte while simultaneously preventing unwanted compounds from reaching the anode.

Salehi-Khojin and his colleagues made the coating from a unique hybrid electrolyte made of ionic liquid and dimethyl sulfoxide, a common component of battery electrolytes, to help facilitate lithium-oxygen reactions, minimize lithium reactions with other elements in the air, and boost efficiency.

“The complete architectural overhaul we performed on this battery by redesigning every part of it, helped us enable the reactions we wanted to occur and prevent those that would ultimately cause the battery to go dead,” said Salehi-Khojin.



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The AC600 Series Ductless Chemical Workstation is an economical solution for protection of the operator and environment from toxic vapors, gases, fumes, and particulates. Ships fully assembled and can be configured in a variety of common applications.

Standard Features:

- Microprocessor controller has audible and visible alarms for both airflow velocity and filter change
- 360° visibility
- Ideal for low-volume chemical applications

Description	Cat. No.
AC632A 32" Workstation	36-100-4271
AC632TA 32" Workstation, Tall Version	36-100-4272
AC648A 48" Workstation	36-100-4274
AC648TA 48" Workstation, Tall Version	36-100-4275

Filters sold separately, application worksheet required.

Combination PCR Workstation

The AirClean Systems Combination PCR Workstation combines an ISO 5/Class 100 Clean Air Environment with UV light sterilization for optimal protection from sample contamination. UVtect microprocessor constantly monitors workstation functions.

Standard Features:

- Class 100 clean vertical laminar flow air
- Polycarbonate and polypropylene design to reflect UV energy
- Digital UV light timer: 0 to 59 minutes
- UV shelf with integral pipette holder

PCR Workstation	Cat. No.
AC632LFUVC 32" PCR Workstation	36-101-8894
AC648LFUVC 48" PCR Workstation	36-101-8897



Endeavour Ductless Fume Hood

The Endeavour Ductless Fume Hood is designed to provide superior operator protection from potential toxic fumes, vapors, and particulates. AirSafe NXT provides simple and effective user interaction with fume hood operational parameters.

Standard Features:

- Microprocessor controller with audible and visible alarms for both airflow velocity and filter change
- Bonded carbon filters — no dust!
- Polypropylene construction — excellent chemical resistance

Endeavour Ductless Fume Hood	Cat. No.
ACPT4000 48" Ductless Fume Hood	36-100-0063
ACPT5000 60" Ductless Fume Hood	36-100-0067
ACPT6000 72" Ductless Fume Hood	36-100-0069

Filters sold separately; application worksheet required.



Redefining Value in Moisture Analysis

OHAUS MB Series Moisture Analyzers

No matter what you're looking for, OHAUS has a moisture analyzer to fit your laboratory or specialty environment. For basic, entry-level uses, the OHAUS MB23 features an infrared heating element and glassless heating chamber for regulated food processing and other specific applications.

For more advanced needs, the MB120 features a state-of-the-art halogen heating element, moisture analysis-specific weighing cells, tools for creating and storing new test methods, customizable shut-off criteria, user management software, and more.

- Measure moisture levels as low as 0.01%
- Save space with the compact, easy-to-clean design
- Store up to 1,000 results and 100 test methods with the MB120 model



MB120

Model	Heat Source	Temperature Range	Capacity (Readability)	Moisture Readability	Cat. No.
MB27	Halogen	50 to 160°C	90g (1mg)	0.01%	01-920-250
MB90	Halogen	10 to 40°C	90g (1mg)	0.01%	01-922-165
MB120	Halogen	40 to 230°C	120g (1mg)	0.01%	01-922-164
MB23	Infrared	5 to 40°C	110g (10mg)	0.1%	01-920-230

Precision Through Advanced Controls



Branson SFX Sonifier Series Cell Disruptors

The SFX Series of cell disruptors provides a new level of ease, precision, and repeatability with advanced energy and temperature control modes, process monitoring capabilities, and programming features.

Features:

- Precision energy input delivered in continuous or pulse modes
- True temperature control (temperature probe sold separately)
- Control modes for time, temperature, and energy
- In-process feedback for key variables (power level, energy usage, sample temperature)
- Programmable controls with room for 20 stored programs

The SFX150 Sonifier comes with a recessed push button and LED display and either a traditional or handheld converter (designed for ergonomic comfort and easy control). A wide variety of probes/microtips and other Sonifier series accessories are also available to help meet your application needs.



Handheld Converter



Traditional Converter

Description	Sample Size	Power	Probe	Mfr. No.	Cat. No.
SFX150 with Traditional Converter	0.2mL to 150mL	150W	1/8 in. Microtip	101-063-1096R	15-338-528
SFX150 with Handheld Converter	0.2mL to 150mL	150W	1/8 in. Microtip	101-063-962R	15-345-136
SFX250	0.2mL to 500mL	250W	1/2 in. Tapped	101-063-965R	15-345-138
SFX550	0.2mL to 1000mL	550W	1/2 in. Tapped	101-063-969R	15-345-141
SFX550	0.2mL to 1000mL	550W	3/4 in. Solid	101-063-968R	15-345-140

Clean, Safe, and Draft Free

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Plas-Labs Basic and Compact Glove Boxes

Basic Glove Box, Model 818

- For general isolation or containment work
- Compact, portable, lightweight, and easily moveable
- Modify with optional accessories (sold separately)

Basic Glove Box,
Model 818

Compact Glove Box, Model 830

- Accommodates balances, bench scales, and moisture analyzers
- Transfer chamber and removable top section
- Four purging gas valves; replaceable filters

Compact Glove Box,
Model 830Compact Glove Box,
Model 830-CP

Compact Glove Box, Model 830-CP

- For weighing hazardous materials
- Removeable top section
- Two purging gas valves; replaceable filters

Description	Dimensions (W x H x D)	Certifications	Voltage	Cat. No.
Basic Glove Box, Model 818	55 x 38 x 35 in. (140 x 97 x 89cm)	UL Listed, CSA, CA Certified	120V	11-389
Compact Glove Box, Model 830	49 x 31 x 30 in. (125 x 79 x 77cm)	UL Listed, CSA Approved	120V	11-389-121
Compact Glove Box, Model 830-CP	49 x 31 x 30 in. (125 x 79 x 76cm)	UL Listed, CSA, CE Certified	120V	11-386-138

Controlling Vacuum Levels Just Got Easier



KNF SC920 Programmable Vacuum Pump System

Control and monitor your process from anywhere in the lab.

This vacuum system provides a new level of control and performance for your vacuum applications. It features a wireless remote control unit that operates the pump wherever needed — on the bench or under the hood. This space-saving, high-performance system is also safe and easy to control.

Four easy-to-use operating modes:

Evacuation Mode — Adjust the speed of the pump from 15 to 100% to fit the needs of your specific application.

Pressure Control Mode — Set the pump speed to your programmed setpoint to eliminate bumping.

Automatic Setpoint Detection Mode — Your SC920 automatically detects and records the vapor pressure of the solvent and the setpoint. Press a button and walk away — the system does the rest.

Function Mode — Program the system to perform a series of steps or follow a specified pump-down curve. Function mode improves repeatability when handling multiple samples.

Description	Electrical Requirements	Mfr. No.	Cat. No.
Vacuum Pump System	120V 60Hz	SC920	13-880-90
Optional Coolant Valve		117121	13-880-951

Provides consistent results and frees you up to get more done.

- Work quietly with the smooth-running, oil-free vacuum system
- Control everything from up to 60 feet away with the intuitive remote
- Monitor your process without opening the sash
- Connect to any Windows PC via SC920 USB port

Includes: Microsoft Windows-based software, USB interface to PC



13-880-90

Specifications

Flow Rate	20L/min.
Vacuum	1.5 torr (2mbar)
Control	Wireless Remote and Windows-Based Software
Power/Current Consumption	135w/1.7A
Hose Connection, Pneumatic	3/8" I.D. (10mm)
Hose Connection, Coolant	5/16" I.D. (8mm)
Net Weight	33 lb. (15kg)
Dimensions (L x W x H)	11.6 x 14.4 x 16.7" (29.4 x 36.6 x 42.3cm)

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SevenCompact pH and Conductivity Meters

The SevenCompact combines best-in-class measurement technology with intuitive menus and a large color touchscreen. It's so easy to use, it won't ever leave your lab workers puzzled.

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Reax Vortexers

- Vibration orbit: 5mm
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- Includes standard black rubber pad for 20mm diameter test tubes
- Analog speed control dial with accurate rpm number settings (Reax Control only)

Reax Control

- Analog dial speed control (rpm setting)
- Maintains constant rpm at very low speeds or with changing loads

Multi Reax — The Only Hands-Free Multi Vortexer

- Accommodates up to 26 vessels with various diameters
- Hands-free operation with use of secure rubber holder
- Speed: 150 to 2,000rpm
- Digital process timer from 1 to 999 minutes
- Includes one attachment to hold 26 vessels (10 to 16mm diameter) and one to hold 12 vessels (16 to 32mm diameter)



Reax Top



Reax Control



Multi Reax

Description	Mfr. No.	Cat. No.
Reax Top Vortex Mixer	03-613-0000	13-889-310
Reax Control Vortex Mixer	03-613-0020	02-321-067
Multi Reax Vortex Mixer	03-613-0040	13-889-410

In Stock and Available to Ship

Labconco Protector XL Laboratory Hoods

- High-performance fume hood as defined by SEFA 1
- Bypass airflow design with ergonomic Eco-Foil air foil and patented Clean-Sweep airflow openings
- Chemical-resistant, fiberglass-reinforced, composite panel liner and baffle (baffle removes for cleaning)
- Tempered safety glass vertical-rising single sash with cable and pulley
- Removable front and side panels with front and interior service access panels
- Pre-wired T8 fluorescent lighting with vapor-proof design and ADA-compliant light and blower switches
- Powder-coated stainless steel; 12.81 in. (32.5cm) ID exhaust connection(s)
- Two pre-plumbed service fixtures with brass tubing for gas and copper tubing for cold water
- Pre-wired GFCI electrical duplex receptacle (one additional on 8 ft. model)
- Remote blower, work surface, base cabinet or stand, and ductwork (sold separately) required



Description	Fixtures (Duplexes)	Flow Rate with Sash 100% Open*	External (Internal) Dimensions	Cat. No.
4 ft. XL Hood	2 (1)	725 CFM (100 fpm)	48.0 x 31.7 x 59.0 in. (38.1 x 23.6 x 41.1 in.)	16-317-155
6 ft. XL Hood	2 (1)	1180 CFM (100 fpm)	72 x 31.7 x 59.0 in. (62.1 x 23.6 x 41.1 in.)	16-317-156
8 ft. XL Hood	2 (2)	1640 CFM (100 fpm)	96.0 x 31.7 x 59.0 in. (86.1 x 23.6 x 41.1 in.)	16-317-157

*28 in.



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Designed to help with the challenges you face in your lab every day, GENESYS spectrophotometers make doing your job easier than ever before. Choose between manual or automated versions and units with reference cells for high-throughput sample processing. Or choose the Thermo Scientific BioMate 160 to perform automated nucleic acid, protein, and cell culture measurements.

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The new GENESYS line of spectrophotometers will exceed your expectations for usability and performance — and deliver the accurate, reproducible results you need.



GENESYS 180

GENESYS 50

Model	Type	Spectrum (Wavelength)	Mfr. No.	Cat. No.
GENESYS 40	Manual	Visible (325 to 1100nm)	840297000	14-385-50
GENESYS 50	Manual	UV-Vis (190 to 1100nm)	840298000	14-385-351
GENESYS 140	Automated	Visible (325 to 1100nm)	840308000	14-385-352
GENESYS 150	Automated	UV-Vis (190 to 1100nm)	840300000	14-385-353
GENESYS 180	High Throughput	Visible (325 to 1100nm)	840309000	14-385-354
BioMate 160	Life Sciences Applications	UV-Vis (190 to 1100nm)	840301000	14-385-355

Accessories sold separately.

A New Kind of Biosafety Cabinet

LABCONCO

Labconco Purifier Axiom Biosafety Cabinets

The Axiom Class II, Type C1 is the first of its kind: a biological safety cabinet (BSC) that can be used as either a Type A cabinet (recirculating) for standard microbiological work or a Type B cabinet (connected to an exhaust system) to handle hazardous chemical vapors or radionuclides.

- For handling agents that require Biosafety Level 1, 2, or 3 containment, or BSL 4 with proper PPE
- Chem-Zone work surface: large central work area with staging areas on either side
- More energy efficient than a Type B cabinet
- Easily switch between Type A and B modes of circulation
- Multiple configurations including 8 in. or 10 in. sash height, with or without base stand, and with or without Accessory Package



Nominal Width	Actual Width	Sash Opening	Includes	Cat. No.
4 ft.	54.2 in. (137.6cm)	10 in.	Base Stand	30-441-0100
6 ft.	78.2 in. (198.6cm)		30-461-0100	
4 ft.	54.2 in. (137.6cm)		Base Stand, Accessory Package*	30-441-1100
6 ft.	78.2 in. (198.6cm)		30-461-1100	

*Accessory Package includes right side-mounted factory-installed service fixture (one on each side for 6 ft. models), UV lamp with timer, and right side-wall Vacu-Pass Portal.



WE KNOW THE GUAC IS EXTRA, BUT IS IT SAFE?

By Kylie Wolfe

Outbreaks linked to fresh produce items have sparked research efforts by the FDA, which reported that contaminated herbs led to 2,699 cases of illness and 84 hospitalizations from 1996 to 2015. It was also noted that 525 cases of illness and 23 hospitalizations between 2005 and 2015 were caused by pathogenic bacteria specifically found in avocado products.

The FDA recently began an 18-month project to test for microbial contaminants in common produce items. The project includes two separate assignments: one assessing the amount of pathogens found on fresh herbs, including cilantro, parsley, and basil, and the other measuring bacteria found in avocado and avocado products. The study will include 1,600 samples collected from both domestic and imported products.

Don't Pass the Parsley

Samples collected since January 1, 2018, have already provided some evidence of disease-causing microbes. While none of the 35 domestic herb samples were contaminated, four of the 104 imported samples did test positive for *Salmonella* sp., and three showed Shiga toxin-producing *Escherichia coli*. Three of

the 58 domestic avocado and guacamole samples collected tested positive for *Listeria monocytogenes*, as did one of the 49 imported samples.

According to Craig Hedberg, food safety expert at the University of Minnesota, the presence of these bacteria is “an indication that companies need to pay more attention to sanitation in their plants.”

Contamination Concerns

Since fresh herbs are only a small component in recipes, people can rarely pinpoint them as the cause of food-related illness. While washing produce can help decrease any bacteria present, it won't remove it completely. A “kill step” like cooking can reduce or even eliminate these contaminants, but many herbs aren't heated before they're consumed.

In contrast, avocados are often a main ingredient that provides a high-moisture, non-acidic environment perfectly suited to support the growth of bacteria. The avocado samples containing *Listeria* also demonstrated the potential for bacterial growth during refrigeration, an additional concern. The FDA has not released details

about the amount of bacteria found in the contaminated samples, but that will ultimately determine the severity of the situation.

Future Findings

The FDA is still collecting data, but they plan to release their results quarterly in addition to a comprehensive report at the end of the study. No conclusions can be made about the above-mentioned results until all data is collected.

Depending on their findings, the FDA may pursue additional regulations to further protect the public from contaminated products. Currently, contaminated imported produce items are denied entry to the United States, and domestic produce is voluntarily recalled.



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- Prioritized data integrity with unmodified raw image data
- Convenient and streamlined workflow, featuring a 13.3 in. integrated touchscreen monitor, fold-down door, and Thin-Line Transilluminator on a slide-out tray



Description	Camera & Lens	Software Control	Mfr. No.	Cat. No.
UVP ChemStudio <i>touch+</i> Imager	8.1MP, f/0.95	Integrated touchscreen	849-97-0928-01	84-997-092801
UVP ChemStudio+ Imager	8.1MP, f/0.95	PC-controlled	849-97-0928-03	84-997-092803

Affordable Automated Microscopy



BioTek Lionheart LX Automated Microscopes

- 1.25x to 60x air, 60x and 100x oil immersion magnification
- Fluorescence, high-contrast brightfield, and color brightfield imaging
- Automated image capture, processing, and analysis for publication-ready images
- Quick analyze: instant cell count and confluence measurement
- Integrated, compact design offers quick installation and setup



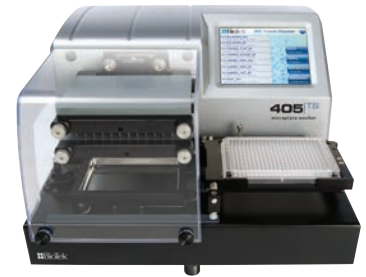
Model	Description	Cat. No.
Lionheart LX	Fluorescence, High-Contrast Brightfield, and Color Brightfield Imaging; Includes Gen5 Software	BTLX

Advanced Plate Washing



BioTek 405 TS Washers

- High-resolution, touchscreen user interface
- Patented, built-in Ultrasonic Advantage automatically cleans clogged tubes
- Two USB flash drive ports for convenient file transfer, storage, and operation
- Compatible with robotics, biomagnetic separation, and vacuum filtration
- Built-in automatic maintenance programs



Model	Description	Cat. No.
405 TS	96/384-Well Microplate Washing, Ultrasonic Advantage	BT405TSUS

Automate Common Endpoint Assays



NEW: BioTek Synergy LX Multi-Mode Microplate Readers

Economically automate your most common microplate assays with the new BioTek Synergy LX. With immediate data display and output to a USB drive, printer, or Gen5 Software, the Synergy LX is a versatile assay workstation.

- High-quality optical design ensures excellent absorbance, fluorescence, and luminescence data
- Xenon flash lamp and monochromator for measuring absorbance in wavelengths from low UV to 999nm
- Filter-based optics measure fluorescence and luminescence for optimal specificity and direct detection
- Easily accessible filter cubes for quick and effortless changes between assays
- Touchscreen user interface simplifies programming
- Suitable for nucleic acid and protein quantification, ELISA, BCA, Bradford, and cell viability



Model	Description	Cat. No.
Synergy LX	Absorbance, Fluorescence, and Luminescence; Includes Gen5 Software	BTSLXFA
Synergy LX	Absorbance, Fluorescence, and Luminescence with Touchscreen UI; Includes Gen5 Software	BTSLXFATS

Models shown may not reflect all product features listed. Contact your Fisher Scientific Sales Representative to learn more about other available configurations.

TAKING OWNERSHIP OF FACILITY SAFETY

By Tim Van Hoecke, QSSP,
Senior Program Manager of Safety,
Thermo Fisher Scientific

What if we took the same ownership of safety in the workplace that we do in our homes?

We traditionally spend five days a week — a little more than a third of our lives — at work and become very familiar with that environment. We also have familiar and established routines at home, but, as the homeowner, head of household, or family member, we're usually more aware of things that require maintenance, repair, or replacement.

Officially, the responsibility for workplace safety resides with the organization's leadership: the Environmental Health and Safety Director, Industrial Hygienist, and other supervisors. While companies usually have processes to address and track hazards and a plan to improve overall safety, employees are an integral part of workplace safety. They need to be aware of hazards, properly trained, and prepared to participate in promoting safety.

To help protect workers everywhere, the U.S. Occupational Safety and Health Administration (OSHA) established a Hierarchy of Controls outlining the key elements, listed from most to least effective, needed to keep workplaces safe:

1. Elimination — completely remove the hazard from the application or area

2. Substitution — use a less hazardous material or replace specific steps in the process
3. Engineering controls — make physical changes to the work area or the process itself to reduce risks to the worker or facility
4. Administrative controls — develop standard operating procedures (SOPs) or work schedules to limit employee exposure times
5. Personal protective equipment (PPE) — provide as needed and when a hazard cannot be eliminated, substituted, engineered, or administratively controlled (although PPE may be considered the primary way to address hazards, controls or safety equipment solutions may be better options, with or without PPE)

With those elements in mind, take the following steps in your own facility:

1. Evaluate your work environment for safety as you would your home
2. Have every employee help monitor conditions, ensure that the proper safety measures are in place, identify deficiencies, actively participate in training, and comply with prescribed safety practices
3. Perform regular audits and reviews of the facility itself and of the applications being performed
 - Is there a hazard that can be eliminated, substituted, engineered, or administratively controlled?

- Are your employees aware of your existing hazardous communication program and have they been properly trained for their existing jobs and known hazards?
- Are there accidents you can prevent by using equipment that communicates hazards through signage and floor markings, hazardous storage cabinets, gas instrumentation, or spill containment equipment?
- What is your response plan and readiness level?
- Do you have safety response equipment in serviceable condition strategically placed throughout the facility? (e.g. first aid kits, eye washes and showers, AEDs, fire extinguishers, spill remediation kits)
- Have maintenance checks been performed on safety equipment? Is that equipment ready for use?

Your commitment to the safety of your workplace facility and employees should be on a par with the commitment to the safety and security of your own home. Become an active, accountable member of your workplace safety family and look for ways to make the needed improvements to its existing foundation.

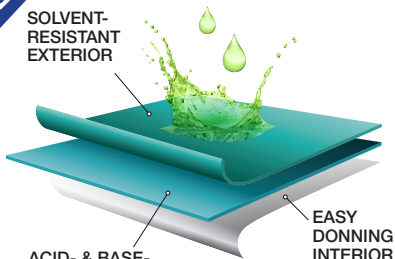
And remember, you don't have to do it all alone — let our Fisher Scientific Safety Specialists and industry-leading suppliers help you with your facility safety needs.

Ansell

tough **CHEMICAL PROTECTION** unparalleled **COMFORT**

NEW

SOLVENT-
RESISTANT
EXTERIOR



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RESISTANT
MIDDLE LAYER

EASY
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MICROFLEX 93-260: THE THINNEST CHEMICAL-RESISTANT DISPOSABLE GLOVE

Meet the new glove that's changing the face of chemical hand protection. With an innovative three-layer design*, Microflex 93-260 offers the reliable protection workers need when handling chemicals. And because it's the thinnest chemical-resistant disposable glove available, it goes beyond protection to offer the comfort, dexterity, and dexterity workers need to be their most productive.

Microflex 93-260. Beyond Protection.

Visit fishersci.com/ansell or
call **1-800-766-700** for more information.

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Stay safe and compliant with Brady SPC absorbents

Limit your exposure to hazardous conditions with absorbent products designed for the lab. Brady SPC offers a variety of absorbents that keep your laboratory safe and compliant if an accidental spill or leak occurs. Clean up spills safely with:

Spillfix Granular Absorbents

Lightweight, easy to deploy, and 100% all natural alternative to silica-based clay. Granular and extremely effective in absorbing harsh chemicals.

BRIGHTSORB High Visibility Absorbents

Signage and absorbent in one; works with a wide range of aggressive chemicals while remaining chemically inert.

Spill Kits

Get everything to respond to spills quickly in one convenient kit.

Description	Absorbance Capacity	Mfr. No.	Cat. No.	Quantity
SpillFix, Granular	0.75 gal. (2.84L)	SF-JAR-CS	19-666-506	3 quarts
BRIGHTSORB Heavyweight Chemical Absorbent Pads, 15 x 19 in.	22 gal. (83.2L)	CH100	19-150-260	100/Case
BRIGHTSORB Lightweight Chemical Absorbent Pads, 15 x 19 in.	28 gal. (106L)	CH200	19-103-101	200/Case
Universal Economy Spill Kit	5 gal. (19L)	SKAPPTAA	17-111-228	Each

▶ Visit fishersci.com/Brady for more information.



THREE LEVELS OF LAB PROTECTION FROM A BRAND YOU TRUST

Laboratory hazards are as varied as the workers who face them. From light particle threats to toxic chemicals, every situation presents its own unique challenges. That's why DuPont offers a range of protective fabric technologies that provide a level of comfort, durability, and protection tailored to each worker's specific needs.



LIGHT PROTECTION

**ProShield NG273B apron
(Cat. No. 19-048-402A)**

Cost-effective, disposable barrier protection against a variety of nonhazardous particles, liquids, and aerosols. Engineered from microporous film laminated to a nonwoven fabric with bound seams and ties.



MODERATE PROTECTION

**Tyvek TY273B apron
(Cat. No. 01-361-83)**

Enhanced frontal protection with inherent barrier protection against aerosols, nonhazardous light liquid splash, and hazardous dry particles down to 1.0 micron in size. Bound seams around neck; ties at waist.



EXTREME PROTECTION

**Tychem QC275B apron
(Cat. No. 19-088-1445)**

Lightweight yet durable protection that brings together the strength of DuPont Tyvek fabric with a polyethylene coating. Provides at least 30 minutes of protection against more than 40 chemical challenges, as well as a range of hazardous particles.

Get protective clothing recommendations with DuPont SafeSPEC, our online product selector tool.

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SafeSPEC.DuPont.com

HARD WORKING GEAR

Workers who wear our gear
refuse to be outperformed
and so do we.

We Protect People with Gloves,
Glasses, and Garments.



**MCR
SAFETY**



**BIG JAKE
CAT2**



Versatile, Comfortable, Easy to Use

3M Science.
Applied to Life.™

3M Versaflo TR-300N+ Heavy Industry PAPR Kit

The 3M Versaflo TR-300+ PAPR System for particulate environments has been re-engineered to bring you even greater versatility, comfort, and ease of use.

- High efficiency (HE) filter
- Two flow rate options: 6.5 and 7.2 CFM
- Innovative Quick Release Swivel (QRS) helps avoid kinks in the breathing tube
- User-friendly interface — monitor filter, battery, and airflow status at a glance
- Upgraded altitude compensation up to 14,000 ft.



Description

TR-302N+ PAPR Kit; Includes: M-307N+ Respiratory Hard Hat Assembly, TR-302N+ PAPR Unit, TR-326 High Durability Belt, TR-341N Battery Charger, TR-3712N Filter, TR-362 Spark Arrestor, TR-3600 Pre-Filter, TR-332 High Capacity Battery, BT-40 Heavy Duty Breathing Tube, TR-971 Airflow Indicator

Mfr. No.

70071696770

Cat. No.

17-000-725

A mold unlike any other.

There are important differences in cleanroom glove manufacturing and technology that can impact the way a glove feels and performs. We believe that the glove mold used makes all the difference in the fit and feel of the glove.

The Cardinal Health Glove mold features an independent thumb design — meaning the finger placement replicates the anatomical position of a resting hand — allowing for natural, comfortable movement.

One study shows that gloves featuring an independent thumb require less force for similar displacements of the thumb than those gloves produced without an independent thumb feature.¹

No matter what type of cleanroom you are in, gloves produced on a mold with an independent thumb design ultimately can help reduce hand fatigue so you can perform at your best.

Anatomic thumb to reduce thumb and hand fatigue.

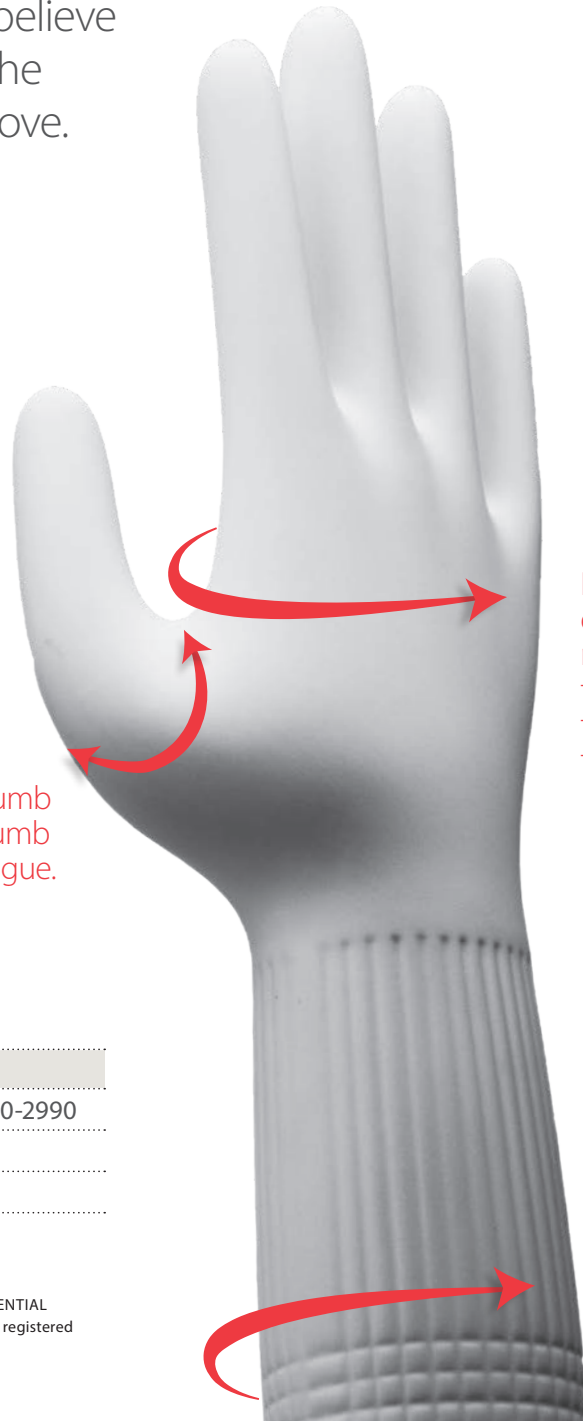
Less flexion and extension force required across the palm due to independent thumb design.

Contact your Fisher Scientific Sales Representative today to order.

Product Name	Cat. No.
Esteem CP	19-166-690, 19-120-2984 through 19-120-2990
Duraprene CP	19-166-612 through 19-166-619
Protegrity	19-120-2975 through 19-120-2982

¹ Bennet, M. A. & Tekamp, D. A. Surgical Glove Comparison Testing. Stress Engineering Services. February 2012.

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Interlocking beaded cuff to help prevent roll down.

Clean Safely

Peroxigen ST Sterile, 6% Hydrogen Peroxide

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

- Made with water-for-injection (WFI)
- Lot-specific documentation ships with each case
- Safe to use, breaks down into water and oxygen and leaves no residues
- Low toxicity, non-flammable, and zero VOC profile assists in VOC compliance
- Used for cleaning hard, non-porous surfaces in labs and production areas

Peroxigen is a ready-to-use 6% hydrogen peroxide solution in a convenient trigger bottle.

- Safe to use, does not leave residues, and it breaks down into water and oxygen
- Low toxicity, nonflammable, and zero VOC profile, which assists in VOC compliance
- Used for cleaning hard, nonporous surfaces in labs and production areas

Description	Mfr. No.	Cat. No.	Quantity
Peroxigen ST, Trigger Bottle, 16 oz.	9716	04-355-161	12/Case
Peroxigen, Trigger Bottle, 16 oz.	9816	04-355-160	1
			12/Case



Visit fishersci.com/deconlabs or fishersci.ca/deconlabs to learn more.

Industrial Protection

WELLS LAMONT
Industrial

Wells Lamont Flextech Impact Gloves

Wells Lamont Industrial Cut-Resistant Impact Gloves provide ANSI cut protection on the back of the hand and fingers to guard against lacerations and pinch-point crushes. Choose from a goatskin leather driver or palm-coated styles for added grip.

- Made with a cut-resistant shell or Kevlar liner
- Flexible TPR pads protect the fingers and back of the hand
- High-visibility awareness on back of hand
- Coated gloves offer a sandy nitrile palm for grip



Style	Description	Size	Mfr. No.	Cat. No.	Quantity
I2459	A7 Cut-Resistant Impact Glove with Sandy Nitrile Palm	Small	I2459S	19-086-620	12 Pairs
		Medium	I2459M	19-086-621	
		Large	I2459L	19-086-622	
		X-Large	I2459XL	19-086-623	
		2X-Large	I2459XXL	19-086-624	
I2449T	A3 Cut Thermal Hi-Vis Impact Glove with Sandy Nitrile Palm	Medium	I2449TM	17-200-362	72/Case
		Large	I2449TL	17-200-363	
		X-Large	I2449TXL	17-200-364	
I2430	Goat Leather Impact Driver with A3 Cut Liner	Small	I2430S	17-200-366	72/Case
		Medium	I2430M	17-200-367	
		Large	I2430L	17-200-368	
		X-Large	I2430XL	17-200-369	
		2X-Large	I2430XXL	17-200-370	

The Ultimate Barrier

Microflex 93-850 Disposable Nitrile Gloves

Offering a high level of protection against harmful exposures, these robust gloves are resistant to rips and tears and have twice the chemical splash protection as other leading brands.

- Enhanced durability reduces risk of rips/tears
- 2X more chemical splash protection than leading nitrile brands*
- Exceeds highest known standard for barrier quality and consistency (Low 0.40 AQL)
- Improved grip
- Compliant with U.S. Food Contact Regulations



Size	Cat. No.	Quantity
X-Small (5.5 – 6.0)	19-010-170	1,000/Case
Small (6.5 – 7.0)	19-010-171	1,000/Case
Medium (7.5 – 8.0)	19-010-172	1,000/Case
Large (8.5 – 9.0)	19-010-173	1,000/Case
X-Large (9.5 – 10.0)	19-010-174	1,000/Case
2X-Large (10.5 – 11.0)	19-010-175	900/Case

*Based on EN 374 and ASTM F739 chemical permeation test data when compared to performance of disposable nitrile gloves of a similar weight

Meet OSHA and Fire Protection Regulations



Justrite Sure-Grip EX Safety Cabinets

Fully compliant, FM-approved steel cabinets feature a fire-resistant design with double-walled, all-welded, 18-gauge steel construction for safe storage of flammables.

High-performance features include:

- U-Loc handle with cylinder lock and key set that accepts optional padlock
- Three-point stainless-steel bullet latching system
- Leak-proof 2 in. bottom sump
- Haz-alert reflective warning labels are visible under fire conditions



Description	Capacity	Dimensions (H x W x D)	Cat. No.
Two Manual Doors, One Shelf	30 gal. (114L)	44 x 43 x 18 in.	19-120-2333
Two Self-Close Doors, One Shelf			19-120-2334
Two Manual Doors, Two Shelves	45 gal. (170L)	65 x 43 x 18 in.	19-120-2335
Two Self-Close Doors, Two Shelves			19-120-2336
Two Manual Doors, Two Shelves	60 gal. (227L)	65 x 34 x 34 in.	19-120-2337
Two Self-Close Doors, Two Shelves			19-120-2338

KIMTECH*

Are You Dressed For Success?

People are the largest source of contamination. If their garments are compromised, your process could be too. Kimtech is asking you to take a closer look at your reusable apparel. Is it protecting your process and your people? Or is it a potential cause of contamination?

Kimtech Brand Single-Use Apparel is specifically designed to reduce the contamination risk in your critical environments.

Are you doing all you can to protect your process and your workers? Turn to the experts in sterile garments. **Get Dressed For Success** with Kimtech.*

Visit fishersci.com/dressforsuccess to learn more.

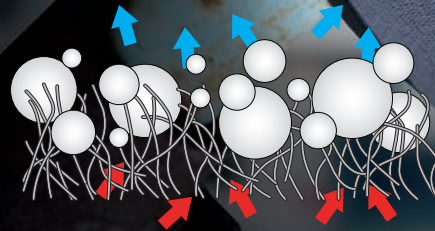


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#1 INDUSTRIAL GLOVE IN AMERICA

MaxiFlex ULTIMATE

The patented micro-foam nitrile coating of the MaxiFlex Ultimate offers 360° breathability, making it the most breathable glove on the market. An optimized grip is delivered through our micro-cup finish, designed to channel away liquids to allow better handling in wet and oily conditions.



AIRtech, which enables 360° breathability of the hand, is delivered through our patented foam technology.

MaxiFlex® Ultimate™
ATG®
EN 388 34-874
CAT II
Sanitized®
Patent No. EP 1 608 808
www.atg-glove.com

PROTECTIVE INDUSTRIAL PRODUCTS, INC.
BRINGING THE BEST OF THE WORLD TO YOU




Youngstown Barrel & Drum Co.

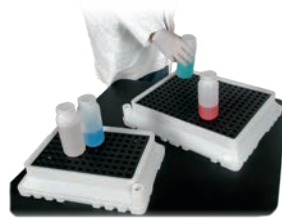
ULTRATECH INTERNATIONAL, INC.

Products for a cleaner, safer world.

Youngstown Barrel & Drum Co. has a containment product to fit spills as small as a five-gallon drum or as large as an entire rail car to help you stay compliant with EPA and SPCC regulations. Hold up to four 55-gallon drums with Ultra-Spill Pallets, or get low-profile containment with Ultra-Spill Decks.



Description	Cat. No.
Ultra-Bung Access Funnels, Capacity: 6 gal. (22.7L)	19-130-4814
Ultra-Spill Deck Bladder Systems, Capacity: 77 gal. (291.4L)	19-058-005
Ultra-Drain Seal Mats, 36 x 36 in.	19-823-211
Ramp, Nonslip, Polyethylene, 55.5 x 28.5 x 8.75 in.	19-130-4953
Ultra-Spill Pallets Plus, 62 x 62 x 8.75 in.	19-130-4780
Ultra-Drum Rack P2 Racks, Holds Two (55 gal.) Drums	19-820-937
Ramp, 24 x 32 x 5.75 in.	19-058-033
Ultra-Spill Deck, Four Drum, 52 x 52 x 5.75 in.	19-058-074
Ultra-Spill Berm, Orange, 10 ft. x 4 in.	19-058-009
Ultra-Spill Trays, Capacity: 1.8 gal. (6.8L), 17 x 12 x 4 in.	19-130-2734
Ultra-Spill Trays, Capacity: 2.9 gal. (11L), 21 x 17 x 4 in.	19-130-2735



Protect Your PEOPLE and Your PRODUCTS

HandPRO[®] SERIES 9100 Cleanroom Nitrile Gloves



Patented Technology*

- ▶ ISO 5 Compatible | 12 in. Length
- ▶ Consistently Low Endotoxin Levels in a non-sterile glove with exceedingly low bio-burden levels
- ▶ LOW DERMA Accelerator-Free Nitrile reduces the risk of developing Type IV chemical allergies



Size	Mfr. No.	Cat. No.	Quantity
X-Small	9100	19-423-100	1,000/Case
Small	9101	19-423-101	1,000/Case
Medium	9102	19-423-102	1,000/Case
Large	9103	19-423-103	1,000/Case
X-Large	9104	19-423-104	1,000/Case
2X-Large	9105	19-423-105	1,000/Case

Packaging: 100 Pieces/Bag, 10 Bags/Case

*Patent LowDerma.com/patents

- Low-Density Manufacturing Process
- Sulfur-Free
- Anti-Slip Grip
- Enhanced Strength
- Ambidextrous

"Your Protection Is Our Purpose"



High Dexterity and Thermal Protection



MAPA Temp-Dex 710 Gloves

MAPA Temp-Dex Gloves provide better dexterity and grip than comparable gloves. Each layer in these yellow gloves captures the maximum amount of air to effectively protect the hands

- Thin, anatomically shaped glove ensures dexterity
- Fluid proof on palm area to prevent fumes or hot liquids from contacting the skin
- Nitrile grip coating (dot embossing) for firm grasp in moderately oily environments
- Safely maintain contact for more than 30 seconds at 100°C
- Abrasion resistant (level 4 of 4)



Size	Mfr. No.	Cat. No.	Quantity
Size 7	710127	19-046-550	Pair 50 Pairs/Case
Size 9	710129	19-046-551	Pair 50 Pairs/Case
Size 11	710121	19-046-552	Pair 50 Pairs/Case

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Soft, Strong Comfort



Microflex XCEED Powder-Free Nitrile Examination Gloves

Microflex XCEED Nitrile Gloves are ergonomically certified to reduce hand fatigue and made with a lightweight, thin formulation that provides exceptional tactile sensitivity, strength, and advanced barrier integrity (0.65 AQL).

- Ergonomically certified
- Textured fingertips
- Thickness: 4.3mil fingers, 2.8mil palm
- Length: 9.5 in. (240mm)
- Beaded cuff
- Blue



Ideal for laboratory, food processing, healthcare, and manufacturing.



Size	Mfr. No.	Cat. No.	Quantity
X-Small	XC310XS	19-177-520	250/Pack 2,500/Case
Small	XC310S	19-177-521	250/Pack 2,500/Case
Medium	XC310M	19-177-522	250/Pack 2,500/Case
Large	XC310L	19-177-523	250/Pack 2,500/Case
X-Large	XC310XL	19-177-524	230/Pack 2,300/Case

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