

## SAFETY

PRODUCT	SUPPLIERS/BRANDS
Air Monitoring/Purifying Accessories	
Air Purifying Reuse Respirators (Gas Masks, Facemasks) and Cartridges	
Air Purifying Disposable Respirators	
Air Quality Test Kits	
Cleaners/Disinfectants/Cleaning Supplies	
First Aid/Rescue	
Flashlights	
Gloves (Exam, Cleanroom, Chemical Resistant)	
Hearing Protection	
Lens Cleaner	
Padlocks, Lock Stations, Lock Boxes	
Signs, Tags, Labels	
Spill Control	

## APPARATUS, CLOTHING AND FURNITURE

PRODUCT	SUPPLIERS/BRANDS
Apparel – Coated Reusable – Level A, B and C Ensembles	
Apparel – Chemical Resistant, Neoprene, PVC	
Apparel – Disposable Aprons and Coveralls	
Boots – Protective	
Eyewash Stations/Accessories	
Fume Hoods	
Glasses/Goggles/Eye Protection	
Head Protection – Hardhats, Headbands, Accessories	
Industrial Gloves	
SCBAs	
Storage Drawers/Cabinets, Safety Cabinets	

### NEED MORE INFORMATION?

For a more detailed products list, visit [www.fishersci.com](http://www.fishersci.com). You will find an electronic file that you can download. It contains suggested products in each category, with catalog numbers, a brief description, and links to the product page on [www.fishersci.com](http://www.fishersci.com). Using this file, you can create your own lab shopping list.



For customer service, call 1-800-766-7000.  
To fax an order, use 1-800-926-1166.  
To order online: [www.fishersci.com](http://www.fishersci.com)

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A COMMITMENT TO EXCELLENCE FOR LABORATORY SUPPLIES, CHEMICALS, EQUIPMENT & SPECIALTY PRODUCTS

## Biofuels Capabilities & Laboratory Checklist





## Think Fisher Scientific First. Here's Why.

Of the 539 existing biofuels plants in the U.S. at this printing, 251 count themselves as Fisher Scientific customers. It's a similar story with research facilities across the country. Why have so many selected Fisher Scientific?

- The breadth of our product portfolio is second to none: consumables, equipment, instruments, chemicals, safety apparatus, and furniture
- We offer services that allow you to focus on science—comprehensive instrument repair, pipet preventive maintenance and calibration, or inventory management—all tailored to your unique requirements
- e-Commerce capabilities including a market-leading Web site, optimized business processes and comprehensive EDI programs
- Ease of order entry via our Web site, customer service, fax or integration with Ariba, Oracle, SciQuest and PeopleSoft
- Quotations customized to your laboratory and usage rates
- Key product exclusives with some of the most important suppliers in the business like Millipore, Reichert, Decon, and Thermo Scientific





Legislation and state-mandated programs such as E pact, The Reformulated Gas Program, The Winterized Oxygenated Fuel Program, VEETC, and Renewable Fuel Standards are impacting demand for biofuels and alternative MTBE oxygenates.

Fisher Scientific offers a comprehensive product portfolio— unrivaled in the industry—that supports biofuels research, production and QA/QC.



## Biofuels Tools

To better serve the industry, Fisher Scientific produced a **Biofuels catalog** which contains a sub-set of products from our portfolio of over 600,000 that have particular relevance to the biofuels industry.



**Highlights** of this catalog are:

- **Coverage** of the full range of activities in this dynamic industry:
  - Raw materials testing
  - Production process support
    - ▶ Bioethanol—milling, fermentation, distillation, dehydration
    - ▶ Biodiesel—transesterification, solids separation, viscosity
    - ▶ DDGS—protein, fat, fiber and moisture content
    - ▶ Safety
  - Bioscience research
- **Identification** of the relevant test method for products, where applicable
- **Listing** of key test methods in a separate table
- **Helpful articles** describing in greater detail the function and application of certain key items such as pH electrodes and refractometers

Fisher Scientific can also help you **start up or stock** your laboratory with our **Laboratory Product Checklist**. Our specialists can assist you with laboratory design, furniture and safety installations. We can also stock your lab benches and shelves with testing equipment, instrumentation, ASC-certified chemicals, and an uninterrupted supply of consumables and diagnostic kits.



Contact your Fisher Scientific Sales Representative or visit [www.fishersci.com](http://www.fishersci.com) for more tools, products, and the latest information on Biofuels.






























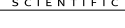


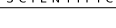












































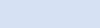
## METHODS IN SEQUENCE

TEST METHOD	PROPERTY	TECHNIQUE	BIOETHANOL	BIODIESEL	E85 BLENDING	DDGS
ASTM D93	Flash point	Flash point tester.		X		
ASTM D130	Color	Color change in copper strip after immersion in sample		X		
ASTM D381	Gum content	Heated evaporation and weighing using water or solid block bath and steam source, directed into the sample	X		X	
ASTM D445	Viscosity	Automated viscometers		X		
ASTM D512	Inorganic Chloride	Titration or ion-selective electrode	X		X	
ASTM D613	Cetane number	Combustion characteristics in test engine		X		
ASTM D664	Acid number	Manual titrator, pH meters, combination electrodes		X		
ASTM D874	Sulfur content	Muffle furnace (775F)		X		
ASTM D891	Specific Gravity	Weighing standard volume	X			
ASTM D1152	Methanol, %	Conformance testing to several specifications	X			
ASTM D1160	Component boiling points	Vacuum distillation apparatus		X		
ASTM D1209	Color	Spectrophotometric		X		
ASTM D1353	Solids	Heated sample (105°C) in weigh dish		X		
ASTM D1613	Acidity, %	Titration with sodium hydroxide to color change	X		X	
ASTM D1688	Copper content	Atomic absorption with wet chemistry prep	X		X	
ASTM D2500	Cloud point	Cooling bath, special jar		X		
ASTM D2622	Sulfur content	Combustion, UV or X-ray fluorescence	X			
ASTM D2709	Water and sediment	Centrifuge with special beaker		X		
ASTM D3120	Sulfur content	Oxidative microcoulometry	X		X	
ASTM D1266, D2622	Sulfur content	UV or X-ray fluorescence			X	
ASTM D3231	Phosphorus content	Spectrophotometer			X	
ASTM D3606	Benzene and toluene content	Gas chromatography		X		
ASTM D4052	Density	Digital Density Analyzer		X		
ASTM D4530	Carbon content	Weight after pyrolysis		X		
ASTM D4806	General specification		X			
ASTM D4815	Hydrocarbon content				X	
ASTM D4929	Total chloride	Distillation followed by a: sodium biphenyl reduction or b: microcoulometry			X	
ASTM D4951	Additive content	Inductively coupled plasma (ICP) atomic spectrometry		X		
ASTM D4953	Vapor pressure	Modified Reid method			X	
ASTM D5059	Lead content	X-ray dispersive			X	
ASTM D5190, D5191	Vapor pressure	Vacuum distillation apparatus			X	
ASTM D5453	Sulfur content	Ultraviolet fluorescence (UVF) detector, combustion tube		X		
ASTM D5501	Ethanol, Methanol content	Gas chromatography	X		X	
ASTM D5798	General specification				X	
ASTM D6423	pHe	Measurement with pH meter, Orion electrode	X			
ASTM D6550	Olefin content	Super-critical fluid chromatograph		X		
ASTM D6584	Glycerin content	Gas chromatography		X		
ASTM D6751	General specification			X		
ASTM E1064, E203	Water content	Wet chemistry Karl Fischer titration-coulometric, volumetric	X			
ASTM E203	Water content	Volumetric Karl Fischer titration			X	
AOAC 990.03*	Crude protein content	Combustion				X
AOAC 2001.11*	Crude protein content	Copper catalyst				X
<b>*Methods are statistically similar and either is acceptable for use on DDGS</b>						
AOAC 945.16	Crude fat content	Petroleum ether				X
AOAC 978.10	Crude fiber content	F.G. crucible				X
NFTA 2.2.2.5	Moisture content	Weight loss on drying				X
<b>Sources:</b>						
<a href="http://www.ethanolrfa.org/objects">www.ethanolrfa.org/objects</a>			X			
<a href="http://www.nrel.gov/docs">www.nrel.gov/docs</a>				X		
<a href="http://www.eere.energy.gov/afdc/e85toolkit">www.eere.energy.gov/afdc/e85toolkit</a>					X	
<a href="http://www.afia.org">www.afia.org</a>						X




















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The following checklist is designed to help you determine your laboratory, QA/QC testing, and safety needs. Each group contains a listing of product categories with the names of representative suppliers and brands. We've added a check box to help you track your selections.

























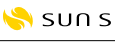















## LAB ESSENTIALS

PRODUCT	SUPPLIERS/BRANDS
Balance Weights	  
Beakers, Bottles, Cylinders, Funnels—Glass and Plastic	   
Bench Protectors	  
Brushes	
Burets	  
Carts	  
Chairs	
Clamps	
Closures, Caps and Plugs	
Filtration Paper and Accessories	  
Filtration Supplies—Syringes, Membranes, etc.	  
Furniture	 
Implements—Forceps, Scoops, Ladles, Dippers, Spatulas	  
Petri Dishes and Plates	  
Pipet Tips	 
Pipets—Glass, Plastic, Disposable, Reusable	    
Racks and Supports	  
Sample Bags	 
Slides and Cover Slips	    
Specimen Collection	
Stationery, Forms, Labeling Tape, Markers, Pens	   
Stir Bars	 
Syringes/Needles	  
Tubes	   
Vials (General)	 
Wash Bottles	  
Waste Disposal Containers and Bags, Safety Containers	 
Water Purification Cartridges and Accessories	 
Wipes	 





















































































## BIOREAGENTS AND CHEMICALS

PRODUCT	SUPPLIERS/BRANDS
Acids – Standardized Solutions, ACS, e.g., Nitric Acid, Sulfuric Acid	
Bioreagents – e.g., Calcium Oxide, Sodium Bicarbonate, D-Maltotriose, Malt Extract Agar, Glycerol, Acetone	 
Drys – ACS/Certified (e.g., Potassium Iodide, Cobaltous Chloride), Dessicants	
Microbiological Media – Dehydrated, Additives, Prepared	  
Solutions – Buffers	  
Solutions – Electrochemistry	 
Solutions – Karl Fischer Reagents	  
Solvents – ACS/Certified, e.g., Methanol, Petroleum Ether, HPLC Grade, High Purity, Alcohol	
Organics – e.g., HPLC, Normal-Hexane, Sodium Thiosulfate	
Indicating Solutions	 

## CHROMATOGRAPHY

PRODUCT	SUPPLIERS/BRANDS
Chromatography Chemicals and Reagents	  
Chromatography Tubing	 
GC – Accessories	     
GC – Columns	   
GC – Generators	
GC – Instrumentation	
GC – Regulators	  
HPLC – Accessories	     
HPLC – Columns	   
HPLC – Dissolution Testing	
HPLC – Instrumentation	
Flash Chromatography	   
Ion Chromatography	 
Vials (Autosampler, COD, Digestion)	 

## EQUIPMENT AND INSTRUMENTS

PRODUCT	SUPPLIERS/BRANDS
Balances (Analytical, Top Loading, Moisture)	  
Baths	 
Centrifuges	  
Calorimeters (Flash Point, Pour Point)	  
Electrochemistry	    
Environmental Test Chambers	
Evaporators	  
Extractors	
Homogenizers	  
Hotplates, Stirring Hotplates	  
Hydrometers	 
Hygrometers	 
Incubators	  
Melting Point Apparatus	 
Microscopes and Accessories	  
Mixers	 
Osmometers	 
Ovens	  
Penetrometers	 
Pipettors – Electric and Manual; Single- and Multi-channel	  
Pipet Aids	     
Polarimeters	
Pumps	    
Rapid Test Kits, e.g., aflatoxin	
Recorders, Controllers, Dataloggers	 
Refrigerators and Freezers	  
Shakers	
Sieves and Shakers	  
Stirrers—Magnetic and Overhead	  
Refractometers	 
Spectrophotometers	 
Thermometers (Electrical and Manual)	 
Timers	
Titrators	
Viscometers	