Chemicals, Raw Materials, Intermediates, and Excipients

Manufacturing Equipment and Supplies

Cleanroom Equipment and Supplies

Packaging Equipment and Accessories

Laboratory Equipment and Supplies

Information Technologies

Outsource Services
Adare has over 30 years’ experience transforming the challenges of pediatric drug formulation into product solutions that drive compliance. Our team of 100+ scientists combine expertise, integrated services, and specialized technology platforms to develop optimized pediatric formulations that provide ease of application and improved patient outcomes. From NCEs to product lifecycle extensions, we can deliver flexible and convenient medications for your youngest patients.

Connect with our experts today: BusDev@adareps.com

TRANSFORMING DRUG DELIVERY. TRANSFORMING LIVES.
EDITORIAL ADVISORY BOARD

Pharmaceutical Technology publishes contributed technical articles that undergo a rigorous, double-blind peer-review process involving members of our distinguished Editorial Advisory Board. Manuscripts should be sent directly to the managing editor.

Below is a partial list of the Pharmaceutical Technology brand editorial advisory members. The full board, which includes advisory members from Pharmaceutical Technology Europe, can be found online at PharmTech.com.

Larry L. Augsburger, PhD
Professor Emeritus
University of Maryland School of Pharmacy

Phil Borman, DSc
Director & Senior Fellow
Portfolio & Technology Delivery
Medicine Development & Supply
Pharma R&D

Eveline Brennan
Co-Founder,
Atam Health Ltd

Rory Budhandjo
Independent GMP Consultant

Metin Celik, PhD
President
Pharmaceutical Technologies International (PTI)

Roger Dabah, PhD
Principal Consultant,
Tri-Intersect Solutions

Robert Dream
Managing Director,
VARI Company

Sanjay Garg, PhD
Professor and Director,
Center for Pharmaceutical Innovation and Development,
University of South Australia

R. Gary Hollenbeck, PhD
Research Scientist
University of Maryland School of Pharmacy

Ruey-ching (Richard) Hwang, PhD
Executive Director,
Clinical Supply Operations,
Pfizer Global R&D

Maik W. Jornitz
President
G-CON Manufacturing Inc.

Mansoor A. Khan, PhD
Professor & Vice Dean
Ima Lerma Range College of Pharmacy, Texas A&M Health Science Center

Heidi M. Mansour, PhD
Regents Professor and Vice Dean,
Presidential Impact Fellow
Range College of Pharmacy
Texas A&M University

Jim Miller
President, Advisor
Bio/Pharmaceutical Manufacturing Strategy

Colin Minchom, PhD
Founder and Principal CMC Consultant
Cardiac CMC Consulting

R. Christian Moreton, PhD
Partner
FinnBrit Consulting

Fernando J. Muzzio, PhD
Distinguished Professor,
Chemical and Biochemical Engineering,
Rutgers University

Mohib M. Nazr, PhD
Principal
Nas Pharma Regulatory Consulting

Wendy Saffell-Clemmer
Sr Director,
Global Pharma Business Operations & BPS R&D
Baxter Healthcare Corporation

Gurvinder Singh Rohkhi, PhD
Department of Pharmaceutical and Biomedical Sciences,
The University of Georgia College of Pharmacy

Susan J. Schniepp
Distinguished Fellow
Regulatory Compliance Associates

David R. Schoner
President,
Black Diamond Regulatory Consulting

Aloka Srinivasan
Principal and Managing Partner
RA&H LLC

Read board members’ biographies online at PharmTech.com/view/pharmaceutical-technology-editorial-advisory-board.

Pharmaceutical Technology’s eNewsletter Team:
• EPL Editor Grant Player,
  grantplayer@mmhgroup.com
• In the Lab, Editors Grant Player and Feliza Miraso,
  grantplayer@mmhgroup.com
 • Equipment & Processing Report,
  Editor Alivia Leon,
  aleon@mmhgroup.com
 • Send news and product releases to
  ptpress@mmhgroup.com

SALES

Publisher Mike Tracey
mtracey@mmhliifesciences.com

East Coast Sales Manager Joel Kern
jkern@mmhliifesciences.com

Mid West, West Coast Sales Manager BJ Ghiglione
bghiglione@mmhliifesciences.com

European Sales Manager Linda Hewitt
lhwewitt@mmhliifesciences.com

European Senior Sales Executive Stephen Cleland
scleland@mmhliifesciences.com

C.A.S.T. Data and List Information Michael Kushner
mkushner@mmhliifesciences.com

Audience Development Stacy Argondizzo
sarargondizzo@mmhliifesciences.com

Senior Vice President, Industry Sciences Michael Tessalone

ADDRESS

485 Route One South, Building F, Second Floor, Iselin, NJ 08830, USA
Tel. 732.596.0276, Fax 732.647.1235
PharmTech.com

PHARMACEUTICAL TECHNOLOGY (Print ISSN: 1543-2521, Digital ISSN: 2150-7376) is published monthly, except two issues in July, by MultiMedia Healthcare LLC, 2 Clarke Drive, Suite 100, Cranbury, NJ 08512.

Subscription rates: US and possessions — 1 year (13 issues), $86.00; 2 years (26 issues), $151.00. Canada and Mexico — 1 year, $112.00; 2 years, $171.00. All other countries 1 year, $164.00; 2 years, $298.00.

Cranbury, NJ 08512-0457. PUBLICATIONS MAIL AGREEMENT NO. 40612608, Return Undeliverable Canadian Addresses to: IMEX Global Solutions, P. O. Box 25542, London, ON N6C 6B2, CANADA. Canadian G.S.T. number: R-124213133RT001. Printed in the U.S.A.

© 2022 MultiMedia Pharma Sciences LLC All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical including by photocopy, recording, or information storage and retrieval without permission in writing from the publisher. Authorization to photocopy items for internal/educational or personal use, or the internal/educational or personal use of specific clients is granted by MultiMedia Pharma Sciences LLC for libraries and other users registered with the Copyright Clearance Center, 222 Rosewood Dr. Danvers, MA 01923, 978-750-8400 fax 978-667-8070 or visit http://www.copyright.com online. For uses beyond those listed above, please direct your written request to PPress@mmhgroup.com with “Permissions Department” in the subject line.

MultiMedia Pharma Sciences LLC provides certain customer contact data (such as customers name, addresses, phone numbers, and e-mail addresses) to third parties who wish to promote relevant products, services, and other opportunities that may be of interest to you. If you do not want MultiMedia Pharma Sciences LLC to make your contact information available to third parties for marketing purposes, simply email mmhinfo@mmhgroup.com and a customer service representative will assist you in removing your name from MultiMedia Pharma Sciences LLC lists.

Pharmaceutical Technology does not verify any claims or other information appearing in any of the advertisements contained in the publication, and cannot take responsibility for any losses or other damages incurred by readers in reliance of such content. Pharmaceutical Technology welcomes unsolicited articles, manuscripts, photographs, illustrations, and other materials but cannot be held responsible for their safekeeping or return.

Reprints: Contact Mike Tracey, mtracey@mmhliifesciences.com. Display, Web, Classified, and Recruitment Advertising: Contact, tel. 732.346.3027.

To subscribe: mmhinfo@mmhgroup.com

CHAIRMAN & FOUNDER

Mike Hennessy Jr
1960 – 2021

Connectiv

AN life sciences® BRAND
CATEGORIES

7 Chemicals, Raw Materials, Intermediates, & Excipients

30 Manufacturing Equipment & Supplies

54 Cleanroom Equipment & Supplies

62 Packaging Equipment & Accessories

69 Laboratory Equipment & Supplies

81 Information Technologies

87 Outsource Services

CATEGORIES/ICON IMAGES
stock.adobe.com: Coprid, warut, industrieblick, 3D motion, totojang1977, Olivier Le Moal, WrightStudio, BillionPhotos.com, Nordroden, MH.
The New SMA MicroPortable ICS Air Sampler

Superior Precision, Superior Control

- Automated Flow Control
- 3 Flow Rates in 1 Unit (1, 2 & 5 CFM)
- Robust, 316L Stainless Steel Construction
- Intuitive Touchscreen
- Automatically Configure Sample Intervals
- Available with the D50 SMA Atrium

Veltek Associates, Inc.
Patents: www.sterile.com/patents

www.sterile.com
15 Lee Blvd., Malvern, PA 19355-1234 USA • (610) 644-8335
CASE STUDIES

110 How a Leading Biotech Company Is Using AI to Improve Yield

112 Control Particulates and Aggregates in Biologics and Biotherapeutics with Element

113 A Technology Prepared for a Pandemic

COMPANY DIRECTORY

114 Company Directory

DEPARTMENTS

131 Ad Index
For vendor contact information, see Company Directory section.

All companies listed here are advertisers in this issue.
<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminophenol</td>
<td>Thomas Scientific, Regis Technologies, Avantor Performance Materials, Arkema</td>
</tr>
<tr>
<td>Acetone</td>
<td>Penta Mfg Co, Scandinavian Formulas</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>Arkema, FAR Chemical, Univar Solutions</td>
</tr>
<tr>
<td>Acetic anhydride</td>
<td>Brentnag North America, Parchem Fine Specialty Chemicals, Thomas Scientific</td>
</tr>
<tr>
<td>Acetin</td>
<td>Penta Mfg Co, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Acetin blends</td>
<td>Penta Mfg Co</td>
</tr>
<tr>
<td>Acetone</td>
<td>Arkema, Avantor Performance Materials</td>
</tr>
<tr>
<td>Acetinylmide</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>Acetophenone</td>
<td>Penta Mfg Co, Vantage</td>
</tr>
<tr>
<td>Acetic acid chloride</td>
<td>Arkema, FAR Chemical, Univar Solutions</td>
</tr>
<tr>
<td>Activated carbon</td>
<td>Phenomenex</td>
</tr>
<tr>
<td>Algin</td>
<td>JRS Pharma</td>
</tr>
<tr>
<td>Alginic acid</td>
<td>Alfa Aesar, FMC Corp, Univar Solutions, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Aloe</td>
<td>Barrington Nutritional Foods, Spectrum Chemical Mfg Corp, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alpha bisabolol</td>
<td>KIC Chemicals</td>
</tr>
<tr>
<td>Alumin</td>
<td>Lampire Biological Labs</td>
</tr>
<tr>
<td>Alumin hydrolysate</td>
<td>Marcor Development Corp</td>
</tr>
<tr>
<td>Albuterol</td>
<td>LGM Pharma, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alcools</td>
<td>Avantor Performance Materials, Croda, Grain Processing Corp, Penta Mfg Co</td>
</tr>
<tr>
<td>Alcohols, propoxylated</td>
<td>Croda, Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alfuzosin HCl</td>
<td>LGM Pharma</td>
</tr>
<tr>
<td>Algin</td>
<td>FMC Corp, TIC Gums, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alginic acid</td>
<td>Alfa Aesar, FMC Corp, Univar Solutions, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alginates</td>
<td>Guixin Int, JRS Pharma</td>
</tr>
<tr>
<td>Aldheydes</td>
<td>Croda, Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alum, ammonium</td>
<td>Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun acetate</td>
<td>Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun alkyls</td>
<td>Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun bromide</td>
<td>Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun chlorhydrate</td>
<td>Monte-Cristo, Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun formulate</td>
<td>Scandinavian Formulas</td>
</tr>
<tr>
<td>Alumimun hydroxide, magnesium carbonate co-dried gel</td>
<td>Brentnag Specialties, Generichem Corp, Scandinavian Formulas, SPM Pharma, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun hydroxide, magnesium hydroxide fluid gel</td>
<td>Generichem Corp, Scandinavian Formulas, SPM Pharma, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun lactate</td>
<td>Generichem Corp, Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun metaphosphate</td>
<td>Scandinavian Formulas</td>
</tr>
<tr>
<td>Alumimun monostearate</td>
<td>Imperial Systems, Parchem Fine Specialty Chemicals, Scandinavian Formulas, Thomas Scientific, Vantage</td>
</tr>
<tr>
<td>Alumimun nitrate</td>
<td>Alfa Aesar, Alphan Chemical Corp, Scandinavian Formulas, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Alumimun oxide</td>
<td>Alfa Aesar, Brentnag North America, Brentnag Specialties, CB Minerals LLC, Scandinavian Formulas, Thomas Scientific, Vantage</td>
</tr>
<tr>
<td>Alumimun phenol sulfonate</td>
<td>Scandinavian Formulas, SPM Pharma</td>
</tr>
<tr>
<td>Alumimun phosphophate</td>
<td>Scandinavian Formulas, SPM Pharma</td>
</tr>
<tr>
<td>Alumimun silicate</td>
<td>Arkema, Momentive Performance Materials</td>
</tr>
<tr>
<td>Alumimun sulfate</td>
<td>Alphan Chemical Corp, Scandinavian Formulas, Thomas Scientific, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Amantadine hcl</td>
<td>LGM Pharma, Universal Preserv-A-Chem Vantage</td>
</tr>
<tr>
<td>Ambroxol</td>
<td>Cambrex, LGM Pharma</td>
</tr>
<tr>
<td>Amiloride hcl</td>
<td>Cambrex, Spectrum Chemical Mfg Corp, BioSpectra Inc, Patheon</td>
</tr>
<tr>
<td>Amino acid chlorides</td>
<td>BioSpectra Inc, Patheon</td>
</tr>
</tbody>
</table>
Problems getting your desired release profile?
Trouble masking an unpleasant taste?
Coating Place can help.

Oral Delivery Innovation
Custom particle coating techniques created through years of experience

The Original Wurster Technology Source and Leader in Modified Release Coating.

Oral solid dosage DEVELOPMENT through MANUFACTURING

www.coatingplace.com
info@coatingplace.com
### CHEMICALS

**raw materials, intermediates, & excipients**

See listings online at PharmTechBuyersResource.com

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALCIUM PROPIONATE</td>
<td>Brenntag North America, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CALCIUM PYROPHOSPHATE</td>
<td>Brenntag North America, Budenheim USA, Vantage</td>
</tr>
<tr>
<td>CALCIUM SACCHARATE</td>
<td>Scandinavian Formulas, SuzzoChem, Vantage</td>
</tr>
<tr>
<td>CALCIUM SORBITOL</td>
<td>Penta Mg Co, Vantage</td>
</tr>
<tr>
<td>CALCIUM SILICATE</td>
<td>Evonik Resource Efficiency GmbH, Huber Engineered Materials, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CALCIUM SORBATE</td>
<td>AIC, Brenntag North America, Allian Chemical Corp, Arkema, Brenntag North America, Carbonell Pharmaceutical Corp, Genrichem Corp, KIC Chemicals, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CALCIUM SULFATE</td>
<td>CB Minerals LLC, JRS Pharma, Vantage</td>
</tr>
<tr>
<td>CALCIUM SULFATE, ANHYDROUS</td>
<td>Aesar, Brenntag North America, Carbonell Pharmaceutical Corp, KIC Chemicals, Vantage</td>
</tr>
<tr>
<td>CALCIUM SULFATE, DIHYDRATE</td>
<td>CB Minerals LLC, JRS Pharma, Vantage</td>
</tr>
<tr>
<td>CALCIUM SULFATE, DIRECT COMPRESSIBLE</td>
<td>CB Minerals LLC, JRS Pharma, Vantage</td>
</tr>
<tr>
<td>CALCIUM, HYDROXIDE</td>
<td>Jost Chemical Co, Vantage</td>
</tr>
<tr>
<td>CALCIUM HYDROXIDE</td>
<td>Jost Chemical Co, Vantage</td>
</tr>
<tr>
<td>CALCIUM HYPOPHOSPHITE</td>
<td>Brenntag North America, Vantage</td>
</tr>
<tr>
<td>CALCIUM IOIDE</td>
<td>Aesar, Vantage</td>
</tr>
<tr>
<td>CALCIUM LACTATES</td>
<td>Brenntag North America, Carbonell Pharmaceutical Corp, Jost Chemical Co, Parchem Fine Specialty Chemicals, Vantage</td>
</tr>
<tr>
<td>CALCIUM LACTATE</td>
<td>Brenntag North America, Carbonell Pharmaceutical Corp, Jost Chemical Co, Parchem Fine Specialty Chemicals, Spectrum Chemical Mfg Corp, Vantage</td>
</tr>
<tr>
<td>CALCIUM LEVULINATE</td>
<td>Spectrum Chemical Mfg Corp, Vantage</td>
</tr>
<tr>
<td>CALCIUM LORATADINE</td>
<td>Carbonell Pharmaceutical Corp, Vantage</td>
</tr>
<tr>
<td>CALCIUM LORATADINE</td>
<td>Carbonell Pharmaceutical Corp, Vantage</td>
</tr>
<tr>
<td>CALCIUM PANTOETHENATE</td>
<td>Basf Corp, Brenntag North America, Charles Bowman &amp; Co, Helmholtz, Vantage</td>
</tr>
<tr>
<td>CALCIUM PANTOETHENATE</td>
<td>Basf Corp, Brenntag North America, Charles Bowman &amp; Co, Helmholtz, Vantage</td>
</tr>
<tr>
<td>CALCIUM PEROXIDE</td>
<td>Brenntag North America, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CALCIUM PHOSPHATE</td>
<td>Arkema, Brenntag North America, Carbonell Pharmaceutical Corp, Budenheim USA, Contract Pharmaceutical Corp, Fuji Chemical Industries USA, Jost Chemical Co, JRS Pharma, Vantage</td>
</tr>
<tr>
<td>CALCIUM PHOSPHATE</td>
<td>Arkema, Brenntag North America, Carbonell Pharmaceutical Corp, Budenheim USA, Contract Pharmaceutical Corp, Fuji Chemical Industries USA, Jost Chemical Co, JRS Pharma, Vantage</td>
</tr>
<tr>
<td>CAPROIC ACID (HEXANOIC)</td>
<td>Aesar, Brenntag North America, KIC Chemicals, Penta Mg Co, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CAPRYL ALCOHOL (OCTANOL)</td>
<td>Penta Mg Co, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CARBAMAZEPINE</td>
<td>BASF Corp, Penta Mg Co, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CARBAPENTAPENTE CINNAMNITRILE</td>
<td>Contract Pharmaceutical Corp, Vantage</td>
</tr>
<tr>
<td>CARBON DISULFIDE</td>
<td>Arkema, KIP Chemicals, Vantage</td>
</tr>
<tr>
<td>CARBON TETRACHLORIDE</td>
<td>Arkema, Vantage</td>
</tr>
<tr>
<td>CARBON, ACTIVATED (CHARCOAL, ACTIVATED) 5N Plus</td>
<td>NUCON Int'l, Vantage</td>
</tr>
<tr>
<td>CARBONATES</td>
<td>Avantor Performance Materials, Brenntag Nutritional, Vantage</td>
</tr>
<tr>
<td>CARBOXILIC ACIDS AND SALTS, PERFLUORINATED</td>
<td>Kingchem LLC, Vantage</td>
</tr>
<tr>
<td>CARBOXYMETHYLCELLULOSE</td>
<td>Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CARISOPROPOOL</td>
<td>BASF Corp</td>
</tr>
<tr>
<td>CARRAMEGAN</td>
<td>Brenntag North America</td>
</tr>
<tr>
<td>CASEINE</td>
<td>Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CASEIN</td>
<td>Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CASEINE HYDROLYSATE</td>
<td>Kerry, Vantage</td>
</tr>
<tr>
<td>CASEIN</td>
<td>Scandinavian Formulas, Thomas Scientific, Vantage</td>
</tr>
<tr>
<td>CASEINATES</td>
<td>Brenntag North America, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CASSIA OIL</td>
<td>Penta Mg Co</td>
</tr>
<tr>
<td>CASTOR OIL</td>
<td>Arkema, BASF Corp, Brenntag North America, Crotal, Jedwards Intl, KIC Chemicals, Morre-Tec Industries, Vantage</td>
</tr>
<tr>
<td>CARBOMER</td>
<td>Brenntag North America, Lubrizol Life Science Health, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CARBON DISULFIDE</td>
<td>Arkema, Thomas Scientific, Vantage</td>
</tr>
<tr>
<td>CARBOXILIC ACIDS AND SALTS, PERFLUORINATED</td>
<td>Kingchem LLC, Vantage</td>
</tr>
<tr>
<td>CARBOXYMETHYLCELLULOSE</td>
<td>Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CARISOPROPOOL</td>
<td>BASF Corp</td>
</tr>
<tr>
<td>CARRAMEGAN</td>
<td>Brenntag North America</td>
</tr>
<tr>
<td>CASEINE</td>
<td>Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CASEIN</td>
<td>Scandinavian Formulas, Thomas Scientific, Vantage</td>
</tr>
<tr>
<td>CASEINATES</td>
<td>Brenntag North America, Scandinavian Formulas, Vantage</td>
</tr>
<tr>
<td>CASSIA OIL</td>
<td>Penta Mg Co</td>
</tr>
<tr>
<td>CASTOR OIL</td>
<td>Arkema, BASF Corp, Brenntag North America, Crotal, Jedwards Intl, KIC Chemicals, Morre-Tec Industries, Vantage</td>
</tr>
</tbody>
</table>
For vendor contact information, see Company Directory section.
CRITICAL cGMP INGREDIENT NEEDS?

Synthesis | Purification | GMP Solutions

- APIs / NCEs
- Functional Excipients
- Amino Acids / Sugars
- Critical Small Molecules
- Custom Buffer Solutions

For further information please contact Paul DiMarco, Vice President at paul.dimarco@biospectra.us

When You Absolutely Need FULL cGMP!

www.biospectra.us • 100 Majestic Way, Bangor, PA 18013
For vendor contact information, see Company Directory section.
<table>
<thead>
<tr>
<th>Chemical</th>
<th>Company/Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>SULFATE</td>
<td>Brenntag Specialties, Ashland, Vantage</td>
</tr>
<tr>
<td>HYDROXYLAMINE</td>
<td>Vantage, Thomas Scientific, Brenntag North America</td>
</tr>
<tr>
<td>VANTAGE</td>
<td>Brenntag North America, SCM Chemicals</td>
</tr>
<tr>
<td>CELLULOSE</td>
<td>Vantage, Thomas Scientific, Brenntag North America</td>
</tr>
<tr>
<td>HYDROCHLORIDE</td>
<td>Vantage, Thomas Scientific, Brenntag North America</td>
</tr>
<tr>
<td>CHEMICALS</td>
<td>Hormone Compositions, Thomas Scientific, Brenntag North America</td>
</tr>
<tr>
<td>CHEMICALS</td>
<td>Ingredients, Thomas Scientific, Brenntag North America</td>
</tr>
<tr>
<td>CHEMICALS</td>
<td>PharmTechBuyersResource.com, PharmTech.com</td>
</tr>
</tbody>
</table>

For vendor contact information, see Company Directory section.
For vendor contact information, see Company Directory section.
<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Vendor 1</th>
<th>Vendor 2</th>
<th>Vendor 3</th>
<th>Vendor 4</th>
<th>Vendor 5</th>
<th>Vendor 6</th>
<th>Vendor 7</th>
<th>Vendor 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methocarbamol</td>
<td>Lachesis Labs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl 3,4-Dimethoxy-6-nitrobenzoate</td>
<td>Lachesis Labs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miconazole Nitrate/</td>
<td>AIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium Base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myristic Acid</td>
<td>KIC Chemicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myristyl Alcohol</td>
<td>Parchem Fine Specialty Chemicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myristyl Trimethylammonium Bromide</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Hydroxy-Ethylpiperazine-N'-</td>
<td>BioSpectra Inc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethanesulfonic Acid, Hydrochloride</td>
<td>AIC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Isopropylidimethylglycerine</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylacetamide</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylcellulose</td>
<td>BOC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methyldehydroabietic acid</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methyldehydroabietic acid base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylformamide</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylphosphonate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylthiophosphonic acid</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylnicotinamide</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methyllactamid</td>
<td>Volatile Chemicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Metylsalicylate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methyltestosterone</td>
<td>VOLATILE Chemicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylethylketone</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylisobutylketone</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylisobutyric acid</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylketole</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylleucine</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylleucine Chloride</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylleucine Methylceramide</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylleucine Methylceramide base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Methylleucine Phosphate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzenesulfonate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochloroacetic acid</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-Monochlorobenzylisothiocyanate base</td>
<td>Vantage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
POLYMER DELIVERY SYSTEMS  
Biddle Sawyer Corp  
Colicon  
Evonik Corp  
Univar Solutions

POLYMER FILMS, HYDROPHILIC  
BASF Corp  
Colodon  
Evonik Corp  
Momentive Performance Materials  
Roquette  
Univar Solutions

POLYMER FILMS, HYDROPHOBIC  
BASF Corp  
Colodon  
CP Kelco  
Evonik Corp  
Momentive Performance Materials  
Univar Solutions

POLYMERS, CROSS-LINKED  
Asahi Kasei  
Bangs Labs  
BASF Corp  
Evonik Corp  
Momentive Performance Materials  
Univar Solutions  
Vantage

POLYMERS, SUPERABSORBENT  
Evonik Corp  
Momentive Performance Materials  
Univar Solutions  
Vantage

POLYMETHYL B SULFATE  
AIC

POLYOXYETHYLENE FATTY ESTERS  
Croda  
Gattefossé USA  
Vantage

POLYOXYETHYLENE GLYCOLS  
Bangs Corp  
Bioblink Life Sciences  
Gattefossé USA  
Vantage  
Wako Chemicals USA

POLYPEPTIDES  
Evonik Corp

POLYPROPYLENE GLYCOLS  
Brentnagl North America  
Vantage

POLYSORBATES  
Aeromor Performance Materials  
Croda  
KIC Chemicals

POLYVINYL ALCOHOL  
BASF Corp  
Brentnagl North America  
JRS Pharma  
Penta Mfg Co  
Vantage

POLYVINYLPROPIONOLONE  
AIC  
Ashland  
BASF Corp  
Biddle Sawyer Corp  
Genomen Corp  
JRS Pharma  
Vantage

POLYVINYLACETATE  
Alfa Aesar  
Avantor Performance Materials  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL ALGINATE  
Spectrum Chemical Mfg Corp

POLYVINYLAMINE  
Contract Pharmacal Corp  
Genencor Corp  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Vantage

POLYVINYL BENZOATE  
Spectrum Chemical Mfg Corp

POLYVINYL BICARBONATE  
Alfa Aesar  
Brentnagl North America  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL BROMATE  
Alfa Aesar  
Allan Chemical Corp  
More-Tec Industries  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific

POLYVINYL BROMIDE  
BioSpectra Inc.  
More-Tec Industries  
ROSS Mixers (Charles Ross & Son Company)  
Spectrum Chemical Mfg Corp  
Vantage

POLYVINYL CARBONATE  
Alfa Aesar  
Allan Chemical Corp  
Avantor Performance Materials  
Brentnagl North America  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL CHLORIDE  
Alfa Aesar  
Avantor Performance Materials  
Brentnagl North America  
Contract Pharmacal Corp  
More-Tec Industries  
Pharmov LLC  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL CITRATE  
Barrington Nutritional  
Brentnagl North America  
Genencor Corp  
KIC Chemicals  
Parchem Fine Specialty Chemicals  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Vantage

POLYVINYL CYANIDE  
Alfa Aesar  
Spectrum Chemical Mfg Corp  
Thomas Scientific

POLYVINYL DICHLORIDE  
Spectrum Chemical Mfg Corp

POLYVINYL FERRIVANIDE  
Alfa Aesar  
Allan Chemical Corp  
Spectrum Chemical Mfg Corp  
Thomas Scientific

POLYVINYL FORMATE  
Spectrum Chemical Mfg Corp

POLYVINYL GLUCONATE  
Brentnagl North America  
Contract Pharmacal Corp  
Genencor Corp  
Jost Chemical Co  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Vantage

POLYVINYL GLYCEROPHOSPHATE  
Seppic

POLYVINYL HYDROXIDE  
Alfa Aesar  
Allan Chemical Corp  
Parchem Fine Specialty Chemicals  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL IODAZE  
AIC  
Alfa Aesar  
Contract Pharmacal Corp  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL LACTATE  
Alfa Aesar  
Allan Chemical Corp  
Parchem Fine Specialty Chemicals  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL METABISULFITE  
Spectrum Chemical Mfg Corp  
Scandinavian Formulas  
Generichem Corp  
Brenntag North America  
Avantor Performance Materials  
Brentnagl North America  
Budenheim USA  
Jost Chemical Co  
Thomas Scientific  
Vantage

POLYVINYL NITRATE  
AIC  
Alfa Aesar  
Allan Chemical Corp  
Avantor Performance Materials  
Jost Chemical Co  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL NITROXIDE  
AIC  
Alfa Aesar  
Allan Chemical Corp  
Avantor Performance Materials  
Jost Chemical Co  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL OXALATE  
Alfa Aesar  
Allan Chemical Corp  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL PHENYLACETATE  
Arkema  
Spectrum Chemical Mfg Corp

POLYVINYL PHOSPHATE, DIBASIC  
Allan Chemical Corp  
Brentnagl North America  
Budenheim USA  
Jost Chemical Co  
Thomas Scientific  
Vantage

POLYVINYL PHOSPHATE, MONOBASIC  
Allan Chemical Corp  
Avantor Performance Materials  
Brentnagl North America  
Budenheim USA  
Jost Chemical Co  
Vantage

POLYVINYL SACCHARATE  
Spectrum Chemical Mfg Corp  
Jost Chemical Co  
Vantage

POLYVINYL SALT  
Spectrum Chemical Mfg Corp  
Jost Chemical Co  
Vantage

POLYVINYL SULFATE  
Alfa Aesar  
Allan Chemical Corp  
Jost Chemical Co  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific  
Vantage

POLYVINYL SULFATE  
Spectrum Chemical Mfg Corp  
Jost Chemical Co  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Vantage

POLYVINYL TETRABORATE  
Spectrum Chemical Mfg Corp

POLYVINYL THIOCYANATE  
Alfa Aesar  
Brentnagl North America  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Thomas Scientific

POLYVINYL THIOSULFATE  
Alfa Aesar  
Avantor Performance Materials  
Scandinavian Formulas  
Spectrum Chemical Mfg Corp  
Vantage

POVIDONE  
Ashland  
BASF Corp  
Biddle Sawyer Corp  
Genencor Corp  
JRS Pharma  
Penta Mfg Co  
Vantage

POVIDONE-IODINE  
Ashland  
BASF Corp  
Biddle Sawyer Corp  
Genencor Corp  
JRS Pharma  
Penta Mfg Co  
Vantage

FOR VENDOR CONTACT INFORMATION, SEE COMPANY DIRECTORY SECTION.
<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Company Name</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROPYLENE GLYCOL ALGINATE</td>
<td>Brenntag North America</td>
<td>FMC Corp</td>
</tr>
<tr>
<td></td>
<td>TIC Gums</td>
<td></td>
</tr>
<tr>
<td>PROPYLENE GLYCOL FATTY ACID ESTERS</td>
<td>Croda</td>
<td></td>
</tr>
<tr>
<td>PROPYLENE GLYCOL MONOSTEARATE</td>
<td>Brenntag North America</td>
<td>Gattefosse USA</td>
</tr>
<tr>
<td></td>
<td>TIC Gums</td>
<td>Vantage</td>
</tr>
<tr>
<td>PROPYL PARABEN</td>
<td></td>
<td>Vantage</td>
</tr>
<tr>
<td>PROSTAGLANDINS</td>
<td>Pfizer CentreOne</td>
<td></td>
</tr>
<tr>
<td>PROTECTING AGENTS</td>
<td>Morre-Tec Industries</td>
<td></td>
</tr>
<tr>
<td>PROTEIN HYDROLYSATES</td>
<td>Kerry</td>
<td></td>
</tr>
<tr>
<td>PROTEIN NUTRIENTS</td>
<td>Pharmosolv LLC</td>
<td></td>
</tr>
<tr>
<td>PROTEINS</td>
<td>Barrington Nutritional</td>
<td>Lampire Biological Labs</td>
</tr>
<tr>
<td></td>
<td>Roquette</td>
<td>Vantage</td>
</tr>
<tr>
<td></td>
<td>Worthington Biochemical Corp</td>
<td></td>
</tr>
<tr>
<td>PSEUDOEPHEDRINE HCL BASF Corp</td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>PSEUDOEPHEDRINE SULFATE BASF Corp</td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>PSSYLIUM SEED (PLAN-TAGO SEED)</td>
<td>Barrington Nutritional</td>
<td>Charles Bowman &amp; Co</td>
</tr>
<tr>
<td></td>
<td>Scandinavian Formulas</td>
<td></td>
</tr>
<tr>
<td>PVP/VA COPOLYMERS</td>
<td>Ashland</td>
<td>BASF Corp</td>
</tr>
<tr>
<td></td>
<td>Momentive Performance Materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biddle Sawyer Corp</td>
<td>Generichem Corp</td>
</tr>
<tr>
<td>PYRANTEL PAMOATE</td>
<td>AIC</td>
<td></td>
</tr>
<tr>
<td>PYRANTEL TARTRATE</td>
<td>AIC</td>
<td></td>
</tr>
<tr>
<td>PYRINEDE</td>
<td>Regis Technologies</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td></td>
<td>Thomas Scientific</td>
<td></td>
</tr>
<tr>
<td>PYRILAMINE MALEATE (MEPYRAME)</td>
<td>AIC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lonza</td>
<td>Marcov Development Corp</td>
</tr>
<tr>
<td></td>
<td>Parchem Fine Specialty Chemicals</td>
<td></td>
</tr>
<tr>
<td>QUINIDINE HCL</td>
<td>ChiroSolve</td>
<td></td>
</tr>
<tr>
<td>QUINIDINE SULFATE</td>
<td>ChiroSolve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Momentive Performance Materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>QUININE HYDROCHLORIDE</td>
<td>ChiroSolve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Penta Mfg Co</td>
<td></td>
</tr>
<tr>
<td>R(-)-GLICYDIL BUTRATE</td>
<td>ChiroSolve</td>
<td></td>
</tr>
<tr>
<td>R(+)-GLICYDIL TOSYLALE</td>
<td>ChiroSolve</td>
<td></td>
</tr>
<tr>
<td>RAMPRIL</td>
<td>Hetero</td>
<td></td>
</tr>
<tr>
<td>RANITIDINE HCL</td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>REAGENT CHEMICALS</td>
<td>Avantor Performance Materials</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td></td>
<td>Soltec Ventures</td>
<td>Wako Chemicals USA</td>
</tr>
<tr>
<td>RESORCINOL</td>
<td>Richman Chemical</td>
<td>Vantage</td>
</tr>
<tr>
<td>RETINIC ACID (TRETINOIN) BASF Corp</td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>RHAMNOSE</td>
<td>Marcov Development Corp</td>
<td></td>
</tr>
<tr>
<td>RIBAVIRIN</td>
<td>BASF Corp</td>
<td>Scandinavian Formulas</td>
</tr>
<tr>
<td>RIBOFLAVIN SODIUM PHOSPHATE</td>
<td>Brenntag North America</td>
<td>Charles Bowman &amp; Co</td>
</tr>
<tr>
<td></td>
<td>Scandinavian Formulas</td>
<td></td>
</tr>
<tr>
<td>RIBONUCLEASE</td>
<td>Worthington Biochemical Corp</td>
<td></td>
</tr>
<tr>
<td>RIBONUCLEIC ACID</td>
<td>Charles Bowman &amp; Co</td>
<td>Marcov Development Corp</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td>Worthington Biochemical Corp</td>
</tr>
<tr>
<td>RIFAMPIN</td>
<td>Scandinavian Formulas</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>RIFAMYCIN</td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>RISPERIDONE</td>
<td>AIC</td>
<td></td>
</tr>
<tr>
<td>RITODRINE HCL</td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>ROCHELLE SALTS</td>
<td>CB Minerals LLC</td>
<td>Vantage</td>
</tr>
<tr>
<td></td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>ROSE BENGAL</td>
<td>Scandinavian Formulas</td>
<td></td>
</tr>
<tr>
<td>ROSE OIL</td>
<td>Jedwards Intl</td>
<td>Scandinavian Formulas</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>ROVIN</td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>RUBIDUAL SALTSDS</td>
<td>Alfa Aesar</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>RUTHERIUM SALTS</td>
<td>Alfa Aesar</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>RUTIN</td>
<td>Generichem Corp</td>
<td>Marcov Development Corp</td>
</tr>
<tr>
<td></td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>S-INDOLE-2-CARBOXYLIC ACID</td>
<td>ChiroSolve</td>
<td></td>
</tr>
<tr>
<td>SACCHARIN</td>
<td>KIC Chemicals</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SACHARIN SODIUM</td>
<td>Brenntag North America</td>
<td>Helen KIC Chemicals</td>
</tr>
<tr>
<td></td>
<td>Scandinavian Formulas</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SAFFLOWER OIL</td>
<td>Croda</td>
<td>Jedwards Intl</td>
</tr>
<tr>
<td></td>
<td>KIC Chemicals</td>
<td>KIC Chemicals</td>
</tr>
<tr>
<td></td>
<td>Scandinavian Formulas</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SAFRANE</td>
<td>Spectrum Chemical Mfg Corp</td>
<td>Vantage</td>
</tr>
<tr>
<td>SAFROLE</td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>SALICYLAMIDE</td>
<td>Contract Pain Corp</td>
<td>WeyChem US</td>
</tr>
<tr>
<td>SALICYLIC ACID</td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>SAMARIUM SALTS</td>
<td>Brenntag Specialists</td>
<td>Soltec Ventures</td>
</tr>
<tr>
<td></td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>SEALANTS</td>
<td>Mantontmauser Co</td>
<td>Momentive Performance Materials</td>
</tr>
<tr>
<td></td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>SILANES</td>
<td>Alfa Aesar</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td></td>
<td>Vantage</td>
<td></td>
</tr>
<tr>
<td>SILVER (METAL)</td>
<td>Alfa Aesar</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td></td>
<td>Soltec Ventures</td>
<td>Thomas Scientific</td>
</tr>
<tr>
<td>SILVER ACETATE</td>
<td>Alfa Aesar</td>
<td>Soltec Ventures</td>
</tr>
<tr>
<td></td>
<td>Gelest</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SILVER ACID</td>
<td>Alfa Aesar</td>
<td></td>
</tr>
<tr>
<td>SILVER BIOMIDE</td>
<td>Alfa Aesar</td>
<td>Soltec Ventures</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>SILVER CARBONATE</td>
<td>Alfa Aesar</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SILVER CHLORIDE</td>
<td>Alfa Aesar</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SILVER CYANIDE</td>
<td>Alfa Aesar</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SILVER IOIDIDE</td>
<td>Alfa Aesar</td>
<td>Soltec Ventures</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>SILVER NITRATE</td>
<td>Avantor Performance Materials</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SILVER OXIDE</td>
<td>Alfa Aesar</td>
<td>Soltec Ventures</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>SILVER SULFADIAZINE</td>
<td>Alfa Aesar</td>
<td>Soltec Ventures</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
<tr>
<td>SILVER SULFATE</td>
<td>Alfa Aesar</td>
<td>MilliporeSigma</td>
</tr>
<tr>
<td></td>
<td>Soltec Ventures</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td></td>
<td>Thomas Scientific</td>
<td></td>
</tr>
<tr>
<td>SILYLATING AGENTS</td>
<td>Biddle Sawyer Corp</td>
<td>Gelest</td>
</tr>
<tr>
<td></td>
<td>Momentive Performance Materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regis Technologies</td>
<td>Soltec Ventures</td>
</tr>
<tr>
<td>SIMETHICONE</td>
<td>AIC</td>
<td>Momentive Performance Materials</td>
</tr>
<tr>
<td></td>
<td>Parchem Fine Specialty Chemicals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td>Vantage</td>
</tr>
<tr>
<td>SIMETHICONE EMULSION</td>
<td>Momentive Performance Materials</td>
<td></td>
</tr>
<tr>
<td>SIMETHICONE EMULSION, LOW-SODIUM</td>
<td>Momentive Performance Materials</td>
<td></td>
</tr>
<tr>
<td>SIMETHICONE, GRANULAR</td>
<td>Momentive Performance Materials</td>
<td></td>
</tr>
<tr>
<td>SIMVASTATIN</td>
<td>Hetero</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SODIUM ACETATE</td>
<td>Alfa Aesar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allian Chemical Corp</td>
<td>endant North America</td>
</tr>
<tr>
<td></td>
<td>Avantor Performance Materials</td>
<td>Jost Chemical Co</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td>Richman Chemical</td>
</tr>
<tr>
<td>SODIUM ACID PYROPHOSPHATE</td>
<td>Brenntag North America</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td>SODIUM ALGINATE</td>
<td>AIC</td>
<td>Budenheim USA</td>
</tr>
<tr>
<td>SODIUM ALUMINUM HYDRIDE</td>
<td>AIC</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
<tr>
<td></td>
<td>Spectrum Chemical Mfg Corp</td>
<td></td>
</tr>
</tbody>
</table>
Benecel™ XRF HPMC products have been optimized for controlled-release matrix formulations providing robust products and consistent drug release, especially for high speed tableting operations.

For more information visit ashland.com/benecelxrf
<table>
<thead>
<tr>
<th>CHEMICALS</th>
<th>raw materials, intermediates, &amp; excipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>SODIUM AMINOBENZOATE</td>
<td>Scandinavian Formulas</td>
</tr>
<tr>
<td>SODIUM AMMONIUM PHOSPHATE</td>
<td>Brenntag North America</td>
</tr>
<tr>
<td>SODIUM BENZOATE</td>
<td>Alfa Aesar Brenntag North America Helmer KIC Chemicals Scandinavian Formulas Spectrum Chemical Mfg Corp Vantage</td>
</tr>
<tr>
<td>SODIUM BICARBONATE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America CrovSolve MilliporeSigma Natrium Products Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM BIPHOSPHATE</td>
<td>Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM BISULFATE</td>
<td>Jost Chemical Co Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM BORATE</td>
<td>Alfa Aesar Brentnag North America Scandinavian Formulas Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM BOROHYDRIDE</td>
<td>Alfa Aesar MilliporeSigma Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM BROMIDE</td>
<td>Morre-Tec Industries Spectrum Chemical Mfg Corp Vantage</td>
</tr>
<tr>
<td>SODIUM CAPRYLATE</td>
<td>MilliporeSigma Richman Chemical Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM CARBONATE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America Jost Chemical Co Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM CARBOXYMETHYL CELLULOSE</td>
<td>AIC Ashland Biddle Sawyer Corp Brentnag North America Brenntag Specialties Gumix Intl IFF KIC Chemicals TIC Gums Vantage</td>
</tr>
<tr>
<td>SODIUM CARBOXYMETHYL CHLORIDE</td>
<td>Alfa Aesar Akema Avantor Performance Materials Brentnag North America MilliporeSigma ROSS Mixers (Charles Ross &amp; Son Company) Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM CHLORIDE</td>
<td>Alfa Aesar Arkema Avantor Performance Materials Brentnag North America MilliporeSigma Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM CHLORATE</td>
<td>Alfa Aesar Arkema Top Science &amp; Technology Corporation Vantage</td>
</tr>
<tr>
<td>SODIUM CITRATE</td>
<td>Alfa Aesar Avantor Performance Materials Barrington Nutritional Brentnag North America KIC Chemicals MilliporeSigma Parchem Fine Specialty Chemicals Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM CITIONATE</td>
<td>Alfa Aesar Spectrum Chemical Mfg Corp Vantage</td>
</tr>
<tr>
<td>SODIUM CYANIDE</td>
<td>Spectrum Chemical Mfg Corp Vantage</td>
</tr>
<tr>
<td>SODIUM DECANOATE</td>
<td>BioSpectra Inc.</td>
</tr>
<tr>
<td>SODIUM DEHYDROCHOLATE</td>
<td>DSM Pharmaceuticals Products Soltec Ventures Vantage</td>
</tr>
<tr>
<td>SODIUM DEOXYCHOLATE</td>
<td>Marcor Development Corp Soltec Ventures Vantage</td>
</tr>
<tr>
<td>SODIUM DIATRIZOATE</td>
<td>Spectrum Chemical Mfg Corp Vantage</td>
</tr>
<tr>
<td>SODIUM FLUORIDE</td>
<td>ABC AIC Arkema Avantor Performance Materials Brentnag North America Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM FORMATE</td>
<td>Brentnag North America Jost Chemical Co Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM GLACONATE</td>
<td>Brentnag North America Roquette Scandinavian Formulas Spectrum Chemical Mfg Corp UFP Technologies Vantage</td>
</tr>
<tr>
<td>SODIUM GLYCLATE</td>
<td>Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM GLYCINE CARBONATE</td>
<td>Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM GLYCOSIDE</td>
<td>Alfa Aesar MilliporeSigma Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM GLYCOSYLATED</td>
<td>Alfa Aesar MilliporeSigma Spectrum Chemical Mfg Corp UFP Technologies Vantage</td>
</tr>
<tr>
<td>SODIUM HYDROXIDE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America MilliporeSigma Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM HYPOCHLORITE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America MilliporeSigma Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM HYPOPHOSPHITE</td>
<td>Brentnag North America Arkema Richman Chemical Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM HYPOCHLORITE</td>
<td>Alfa Aesar MilliporeSigma Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM HYDROXIDE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America MilliporeSigma Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM IODIDE</td>
<td>Alfa Aesar MilliporeSigma Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM LAURYL SARCOSINE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America MilliporeSigma Vantage</td>
</tr>
<tr>
<td>SODIUM LAURYL SULFATE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America MilliporeSigma Vantage</td>
</tr>
<tr>
<td>SODIUM METABISULFITE</td>
<td>Brentnag North America Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM METALIC</td>
<td>Alfa Aesar Spectrum Chemical Mfg Corp Vantage</td>
</tr>
<tr>
<td>SODIUM METALLIC</td>
<td>Alfa Aesar Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM METALLIC</td>
<td>Alfa Aesar Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM METHYLATE</td>
<td>Brentnag North America MilliporeSigma Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM MUSCOPHOSPHATE</td>
<td>Alfa Aesar Avantor Performance Materials Brentnag North America MilliporeSigma Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM MONOCHLORACETATE</td>
<td>Arkema Brentnag North America Scandinavian Formulas Vantage</td>
</tr>
<tr>
<td>SODIUM NITRATE</td>
<td>Alfa Aesar Brentnag North America Jost Chemical Co Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
<tr>
<td>SODIUM NITRITE</td>
<td>Brentnag North America Scandinavian Formulas Spectrum Chemical Mfg Corp Thomas Scientific Vantage</td>
</tr>
</tbody>
</table>
For vendor contact information, see Company Directory section.

SOY HYDROLYSATE
Kerry
Marcor Development Corp
Scandinavian Formulas

SOY OIL
Brenntag North America
Croda
Jedwards Intl
Scandinavian Formulas
Vantage

SOY PROTEIN CONCENTRATE
Brenntag North America
Contract Pharmacal Corp
Scandinavian Formulas
Vantage

SPEARMINT OIL
Jedwards Intl
KIC Chemicals
Spectrum Chemical Mfg Corp

SPERMACETI, SYNTHETIC
Croda
Strahl & Pitsch
Vantage

SPHINGOLIPIDS
MilliporeSigma
Vantage

SPIRONOLACTONE
Piramal Pharma Solutions

SQUALANE
Jedwards Intl
Parchem Fine Specialty Chemicals
Scandinavian Formulas
Vantage

STANNOUS FLUORIDE
AIC
Spectrum Chemical Mfg Corp

STARCH
Brenntag North America
Colorcon
Generichem Corp
Grain Processing Corp
MilliporeSigma
Roquette
Thomas Scientific
Vantage

STARCH, COMPRESSIBLE
Biddle Sawyer Corp
Brenntag North America
Colorcon
Generichem Corp
Grain Processing Corp
Roquette
Vantage

STARCH, POTATO, MODIFIED
Brenntag North America
Colorcon
Generichem Corp
Roquette
Vantage

STAVUDINE
Hetero

STEARYL ALCOHOL
Croda
KIC Chemicals
Scandinavian Formulas
Vantage

STEARYL STEARATE
Scandinavian Formulas

STEROIDS
MilliporeSigma
Spectrum Chemical Mfg Corp

STREPTOMYCEIN SULFATE
Helm
MilliporeSigma

STREPTOZOCIN
Wako Chemicals USA

STRONIUM CHLORIDE
Alfa Aesar
Allan Chemical Corp
MilliporeSigma

STRONIUM SALTS
Alfa Aesar
Allan Chemical Corp
Bionlink Life Sciences
Soltect Ventures
Spectrum Chemical Mfg Corp

STRYCHNINE SALTS
ChiroSolve
Spectrum Chemical Mfg Corp

STRYCHNINE SULFATE
ChiroSolve

SUCINIC ACID
Allan Chemical Corp
KIC Chemicals
Scandinavian Formulas
Thomas Scientific
Vantage

SUCINIC ANHYDRIDE
MilliporeSigma

SUCROSE
Avantor Performance Materials
Plantextrakt, Inc.
ROSS Mixers (Charles Ross & Son Company)

SULFOLACTONE
Piramal Pharma Solutions

SULFAMETHAZINE
Cambrex

SULFUR
Arkema
Spectrum Chemical Mfg Corp

SULFURIC ACID
Arkema
Avantor Performance Materials
Brenntag North America
MilliporeSigma
Spectrum Chemical Mfg Corp

SUPEROXIDE DISMUTASE
Contract Pharmacal Corp

SURFACE ACTIVE AGENTS
Aconox

QUALITY
DELIVERY
SERVICE

Visit us at
www.tcstainless.com

Not the biggest,
just the BEST!

A family owned business since 1994.

BioTech / Pharma is our specialty.

Call our team at
417-466-4704
<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Vendor Name</th>
<th>Vendor Name</th>
<th>Vendor Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANDEM SALTS</td>
<td>Alfa Aesar</td>
<td>MilliporeSigma</td>
<td>Spectrum Chemical Mfg Corp Vantage</td>
</tr>
<tr>
<td>TARTARIC ACID</td>
<td>ChiroSolve</td>
<td>Glati Pharmaceutical Services</td>
<td>KIG Chemicals Vantage</td>
</tr>
<tr>
<td>TAURINE</td>
<td>Alfa Aesar</td>
<td>Brentnag North America</td>
<td>Charles Bowman &amp; Co</td>
</tr>
<tr>
<td>TETRACAINIE</td>
<td>BASF Corp</td>
<td>Spectrum Chemical Mfg Corp</td>
<td>Vantage</td>
</tr>
<tr>
<td>TETRACAINIE HCL</td>
<td>BASF Corp</td>
<td>Spectrum Chemical Mfg Corp</td>
<td>Vantage</td>
</tr>
<tr>
<td>TETRACYCLINE HCL</td>
<td>Helm</td>
<td>Spectrum Chemical Mfg Corp</td>
<td>Vantage</td>
</tr>
<tr>
<td>TETRASODIUM ETHYLENE-DIAMINETETRAACETATE</td>
<td>Brentnag North America</td>
<td>Central Glass Germany</td>
<td>Vantage</td>
</tr>
<tr>
<td>TETRASODIUM PHOSPHORATE</td>
<td>Alfa Aesar</td>
<td>Ordrup and Co</td>
<td>Spectrum Chemical Mfg Corp</td>
</tr>
</tbody>
</table>
UREA
AIC
Avantor Performance Materials
BioSpectra Inc.
Brenntag North America
ROSS Mixers (Charles Ross & Son Company)
Scandinavian Formulas
Thomas Scientific
Vantage

URAL
BioSpectra Inc.
URIDINE
BioSpectra Inc.
UV ABSORBERS
BASF Corp
Brenntag North America
Momentive Performance Materials
Parchem Fine Specialty Chemicals
Vantage

VALERIC ACID
Alfa Aesar

VALINE
Evonik Corp
Kyowa Hakko USA
Scandinavian Formulas

VALPROIC ACID
Generichem Corp

VANADIUM
Alfa Aesar
Scandinavian Formulas
Thomas Scientific
Vantage

VANOCMYCIN
Parchem Fine Specialty Chemicals

VANILLA
Jedwards Intl
Virginia Dare

VANILLA OIL
Scandinavian Formulas
Virginia Dare

VANILLIN
Brenntag North America
Helm
KIC Chemicals
Scandinavian Formulas
Vantage
Virginia Dare

VANILLYLACETONE
Scandinavian Formulas

VASOPRESSIN
Helm

VERAPAMIL HCL
Piramal Pharma Solutions
Spectrum Chemical Mfg Corp

VERATRALDEHYDE
Penta Mfg Co

VINCAMINE
Spectrum Chemical Mfg Corp

VINCISTINE SULFATE
MilliporeSigma
Spectrum Chemical Mfg Corp
Wako Chemicals USA

VITAMIN A
Barrington Nutritional
Morre-Tec Industries

VITAMIN B1(1)
Brenntag North America
Charles Bowman & Co
Helm
Huber Engineered Materials
Scandinavian Formulas
SuzhouChem
Vantage

VITAMIN B1(2)
BASF Corp
Brenntag North America
Charles Bowman & Co
Helm
Huber Engineered Materials
KIC Chemicals
MilliporeSigma
Scandinavian Formulas
SuzhouChem
Vantage

VITAMIN B1(3)
Barrington Nutritional
Charles Bowman & Co
Helm
Scandinavian Formulas

VITAMIN B2
Brenntag North America
Charles Bowman & Co
Helm
Scandinavian Formulas

VITAMIN B3
Barrington Nutritional
BASF Corp
Helm
KIC Chemicals
MilliporeSigma
Scandinavian Formulas
Vantage

VITAMIN B4
Brenntag North America
Helm
Scandinavian Formulas

VITAMIN B5
Barrington Nutritional
BASF Corp
Helm
KIC Chemicals
MilliporeSigma
Scandinavian Formulas

VITAMIN B6
Brenntag North America
Charles Bowman & Co
Helm
LGM Pharma
MilliporeSigma
Morre-Tec Industries
Scandinavian Formulas
Vantage

VITAMIN B7
Brenntag North America
Helm
Scandinavian Formulas

VITAMIN B8
Brenntag North America
Helm
Morre-Tec Industries
Scandinavian Formulas

VITAMIN B9
Brenntag North America
Helm
SuzhouChem

VITAMIN B12
Brenntag North America
Helm
SuzhouChem

WAXES, EMULSIFYING
Brenntag North America
Brenntag Specialties
Crodina
Gattefossé USA
Jedwards Intl
Lanza
Vantage

WAXES, MICROCRYSTALLINE
Brenntag Specialties
Crodina

WAXES, SYNTHETIC
Crodina

WAXES, WHITE
Brenntag North America
Brenntag Specialties
Jedwards Intl
Strahl & Pitsch
Vantage

WAXING AGENTS
Brenntag Specialties
Crodina
Gattefossé USA
Momentive Performance Materials
Vantage

WHEAT GERM GLYCERIDES
Scandinavian Formulas
Vantage

WHEAT GERM OIL
Jedwards Intl
KIC Chemicals

WHEAT GLUTEN
Brenntag North America
Roquette
Scandinavian Formulas

WHEY PROTEIN CONCENTRATES
Brenntag North America

WOOL WAX ALCOHOL
Crodina

XANTHAN GUM
Brenntag North America
CP Kelco
Gumix Intl
IFF
KIC Chemicals
MantroseHauser Co
Scandinavian Formulas
TIC Gums
Vantage

XYLENE
Brenntag North America
Thomas Scientific
Vantage

XYLENOL
Thomas Scientific

XYLILOL
AIC
Barrington Nutritional
Brenntag North America

ZINC CITRATE
Generichem Corp
Jost Chemical Co
Scandinavian Formulas
Soltex Ventures

ZINC GLUCONATE
Jost Chemical Co

ZINC GLYCINATE
Generichem Corp
Scandinavian Formulas
Soltex Ventures

ZINC HEPARIN
Scandinavian Formulas
Soltex Ventures

ZINC LACTATE
Generichem Corp
Jost Chemical Co
Scandinavian Formulas
Soltex Ventures

ZINC NITRATE
Alfa Aesar
Allan Chemical Corp
Scandinavian Formulas
Soltex Ventures

ZINC OXIDE
AIC
Alfa Aesar
Brenntag Nutritionalis
Brenntag North America
Brenntag Specialties
CB Minerals LLC
Generichem Corp
Helm
Jost Chemical Co
MilliporeSigma
Scandinavian Formulas
Soltex Ventures
Vantage

ZINC PHENOLSULFONATE
Scandinavian Formulas
Soltex Ventures
Vantage

ZINC STEARATE
AIC
Alfa Aesar
Allan Chemical Corp
Brenntag North America
Brenntag Specialties
Generichem Corp
KIC Chemicals
Scandinavian Formulas
Soltex Ventures
Vantage

ZINC SULFATE
Jost Chemical Co

ZINC SULFIDE
Arkema
Brenntag Specialties
Scandinavian Formulas
Soltex Ventures
Vantage

ZINC UNDECYLANATE
Arkema
Scandinavian Formulas

ZINC CARBONATE
Generichem Corp
Scandinavian Formulas
Soltex Ventures
Vantage

ZINC CHLORIDE
AIC
Allan Chemical Corp
MilliporeSigma
Scandinavian Formulas
Soltex Ventures

ZIRCONIUM (METAL)
Alfa Aesar
Soltex Ventures

For vendor contact information, see Company Directory section.
ADVERTISER’S INDEX

Pharmaceutical Technology equipment & supplies

For vendor contact information, see Company Directory section.

See listings online at PharmTechBuyersResource.com

MANUFACTURING

ADVERTISERS’ INDEX

All companies listed here are advertisers in this issue.

COMPANY
Halkey Roberts
IMA S.p.A.
Leislritz

PHONE
727-471-4200
39 051 651 4111
908-885-2333

PAGE
45
39
35

COMPANY
Ligand Pharmaceuticals
Natioferring
ROSS Mixers

PHONE
588-850-7500
636-826-8900
631-234-0500

PAGE
51
31
33

WARUT - STOCK.ADOBE.COM

see page 15 for a list of all advertisers.
WE MAKE TABLETING EASY
Consistent weight & dosage. Easy batch reporting.

We know tableting.

When you buy a quality tablet press from Natoli Engineering you're getting more than a piece of equipment - you're getting a network of support. From research and development through production, our experts are with you every step of the way.

Contact Natoli today and start the conversation with a trusted leader in tablet compression and a leading supplier to the cannabis industry.

YOU DEMAND. WE DELIVER.
NATOLI ENGINEERING COMPANY, INC.
natoli.com • info@natoli.com • +1 636.926.8900

Custom PLC recipe controls are available to optimize your batch data and meet CFR-21 requirements.

With units sized from 200mL to 4000L, Ross has the Double Planetary Mixer to fit your process.

Learn more at mixers.com. Call 1-800-243-ROSS or try our free online Knowledge Base & Product Selector web app at mixers.com/web-app.
<table>
<thead>
<tr>
<th>MANUFACTURING</th>
<th>equipment &amp; supplies</th>
<th>See listings online at PharmTechBuyersResource.com</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEE Intl</td>
<td>BETE Fog Nozzle</td>
<td>Blackstone-NEY Ultrasonics</td>
</tr>
<tr>
<td>Biodor Industries</td>
<td>Capmatic Ltd</td>
<td>Custom Powder Systems</td>
</tr>
<tr>
<td>Buro的看法 Industries</td>
<td>LEICO Corp</td>
<td>DiEtchiatric Process Systems</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td>Ecolabs</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td>EquipNet</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td>ESC</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td>ESOO Technologies</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td>Integrated Containment Systems LLC</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td>Steris Corp</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td>TOMI Environmental Solutions</td>
</tr>
<tr>
<td>Celsys Ltd</td>
<td>Celsys Ltd</td>
<td></td>
</tr>
</tbody>
</table>
One supplier takes care about the complete line, the entire process. Achieving real innovation requires the complete interaction of every single element. It means creating an environment where people, equipment and technology come together in perfect synergy.

This is IMA Pharma. This is the All-In-One.
For vendor contact information, see Company Directory section.
For vendor contact information, see Company Directory section.

Glen Mills
Grieve
Keith Machinery Corp
Liftomatic Material Handling
Nordic Group
Olisa USA
Pink GmbH Thermostystemes
Thomas Scientific
Verder Scientific

OVENS, REVOLVING
EquipNet
Verder Scientific

OVENS, STERILIZING
AWS Bio-Pharma Technologies
Buhler Aerolide
Despatch - ITW EAE
EquipNet
ESC Technologies
Federal Equipment Co
Grieve
Gruben
HealthStar
Nicos Group
Olisa USA
Optima Machinery Corp
Pink GmbH Thermostystemes
Remmers Electra Steam
Thomas Scientific

OVENS, VACUUM
EquipNet
F.F.S. Food and Pharma Systems srl
Federal Equipment Co
Grieve
HealthStar
Olisa USA
PHC Europe B.V.
Pink GmbH Thermostystemes
Thomas Scientific
Verder Scientific

PANS, COATING
AC Compacting LLC
DJs Enterprises
Driam USA
EquipNet
Federal Equipment Co
Freund-Vector Corporation
HealthStar
IMA S.p.A.
International Process Plants
IPP
Keith Machinery Corp
Nicos Group
ProCepT
Thomas Processing

PANS, PULSATING
Driam USA
EquipNet
Federal Equipment Co
HealthStar
Keith Machinery Corp
Nicos Group

PANS, VACUUM
3V TECH USA
EquipNet
Federal Equipment Co
HealthStar
Keith Machinery Corp
Nicos Group

PASTEURIZERS
API Heat Transfer
Feldmeier Equipment
Keith Machinery Corp
Microthermics
Pick Heaters

PELLETIZERS
Federal Equipment Co
International Process Plants
IPP
Keith Machinery Corp
Lee Industries

PHOTOMETERS
Air Techniques Intl (ATI)
Artel
Eppendorf
First Sensor
Konica Minolta Sensing
Americans
NUCON Int'l
optic-eleafmat
Thomas Scientific

POWER LEVEL SENSORS
Automation Products, Inc.
DYNATROL® Division
Benteler
Monitor Technologies LLC
Vac-U-Max

POWER SCOOPS
ERE
Thomas Scientific

POWER SELECTION TESTERS
Black Forest Container Systems
Custom Powder Systems
Jenike & Johanson
Texture Technologies Corp

POWER TESTING/TESTER
Aerodruck
ERE
Federal Equipment Co
Fluid Air
Freeman Technology
Hosokawa Micron
Power Systems
Jenike & Johanson

POWER TRANSMISSION, GEAR
Stainless Motors

PRESSES, COMPACT
AC Compacting LLC
DJs Enterprises
EquipNet
Federal Equipment Co
Fette Compacting America
HealthStar
International Process Plants
IPP
Keith Machinery Corp
KIKUSUI USA
KORSCH America
Mendel Co
Natoz Engineering
Plastic Supply of PA
Sancilio & Co
Schafer Technologies
SMI
Thomas Scientific
Wilson Tool Int'l

PRESSURES, TABLETS, REPLACEMENT PARTS
AC Compacting LLC
DJs Enterprises
Elizabeth Companies
EquiNet
Fette Compacting America
HealthStar
IMA S.p.A.
International Process Plants
IPP
Keith Machinery Corp
Key Intl
KIKUSUI USA
KORSCH America
Mendel Co
Natoz Engineering
Plastic Supply of PA
Sancilio & Co
Schafer Technologies
SMI
Thomas Scientific
Wilson Tool Int'l

PRESSURE GAUGES, PRECISION TEST
AGR Intl
Ametek Sensors, Test & Calibration
Achacofr
Bentex
Festo Corp
GMP Systems
Isolation Systems
Palmer Wahl Instruments
Plast-O-Matic Valves
Qosina
RJM Sales
Siemens
Viatran
Wika Instrument Corp

PRESSURE REGULATORS AND VALVES
Asahi/America
Festo Corp
GMP Systems
Haakey Roberts
Ingersoll Rand
Isolation Systems
MKS Instruments
Omega Engineering
Plast-O-Matic Valves
Qosina
Spirax Sarco
Thiar Process
Thomas Scientific
Wika Instrument Corp

PRESSURE SENSOR FITTINGS
Conax Technologies
Festo Corp
GMP Systems
MKS Instruments
Palmer Wahl Instruments
Unibloc-Pump
Wika Instrument Corp

PRESSURE SENSORS, ELECTRONIC
Anderson-Negele
Achacofr
Festo Corp
First Sensor
GE Sensing & Inspection Technologies
GMP Systems
Isolation Systems
MKS Instruments
Omega Engineering
Palmer Wahl Instruments
RJM Sales
Siemens
SMI
Viatran
Wika Instrument Corp

PRESSURE TRANSMITTERS
Anderson-Negele
Achacofr
Bentex
Emerson Automation Solutions
Festo Corp
First Sensor
GE Sensing & Inspection Technologies
GMP Systems

PROCESS CONTROL INSTRUMENTATION
Acom Inc
Anderson-Negele
Applied Physics, Inc.
Achacofr
Automation Products, Inc.
DYNATROL® Division
Beamex
BinMaster
BLH Nobel
Buchiglas USA
Burkert Fluid Control Systems
Charles River
Chromalox
De Dietrich Process Systems
Diassoci
ESC
DuraSense
Enerpac
ETC
Festo Corp
First Sensor
FSI Technologies
GEMU Valves
GMP Systems
Hiden Analytical
Hoffer Flow Controls
Honeywell
Industrial Technology
System Ltd
Isolation Systems
JH Technology
Kaiser Morse
Krohne
Lee Industries
LJ Star
LT Industries
Metrohm USA
MKS Instruments
ModTech Corp
Monitor Technologies LLC
Niagara Meters
Olsa USA
Omega Engineering
Optek-Danulat
RJM Sales
ROSS Makers (Ross & Son Company)
Stainless Fabrication
T&C Stainless Inc.
Thiar Process
Walker Stainless
Equipment Co

PROCESS CONTROL SERVICES & SUPPLIES
000 Process Control Services
Interfor Personnel Int'l

PROTEIN & VACCINE PROCESSOR PERSONAL PROFESSIONAL SERVICES & SUPPLIES

RJM Sales
ROSS Makers (Ross & Son Company)
Stainless Fabrication
T&C Stainless Inc.
Thiar Process
Walker Stainless
Equipment Co

See listings online at PharmTechBuyersResource.com
Robertsite® Bag Access Valves (BAV)

Designed to be integrated by press fit or heat sealing into fluid delivery bags

- Eliminates the use of needles and spikes
- Compatible with all standard male luers
- Eliminates leaking and dripping when disconnected
- Incorporates proven split septum valve technology
- Available in polycarbonate and polypropylene

sales@halkeyroberts.com
727.471.4200
www.halkeyroberts.com

Visit our website to view our comprehensive line of needlefree swabable valves

HALKEY | ROBERTS®
For vendor contact information, see Company Directory section.
<table>
<thead>
<tr>
<th>COMPANY</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>EquipNet</td>
<td>Federal Equipment Co</td>
</tr>
<tr>
<td>Eriez</td>
<td>Federal Equipment Co</td>
</tr>
<tr>
<td>Fette Compacting America</td>
<td>HealthStar</td>
</tr>
<tr>
<td>IMA S.p.A.</td>
<td>Jenkem &amp; Johnson</td>
</tr>
<tr>
<td>Key Int'l</td>
<td>Kirby Lester</td>
</tr>
<tr>
<td>Kramer US LLC</td>
<td>Labco Instruments</td>
</tr>
<tr>
<td>LB Bohle LLC</td>
<td>METO Systems</td>
</tr>
<tr>
<td>MCM</td>
<td>Molded Fiber Glass Tray Co</td>
</tr>
<tr>
<td>Notting Engineering</td>
<td>Palmetto Packaging Machines</td>
</tr>
<tr>
<td>Plab</td>
<td>R.J. Hartnett Co</td>
</tr>
<tr>
<td>Remcom Plastics</td>
<td>Servisol</td>
</tr>
<tr>
<td>Symtek</td>
<td>Tamper Technologies Ltd</td>
</tr>
<tr>
<td>Wilson Tool Int'l</td>
<td>Tote Systems</td>
</tr>
</tbody>
</table>

**TABLET HOPPERS**

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>EquipNet</td>
<td>AC Compacting LLC</td>
</tr>
<tr>
<td>Mecmesin Corp</td>
<td>KIKUSUI USA</td>
</tr>
<tr>
<td>HealthStar</td>
<td>Fette Compacting America</td>
</tr>
<tr>
<td>Federal Equipment Co</td>
<td>Tamper Technologies Ltd</td>
</tr>
<tr>
<td>AC Compacting LLC</td>
<td>Terracorp</td>
</tr>
<tr>
<td>Tamper Technologies Ltd</td>
<td>Wilson Tool Int'l</td>
</tr>
</tbody>
</table>

**TABLET TESTERS**

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Compacting LLC</td>
<td>Atlantic Scale Co</td>
</tr>
<tr>
<td>Buehler</td>
<td>Ditek</td>
</tr>
<tr>
<td>DURAN</td>
<td>EquipNet</td>
</tr>
<tr>
<td>Eriez</td>
<td>Feddec</td>
</tr>
</tbody>
</table>
Captisol is the trade name for Ligand’s solvent-free processed modified cyclodextrin preparation. Captisol is a patent-protected mixture of chemically modified cyclodextrins with a modifying structure to optimize drug solubility and stability. Captisol was invented and developed by scientists at the University of Kansas’ Higuchi Biosciences Center specifically for drug development and formulation.

Captisol overcomes solubility and stability hurdles faced during each phase of development. Captisol can make a substance more soluble and an agent more stable. Captisol can convert a solid to a liquid or an oil to an aqueous solution. Combinatorial chemistry, high throughput screening (HTS), and molecular genetics have led to an increase in the number of insoluble and unstable molecules, peptides, and proteins being investigated for their therapeutic activity. There are currently more than 50 Captisol-enabled products in clinical development. This unique technology has enabled several FDA-approved products, including Amgen’s KYPROLIS®, Baxter International’s NEXTERONE®, Gilead’s VEKLURY®, Acrotech Biopharma L.L.C.’s and CASI Pharmaceuticals’ EVOMELA®, Melinta Therapeutics’ BAXDELA™ and Sage Therapeutics’ ZILEREXO™. There are many Captisol-enabled products currently in various stages of development.

SEAMLESS TRANSITION TO CLINICAL TRIALS
Captisol may increase systemic exposure for toxicology studies of investigative compounds and has a proven clinical safety record. In early development, captisol formulation can lead to a seamless transition from nonclinical safety to clinical trials. Captisol-enabled products are approved in more than 60 countries.

MULTIPLE ADMINISTRATION ROUTES ENSURE TARGETED DELIVERY
Captisol’s chemical structure was designed to create new products by improving solubility, stability, bioavailability, and dosing of active pharmaceutical ingredients. Routes of administration investigated include parenteral, oral, ophthalmic, nasal, topical, and inhalation products. Once inside the body, captisol releases the drug agent, which then travels to its target. The interaction between captisol and the agent is not permanent, and captisol is safely expressed from the kidneys.

PATENTED AND VALIDATED MANUFACTURING
Of all modified cyclodextrins, Captisol is an ingredient in the most approved products in the U.S. Manufactured under cGMP, at multiple locations, using a patented and validated all-aqueous process, annual manufacturing capacity is being increased to 500 MT. Captisol is supplied in ultra-low endotoxin, ultra-low bioburden, low-chloride forms in 100g, 1kg, 5kg and 20kg packages for R&D use. Commercial pack sizes include 1kg, 5kg, and 20kg, with the ability to fill metric-ton orders.
A 24-hour streaming program

For Health Care Professionals, By Health Care Professionals

Season 6 is streaming now!

www.medicalworldnews.com
For vendor contact information, see Company Directory section.
FACE MASKS, FOAM
Angstrom Supply
Blue Thunder Technologies
Cintas
Liberty Industries
Thomas Scientific
VWR Intl LLC

FACE MASKS, MOLDED
Angstrom Supply
Blue Thunder Technologies
Cintas
Liberty Industries
Thomas Scientific
VWR Intl LLC

FACE MASKS, REUSABLE
Allegro Industries
Angstrom Supply
Blue Thunder Technologies
Cintas
Hutches & Hutchins
ILC Dover
Liberty Industries
Ronco
Thomas Scientific
UniClean
VWR Intl LLC

FACILITY MONITORING SYSTEMS
FOCUS Labs
GE Sensing & Inspection Technologies
Hampshire Controls Corp
Hutches & Hutchins
Kanomax USA
Sensus
VWR Intl LLC

FILTERS, HEPA ULPA
AES Clean Technology
Air Purifiers
Air Science USA LLC
AirClean Systems
Applied Physics, Inc.
Atmos-Tech Industries
Blue Thunder Technologies
Clean Rooms Intl
CleanZones LLC
HEMCO Corporation
Isolation Systems
Plymouth NA

FANS
Allegro Industries
Clean Rooms Intl
CleanZones LLC
HEMCO Corporation
Isolation Systems
Plymouth NA

FLOOR FINISHES
Blue Thunder Technologies
DurAflex
Liberty Industries
Nicos Group
PlugIn Storage Systems /PSSI
Stonhard

FLOOR SEALANTS
Blue Thunder Technologies
DurAflex
Liberty Industries
PlugIn Storage Systems /PSSI
Stonhard

FLOOR STRIPPERS
Blue Thunder Technologies
Liberty Industries
PlugIn Storage Systems /PSSI
Stonhard

FLOOR WAX
Blue Thunder Technologies
PlugIn Storage Systems /PSSI

FOOD CLEANING EQUIPMENT
Hutches & Hutchins
Yamada America

FOOD RACKS
Advance Tabco
Angstrom Supply
Blue Thunder Technologies
CleanZones LLC
Hutches & Hutchins
Isolation Systems
Laminar Flow
Liberty Industries
LM Air Technology
Metro - InterMetro Industries
Corp
UniClean
VWR Intl LLC

GARMENT CLEANING EQUIPMENT
Hutches & Hutchins
Yamada America

GARMENT FABRIC
Angstrom Supply
Blue Thunder Technologies

GARMENT RACKS
Advance Tabco
Angstrom Supply
Blue Thunder Technologies
CleanZones LLC
Hutches & Hutchins
Isolation Systems
Laminar Flow
Liberty Industries
LM Air Technology
Metro - InterMetro Industries
Corp
VWR Intl LLC

GARMENT STORAGE BAGS
Angstrom Supply
VWR Intl LLC

GARMENT TESTING SERVICES
Mecmesin Corp

GARMENTS, DISPOSABLE
Angstrom Supply
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Steris Corp
Thomas Scientific
UniClean
VWR Intl LLC

GARMENTS, RENTAL
Angstrom Supply
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Steris Corp
UniClean
VWR Intl LLC

GARMENTS, REUSABLE
Angstrom Supply
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Steris Corp
Thomas Scientific
UniClean
VWR Intl LLC

GLOVES, DISPOSABLE
Angstrom Supply
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Steris Corp
UniClean

GLOVES, POWDERED
Angstrom Supply
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Stereos Corp
VWR Intl LLC

GLOVES, POWDER-FREE
Angstrom Supply
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Piercan USA
Qosina
 Ronco
Shoe Inn
Thomas Scientific
VWR Intl LLC

GLOVES, NITRILE
Angstrom Supply
Ansell Protective Products
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Qosina
Ronco
Shoe Inn
Thomas Scientific
VWR Intl LLC

GLOVES, NITRILE FOAM
Angstrom Supply
Ansell Protective Products
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Qosina
Ronco
Shoe Inn
Thomas Scientific
VWR Intl LLC

GLOVES, POLYURETHANE
Angstrom Supply
Ansell Protective Products
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Piercan USA
Qosina
Ronco
Shoe Inn
Wells Lamont Industrial

GLOVES, POLYESTER
Angstrom Supply
Ansell Protective Products
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Piercan USA
Qosina
Ronco
Shoe Inn
Wells Lamont Industrial

GLOVES, POWDER-FREE
Angstrom Supply
Ansell Protective Products
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Piercan USA
Qosina
Ronco
Shoe Inn
Thomas Scientific
VWR Intl LLC

GLOVES, POWDERED
Angstrom Supply
Ansell Protective Products
Blue Thunder Technologies
Cintas
Hutches & Hutchins
Liberty Industries
Piercan USA
For vendor contact information, see Company Directory section.

Liberty Industries
Thomas Scientific
Veltek Assocs
VWR Intl LLC
Werner Mathis USA

PAPER, COPIER

Veltek Assocs
VWR Intl LLC

PAPER, GRAPH

Blue Thunder Technologies
Connecticut Clean Room Corp
Liberty Industries
Veltek Assocs
VWR Intl LLC

PAPER, RECORDER

Blue Thunder Technologies
Cartex
Connecticut Clean Room Corp
Liberty Industries
Palmer Wahl Instruments
VWR Intl LLC

PAPER, WRITING

Blue Thunder Technologies
Connecticut Clean Room Corp
Cartex
ITW Texwipe
Liberty Industries
Veltek Assocs
VWR Intl LLC

PARTICLE COUNTERS, AIR AND GAS

Angstrom Supply
Biolinx
Blue Thunder Technologies
Equipment Net
Hutchins & Hutchins
Liberty Industries
optek-Danulat
Particle Measuring Systems
R. Kraft
Veltek Assocs
VWR Intl LLC

Xitrix North America, LLC
Yokogawa Fluid Imaging Technologies

PARTICLE COUNTERS, LIQUID

Blue Thunder Technologies
Connecticut Clean Room Corp
Liberty Industries
Veltek Assocs
VWR Intl LLC

Yokogawa Fluid Imaging Technologies

PARTICLE SIZE CLASSIFIERS

Blue Thunder Technologies
Federal Equipment Co.
Glen Mills
Horikawa Micron Powder Systems
Micromeritics
Sturtevant
VWR Intl LLC
Yokogawa Fluid Imaging Technologies

PASS-THROUGHS

AES Clean Technology
Atmos-Tech Industries
Baker Co.
BIOQUELL
Central Research Labs (CRL)
Clean Rooms Intl
CleanZones LLC
Connecticut Clean Room Corp
F.P.S. Food and Pharma Systems
Hutchins & Hutchins
Isolation Systems
Kemutec
Liberty Industries
LM Air Technology
Powers Scientific
VWR Intl LLC

PENS

Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Hutchins & Hutchins
Liberty Industries
Thomas Scientific
Veltek Assocs
VWR Intl LLC

PIPING

Asahi/America
GMP Systems
United Industries

PIPING SUPPORTS

GMP Systems

POWER SUPPLIES

Metro - InterMetro Industries Corp
MKS Instruments
Thomas Scientific
VWR Intl LLC

PREFABRICATED ROOMS

AES Clean Technology
Atmos-Tech Industries
AWS Bio-Pharma Technologies
Clean Rooms Intl
CleanZones LLC
FabOhio
G-CON Mfg
Harris Environmental Systems
Hutchins & Hutchins
Isolation Systems
Liberty Industries
LM Air Technology
Pall Corp
R. Kraft
VWR Intl LLC

PREFILTERS

AirClean Systems

PRESSURE GAUGES

Ashcroft
CleanZones LLC
First Sensor
GE Sensing & Inspection Technologies

GMP Systems
Integrated Gas Services
Isolation Systems
MKS Instruments
Posina
Siemens
Spirax Sarco
Thomas Scientific
Vietran
WIKA Instrument Corp

PRINTED FORMS

Connecticut Clean Room Corp
Liberty Industries
Veltek Assocs
VWR Intl LLC

PRINTING

Connecticut Clean Room Corp
Greydon
Matthews Intl Corp
Veltek Assocs

PUMPS

Fluid Metering
Fristam Pumps USA

Follow us

twitter.com/PharmTechGroup

linkedin.com/company/pharmaceutical-technology

Get the latest news, research, and trends in the pharmaceutical industry delivered straight to your inbox by signing up.

pharmtech.com
For vendor contact information, see Company Directory section.

GMP Systems
GoThroat Pumps
Goulds Pumps
Intelex
IVEK Corp
Omega Engineering
Thomas Scientific
Van Veen Pump & Equipment Corp
VWR Intl LLC
Yamada America

RECORDERS, TEMPERATURE AND HUMIDITY
Carel USA LLC
Carland
Honeywell
Liberty Industries
Omega Engineering
Palmer Instruments
Rotronic
Sensitex
Siemens
Testo
Thomas Scientific
VWR Intl LLC

REFRIGERATORS
Powers Scientific
Thomas Scientific
VWR Intl LLC

RETROFIT SERVICES
3V TECH USA
Advanced Tec
AWS Bio-Pharma Technologies
Clean RoomsIntl
IMA S.p.A.

ROBOTS
ATS Automation
Clean Automation
Siemens
Staubli
YNG

ROOMS, PORTABLE/ SOFTWALL
Advance Tec
AES Clean Technology
AWS Bio-Pharma Technologies
Baker Co
Clean Rooms Intl
CleanZones LLC
Connecticut Clean Room Corp
Cytiva
FabOhio
G-COM MFG
HEMCO Corporation
Hutchins & Hutchins
ILC Dover
Isolation Systems
Laminar Flow
Liberty Industries
LM Air Technology
R. Kraft
Ultratune Technology
VWR Intl LLC

SAFETY CABINETS
Baker Co
Flow Sciences
HEMCO Corporation
Hutchins & Hutchins
Isolation Systems
Janitor
Justrite
Kewaunee Scientific Corp
LM Air Technology
Thomas Scientific
VWR Intl LLC

SAFETY ENGINEERING SERVICES
Dräger
pixon engineering AG
Siemens

SEALANTS
Isolation Systems
Thomas Scientific
VWR Intl LLC

SECURITY SYSTEMS
CustomVault
Siemens

SHELVES
Advance Tabco
Akro-Mils
Connecticut Clean Room Corp
Isolation Systems
Liberty Industries
Omega Engineering
Palmer Instruments
Rotronic
Sensitex
Siemens
Testo
Thomas Scientific
VWR Intl LLC

SHOES
Blue Thunder Technologies
Liberty Industries
Nicos Group
VWR Intl LLC

SHOES, BLUE THUNDER TECHNOLOGIES
Liberty Industries
Nicos Group
VWR Intl LLC

SHOES, SAFETY ENGINEERING
Kewaunee Scientific Corp
Jamco
Isolation Systems
HEMCO Corporation
Flow Sciences

SILENE PROTECTORS, DISPOSABLE
Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Hutchins & Hutchins
Liberty Industries

SILENE PROTECTORS, REUSABLE
Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Hutchins & Hutchins
ISO Tech Design
Liberty Industries
Qosina
Schweitzer-Mauduit Intl
Steris Corp
Veiltex Assocs
VWR Intl LLC

SILENE PROTECTORS, STERILE
Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Hutchins & Hutchins
Steris Corp
Veiltex Assocs
VWR Intl LLC

SMOCKS, DISPOSABLE
Angstrom Supply
Blue Thunder Technologies
Cintas
Connecticut Clean Room Corp
Hutchins & Hutchins
Liberty Industries
Steris Corp
Qosina
Sterigenics
Thomas Scientific
Veiltex Assocs

SMOCKS, STERILE
Angstrom Supply
Blue Thunder Technologies
Cintas
Connecticut Clean Room Corp
Hutchins & Hutchins
Liberty Industries
Steris Corp
Sterigenics
Veiltex Assocs

SMOKE DETECTORS
Thomas Scientific
VWR Intl LLC

SMOKE GUNS
Degree Controls
Liberty Industries

SMOKE STICKS
Degree Controls
Liberty Industries

SPILL-CONTROL AGENTS
Blue Thunder Technologies
Hutchins & Hutchins

SPONGES
Angstrom Supply
Blue Thunder Technologies
Cintas
Connecticut Clean Room Corp
Liberty Industries
Perflex Corp
Qosina
Steris Corp
Thomas Scientific
Veiltex Assocs
VWR Intl LLC

SPRINKLER SYSTEMS
Flexhead Industries

SQUEEGEES
Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Hutchins & Hutchins
Liberty Industries
Steris Corp
Veiltex Assocs
VWR Intl LLC

STEAM GENERATORS
AWS Bio-Pharma Technologies
Getinge USA
Isolation Systems
Liberty Industries
Porex Technology
Qosina
Sonic Packaging Industries
Thomas Scientific
VWR Intl LLC

STOPES, BINS
Akro-Mils
Blue Thunder Technologies
Hurst Corp
Hutchins & Hutchins
ISO Tech Design
Isolation Systems
Liberty Industries
Listo Int Corp
Metro - InterMetro Industries Corp
Molded Fiber Glass Tray Co
Remcon Plastics
Snyder Industries
Thomas Processing
Thomas Scientific
VWR Intl LLC

STOPES, FOAM
Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Contec
FG Cleanwipe
Hutchins & Hutchins
ITW Texwipe
Liberty Industries
Porex Filtration group
Qosina
Sonic Packaging Industries
Thomas Scientific
VWR Intl LLC

STOPES, SYNTHETIC FIBER
Angstrom Supply
BD Diagnostics
Blue Thunder Technologies
Connecticut Clean Room Corp
Contec
FG Cleanwipe
Hutchins & Hutchins
ITW Texwipe
Liberty Industries
Porex Filtration group
Qosina
Sonic Packaging Industries
Thomas Scientific
VWR Intl LLC

STORAGE TANKS
Isolation Systems
Niles Steel Tank
Notch Mechanical Constructors
Remcon Plastics
Snyder Industries
VWR Intl LLC

SWABS, COTTON
Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Contec
FG Cleanwipe
Hutchins & Hutchins
ITW Texwipe
Liberty Industries
Porex Filtration group
Qosina
Sonic Packaging Industries
Thomas Scientific
VWR Intl LLC

SWABS, FOAM
Angstrom Supply
Blue Thunder Technologies
Connecticut Clean Room Corp
Contec
FG Cleanwipe
Hutchins & Hutchins
ITW Texwipe
Liberty Industries
Porex Filtration group
Qosina
Sonic Packaging Industries
Thomas Scientific
VWR Intl LLC

TABLES
Advance Tabco
Angstrom Supply
Blue Thunder Technologies
Clean Rooms Intl
Connecticut Clean Room Corp
Hutchins & Hutchins
Isolation Systems
Laminar Flow
Liberty Industries

See listings online at PharmTechBuyersResource.com
<table>
<thead>
<tr>
<th>Category</th>
<th>Brands/Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLETOPS</td>
<td>Advance Tabco, Angstrom Supply, Blue Thunder Technologies, Clean Rooms Intl, IKA Works, Liberty Industries, Omega Engineering, Palomar, Tamper Scientific, VWR Intl LLC</td>
</tr>
<tr>
<td>THERMOMETERS</td>
<td>Alpha Technologies, E Instruments Intl, IKA Works, Liberty Industries, Marathon Products, Omega Engineering, Palmner Walh Instruments, Teledyne, Thomas Scientific, VWR Intl LLC, Wika Instrument Corp</td>
</tr>
<tr>
<td>TIMERS</td>
<td>ISO Tech Design, Thomas Scientific, VWR Intl LLC</td>
</tr>
<tr>
<td>TOOLS, CLEANROOM</td>
<td>AdvanceTAC, Blue Thunder Technologies, Epsilon, Fette Compacoting America, ITW Texwipe, Liberty Industries, Perfx Corp, Sterile Tool, VWR Intl LLC</td>
</tr>
<tr>
<td>TRAINING MATERIALS</td>
<td>Angstrom Supply, Cleanroom Mgmt Assoc, Ecolabs, Fette Compacoting America, ITW Texwipe, Liberty Industries, Micron Video Intl</td>
</tr>
<tr>
<td>TRAINING SERVICES</td>
<td>Cleanroom Mgmt Assoc, Distek, Element, Fette Compacoting America, Focus Labs, IsoTech Design, Particle Measuring Systems, R. Kraft, Siemens, Veltek Assoc, Sterile Corp</td>
</tr>
<tr>
<td>TRANSDUCERS</td>
<td>Adenics, First Sensor, GE Sensing &amp; Inspection Technologies, MKS Instruments, Omega Engineering, RJM Sales, Viatran</td>
</tr>
<tr>
<td>UNDERGARMENTS</td>
<td>Blue Thunder Technologies, Sterile Corp</td>
</tr>
<tr>
<td>VACUUM CLEANERS</td>
<td>Blue Thunder Technologies, Connecticut Clean Room Corp, Dycem Corp, Liberty Industries, MEECO, Nilfisk, Perkins, Spencer Turbine Co</td>
</tr>
<tr>
<td>VACUUM CLEANERS,</td>
<td>FabOhio, TRAX Industrial Products Corp</td>
</tr>
<tr>
<td>VACUUM CONTROL</td>
<td>Blue Thunder Technologies, Connecticut Clean Room Corp, Dycem Corp, Liberty Industries, MEECO, Nilfisk, Perkins, Spencer Turbine Co, VAC-U-Max, VWR Intl LLC</td>
</tr>
<tr>
<td>VACUUM TOOLKITS</td>
<td>Liberty Industries, MEECO, Spencer Turbine Co</td>
</tr>
<tr>
<td>VALVES</td>
<td>Ashai/Amersham, Dikma, Kometec, METO Systems, MKS Instruments, Parker, Plast-O-Matic Valves, Qosina, Remcon Plastics, Spencer Turbine Co, Spirax Sarco, Strauman Valves, VAC-U-Max</td>
</tr>
<tr>
<td>VIBRATION CONTROL</td>
<td>Fabrekia Int'l, Isolation Systems, Ludeca, Siemens</td>
</tr>
<tr>
<td>WALL COATINGS/SEALERS</td>
<td>Blue Thunder Technologies, Duraflex, Nicos Group</td>
</tr>
<tr>
<td>WALL PANELS, POLYESTER</td>
<td>Nicos Group, TRAX Industrial Products Corp</td>
</tr>
<tr>
<td>WALL PANELS, POWDER-COATED</td>
<td>Blue Thunder Technologies, Connecticut Clean Room Corp, Nicos Group</td>
</tr>
<tr>
<td>WALL PANELS, STAINLESS STEEL</td>
<td>AES Clean Technology, Atmos-Tech Industries, HEMCO Corporation, Isolation Systems, Laminar Flow, LM Air Technology, Nicos Group</td>
</tr>
<tr>
<td>WALL PANELS, URETHANE</td>
<td>FabOhio, Nicos Group, TRAX Industrial Products Corp</td>
</tr>
<tr>
<td>WATER ANALYZERS</td>
<td>Honeywell, optek-Danulat, Siemens, VWR Intl LLC</td>
</tr>
<tr>
<td>WATER PROCESS</td>
<td>Isolation Systems, LM Air Technology, Process Technology, Veltek Assoc, WVR Intl LLC</td>
</tr>
<tr>
<td>WIPERS, CELLULOSE</td>
<td>Angstrom Supply, Blue Thunder Technologies, Connecticut Clean Room Corp, Contec, Duraflex, Nicos Group</td>
</tr>
<tr>
<td>WIPERS, COTTON</td>
<td>Angstrom Supply, Blue Thunder Technologies, Connecticut Clean Room Corp, Nicos Group</td>
</tr>
<tr>
<td>WIPERS, NYLON</td>
<td>Angstrom Supply, Blue Thunder Technologies, Connecticut Clean Room Corp, Contec, Duraflex, Nicos Group</td>
</tr>
<tr>
<td>WIPERS, POLYSTYRENE</td>
<td>Angstrom Supply, Blue Thunder Technologies, Connecticut Clean Room Corp, Contec, Duraflex, Nicos Group</td>
</tr>
<tr>
<td>WRAPAROUND COATS, DISPOSABLE</td>
<td>Angstrom Supply, Blue Thunder Technologies, Connecticut Clean Room Corp, Contec, Duraflex, Nicos Group</td>
</tr>
<tr>
<td>WRAPAROUND COATS, REUSABLE</td>
<td>Angstrom Supply, Blue Thunder Technologies, Connecticut Clean Room Corp, Contec, Duraflex, Nicos Group</td>
</tr>
<tr>
<td>WRAPAROUND COATS, STERILE</td>
<td>Angstrom Supply, Blue Thunder Technologies, Connecticut Clean Room Corp, Contec, Duraflex, Nicos Group</td>
</tr>
<tr>
<td>WRITING SUPPLIES</td>
<td>Blue Thunder Technologies, Connecticut Clean Room Corp, Contec, ITW Texwip, Liberty Industries, Nicos Group, Veltek Assoc, VWR Intl LLC</td>
</tr>
<tr>
<td>Company</td>
<td>Category</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Thomas Packaging LLC</td>
<td>Zed Industries</td>
</tr>
<tr>
<td>ADAPTORS</td>
<td>Cadence Science</td>
</tr>
<tr>
<td>ADHESIVE-FASTENING SYSTEMS, PRESSURE-SENSITIVE</td>
<td>Adhesives Research</td>
</tr>
<tr>
<td>ADHESIVES</td>
<td>Research</td>
</tr>
<tr>
<td>ADHESIVES, SILICONE</td>
<td>Adhesive HealthCare Packaging</td>
</tr>
<tr>
<td>BAGS, BAG-IN-BOX</td>
<td>Black Forest Container Systems</td>
</tr>
<tr>
<td>BANDERS</td>
<td>HealthStar</td>
</tr>
<tr>
<td>BANDERS</td>
<td>HealthStar</td>
</tr>
<tr>
<td>BOTTLE CLOSING EQUIPMENT</td>
<td>Auto-Mate Technologies LLC</td>
</tr>
</tbody>
</table>
### BOTTLE FEEDING EQUIPMENT
- ATS Automation
- Auto-Mate Technologies LLC
- Bausch+Stroebel Machine Co
- Capmatic Ltd
- Cozzoli Machine Co
- Federal Equipment Co
- Filamatic
- Garvey Corp
- groninger USA L.L.C
- Heartmann Packaging Systems

### BOTTLE PRINTING EQUIPMENT
- Bausch+Stroebel Machine Co
- Clear Automation
- Control Micro Systems
- Dalemark Industries
- Federal Equipment Co
- FP Developments
- Intellitech
- Per-Fil Industries
- Oyster Bay Pump Works
- OPTIMA pharma GmbH
- OBEK Corp
- Omnicode Inc
- Per-Fil Industries
- Thomas Packaging LLC
- T Shank Co

### BOTTLE PRINTING/CODING EQUIPMENT
- Bausch+Stroebel Machine Co
- Clear Automation
- Control Micro Systems
- Dalemark Industries
- FedDev Co

### BOTTLE UNSCRAMBLER
- ATS Automation
- Bausch+Stroebel Machine Co
- Clear Automation
- Control Micro Systems

### BOTTLE CLEANING EQUIPMENT
- Bausch+Stroebel Machine Co
- Intellitech
- Optima Machinery Corp
- New England Machinery

### BOTTLE CLEANSER
- Bausch+Stroebel Machine Co
- Clear Automation
- Control Micro Systems
- Dalemark Industries
- FedDev Co

### BOTTLE FEEDING EQUIPMENT
- ATS Automation
- Auto-Mate Technologies LLC
- Bausch+Stroebel Machine Co
- Capmatic Ltd
- Cozzoli Machine Co
- Federal Equipment Co
- Filamatic
- Garvey Corp
- groninger USA L.L.C
- Heartmann Packaging Systems

### BOTTLE PRINTING EQUIPMENT
- Bausch+Stroebel Machine Co
- Clear Automation
- Control Micro Systems
- Dalemark Industries
- Federal Equipment Co
- FP Developments
- Intellitech
- Per-Fil Industries
- Oyster Bay Pump Works
- OPTIMA pharma GmbH
- OBEK Corp
- Omnicode Inc
- Per-Fil Industries
- Thomas Packaging LLC
- T Shank Co

### BOTTLE PRINTING/CODING EQUIPMENT
- Bausch+Stroebel Machine Co
- Clear Automation
- Control Micro Systems
- Dalemark Industries
- FedDev Co

### BOTTLE UNSCRAMBLER
- ATS Automation
- Bausch+Stroebel Machine Co
- Clear Automation
- Control Micro Systems

### BOTTLE CLEANING EQUIPMENT
- Bausch+Stroebel Machine Co
- Intellitech
- Optima Machinery Corp
- New England Machinery

### BOTTLE CLEANSER
- Bausch+Stroebel Machine Co
- Intellitech
- Optima Machinery Corp
- New England Machinery

---

For vendor contact information, see Company Directory section.
READY TO USE (RTU)
PHARMACEUTICAL VIALS, STOPPERS,
SEALS, AND OTHER PRODUCTS

Our PRODUCTS

- RTU Vials, empty
  (Stainless steel trays, Polypropylene trays)

- RTU Stoppers and Seals
  (Flexible Packaging And Customizable Pack quantities)

- RTU Vials, Assembled
  (Depyrogenated & Sterile Vials Assembled With Stopper And Seal)

Our SERVICES

- Terminal Moist Heat Steam Sterilization
  (Finished Drug Products; Vials, Syringes, Bottles, Bags)

- Dry Heat Sterilization

- Depyrogenation

- Water For Injection (WFI) Rinsing
For vendor contact information, see Company Directory section.
Industry Leading Process Equipment Protection

Benefits

- Integral 360° sight glass, fully drainable design, and unique basket design for easy particulate removal and non-scratching of internals.
- A standard 20 µm EP finish and full pharmaceutical documentation package, integration into your process is easy.

Applications

- CIP Supply and Return Lines
- Utility Supply Lines
- Specific Equipment Protection
- Buffer, Media Solution, Process Lines, Initial Start-up Flushing


For vendor contact information, see Company Directory section.
ESCO Technologies
GE Sensing & Inspection Technologies
Hannah Physics Controls Corp
ICONICS
Industrial Technology Systems Ltd
InfinityQS Intl
Natoil Engineering
NNE Pharmaplan
Perkin Elmer Corp
RCM Technologies
Sensitrac
Siemens
APPLICATION INTEGRATION
Applied Control Engineering
Arch-Tech Systems
Automated Control Concepts
CMICINO Software
Clarkston Consulting
Complete Inspection Systems
Dacon
enLabel Global Services
ESCO Technologies
ETQ
GE Sensing & Inspection Technologies
I Holland Ltd
ICONICS
Industrial Technology Systems Ltd
InfinityQS Intl
IOVIA
JAF Consulting
LabWare
LT Industries
Mar-Kov Computer Systems
MasterControl
Metromax USA
Metro-Tech
Natoil Engineering
NNE Pharmaplan
Particle Measuring Systems
PCI: Pharmaceutical Calibrations And Instrumentation
Perkin Elmer Corp
PharmaDirections
PrimeSys
Prime Technologies
ProcessPro Software
Qtherma
QualityHub
R. Kraft
RCM Technologies
Rees Scientific
Sani-Matic, Inc.
Senstech
Siemens
Sparta Systems
Sensors
Waters Corp
WIPOTEC-OCS
APPLICATION SUPPORT
Applied Control Engineering
Arch-Tech Systems
Automated Control Concepts
CMICINO Software
Clarkston Consulting
Complete Inspection Systems
Dacon
enLabel Global Services
ESCO Technologies
ETQ
GE Sensing & Inspection Technologies
I Holland Ltd
ICONICS
Industrial Technology Systems Ltd
InfinityQS Intl
IOVIA
JAF Consulting
LabWare
LT Industries
Mar-Kov Computer Systems
MasterControl
Metromax USA
Metro-Tech
Natoil Engineering
NNE Pharmaplan
Particle Measuring Systems
PCI: Pharmaceutical Calibrations And Instrumentation
Perkin Elmer Corp
PharmaDirections
PrimeSys
Prime Technologies
ProcessPro Software
Qtherma
QualityHub
R. Kraft
RCM Technologies
Rees Scientific
Sani-Matic, Inc.
Senstech
Siemens
Sparta Systems
Sensors
Waters Corp
WIPOTEC-OCS
ASSET OPTIMIZATION
Atron
Automated Control Concepts
Beamex
Blue Mountain Quality Resources
CMICINO Software
Clarkston Consulting
Court Square Group
cSols
CyberMetrics Corp
Emerson Automation Solutions
ICONICS
Industrial Technology Systems Ltd
NNE Pharmaplan
PCI: Pharmaceutical Calibrations And Instrumentation
Perkin Elmer Corp
RCM Technologies
Siemens
AUTOMATIC ID/BAR CODING
Applied Control Engineering
Aspect Automation
Atlantic Scale Co
Automated Control Concepts
CMICINO Software
Complete Inspection Systems
Court Square Group
tenLabel Global Services
FSI Technologies
Industrial Technology Systems Ltd
Mar-Kov Computer Systems
Matthews Intl Corp
NNE Pharmaplan
Optical Image Technology
Perkin Elmer
ProcessPro Software
RCM Technologies
SSE Technologies
Werus IT Solutions
America
WIPOTEC-OCS
AUTOMATION SYSTEMS
Applied Control Engineering
Aspect Automation
Atlantic Scale Co
Automated Control Concepts
CMICINO Software
Clear Automation
Complete Inspection Systems
tenLabel Global Services
Festo Corp
FP Developments
FSI Technologies
GEA Process Engineering
Getinge USA
ICONICS
Industrial Technology Systems Ltd
InfinityQS Intl
IPS-Integrated Project Services LLC
MasterControl
Mpac Langen
NNE Pharmaplan
Perkin Elmer
Prior Scientific
ProcessPro Software
RCM Technologies
SSE Technologies
Sani-Matic, Inc.
Siemens
Siemens
Sensors
Sparta Systems
SPEC Process Engineering & Construction
Spirioflow Systems
Thermo Fisher Scientific
AUTOMATION SYSTEMS, DESIGN AND ENGINEERING
Applied Control Engineering
Aspect Automation
Automated Control Concepts
CMICINO Software
Clear Automation
EAM
Festo Corp
FP Developments
FSI Technologies
GEA Process Engineering
Getinge USA
ICONICS
Industrial Technology Systems Ltd
IPS-Integrated Project Services LLC
Mpac Langen
NNE Pharmaplan
Perkin Elmer
Prior Scientific
ProcessPro Software
RCM Technologies
SSE Technologies
Sani-Matic, Inc.
Siemens
Sensors
Sparta Systems
SPEC Process Engineering & Construction
Spirioflow Systems
Thermo Fisher Scientific
BUSINESS SYSTEMS CONNECTIVITY
Applied Control Engineering
Automated Control Concepts
CMICINO Software
Court Square Group
tenLabel Global Services
NNE Pharmaplan
ProcessPro Software
RCM Technologies
ROSS Mixers (Charles Ross & Son Company)
Siemens
Spirioflow Systems
ValiMation
Werus IT Solutions
America
WIPOTEC-OCS
CALIBRATION MANAGEMENT DATABASES
AOI
Atlantic Scale Co
Beamez
Blue Mountain Quality Resources
CMICINO Software
Cour Square Group
CyberMetrics Corp
ENV Services
InfinityQS Intl
LabWare
NNE Pharmaplan
PCI: Pharmaceutical Calibrations And Instrumentation
Prime Technologies
RCM Technologies
Siemens
CALIBRATION SERVICES
Alcamri
Artel
ATAGO USA
Atlantic Scale Co
Court Square Group
ENV Services
Esco Calibration Lab
Fette Compacting
America
GE Sensing & Inspection Technologies
Hosokawa Micron
Powder Systems
InfinityQS Intl
Kanomax USA
Konica Minolta Sensing Americas
Memec-In Corp
Metro-Tech
Natoil Engineering
Particle Measuring Systems
PCI: Pharmaceutical Calibrations And Instrumentation
Perkin Elmer Corp
Sinem
SMA
Sotax Corp
Testing Machines
Testo
Thomas Scientific
Troemner
CHANGE CONTROL PROCEDURES
CMICINO Software
Court Square Group
cSols
enLabel Global Services
ETQ
Industrial Technology Systems Ltd
JAF Consulting
MasterControl
NNE Pharmaplan
PharmaSys
Qtherma
QualityHub
RCM Technologies
Siemens
Sparta Systems
Thomas Scientific
CHEMICAL STRUCTURE MODELING
ChiroSolve
CHROMATOGRAPHIC DATA SYSTEMS (IT)
Agilent Technologies
CMICINO Software
Clear Automation
enLabel Global Services
EAM
NET Pro Software
ProcessPro Software
RCM Technologies
ROSS Mixers (Charles Ross & Son Company)
Siemens
Spirioflow Systems
ValiMation
Werus IT Solutions
America
WIPOTEC-OCS
COMPANY
Aizon
Applied Control Engineering
ATAGO USA
Automated Control Concepts
BinMaster
Bridge Associates Intl
CustomVault
E Instruments Intl
ENV Services
PHONE
1-628-243-2513
PAGE
83
All companies listed here are advertisers in this issue.
Improve Yields by Up to 10% and Give Your Customers More Transparency

- Predict yield and anomalies earlier with powerful AI tools, ready for use
- Make root cause analyses and batch comparisons smarter and faster
- Weave a data fabric across multiple sites with GxP-compliance
- Achieve Continuous Process Verification (CPV) for adaptive control and real-time release

Learn more aizon.ai
For vendor contact information, see Company Directory section.

Court Square Group
CustomVault
Festo Corp
FILTERTEC
GE Sensing & Inspection Technologies
ICONICS
Industrial Technology Systems Ltd
Krohne USA
Kistler Morse
Lenox Instrument Co
LT Industries
Ludwika MARKEN
Mettrer-Toledo
NNE Pharmaplan
Particle Measuring Systems
RCM Technologies
Sensotech
Thomas Scientific
Werum IT Solutions America
WIPOTEC-OCS

NETWORKING
Applied Control Engineering
Automated Control Concepts
Court Square Group
ICONICS
NNE Pharmaplan
Perigon Intl
RCM Technologies
Werum IT Solutions America

ON-LINE SERVICES
Academy Savant
Court Square Group
ETC FILTERTEC
ICONICS
InfinityQS Intl
RCM Technologies
Richman Chemical
Werum IT Solutions America

OUTPUT DEVICES
NNE Pharmaplan

Pharmacy Technology

Sign up for our eNewsletters
Get the latest news, research, and trends in the pharmaceutical industry delivered straight to your inbox by signing up.

Pharma Knowledge Resources
Build your pharma development and manufacturing knowledge base with the latest whitepapers, application notes, posters, and other educational resources from bio/pharma industry suppliers.

ePT
Critical information on industry trends, new technologies, the regulatory arena, recent contract awards, company mergers and acquisitions, and news of interest to a highly desired community of pharmaceutical development and manufacturing professionals.

First Look
Previews the latest issue of Pharmaceutical Technology with links to online content and the digital edition of the magazine.

Equipment & Processing Report
Focuses on pharmaceutical manufacturing process and technology, providing manufacturing news, related regulatory issues, and current trends.

In the Lab
Articles and timely insights on the vital research and quality functions performed in bio/pharmaceutical laboratories.

Subscribe at PharmTech.com
For vendor contact information, see Company Directory section.

Siemens
Sparta Systems
SPEX Process Engineering & Construction
Testo
Thermo Fisher Scientific
Tunnell Consulting
Viatran
Werum IT Solutions America

PROCESS VALIDATION
BiOQUELL
CIMINFO Software
Clarkston Consulting
Court Square Group
CSolS
GE Sensing & Inspection Technologies
GEA Process Engineering
GETING USA
ICONICS
Industrial Technology Systems Ltd
InfinityQS Int'l
Intellitech
Isolation Systems
JAF Consulting
Industrial Medico
Mikart
NNE Pharmaplan
OPTIMA Pharma GmbH
PharmaSys
ProcessPro Software
Qpharma
QualityHub
RCM Technologies
Ruland Engineering & Consulting GmbH
Siemens
Sparta Systems
Stat-Ease
TM USA
Tunnell Consulting
ValiMation
Werum IT Solutions America

PROGRAMMABLE Logic Controllers
Applied Control Engineering
Automatic Control Concepts
Chromalog
CIMINFO Software
Deacom
Festo Corp
GEA Process Engineering
GEMVA Valves
ICONICS
Industrial Technology Systems Ltd
IPS-Integrated Project Services LLC
Isolation Systems
JAF Consulting
NNE Pharmaplan
Optical Image Technology
PCCI: Pharmaceutical Calibrations And Instrumentation
Perigon Int'l
Qpharma
Sparta Systems
Spec Process Engineering & Construction
Spiroflow Systems

PROJECT MANAGEMENT
Applied Control Engineering
Bruker
Ce3
ChiroSolve
CIMINFO Software
Clarkston Consulting
Court Square Group
CSolS
El Assoco
enLabel Global Services
GEA Process Engineering
GemVA Valves
ICONICS
Industrial Technology Systems Ltd
IPS-Integrated Project Services LLC
Isolation Systems
JAF Consulting
NNE Pharmaplan
Optical Image Technology
PCCI: Pharmaceutical Calibrations And Instrumentation
Perigon Int'l
Qpharma
QualityHub
R. Kraft
ROM Technologies
Richman Chemical

Ruland Engineering & Consulting GmbH
Siemens
SPEX Process Engineering & Construction
Tunnell Consulting
Werum IT Solutions America

QUALIFICATION STUDIES
Capaccio Environmental Engineering
Ce3
Court Square Group
DJA Global Pharmaceuticals
DOT Compliance
ETO
Industrial Technology Systems Ltd
InfinityQS Int'l
IPS-Integrated Project Services LLC
IOVIA
JAF Consulting
Konica Minolta Sensing Americas
MasterControl
mdConsultants
NNE Pharmaplan
Qpharma
QualityHub
R. Kraft
RCM Technologies
Siemens
Sparta Systems
SSE Technologies
Tunnell Consulting
ValiMation

QUALITY ASSURANCE
AUDITS
Capaccio Environmental Engineering
Ce3
Court Square Group
DJA Global Pharmaceuticals
DOT Compliance
ETO
Industrial Technology Systems Ltd
InfinityQS Int'l
IPS-Integrated Project Services LLC
IOVIA
JAF Consulting
Konica Minolta Sensing Americas
MasterControl
mdConsultants
NNE Pharmaplan
Qpharma
QualityHub
R. Kraft
RCM Technologies
Siemens
Sparta Systems
SSE Technologies
Tunnell Consulting
ValiMation

REGULATORY AND PART 11 RISK ASSESSMENT
Applied Control Engineering
Aris Global LLC
Bridge Associates Int'l
Capaccio Environmental Engineering
Ce3
CIMINFO Software
Clarkston Consulting
Court Square Group
CSolS
ICONICS
Industrial Technology Systems Ltd
IPS-Integrated Project Services LLC
JAF Consulting
MasterControl
mdConsultants
NNE Pharmaplan
PCCI: Pharmaceutical Calibrations And Instrumentation
PharmaSys
Qpharma
QualityHub
Ruland Engineering & Consulting GmbH
Siemens
ValiMation

SCADA
Automated Control Concepts
Emergo Automation Solutions
ICONICS
Viatran

SECURITY
Court Square Group
CustomVault
Emergo Automation Solutions
ETO
JAF Consulting
NNE Pharmaplan
RCM Technologies
Sensitech
Siemens

SENSORS
Applied Control Engineering
Ashcroft
BinMaster
Chromalog
Conax Technologies
Festo Corp
FSI Technologies
GE Sensing & Inspection Technologies
Hardy Process Solutions
Kiefer Morse
Krohne
MostTech Corp
NNE Pharmaplan
Omega Engineering
Perigon Int'l
Rees Scientific
Sensitech
Siemens
SMI
Thomas Scientific
XiliNTX North America, LLC

SMART SENSORS
Applied Control Engineering
Chromalog
DJA Corp
ETO
Festo Corp
FSI Technologies
Krohne
NNE Pharmaplan
Perigon Int'l
Rees Scientific
Sensitech
Siemens
SMI

SOFTWARE
Academy Savant
Activated Carbon Services
Azen
Applied Control Engineering
Aris Global LLC
Automated Control Concepts
Blue Mountain Quality Resources
ChiroSolve
CIMINFO Software
Climspace Worldwide
COSMOL
Court Square Group
CSolS
CyberMetrics Corp
Cytel
Deacom
DOT Compliance
enLabel Global Services
ETO
Honeywell
I Holland Ltd
ICONICS
IKA Works
Industrial Technology Systems Ltd
InfinityQS Int'l
International Centre for Diffraction Data
JAF Consulting
Krohne
Mar-Kov Computer Systems
NNE Pharmaplan
OPTIMA pharma GmbH
Ruland Engineering & Consulting GmbH
Siemens
Viatran

STATISTICAL
Analytical Scale Co
Azen
Applied Control Engineering
Aris Global LLC
Automated Control Concepts
Blue Mountain Quality Resources
ChiroSolve
CIMINFO Software
Climspace Worldwide
COSMOL
Court Square Group
CSolS
CyberMetrics Corp
Cytel
Deacom
DOT Compliance
enLabel Global Services
ETO
Honeywell
I Holland Ltd
ICONICS
IKA Works
Industrial Technology Systems Ltd
InfinityQS Int'l
International Centre for Diffraction Data
JAF Consulting
Krohne
Mar-Kov Computer Systems
NNE Pharmaplan
OPTIMA pharma GmbH
Ruland Engineering & Consulting GmbH
Siemens
Viatran

STRAIN ANALYSIS
Applied Control Engineering
Atlantic Scale Co
Bruker
Ce3
CIMINFO Software
Court Square Group
Cytel
ICONICS
InfinityQS Int'l
JAF Consulting
Krohne
Mar-Kov Computer Systems
NNE Pharmaplan
OPTIMA pharma GmbH
Ruland Engineering & Consulting GmbH
Siemens
Viatran

SUPPLY CHAIN MANAGEMENT
Automated Control Concepts
Capaccio Environmental Engineering
Cenduit LLC
CIMINFO Software
Clarkston Consulting
Court Square Group
CSolS
ICONICS
JAF Consulting
MasterControl
NNE Pharmaplan
Optical Image Technology
Richman Chemical
Sensitech
Siemens
Software
Sparta Systems
Tunnell Consulting
Werum IT Solutions America

WEB DATABASE TOOLS
Automated Control Concepts
Capaccio Environmental Engineering
CIMINFO Software
Court Square Group
ICONICS
JAF Consulting
Kiefer Morse
Optical Image Technology
ROM Technologies
Richman Chemical

WEB DEVELOPMENT SERVICES
Automated Control Concepts
Capaccio Environmental Engineering
CIMINFO Software
enLabel Global Services
ICONICS
JAF Consulting
Perigon Int'l
ROM Technologies
Viatran (Vormittag Associates)

WEB-BASED ARCHITECTURE
Applied Control Engineering
Automated Control Concepts
CIMINFO Software
enLabel Global Services
ICONICS
JAF Consulting
LabWare
Perigon Int'l
ROM Technologies
Sparta Systems
Werum IT Solutions America
OUTSOURCE services

For vendor contact information, see Company Directory section.

PharmTechBuyersResource.com

OUTSOURCE services

For vendor contact information, see Company Directory section.

PharmTechBuyersResource.com
THE CDMO INVESTED IN YOUR SUCCESS

As true collaborators and innovators, we are fully invested in helping customers achieve their goals. Our comprehensive R&D, analytical testing, and CDMO services are designed for flexibility, responsiveness, and speed. Deliver the safest, most efficacious large- and small-molecule therapies with Element by your side.

Making tomorrow safer than today

contact.us@element.com  element.com  US: +1 888 786 7555  Europe: +44 800 470 3541

Maria Vizcaino, Ph.D.  E&L Manager, Santa Fe Springs, CA
With over 35 years of experience in solving complex manufacturing problems, Societal™ CDMO, a bi-coastal US-based CDMO, offers formulation and analytical development, clinical trial manufacturing, labeling and distribution, commercial manufacturing, and packaging for a wide range of therapeutic dosage forms. We are focused on meeting our clients’ business objectives and providing quality drug products to the patients we ultimately serve.
For vendor contact information, see Company Directory section.
For vendor contact information, see Company Directory section.
Ascendia Pharma

- Formulation Development for Poorly Soluble Drugs
- cGMP Manufacture for Clinical Materials
- CR, Parenteral & Topical Dosage Forms

Delivering sophisticated formulations.

OUR TECHNOLOGIES

EmulSol
AmorSol
NanoSol

732-638-4028
bd@ascendiapharma.com
ascendiapharma.com
We’re the CDMO you’ve been searching for.

US-based • End-to-end services • All under one roof

- Sterile injectable, topical & oral (liquid) preparations
- Liquid or lyophilized products, aseptic or terminally sterilized
- Fill/finish capability of vials, bottles, syringes, cartridges, flexible IV bags
- Formulation & process development
- Small and large molecules, emulsions and suspensions, lipid nanoparticles
- cGMP analytical method development & validation
- cGMP clinical & commercial manufacturing

Start a conversation with August today — email cmartin@augustbio.com

www.augustbio.com
With a track record that spans over 25 years, Metrics Contract Services has enabled hundreds of customers to bring complex novel oral solid dose products to patients with confidence.

We are a science-led CDMO engineered around customers. Our scientists and expert operators are experienced professionals who act as an extension of your team to solve your most complex challenges. We specialize in small batch, novel OSD, from early phase development through to commercialization. All from our single campus facility in Greenville, North Carolina.

- Formulation development
- Clinical manufacturing
- Commercial manufacturing
- Analytical testing

Growing with our clients is important to us here. We continue to invest in our facilities to meet client needs. Meet Metrics Contract Services.

www.metricscontractservices.com
For vendor contact information, see Company Directory section.

PREFORMULATION SERVICES
AC Compacting LLC
Aenova
Alchem Labs
Almac Group
Ascendia
Avocem Analytical Services
Biolink Life Sciences
Cambrex
Catalent Pharma Solutions
Charles River
Chemical Labs
CMIC CMO USA
Coating Place
Corden Pharma
CoreRx
Cura
Dr Reddy’s Labs
Element
Foster Delivery Systems
Goodwin Biotechnology
Iuvo BioScience
KBI BioPharma
Labyrinth BioPharma
Lonza
Lonza Capsules & Health Ingredients
Lubrizol Life Science Health
Microvac Labs
Mikart
Novasep
Phase Analytical Life Sciences LLC
Pathenon
PharmaDx
Physiostat
Pion
ProCepT
Quality Chemical Labs
SanCilco & Co
SGS North America
SL Pharma Labs
Societal™ CDMO
SMI
Tedor Pharma
Vercuta
Xedev

PROCESS ANALYTICAL TECHNOLOGY
Almac Group
Alpha Analytical Labs
Alchem Labs
Ascendia
August Bioservices
BioAnalytical & Pharmaceutical Services
Biovation
Cambrex
Catalent Pharma Solutions
Charles River
Chiral Solutions
CMIC CMO USA
Coating Place
Corden Pharma
CoreRx
Cura
Dr Reddy’s Labs
Element
Foster Delivery Systems
Goodwin Biotechnology
Iuvo BioScience
KBI BioPharma
Labyrinth BioPharma
Lonza
Lonza Capsules & Health Ingredients
Lubrizol Life Science Health
Microvac Labs
Mikart
Novasep
Phase Analytical Life Sciences LLC
Pathenon
PharmaDx
Physiostat
Pion
ProCepT
Quality Chemical Labs
SanCilco & Co
SGS North America
SL Pharma Labs
Societal™ CDMO
SMI
Tedor Pharma
Vercuta
Xedev

PROCESS DEVELOPMENT/SCALE-UP SERVICES
AC Compacting LLC
Aemco
Agalac Bio-Assay
Ajinomoto Bio-Pharma Services
Alicam
Alchem Labs
Almac Group
Asychem
Ascendia

August Bioservices
Biolink Life Sciences
BioReliance
BioVex
Bora Pharmaceutical Laboratories
Cambrex
CapitaCanada
Catalent Pharma Solutions
Central Glass Germany
Chartwell
ChemPacific Corp
ChemPro Group
Chiral Quest
CMIC CMO USA
Coating Place
Corden Pharma
CoreRx
Cura
Cygnus Technologies
Cytiva
De Dietrich Process Systems
Dr Reddy’s Labs
DSM Pharmaceuticals Products
Element
Evolink Corp
Formulated Solutions
Foster Delivery Systems
Fujifilm Diosynth Biotech USA
Glatt Pharmaceutical Services
Goodwin Biotechnology
Importfab
IPS-Integrated Project
Services LLC
IQVIA
Janke & Johansen
Jubilant HollisterStier
KBI BioPharma
Labcorp Drug Development
Labyrinth BioPharma
LGM
Lonza
Lubrizol Life Science Health
Lyophilization Technology
Metrics Contract Services
MicroThermics
MilliporeSigma
Mission Pharmacal
NNE Pharmaplan
Novasep
NUCON Intl
O’Neal
PAREXEL Consulting
Patheon
PCI Pharma Services
Perigon Intl
Pfizer CentreOne
Pharma Tech Industries
PharmaDirections
Pharmassure
PharmaSolv LLC
Pli
Pregab Labs
Quality Chemical Labs
Regis Technologies
Rentschler Biopharma SE
Richman Chemical
Ruland Engineering & Consulting GmbH
Sancilio & Co
SL Pharma Labs
Societal™ CDMO
SMI
SXP Flow
Tedor Pharma
Thar Process
TrLink BioTechnologies
Tunnell Consulting
Univar Solutions
University of Iowa
Pharmaceuticals
UPM Pharmaceuticals
Vectura
Vetter Pharma Intl
Wavelengt Pharmaceuticals
Wockhardt Contract Services
WuXi AppTec
Xedev

PROFESSIONAL SERVICES
AC Compacting LLC
Aemco
Agalac Bio-Assay
Ajinomoto Bio-Pharma Services
Alicam
Alchem Labs
Almac Group
Asychem
Ascendia

August Bioservices
Biolink Life Sciences
BioReliance
BioVex
Bora Pharmaceutical Laboratories
Cambrex
CapitaCanada
Catalent Pharma Solutions
Central Glass Germany
Chartwell
ChemPacific Corp
ChemPro Group
Chiral Quest
CMIC CMO USA
Coating Place
Corden Pharma
CoreRx
Cura
Cygnus Technologies
Cytiva
De Dietrich Process Systems
Dr Reddy’s Labs
DSM Pharmaceuticals Products
Element
Evolink Corp
Formulated Solutions
Foster Delivery Systems
Fujifilm Diosynth Biotech USA
Glatt Pharmaceutical Services
Goodwin Biotechnology
Importfab
IPS-Integrated Project
Services LLC
IQVIA
Janke & Johansen
Jubilant HollisterStier
KBI BioPharma
Labcorp Drug Development
Labyrinth BioPharma
LGM
Lonza
Lubrizol Life Science Health
Lyophilization Technology
Metrics Contract Services
MicroThermics
MilliporeSigma
Mission Pharmacal
NNE Pharmaplan
Novasep
NUCON Intl
O’Neal
PAREXEL Consulting
Patheon
PCI Pharma Services
Perigon Intl
Pfizer CentreOne
Pharma Tech Industries
PharmaDirections
Pharmassure
PharmaSolv LLC
Pli
Pregab Labs
Quality Chemical Labs
Regis Technologies
Rentschler Biopharma SE
Richman Chemical
Ruland Engineering & Consulting GmbH
Sancilio & Co
SL Pharma Labs
Societal™ CDMO
SMI
SXP Flow
Tedor Pharma
Thar Process
TrLink BioTechnologies
Tunnell Consulting
Univar Solutions
University of Iowa
Pharmaceuticals
UPM Pharmaceuticals
Vectura
Vetter Pharma Intl
Wavelengt Pharmaceuticals
Wockhardt Contract Services
WuXi AppTec
Xedev

BUYERS’ GUIDE 2022
For vendor contact information, see Company Directory section.

Visit our website for the latest e-learning tools in the bio/pharmaceutical industry.
• Webcasts
• Digital Editions
• Whitepapers
• Videos
• News updates
• And more!
Visit us at pharmtech.com
Solvias is a world leader in contract research, development and manufacturing. Our name is derived from the Latin terms ‘solutio’ and ‘via’, embedding our promise to explore new ways to find solutions that surpass our customers’ requirements.

For over 20 years, Solvias has been an essential link in the value chain for our customers across the pharmaceutical, biotech, medical device and cosmetic industries. Our comprehensive portfolio of integrated services and solutions backed by professional project management spans all stages of drug development including custom synthesis of drug product.

Beyond our expertise in small molecules, we have built a solid reputation for the characterization and analysis of monoclonal antibodies, therapeutic proteins and biosimilars. These cutting-edge capabilities enable Solvias to address the complex challenges of advanced therapeutic medicinal products (ATMPs): vaccines, cell and gene therapeutics, as well as nucleic acid-based products. Solvias delivers solutions to help our customers bring safer and better products to the market faster.

For more information
www.solvias.com
+41 61 845 60 00 | info@solvias.com
An in-depth conversation on an interesting topic with an interesting person!

Explore the stories and meet the personalities behind the biggest advances in medicine with Deep Dive, an-depth interview program featuring engaging conversations on cutting-edge health care topics with industry-leading guests.

Season 6 is streaming now!

www.medicalworldnews.com
For vendor contact information, see Company Directory section.
HOW A LEADING BIOTECH COMPANY IS USING AI TO IMPROVE YIELD

Subject Matter Expertise Combined with AI-Powered Data Analytics Provides Critical Insights into Manufacturing Processes to Detect Anomalies, Improve Yield and Optimize Production

Increasing competition and growing compliance requirements are pressuring biotech companies. Every step in the manufacturing process needs to be streamlined and made as efficient as possible in order to extract every last drop out of every batch in every process across the entire line. But batch optimization requires the constant analysis of huge volumes of data—a complex and costly operation.

A leading biotech company outsourced much of their data analysis to data scientists and analysts from a well-known consulting firm. Things seemed to be going well, but the analysts and the horizontal data analytics solution they were using lacked contextual awareness into manufacturing processes. Knowing that process knowledge would help further manufacturing operations, the company’s leadership decided the company needed a data analytics solution built specifically for the pharmaceutical and biotech manufacturing industry to accelerate the time to insights and time to value.

The Challenge, Optimizing a Process that Already Had an Impressive Yield

The leading biotech company reached out to Aizon to identify how artificial intelligence (AI) could be used to further optimize yield. Aizon transforms manufacturing operations with the use of advanced analytics and other smart factory technologies focused on optimizing production within highly regulated industries. Thinking big, the biotech company tasked Aizon with analyzing the centrifugation step—which is where the harvesting process starts once fermentation is completed in the bioreactor. Average yield was already tracking at an impressive level—well above industry standard. Improving on that baseline would be surprising but immensely valuable.

The Aizon AI Consulting Services team introduced their unique methodology to the operations team at the leading biotech company. Using Aizon’s Fast Forward and Blueprint services, the integrated team would be able to identify real opportunities to leverage AI in their specific environment and build a roadmap to achieve those goals. Out of five areas identified where AI could have immediate impact, yield optimization in the centrifugation process was selected as one of the most beneficial and difficult to see benefits.

Aizon then implemented the Aizon GxP AI Platform to analyze the centrifugation process and make actionable recommendations. In just under six weeks, Aizon was able to use its manufacturing process expertise and data analytics capabilities to put the centrifugation step in context of other upstream and downstream processes to provide stakeholders with deep insights into what happens to yield in this critical step in the manufacturing process.

Using the Aizon GxP AI Platform to Capture and to Help the Manufacturing Operations Team Better Understand Their Manufacturing Process in the Context of a Holistic, Multivariate View

These insights are served in real-time and in a format that is efficient and consumable across the organization. Actionable information derived by the Aizon platform allows the leading biotech company to make decisions faster with greater confidence and with greater

- Both historical and predictive insights into manufacturing performance can be delivered via a single, GxP compliant cloud platform that is production-ready
- Improved yield that led to $20+ million in expense savings
- Scaled company-wide, this could lead to nearly $400+ million of additional recovered revenue per year
value-based impact. In this case, the Aizon GxP AI Platform was configured to discover which parameters most affected the yield in the centrifugation process and to more finely tune it.

SURPRISING RESULTS
The team was able to analyze five years of historical batch data to discover a direct correlation between hold up volume and time between process operations. It was determined that using this analysis to vary how much time should lapse between these processes for each batch would save an appreciable amount of the product—resulting in millions of additional recovered revenue. Needless to say, all stakeholders from the line operator to senior leadership were shocked at the value Aizon was able to produce—especially when they realized the cost benefit when implemented company wide.

MILLIONS OF RECOVERED REVENUE
The leading biotech company will consider full implementation and also explore other areas where they can use AI to derive more insights and more value. Aizon estimates that scaling the engagement across the entire line could lead to as much as $400+ million in additional revenue per year. “Optimizing yield to this degree allows the leading biotech company to be more competitive in a cutthroat marketplace while achieving operational agility,” Baisch said. “It really is a game changer. For the people who work on the line, for the company itself and the industry as a whole—gaining this level of process visibility and control fundamentally changes how they do business.”

ABOUT AIZON
Aizon is a software provider that transforms manufacturing operations with the use of IoT, cloud, advanced analytics, artificial intelligence, and Pharma 4.0 technologies focused on optimizing pharmaceutical and biotech companies. The Aizon analytics platform seamlessly integrates unlimited sources of structured and unstructured data to deliver actionable insights across all manufacturing sites. Aizon offers an intuitive way to gain meaningful operational intelligence with data by enabling real-time visibility and predictive insights in a GxP compliant manner with end-to-end data integrity. Aizon is based in San Francisco, California and also has a European office in Barcelona, Spain.

Company Name: Aizon
Company Address: 44 Montgomery St., San Francisco, Calif. 94104
Company Phone: +34 768 4678 / +1 628.243.2513
Company Email: sales@aizon.ai
Company Website: aizon.ai
**CASE STUDY**

**CONTROL PARTICULATES AND AGGREGATES IN BIOLOGICS AND BIOTHERAPEUTICS WITH ELEMENT**

In many instances, unwanted immunogenic responses in patients to biologics and biotherapeutics are believed to be associated with large quantities of aggregates and particulates present in biologic formulations. Biological therapeutics are particularly prone to the formation of product-related aggregates and particulates due to susceptibility to degradation during manufacturing or storage. Due to the impact of particulates on the safety and efficacy of the drug product, regulatory agencies require the control of impurities and particulates during lot release and stability testing, and identification of any particulate when observed.

Cell-based therapies present a unique set of challenges when differentiating between the drug product and particulate matter. Cell therapies are typically opaque and cannot be purified or filtered using standard sterile filtration techniques. Furthermore, particulates (product related or otherwise) have the potential to promote aggregate formation, as they can provide a surface for cellular adhesion. A strategic partnership with a CDMO that applies a QC-minded approach to particulate identification can help drug developers and manufacturers understand where they need to act to control particulates and maintain timelines to bring biologic drugs to market.

A cell-based immunotherapy developer turned to Element for assistance after unknown particulates were observed in their drug product vials during lot release testing. Because the drug product vials were already allocated for dosing, the identity of the particulates present was urgently needed. Due to the presence of both cells and cellular debris in the drug product, the unknown particulates had to be isolated prior to analysis.

Element successfully isolated each particulate by manual separation and developed a multi-pronged approach for identification testing. First, a thorough visual inspection and assessment of the isolated particulates under the microscope was performed, which informed the analytical approach to determine the putative identity of the particulates. Then, multiple techniques were employed to identify whether the particulates were cellular or non-cellular in nature. Using analytical techniques, the unknown particulates were identified as both inherent particulates (cellular debris) and intrinsic particulates which were tied to the manufacturing process.

A wide range of analytical techniques and instrumentation in our arsenal could be employed during such investigative analyses, including FT-IR, ICP-MS, UV-Vis, cell staining, and/or SDS-PAGE analysis. With deep experience and expertise in particulate identification, leading organizations turn to Element to identify particulates and aggregates quickly and accurately in biological products, allowing for timely patient dosing in the clinic.

**ABOUT THE AUTHOR**

Khanh Ngo Courtney’s expertise encompasses method development and stage-appropriate validation, characterization studies, and preparation of IND/BLA applications for biopharmaceutical molecules in R&D and CMC settings.

**ABOUT THE COMPANY**

Element is the trusted CDMO partner for leading biopharmaceutical organizations, providing end-to-end support throughout the product development lifecycle, from discovery to small-scale manufacturing and post-approval.

---

Khanh Ngo Courtney,  
Head of Laboratory Operations  
Element
A TECHNOLOGY PREPARED FOR A PANDEMIC

Ligand Pharmaceuticals Incorporated is the sole supplier of Captisol globally. As of 2020 our supply chain network was served by two cGMP European manufacturing facilities and five distribution points around the globe, all of which have remained fully operational during the COVID-19 pandemic. Were we ready for a pandemic? Is anyone, really? No—but we had established a robust technology, manufacturing and supply chain that could pivot rapidly.

On May 1, 2020, Gilead Sciences and the US Government announced an Emergency Use Authorization (EUA) for remdesivir, the first antiviral therapeutic for treating COVID-19. Soon remdesivir was authorized for treatment of COVID-19 around the globe. In early May 2020, Gilead announced plans to build a consortium of manufacturing partners to bring efforts together to help maximize global supply in more than 100 low and middle-income countries. Veklury received FDA approval in October 2020 for the treatment of adults and pediatric patients 12 and older for COVID-19 requiring hospitalization and remains the only FDA approved antiviral therapeutic for COVID-19.

Large amounts, up to 6 g of Captisol, are now used in the two presentations of intravenously infused Veklury (remdesivir) to treat COVID-19. Anticipating substantial continued demand for Captisol for COVID, Ligand announced in June 2020 that up to $60 million would be invested to significantly expand annual manufacturing capacity for Captisol. The investments increased the annual Captisol production capacity to approximately 500 MT, a tenfold increase, and included expansion of the number of sites for the final critical isolation step in the United States and the United Kingdom. In addition to the successful qualification of two new sources of key raw materials required to produce Captisol, the manufacturing batch process was increased by more than 50% through four successful qualifications. Part of the scale increase was achieved through the installation of additional equipment trains, dramatically reducing the batch cycle time. More than a dozen successful validation campaigns were completed for the process changes, new sources of key raw materials and isolation step.

Treating that many patients since the start of the pandemic meant the need for rapid scale up and production of up to 500 MT of Captisol needed for full treatment courses of the injection solution. In addition to material needs, access to safety/tox information in the Captisol Type V DMF enabled the development and clinical evaluation of new formulations and inhalation route of delivery for remdesivir (NCT04539262 and https://doi.org/10.1101/2020.07.26.222109).
<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone</th>
<th>Website</th>
<th>Email</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrel CMS</td>
<td>575 Epsilon Dr Ste 2 Pittsburgh, PA 15238-7822</td>
<td>412-967-7300</td>
<td>exxtrel.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.P.S. Food and Pharma Systems Srl</td>
<td>Via Vandelli 20</td>
<td>Corinaldo, 21200</td>
<td>+39 031 543429</td>
<td><a href="mailto:info@fps-pharma.com">info@fps-pharma.com</a></td>
<td></td>
</tr>
<tr>
<td>Fab-Tech</td>
<td>4813 Hercules Dr</td>
<td>Colchester, VT 05446</td>
<td>802-655-8800</td>
<td>fabtech.com</td>
<td></td>
</tr>
<tr>
<td>Fabohio</td>
<td>521 E Seventh St</td>
<td>Uhrichsville, OH 44683</td>
<td>740-922-4233</td>
<td>fabohio.com</td>
<td></td>
</tr>
<tr>
<td>Fabreeca Intl</td>
<td>1023 Tpe St</td>
<td>Stoughton, MA 02072</td>
<td>781-581-3855</td>
<td><a href="mailto:info@fabreeca.com">info@fabreeca.com</a></td>
<td>fabreeca.com</td>
</tr>
<tr>
<td>Facet Technologies LLC</td>
<td>3900 N Commerce Dr Ste 100</td>
<td>Atlanta, GA 30344</td>
<td>800-526-2387</td>
<td><a href="mailto:info@facettechnologies.com">info@facettechnologies.com</a></td>
<td>facettechnologies.com</td>
</tr>
<tr>
<td>Fairbanks Scales</td>
<td>821 Locust</td>
<td>Kansas City, MO 64106</td>
<td>816-471-0231</td>
<td><a href="mailto:info@fairbanks.com">info@fairbanks.com</a></td>
<td></td>
</tr>
<tr>
<td>Far Chemical</td>
<td>2210 Wilhelmina Ct NE</td>
<td>Palm Bay, FL 32905</td>
<td>772-392-4300</td>
<td><a href="mailto:lsvendsen@far-chemical.com">lsvendsen@far-chemical.com</a></td>
<td>321-723-6160</td>
</tr>
<tr>
<td>Federal Equipment Co</td>
<td>8200 Townline Rd</td>
<td>Stoughton, MA 02072</td>
<td>781-341-3655</td>
<td><a href="mailto:info@fedeq.com">info@fedeq.com</a></td>
<td>fedeq.com</td>
</tr>
<tr>
<td>Feldaieer Equipment</td>
<td>6800 Townline Rd</td>
<td>Sarasota, NY 13211</td>
<td>315-454-8061</td>
<td>feldmeier.com</td>
<td></td>
</tr>
<tr>
<td>Fenner Drives</td>
<td>311 W Stiegel St</td>
<td>Manheim, PA 17545</td>
<td>717-665-2491</td>
<td><a href="mailto:order@fennerdrives.com">order@fennerdrives.com</a></td>
<td>fennerdrives.com</td>
</tr>
<tr>
<td>Festo Corp</td>
<td>1377 Motor Pkwy Ste 310</td>
<td>Islandia, NY 11749</td>
<td>631-435-0800</td>
<td>800-99-FESTO</td>
<td><a href="mailto:customercare@festo.com">customercare@festo.com</a> us.festo.com</td>
</tr>
<tr>
<td>Fette Compacting America</td>
<td>400 Forge Way</td>
<td>Rockaway, NJ 07866</td>
<td>973-386-8722</td>
<td><a href="mailto:sales@fetteamerica.com">sales@fetteamerica.com</a></td>
<td>fette-compacting-america.com</td>
</tr>
<tr>
<td>Fg Cleanwipe</td>
<td>2255 Westover Rd Chichester, MA 01202</td>
<td>413-598-8344</td>
<td><a href="mailto:info@fgcleanwipes.com">info@fgcleanwipes.com</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filamatic</td>
<td>4119 Fordleigh Rd</td>
<td>Baltimore, MD 21215</td>
<td>410-298-1914</td>
<td><a href="mailto:info@filamatic.com">info@filamatic.com</a></td>
<td>filamatic.com</td>
</tr>
<tr>
<td>Filtec</td>
<td>3100 Fujita St</td>
<td>Torrance, CA 90505-4007</td>
<td>888-434-9922</td>
<td><a href="mailto:askfiltec@filtec.com">askfiltec@filtec.com</a></td>
<td>filtec.com</td>
</tr>
<tr>
<td>First Sensor</td>
<td>905 S Main St Ste 201</td>
<td>Mansfield, MA 02048</td>
<td>508-339-2955</td>
<td><a href="mailto:us@first-sensor.com">us@first-sensor.com</a></td>
<td>first-sensor.com</td>
</tr>
<tr>
<td>Fitzpatrick Company</td>
<td>613 Colby Drive</td>
<td>Waterloo, ON N2V 1A1 Canada</td>
<td>+1-519 884 9660</td>
<td><a href="mailto:fitzinfo@idexcorp.com">fitzinfo@idexcorp.com</a></td>
<td>613 Colby Drive</td>
</tr>
<tr>
<td>Flex Industries</td>
<td>56 Lowland St</td>
<td>Holliston, MA 01746-2029</td>
<td>508-693-9596</td>
<td><a href="mailto:sales@flexhead.com">sales@flexhead.com</a></td>
<td>flexhead.com</td>
</tr>
<tr>
<td>Florida Cleanroom Systems</td>
<td>1721 NE 40 Pt</td>
<td>Oakland Park, FL 33334-5459</td>
<td>954-249-6243</td>
<td><a href="mailto:info@flcrsys.com">info@flcrsys.com</a></td>
<td>flcrsys.com</td>
</tr>
<tr>
<td>Flow Sciences</td>
<td>2025 Mercantile Dr</td>
<td>Leland, NC 28451</td>
<td>336-655-5001</td>
<td><a href="mailto:fluidairinfo@spray.com">fluidairinfo@spray.com</a></td>
<td>fluidairinc.com</td>
</tr>
<tr>
<td>Fluid Air Division of Spraying System Co</td>
<td>2119 Fisher Drive</td>
<td>Naperville, IL 60563</td>
<td>630-699-0301</td>
<td><a href="mailto:fluidairinfo@spray.com">fluidairinfo@spray.com</a></td>
<td>fluidairinc.com</td>
</tr>
<tr>
<td>Fluid Metering</td>
<td>8 Aerial Way Ste 500</td>
<td>Sayokey, NJ 07751</td>
<td>516-922-6050</td>
<td><a href="mailto:pumps@fluidmetering.com">pumps@fluidmetering.com</a></td>
<td>fluidmetering.com</td>
</tr>
<tr>
<td>Fluorotherm Polymers</td>
<td>333 New Rd Ste 1</td>
<td>Parsippany, NJ 07054</td>
<td>877-777-2629</td>
<td><a href="mailto:sales@fluorotherm.com">sales@fluorotherm.com</a></td>
<td>fluorotherm.com</td>
</tr>
<tr>
<td>Focus Labs</td>
<td>177 N Commerce Way</td>
<td>Tehran, IN 46107</td>
<td>765-686-7727</td>
<td><a href="mailto:info@focus-lab.com">info@focus-lab.com</a></td>
<td>focus-lab.com</td>
</tr>
<tr>
<td>Food Technology Corporation</td>
<td>45921 Maries Rd Ste 120</td>
<td>Sterling, VA 20166</td>
<td>703-444-1870</td>
<td>foodtechcorp.com</td>
<td></td>
</tr>
<tr>
<td>Formulation</td>
<td>6680 N High St Ste 2A</td>
<td>Worthington, OH 43085</td>
<td>614-886-2988</td>
<td><a href="mailto:sales@formulation.com">sales@formulation.com</a></td>
<td>formulation.com</td>
</tr>
<tr>
<td>Formulated Solutions</td>
<td>11775 Starkey Rd Largo, FL 33737</td>
<td>883-643-8826</td>
<td><a href="mailto:basesales@formulatedsolutions.com">basesales@formulatedsolutions.com</a></td>
<td>formulatedsolutions.com</td>
<td>formulatedsolutions.com</td>
</tr>
<tr>
<td>Fortress Technology</td>
<td>51 Grand Marshall Dr Toronto, ON M1B 5N6 Canada</td>
<td>416-754-2898; 888-207-8737</td>
<td><a href="mailto:sales@fortestechsolutions.com">sales@fortestechsolutions.com</a></td>
<td>fortessolutions.com</td>
<td>fortresstechnology.com</td>
</tr>
<tr>
<td>Foster Delivery Systems</td>
<td>36 Ridge Rd Putnam, CT 06260</td>
<td>860-578-9155</td>
<td>fosterdeliveryscience.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fp Developments</td>
<td>402 S Main St</td>
<td>Williamsport, PA 17701</td>
<td>856-875-7100</td>
<td><a href="mailto:sales@fpdevelopments.com">sales@fpdevelopments.com</a></td>
<td>fpdevelopments.com</td>
</tr>
<tr>
<td>Freeman Technology</td>
<td>PO Box 2822</td>
<td>Wayne, PA 19099</td>
<td>732-829-8345</td>
<td><a href="mailto:info@freemantech.co.uk">info@freemantech.co.uk</a></td>
<td>freemantech.co.uk</td>
</tr>
<tr>
<td>Freestead Process Technology Ltd</td>
<td>Unit 1, Hayvatt Business Park, Hayvatt Rd Windring, 93050 SPK United Kingdom</td>
<td>+44 1934862561</td>
<td><a href="mailto:info@frestead.co.uk">info@frestead.co.uk</a></td>
<td>freestead.co.uk</td>
<td></td>
</tr>
<tr>
<td>Freuen-Vector Corporation</td>
<td>675 44th St</td>
<td>Marion, IA 52302</td>
<td>319-372-6501</td>
<td><a href="mailto:sales@freuen-vector.com">sales@freuen-vector.com</a></td>
<td>freuen-vector.com</td>
</tr>
<tr>
<td>Fristam Pumps Usa</td>
<td>2410 Parvise Rd</td>
<td>Middleton, WI 53562-2521</td>
<td>608-821-6970</td>
<td>800-841-5001</td>
<td>fristam.com</td>
</tr>
<tr>
<td>Frontage Labs</td>
<td>700 Pennsylvania Dr Exton, PA 19341</td>
<td>610-219-1010</td>
<td><a href="mailto:sales@frontagebtl.com">sales@frontagebtl.com</a></td>
<td>frontagebtl.com</td>
<td></td>
</tr>
<tr>
<td>FST Technologies</td>
<td>668 Western Ave Lombard, IL 60148-2005</td>
<td>630-800-0300</td>
<td>800-468-6009</td>
<td><a href="mailto:info@fsinet.com">info@fsinet.com</a></td>
<td>fsinet.com</td>
</tr>
<tr>
<td>Company</td>
<td>Address</td>
<td>Phone</td>
<td>Email</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td>-------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PharmTech.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Ad Index

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adare Pharmaceuticals</td>
<td>2</td>
</tr>
<tr>
<td>Aizon</td>
<td>83, 110</td>
</tr>
<tr>
<td>Ascendia Pharmaceuticals</td>
<td>95</td>
</tr>
<tr>
<td>Ashland Inc.</td>
<td>25</td>
</tr>
<tr>
<td>August Bioservices</td>
<td>99</td>
</tr>
<tr>
<td>Biospectra</td>
<td>15</td>
</tr>
<tr>
<td>Catalent Pharma Solutions, Inc.</td>
<td>132</td>
</tr>
<tr>
<td>Coating Place</td>
<td>9</td>
</tr>
<tr>
<td>Element Materials Testing</td>
<td>89, 112</td>
</tr>
<tr>
<td>Halkey-Roberts</td>
<td>45</td>
</tr>
<tr>
<td>IMA S.p.A.</td>
<td>39</td>
</tr>
<tr>
<td>Ligand Pharmaceuticals</td>
<td>51, 113</td>
</tr>
<tr>
<td>Metrics Contract Services</td>
<td>101</td>
</tr>
<tr>
<td>Natoli Engineering Company, Inc.</td>
<td>31</td>
</tr>
<tr>
<td>Prince Sterilization Services</td>
<td>71</td>
</tr>
<tr>
<td>ROSS Mixers</td>
<td>33</td>
</tr>
<tr>
<td>Sani-Matic</td>
<td>77</td>
</tr>
<tr>
<td>Societal CDMO</td>
<td>91</td>
</tr>
<tr>
<td>Solvias AG</td>
<td>105</td>
</tr>
<tr>
<td>T and C Stainless</td>
<td>27</td>
</tr>
<tr>
<td>Veltek Associates</td>
<td>5</td>
</tr>
</tbody>
</table>
Successful product launches are built on the rigorous science of pharmaceutical development and manufacturing technologies, and the art of orchestrating hundreds of complicated steps to develop a successful treatment, from planning to scale-up.

Catalent’s unrivaled experience, across modalities, helps deliver more than 150 global product launches for our partners every year. Let our comprehensive development solutions and expansive manufacturing capabilities, from complex biologics and vaccines to high volume oral doses, transform your product blueprint into a successful treatment for patients.