Cleaning is a critical practice in the manufacture of high reliability medical devices. As a global supplier, Petroferm offers a diverse portfolio of cleaning technologies and surface treatments developed to meet the performance, compatibility and environmental requirements of the medical device market.

### Aqueous Cleaning

**CleanSafe™ Series**

Biodegradable, low-VOC cleaners designed to replace caustic solutions and cleaners with high levels of silicates.

**CLEANSAFE 787C** is an ultra low-foaming cleaner formulated to operate in spray-in-air and agitated immersion cleaning equipment.

**CLEANSAFE 585** is a high performance ultrasonic cleaner designed to remove buffing and polishing compounds, lubricants, processing fluids and particulate.

### Non-Aqueous Cleaning

**AXAREL® and BIOACT® Series**

Powerful cleaners designed to replace alcohols, ketones, and other solvents with high environmental, worker health and safety impact.

**AXAREL 2000** is an essentially odorless cleaner formulated to provide high solvency and moderate dry times. Suitable for use in both hand wipe and immersion applications.

**BIOACT 105** is a powerful cleaner formulated to remove hard-to-clean soils such as adhesives, greases, inks, mold release compounds, silicones, and waxes. Available in liquid and pre-saturated hand wipes.

**BIOACT 121** is a high-purity, bio-based cleaner with low environmental impact and exposure risk. Suitable for use in both hand wipe and immersion applications.

### Vapor Degreasing

**LENIUM® Series**

Designed to replace most chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) in open-top and vacuum vapor degreasers.

**LENIUM FRA** is a non-ozone depleting, VOC-exempt solvent based on a blend of hydrofluorocarbons (HFCs). Used as a rinsing agent in co-solvent or bi-solvent vapor degreasing, it effectively removes a wide range of contaminants while exhibiting superior material compatibility with polymers and elastomers.

**LENIUM XS** is a powerful solvent based on n-propyl bromide (nPB). Used alone, it effectively removes difficult-to-clean soils such as buffing and polishing compounds, greases, release agents, silicones and waxes.

### Also available from Petroferm

<table>
<thead>
<tr>
<th>Tube Swelling</th>
<th>Deposition Fluid</th>
<th>Defluxing</th>
<th>Deblocing</th>
</tr>
</thead>
<tbody>
<tr>
<td>LERIUM TS</td>
<td>LERIUM DF</td>
<td>BIOACT EC-88</td>
<td>BIOACT 288</td>
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</table>

**CleanSafe is a trademark of Petroferm Inc.**

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*Issued October 2008*
### Medical Device Cleaning Selection Guide

<table>
<thead>
<tr>
<th>Product</th>
<th>pH (Conc. 10%)</th>
<th>Concentration (%)</th>
<th>Temperature °F (°C)</th>
<th>Cleaning Methods</th>
<th>Biodegradable</th>
<th>Conformance Testing (ASTM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CleanSafe 787C</td>
<td>11.2</td>
<td>2-15</td>
<td>160-180 (38-82)</td>
<td>Spray</td>
<td>Yes</td>
<td>D-816, F-483, F-519, F-945, F-1110, F-1111, SAE ARP 1755B</td>
</tr>
<tr>
<td>CleanSafe 585</td>
<td>11.2</td>
<td>2-10</td>
<td>70-180 (21-82)</td>
<td>Ultrasonics</td>
<td>Yes</td>
<td>F-945</td>
</tr>
</tbody>
</table>

### Non-Aqueous Cleaning

<table>
<thead>
<tr>
<th>Product</th>
<th>Flash Point °F (°C)</th>
<th>Concentration (%)</th>
<th>Temperature °F (°C)</th>
<th>Cleaning Methods</th>
<th>Odor</th>
<th>Conformance Testing (ASTM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXAREL 2000</td>
<td>144 (62)</td>
<td>100 (38)</td>
<td>Ambient</td>
<td>Immersion, Hand Wipe</td>
<td>Essentially Odorless</td>
<td>D-130, D-1296, D-1353, F-483, F-945, F-110</td>
</tr>
<tr>
<td>BIOACT 105</td>
<td>105 (41)</td>
<td>100 (38)</td>
<td>Ambient</td>
<td>Immersion, Hand Wipe</td>
<td>Mild Citrus/Alcohol</td>
<td>F-483, F-519, F-945, F-1110</td>
</tr>
<tr>
<td>BIOACT 121</td>
<td>117 (47)</td>
<td>180 (88)</td>
<td>Ambient</td>
<td>Immersion, Hand Wipe</td>
<td>Mild Citrus</td>
<td>F-483, F-484, F-519, F-945, F-1110</td>
</tr>
</tbody>
</table>

### Vapor Degreasing

<table>
<thead>
<tr>
<th>Product</th>
<th>Flash Point °F (°C)</th>
<th>Boiling Point °F (°C)</th>
<th>Cleaning Methods</th>
<th>Ozone Depleting Potential</th>
<th>Conformance Testing (ASTM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENIUM FRA</td>
<td>None</td>
<td>108 (42)</td>
<td>Co-Solvent</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>LENIUM XS</td>
<td>None</td>
<td>156 (69)</td>
<td>Mono-Solvent</td>
<td>0.013-0.018</td>
<td>F-483, F-519, F-945, F-1110, SAE ARP 1755B</td>
</tr>
</tbody>
</table>

### Components Cleaned

- Arthroscopic Probes and Tubing
- Catheters and Catheter Balloons
- CT and X-Ray System Hardware
- Endodontic Hardware
- Heart Valve Assemblies
- Hybrid Microelectronic Circuits
- Scalpels and Skin Closure Needles

### Typical Substrates

- Titanium
- Nitinol
- Cobalt-Chrome
- Stainless Steel
- Copper and Copper Alloys
- Ceramics
- PEEK and UHMW-PE

### Cleaning Methods

- Ultrasonic
- Spray-In-Air
- Agitated Immersion
- Vapor Degreasing
- Vacuum Degreasing
- Semi-A

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**ENVIRONMENTALLY RESPONSIBLE CLEANING AGENTS**

**KRAYDEN INC.**

**AUTHORIZED DISTRIBUTOR**

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