Lonzagard® Actives and Formulations
cGMP Compliant Hand-Hygiene Offerings
Hygiene – Lonzagard® Actives and Formulations cGMP Compliant Hand Hygiene Offerings

« The World Health Organization has confirmed hand hygiene compliance is critical to preventing the spread of disease¹ »

As The Food & Drug Administration (FDA) finalizes the hand hygiene monographs, scrutiny of antimicrobial rinse-off and leave-on hand-care products has increased. In this dynamic and evolving regulatory landscape, formulators must take steps to ensure they comply with strict requirements for cGMP produced active and end formula manufacturing. These requirements are outlined in the Food, Drug and Cosmetic Act (FD&C) regulation for Over-The-Counter (OTC) drugs.

- Antimicrobial hand-care products are regulated as OTC drugs under FD&C §201(g)
- Compendial grade, Active Pharmaceutical Ingredient (API) specifications must conform with United States Pharmacopeia- National Formulary (USP-NF) monograph
- APIs and finished products must be manufactured in compliance with quality manufacturing standards, called current Good Manufacturing Processes (cGMP)¹,²,³
- Non-conformance with requirements is subject to enforcement actions outlined in 21 CFR 210.1
- Since the process to finalize the hand-care drug monographs began in 2014, FDA has actively enforced requirements for OTC drugs:
  - 17 warning letters have been issued, including violations for non-conformance to cGMP
  - 308 Product Recalls
  - Fines and penalties have been issued ranging from $500,000 to $20 million.
- The FDA has shown increased scrutiny of antimicrobial rinse-off and leave-on hand care products in all areas as a whole, extending beyond CGMP related issues. In June 2018, the FDA issued a permanent injunction against a California company and its chief executive officer for misbranding its hand sanitizer product. The complaint was filed by the US Justice Department on behalf of the FDA.
- In April 2018 FDA issued a warning letter to a Florida company manufacturing topical skincare products, citing “significant violations of current good manufacturing practice (cGMP) regulations for finished pharmaceuticals.” Company has since filed chapter 11 citing recall costs for OTC drug products.

« Compliance is also critical for a healthy hand-hygiene business: High product Stewardship standards can help protect your business and company’s reputation »

Technical and regulatory personnel at manufacturers and marketers can help protect their companies’ brands and reputation by ensuring they understand the regulation, formulating with compliant ingredients and producing in compliant facilities.

- Ensure formulations meet latest FDA monograph requirements for the relevant product category⁴
- Use Active Ingredients (API) conforming to USP-NF drug monograph and manufactured under cGMP quality manufacturing standards
- Obtain and follow the latest guidance for good manufacturing practice of topical antimicrobials⁵
- NF/USP grade actives produced under cGMP conditions
- cGMP compliant Non-Alcohol Hand Sanitizer (NAHS) Concentrate
- Rinse-off frame formulations to help speed product development
- Regulatory expertise and support

¹ The Evidence For Clean Hands” and “Testing the WHO Guidelines on hand hygiene in health care in eight pilot sites worldwide” – World Health Organization Website.
Lonza can help with a line-up of cGMP compliant hand hygiene offerings as well as expert technical and regulatory guidance

### Compliant Active Ingredients

<table>
<thead>
<tr>
<th>Product</th>
<th>Chemistry</th>
<th>Applications</th>
</tr>
</thead>
</table>
| Lonzagard cGMP BKC             | Benzalkonium Chloride [50%]      | Consumer Antiseptic Washes: Antibacterial Soaps, Hand Washes, & Body Washes  
Healthcare Antiseptics: Healthcare Personnel Hand Washes & Rubs  
Surgical Hand Rubs & Scrubs  
Patient Pre-operative Skin Preparations  
Consumer Antiseptic Rubs: Antibacterial Hand Sanitizers and Hand Sanitizing Wipes |
| Lonzagard Benzethonium Chloride | Benzethonium Chloride 50%        | Consumer Antiseptic Washes: Antibacterial Soaps, Hand Washes, & Body Washes  
Healthcare Antiseptics: Healthcare Personnel Hand Washes & Rubs  
Surgical Hand Rubs & Scrubs  
Patient Pre-operative Skin Preparations |

### Compliant Non-Alcohol Hand Sanitizer 10X Concentrate

- Lonzagard® NAHS 10X Concentrate
  - formulated with Lonzagard BKC cGMP active ingredient
  - Bacterial efficacy at 30 seconds in both Liquid and Wipe Formats
  - Moisturizers added for skin comfort and protection
  - NSF Category E2

### Hand Sanitizer Formulations

<table>
<thead>
<tr>
<th>Ingredient Trade or Chemical Name</th>
<th>Moisturizing Hand Sanitizer Foam</th>
<th>Moisturizing Hand Sanitizer Wipes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lonzagard® NAHS 10X Concentrate</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Water</td>
<td>90.0</td>
<td>90.0</td>
</tr>
<tr>
<td>Non-Woven Substrate</td>
<td>–</td>
<td>Diluted Hand Sanitizer liquid to non-woven substrate: 4:1</td>
</tr>
<tr>
<td>% Reduction S. aureus 30 Seconds</td>
<td>≥ 99.999 (time kill)</td>
<td>≥ 99.999 (time kill)</td>
</tr>
<tr>
<td>% Reduction E. coli 30 Seconds</td>
<td>≥ 99.999 (time kill)</td>
<td>≥ 99.999 (time kill)</td>
</tr>
<tr>
<td>% Reduction P. aeruginosa 30 Seconds</td>
<td>≥ 99.999 (time kill)</td>
<td>≥ 99.999 (time kill)</td>
</tr>
<tr>
<td>% Reduction S. marcescens 30 Seconds</td>
<td>≥ 99.999 (time kill)</td>
<td>≥ 99.999 (time kill)</td>
</tr>
<tr>
<td>% Reduction S. enterica 30 Seconds</td>
<td>≥ 99.999 (time kill)</td>
<td>≥ 99.999 (time kill)</td>
</tr>
</tbody>
</table>

### Use Areas

- Healthcare
- Institutional & Industrial (I&I)
- Janitorial
- Food processing / service / retail
- Consumer
## Rinse-Off Frame Formulations

<table>
<thead>
<tr>
<th>Formulation</th>
<th>5981-45A</th>
<th>5981-45B</th>
<th>5981-45C</th>
<th>5981-46</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foaming</strong></td>
<td>Fast breaking foam</td>
<td>High foaming</td>
<td>High foaming</td>
<td>High foaming</td>
</tr>
<tr>
<td>Rinseability/skin conditioning</td>
<td>Rinse easily</td>
<td>Skin Conditioning</td>
<td>Highly Skin Conditioning</td>
<td>Skin Conditioning</td>
</tr>
<tr>
<td><strong>% reduction Staph aureus</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 seconds</td>
<td>&gt;99.999</td>
<td>&gt;99.999</td>
<td>&gt;99.999</td>
<td>&gt;99.999</td>
</tr>
<tr>
<td>30 seconds</td>
<td>&gt;99.999</td>
<td>&gt;99.999</td>
<td>&gt;99.999</td>
<td>&gt;99.999</td>
</tr>
<tr>
<td><strong>% reduction Staph aureus</strong></td>
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<tr>
<td>30 seconds</td>
<td>&gt;99.999</td>
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<td>&gt;99.999</td>
<td>&gt;99.999</td>
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</tbody>
</table>

1 Section 501(a)(2)(B) of the FD&C Act requires all drugs (including APIs) be produced in compliance with cGMP.

2 FDA recommends following the guidelines of international cGMP convention ICH Q7, Good Manufacturing Practice Guidance for Active Pharmaceutical Ingredients (or acceptable alternate cGMP quality system).

3 FDA provided guidelines for producing finished drug product under cGMP in 21 CFR §210-211.