How do some of the leading authorities in building, using and inspecting hygienic processing systems view the challenges to improving hygienic design?
GEA – “engineering for a better world”

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees (FTEs)</td>
<td>18,642</td>
</tr>
<tr>
<td>EUR million revenue</td>
<td>4,828</td>
</tr>
<tr>
<td>EUR million order intake</td>
<td>4,918</td>
</tr>
<tr>
<td>EUR million operating EBITDA</td>
<td>518</td>
</tr>
<tr>
<td>% operating EBITDA margin</td>
<td>10.7%</td>
</tr>
<tr>
<td>EUR per share dividend proposal</td>
<td>0.85</td>
</tr>
</tbody>
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The company is listed on the German MDAX (G1A, WKN 660 200), the STOXX® Europe 600 Index and selected MSCI Global Sustainability Indexes.

GEA is one of the largest technology suppliers for food processing and a wide range of other industries. The global group specializes in machinery, plants, as well as process technology and components. GEA provides sustainable solutions for sophisticated production processes in diverse end-user markets and offers a comprehensive service portfolio.

Fiscal year 2018
Our applications – in touch with GEA every day

Dairy Farming and Processing

Approx. one quarter of processed milk comes from GEA production systems

Food

Every third chicken nugget is produced using GEA technology

Beverages

Approx. every third process line for instant coffee was installed by GEA

Pharma

Approx. every second liter of beer is brewed with the aid of systems and process solutions from GEA

Chemical

Every fourth liter of human blood for making plasma-derived products is processed using GEA equipment

Utilities

More than one third of all polymer producers are using GEA drying technology

Marine

Each industry we serve utilizes industrial refrigeration technology from GEA

Every second container ship in the world sails with GEA marine equipment on board
Classic approach

3-A Sanitary Standards, Inc.
- Define standard design criteria for
  - Materials
  - Design
  - Fabrication

Symbol Holder
- Responsible for
  - Design & compliance documentation
  - Cleaning validation

Food Producer
- Responsible for
  - System maintenance
  - System operation
3-A Sanitary Standards, Inc.
- Define standard design criteria for
  - Materials
  - Design
  - Fabrication
- Validation
- Requirements of operation and use

Symbol Holder
- Responsible for
  - Design & compliance documentation
  - Cleaning validation

Food Producer
- Responsible for
  - System maintenance
  - System operation

Food Producer

Food Producer

Food Producer
Thoughts on challenges

**Determining factors of hygienic processes**
- Design
- Process set-up
- Means of control

**Validation in application required**

**Standards need to acknowledge application variances**
- E.g. pasteurization vs. milk harvesting
- EHEDG standard for milk processing plants, applicability for products with varying viscosity/texture questionable; not suited for small equipment
- PMO is widely referenced but regulations therein do not pertain to many food products/applications in the range of today’s 3-A standards

**Rapid rate of development of materials and processes lead to frequent additions in FDA CFR listings that do not make a way into 3-A standards (e.g. polymers).**

**Regulation of end product quality can allow more freedom to innovate better hygienic processes compared to regulation of equipment**
Transformation is ongoing…

• Application focus mirrored in joined effort for standard B-102-00-A
• Let’s keep up shaping