It Depends

Selecting Materials for Sanitary Applications

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Sani-Matic
Agenda

• Introduction
• Applications
• Materials
• Design Considerations
• Resources
• Maintenance
Introduction - Challenges

10) Temperature Limits
9) Water Quality
8) Marketing / Changing Conditions
7) Material Cost
6) Welding
5) Cleaning Detergents / Sanitizers
4) Concentrate
3) Max Headroom
2) Lack of Compatibility Data
1) Sealing
Applications

- Pipelines, Fittings, Vessels
- Pumps, Valves, Instruments
- Plate Heat Exchangers
- Gaskets & Seals
- Insulation
- Sight Glasses, Windows, & Covers
- Non-Product Contact Surfaces
- Adhesives & Bonding Agents
- Homogenizers, Centrifuges, Fillers
- Belts
- Chemical Lines
- Coatings
- Etc.
Improper Passivation?
Improper Passivation?
Chemical Compatibility?
Chemical Compatibility?
Wrong Application?
303 + Nitric Acid
AMI Guidelines - Compatible Materials

6061 Aluminum

Use aluminum **ONLY** when necessary, and when so, anodize (or applicable process) to inhibit corrosion and wear. No coatings in Zone 1.

Bearings 3, 5, & 7 are stainless steel. Bearing 1 is plated. Some bearings on the market are 400 Series stainless steel. 400 Series will rust. Choose wisely!
Non-Product Contact?
Materials

- Stainless Steel
- Rubber Gaskets
- Plastic Components
- Carbon / Ceramic
- Glass
- Insulation
- Solder & Brazing Rods
- Adhesives & Bonding Agents
- Cutting Tools & Polishing Materials
- Coatings
- Etc.
One Size Doesn’t Fit All

Adjustable Advantage
Because, one size does not fit all
Design Considerations

• Product Compatibility
  • pH
  • Chlorides
  • Head Space / Interface

• Chemical Compatibility
  • Cleaning / Sanitizing / Passivation / Water

• Temperature Range
  • Processing
  • Cleaning
  • Sanitizing / Kosherizing

• Toxicity / Food Grade Materials

• Material Strength / Stress

• Surface Finish

• Porosity

• Machinability / Moldability

• Welding

• Cutting / Polishing Contamination
Resources

- 3-A Symbol Holder Search
- Material Suppliers
- CFR
- Material Analyzers
- Corrosion-doctors.org
- Coleparmer.com
- APV Corrosion Handbook
- Nickelinstitution.org
- Chemical Suppliers
- Internal / On-site testing
- ASTM D471 – Effects of Liquids
- ASTM D2240 – Hardness of Rubber
- Processors
Basic Elastomer and Thermoplastic Characteristics
All materials are approved by: 3A, USDA, and comply with FDA's Code of Federal Register — Title 21, Part 177.

<table>
<thead>
<tr>
<th>Materials Tri-Clover Code</th>
<th>BUNA &quot;U&quot;</th>
<th>EPDM &quot;E&quot;</th>
<th>VITON &quot;SFY&quot;</th>
<th>PTFE &quot;G&quot;</th>
<th>SILICONE &quot;X&quot;</th>
<th>POLYETHYLENE &quot;N&quot;</th>
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<tr>
<td>Temperature</td>
<td>− 65°F to 210°F Good</td>
<td>− 50°F to 300°F Good to Ex.</td>
<td>− 20°F to 350°F Good to Ex.</td>
<td>− 40°F to 450°F* Good to Ex.</td>
<td>− 80°F to 450°F Poor to Good</td>
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<td>Acid</td>
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<td>Alkali</td>
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<td>Abrasion Resistance</td>
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<td>Compression Set</td>
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<tr>
<td>Tri-Clover Color Code</td>
<td>Red</td>
<td>Green</td>
<td>Yellow and White</td>
<td>None</td>
<td>Pink</td>
<td>Transparent</td>
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<td>(Identified by a color dot)</td>
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*Refer to "Special Note" section above. ** Depends upon type of oil. Contact Tri-Clover.
Maintenance

- Leakage – fix it!
- Periodic Inspection
  - Corrosion
  - Cracks / Pits
  - Leakage
- Elastomer Replacement
  - Establish the frequency
Questions?