

It Depends

Selecting Materials for Sanitary Applications

Gabe Miller

Sr. Technical Engineer

Sani-Matic



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***

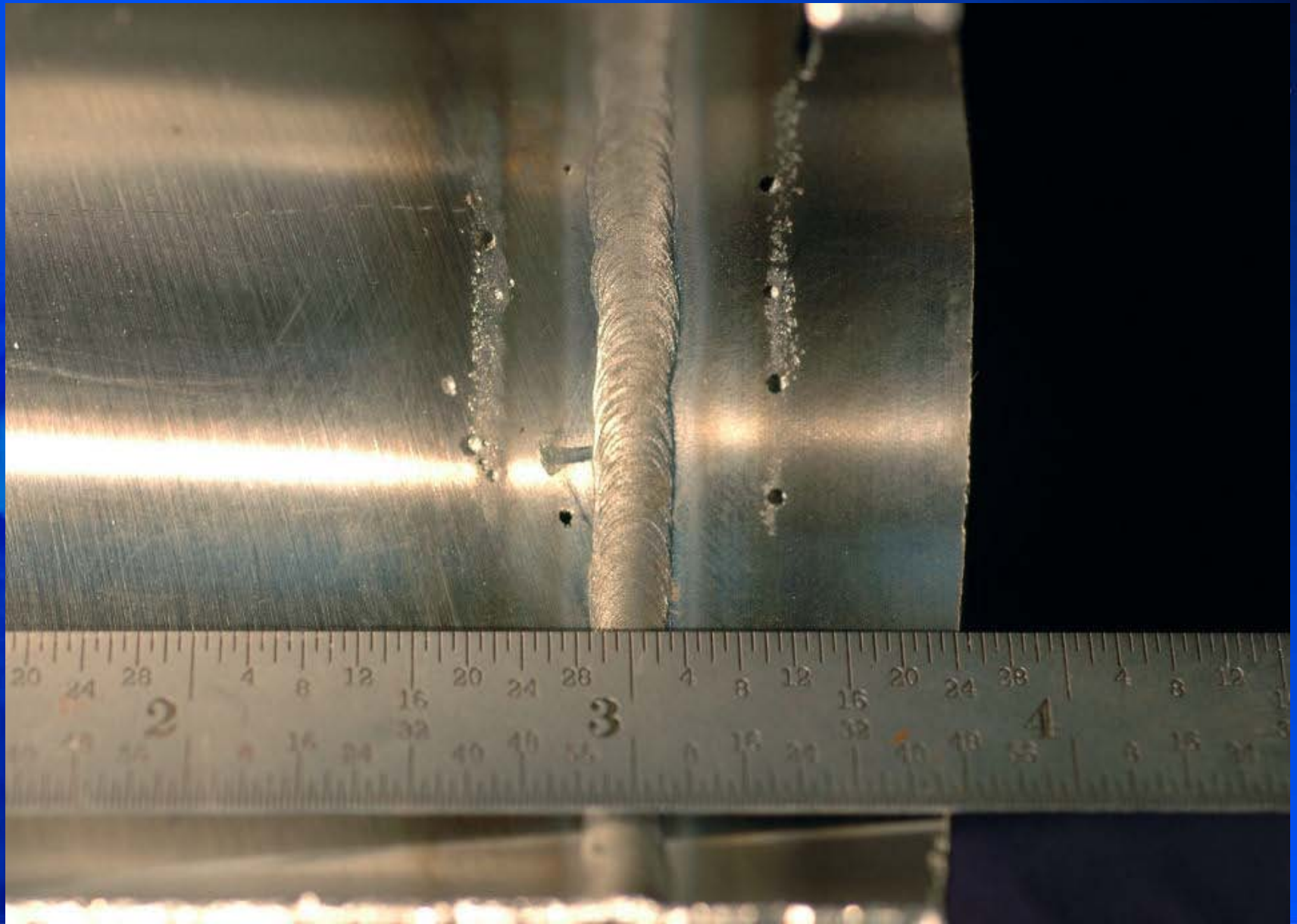
Applications

- ***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?

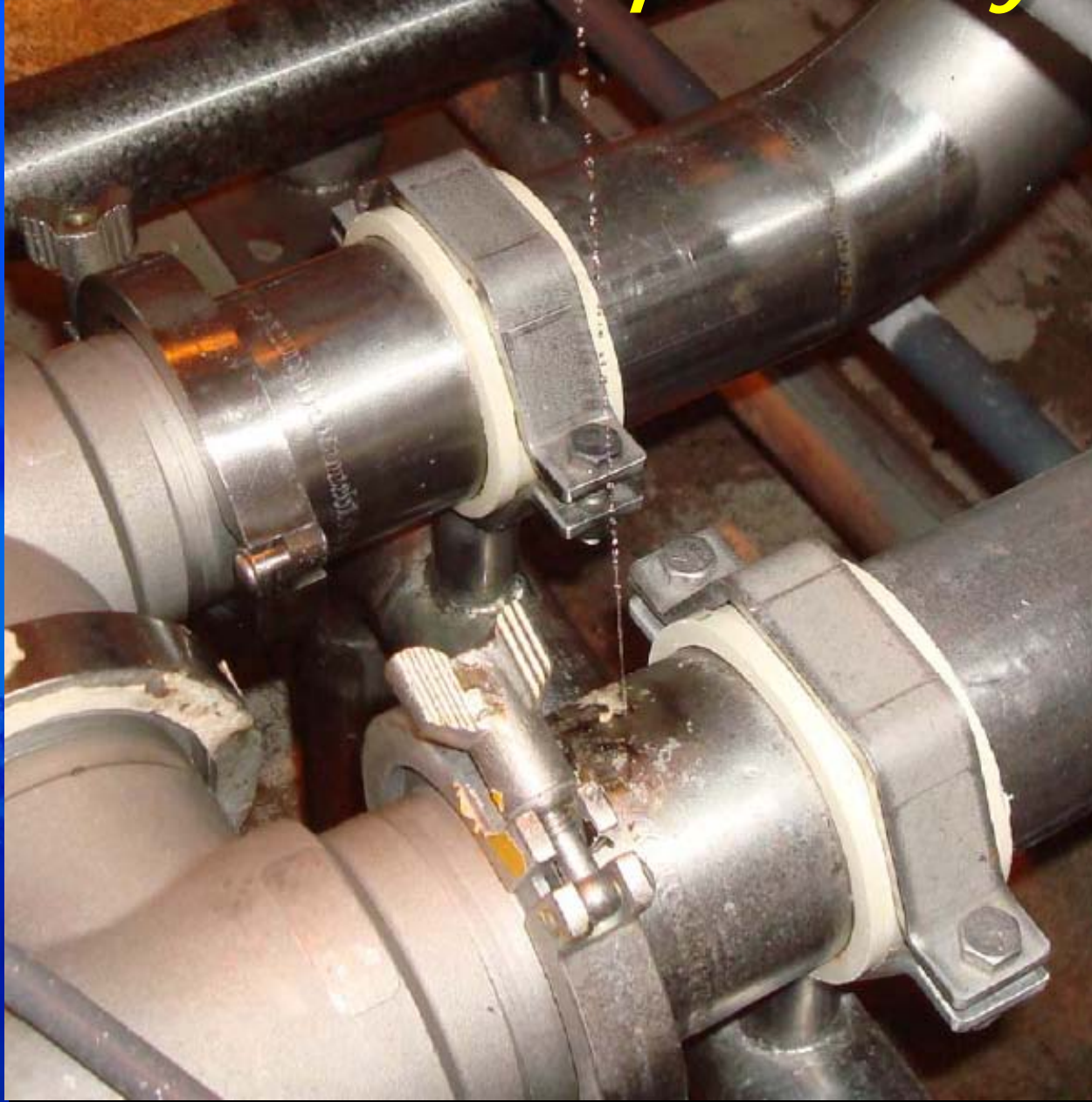


Photo courtesy of Steve Cook

*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.

Photo courtesy of Kraft Foods

Bearing Corrosion Salt Brine

Test

Bearings 1-8
RN20119
24 Hours 11-28-00



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?



Photo courtesy of Steve Cook

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***
- ***Nickelinstitute.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.

Materials Tri-Clover Code	BUNA "U"	EPDM "E"	VITON "SFY"	PTFE "G"	SILICONE "X"	POLYETHYLENE "N"
Temperature	– 65°to 210°F	– 60°to 300°F	– 20°to 350°F	– 40°to 450°F*	– 80°to 450°F	– 20°to 150°F
Acid	Good	Good to Ex.	Good to Ex.	Good to Ex.	Poor to Good	Good
Alkali	Fair to Good	Good to Ex.	Poor to Good	Excellent	Poor to Fair	Good
Fats/Oils	Good to Ex.	Poor	Good to Ex.	Excellent	Poor to Good	Good
Taste	Good	Good	Good	Excellent	Good	Excellent
Odor	Good	Good	Good	Excellent	Good	Excellent
Abrasion Resistance	Excellent	Good	Good	Fair	Poor	Fair
Compression Set	Good	Fair	Good to Ex.	Cold Flows	Good to Ex.	Cold Flows
Tri-Clover Color Code (Identified by a color dot)	Red	Green	Yellow and White	None	Pink	Transparent

*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***

The background of the slide is a blue-tinted image of Earth as seen from space. The curvature of the planet is visible on the left side, showing the outlines of continents and oceans. The rest of the background is a deep blue gradient representing the sky or space, with some faint, distant stars visible in the upper right corner.

Questions?