Technical Data Monograph

Compatibility of Prolystica® 2X Concentrate Neutral Detergent and Other Neutral Detergents with Soft Metal Substrates
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Prolystica 2X Concentrate Neutral Detergent is a concentrated liquid detergent designed for use in ultrasonics and automatic washers/disinfectors for the processing of surgical instruments. The purpose of this study was to compare the compatibility of Prolystica 2X Concentrate Neutral Detergent and eight additional neutral detergent products with two soft metal substrates commonly used in the manufacture of surgical instruments, utensils, trays, and medical devices.

**Purpose**

Prolystica 2X Concentrate Neutral Detergent (STERIS® Corporation), Asepti-Ware® (Huntington® brand, Ecolab®, Inc.), Neutrawash Detergent (Getinge USA, Inc.), Neutrawash Plus Detergent (Getinge USA, Inc.), PowerCon™ Neutral pH Detergent Concentrate (Getinge USA, Inc.), V. Mueller® Instra-Clean™ Low-Sudsing Detergent Concentrate (Cardinal Health), Neutral Low Foam Automatic Detergent Super Concentrate (Medline Industries, Inc.), SuperNova®.25 NpHD Detergent (Case Medical, Inc.®), and Liquiclean-H® (The Ruhof Corporation) were tested for compatibility with two soft metal substrates. Coupons representing brass and aluminum were used in the study.

The substrate compatibility was evaluated by determining the corrosion rate of a given metal substrate. This corrosion rate was based on weight loss expressed as mils per year (mpy) after 48 hours at 50˚C in static immersion in a product dilution of two times the highest concentration recommended on the label, up to a maximum of two ounces/gallon. The higher the corrosion rate, the more corrosive the product dilution is to the metal. A low corrosion rate is therefore desirable.

To simulate worst-case conditions and effects that might only be apparent over extended time periods, the exposure time and temperature were exaggerated to maximize effects. The coupons were cleaned, air dried, and desiccated. The coupons were weighed before and after exposure, and the corrosion rate was calculated based on weight loss data. The coupons were also visually examined for any signs of corrosion or pitting. Additional coupons were exposed to a tap water control under the same test conditions. The control was used to distinguish between the corrosive effects of water and the effects of the detergent product, and to evaluate the detergent’s ability to provide protection from that corrosive water effect.

**Methods**

Evaluation of compatibility is important since repeated exposure to various chemistries has the potential to lead to deterioration of the integral parts of instrumentation and equipment. Incompatibility can lead to refurbishment / replacement of delicate instrumentation and costly repairs of equipment. Prolystica 2X Concentrate Neutral Detergent caused no negative effects on any of the two soft metal substrates tested when compared to water alone. The corrosion rates for brass and aluminum substrates were less than one mpy, and were comparable to tap water (control).

Brass is an alloy that is not only used in the construction of surgical instruments, but also commonly found as parts within automated washer/disinfectors. Thus good compatibility with this material is important for maintaining both instrumentation and equipment alike. Visual inspection of the brass coupons revealed that SuperNova.25 and Neutrawash Plus caused uneven discoloration.
V. Mueller Instra-Clean, PowerCon Neutral, Medline Neutral Super Concentrate, Neutrawash, and Liquiclean-H caused severe dark discoloration, while Asepti-Ware turned the coupons a more orangish-brassy color worse than tap water (control). The corrosion rates for Neutrawash and Liquiclean-H were greater than one mpy.

Aluminum is one of the most difficult metals to protect because it is highly susceptible to corrosion from water alone. The higher pH of a poorly designed neutral chemistry often exacerbates the corrosion problem, whereas a well designed neutral cleaning chemistry will not contribute to corrosion. With current industry trends leading to more instrument trays and transport carts being manufactured out of various types of aluminum, good compatibility with this material is becoming increasingly important. Visual inspection of the aluminum coupons revealed that exposure to Prolystica 2X Concentrate Neutral Detergent caused no negative effects compared to water alone, whereas exposure to SuperNova 0.25, Liquiclean-H, Asepti-Ware, and Neutrawash Plus caused mild to moderate discoloration. Exposure to V. Mueller Instra-Clean and Medline Neutral Super Concentrate caused heavy dark discoloration. The corrosion rates for Asepti-Ware, PowerCon Neutral, Neutrawash, Neutrawash Plus, and Liquiclean-H were all greater than one mpy.

Substrate Compatibility
48 hrs, 50°C

Brass CDA 4

- Prolystica 2X Concentrate Neutral Detergent 1 oz/gal
- SuperNova.25 NpHD Detergent 2/4 oz/gal
- Neutrawash Plus Detergent 2 oz/gal
- Asepti-Ware 2 oz/gal
- V. Mueller Instra-Clean Low-Suds Detergent Concentrate 2/4 oz/gal
- PowerCon Neutral pH Detergent Concentrate 2/10 oz/gal
- Neutral Low Foam Automatic Detergent Super Concentrate 2/4 oz/gal
- Neutrawash Detergent 2 oz/gal
- Liquiclean-H 2 oz/gal
- Tap Water Control
- Unexposed Dry Control
Aluminum

<table>
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<tr>
<th>Substrate</th>
<th>Data</th>
<th>Prolystica 2X Neutral Detergent 1 oz/gal</th>
<th>Asepti-Ware 2 oz/gal</th>
<th>PowerCon Neutral pH Detergent Concentrate 2/10 oz</th>
<th>Neutrawash Plus Detergent 2 oz/gal</th>
<th>Neutrawash Plus Detergent 2 oz/gal</th>
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<tr>
<td>CDA 443 (brass)</td>
<td>MPY</td>
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<td>dark, golden-brassy color</td>
<td>uneven darkening w/ blue and purple iridescent patches</td>
<td>heavy, uneven purple and blue iridescent patches</td>
<td>uneven discoloration</td>
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<tr>
<td>Al 1100</td>
<td>MPY</td>
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<td>1.44</td>
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<td>slight darkening</td>
<td>iridescent discoloration</td>
<td>iridescent discoloration</td>
<td>dark brown iridescent darkening</td>
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Prolystica 2X Neutral Detergent 1 oz/gal
SuperNova.25 NpHD Detergent 2/4 oz/gal
Liquiclean-H 2 oz/gal
Asepti-Ware 2 oz/gal
Neutrawash Plus Detergent 2oz/gal
V. Mueller Instra-Clean™ Low-Suds Detergent Concentrate 2/4 oz/gal
Neutral Low Foam Automatic Detergent Super Concentrate 2/4 oz/gal
Tap Water Control
Unexposed Dry Control
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<td>0.68</td>
<td>0.55</td>
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<td>heavy, uneven purple and blue iridescent patches</td>
<td>uneven dark discoloration</td>
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<td>extremely heavy, uneven dark grey</td>
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<td>dark iridescent discoloration</td>
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**Conclusion**

Under the exaggerated time and temperature conditions of this study, Prolystica 2X Concentrate Neutral Detergent had good substrate compatibility with both of the soft metal substrates. All of the competitive chemistries evaluated caused some level of negative impact on the brass and aluminum materials beyond the impact of tap water alone.

References: Data on file.