

**REPORT NUMBER:QRH01-4312**

**Date:** 18 Jul 2001  
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**Client:** Lanotec Australia Pty Ltd  
**Contact:** Mr G Boyle

**Description:** Chemical stability testing of lanolin based spray (Sample 1) and lanolin based grease (Sample 2).

**Procedure:** Testing was performed in accordance with, or as a modification of, AS 1580.460.2 'Methods of Tests for Paints and Related Materials - Resistance to Alkaline Conditions'.  
Products were applied, as per the manufacturer's specification, to mild steel coupons<sup>1</sup> (approx. 100x20x3mm) then immersed in chemical solutions (% v/v) for a given duration as listed. Observations were recorded for the immersed area (only) of coated coupons.

**ETRS**

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ETRS Pty Ltd  
A.C.N. 006 353 046  
A.B.N. 21 006 353 046  
40 Reginald Street  
Rocklea  
PO Box 82  
Brisbane Market  
Qld 4106 Australia  
Fax (07) 3277 3823  
Phone (07) 3275 2633  
Email [www@etrs.com.au](mailto:www@etrs.com.au)

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<sup>1</sup> Preparation involved acid/ solvent cleaning as per ASTM G1-81 'Preparing, cleaning and evaluating corrosion test specimens'.



**Results:**

Solution Type	Duration	Observations	
		Sample 1 – Lanolin Spray	Sample 2 – Lanolin Grease
<b>Acidic Solutions</b>			
1% Hydrochloric Acid (HCl)	1 hour	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Minimal effect – slight loss of gloss - slight corrosion from edges	Minimal effect – slight loss of gloss
10% Hydrochloric Acid (HCl)	1 hour	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Minimal effect – slight whitening / loss of gloss - slight corrosion from edges	Minimal effect – slight loss of gloss
1% Nitric Acid (HNO <sub>3</sub> )	2 hours	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Minimal effect – slight whitening / loss of gloss - slight corrosion from edges	Minimal effect – slight loss of gloss
10% Nitric Acid (HNO <sub>3</sub> )	1 hour	Minimal effect – slight loss of gloss - slight corrosion from edges	Minimal effect – slight loss of gloss
	4 days	Moderate effect – softening with 50% loss of material.	Moderate effect – softening with 50% loss of material.
1% Sulphuric Acid (H <sub>2</sub> SO <sub>4</sub> )	2 hours	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Minimal effect – slight loss of gloss - slight corrosion from edges	Minimal effect – slight loss of gloss
10% Sulphuric Acid (H <sub>2</sub> SO <sub>4</sub> )	1 hour	Minimal effect – slight loss of gloss - slight corrosion from edges	Minimal effect – slight loss of gloss
	4 days	Moderate effect – majority loss of material and attack.	Moderate effect – softening with 50% loss of material.
1% Phosphoric Acid (H <sub>3</sub> PO <sub>4</sub> )	2 hours	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Moderate effect – slight (20%) loss of material.	Minimal effect – slight loss of gloss
10% Phosphoric Acid (H <sub>3</sub> PO <sub>4</sub> )	2 hours	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Moderate effect – softening with 50% loss of material.	Minimal effect – slight loss of gloss

Solution Type		Duration	Observations
			Sample 1 – Lanolin Spray
1% Acetic Acid	1 hour	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Minimal effect – slight loss of gloss & blackening.	Minimal effect – slight loss of gloss
10% Acetic Acid	1 hour	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Minimal effect – slight loss of gloss & blackening	Minimal effect – slight loss of gloss
<b>Alkaline Solutions</b>			
1% Sodium Hydroxide	30 mins.	Moderate effect – whitening and high level softening of film	Moderate effect – whitening at surface of film (ie < 10% of film thickness) and high level softening
	4 days	High level degradation – whitening and loss of coating	High level degradation – whitening, high level softening and loss of coating (ie 10 to 50% of film thickness)
10% Sodium Hydroxide	30 mins.	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	4 days	Moderate effect – whitening and high level softening of film	Moderate effect – whitening at surface of film (ie < 10% of film thickness)
10% Sodium Hypochlorite (eg. Bleach, pool chlorine)	1 hour	Minimal effect – slight loss of gloss	Minimal effect – slight loss of gloss
	2 days	Moderate effect – whitening and softening of film	Moderate effect – whitening at surface of film (ie < 10% of film thickness)
<b>Organic Solvents</b>			
100% Methanol	1 hour	Minimal effect – slight softening	Minimal effect – slight softening
	2 day	Minimal effect – slight softening	Minimal effect – slight softening
100% Methyl Ethyl Ketone (MEK)	1 hour	Moderate effect – whitening, softening and loss of film	Moderate effect – whitening, softening and 20 % loss of film thickness
	2 day	Severe effect – complete loss of film	High level degradation – 80 % loss of film thickness
100% Methylene Chloride	1 hour	Severe effect – complete loss of film	High level degradation – 80 % loss of film thickness
	2 day	Severe effect – complete loss of film	Severe effect – complete loss of film
100% Kerosene	1 hour	Moderate effect – softening	Moderate effect – softening
	2 day	Severe effect – complete loss of film	High level degradation – 90% loss of film



## Comments

The following comments can be made based on the above results;

- The lanolin based products (Sample 1 & Sample 2) showed very good resistance to acidic solutions with minimal evidence of degradation caused by immersion.
- Degradation due to acidic solutions was sometimes observed (eg. Acetic and Phosphoric Acid), at the liquid/air interface where oxidation (blackening) of the film would be more likely. In addition, attack of the mild steel coupons<sup>2</sup> along the edges often caused indirect loss of film due to the undercutting effect of the attack.
- The lanolin based products exhibited low to moderate resistance to alkaline solutions with whitening and softening most likely caused by the saponification of fatty acids inherent in the product.
- The products exhibited poor resistance to most organic solvents.
- Degree of product degradation would be expected to increase (ie. for alkaline and organic solvent solutions) with increased aggravation<sup>3</sup> of product surface.

R Mendel  
Authorised Signatory

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<sup>2</sup> Attack of the mild steel will tend to initiate at the edges where lower film thickness will allow faster permeation of the acidic solution.

<sup>3</sup> Aggravation by scrubbing, turbulence and other mechanical action will tend to further expose unaffected product to the detrimental effects of the solution.