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**Technical
Evaluation of a
Freshclean**

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1. INTRODUCTION

A sample of Freshclean has been submitted for laboratory analysis at Scientifics Ltd, Doncaster.

The objective in carrying out the technical evaluation was to assess the product's suitability for use within the railway environment and also to identify possible problems, which may occur during chemical application.

The areas of particular concern relate to health and safety, damage to surfaces and paint systems together with environmental issues.

2. PRODUCT DETAILS

The product received at Scientifics Ltd, Doncaster and its proposed application is as follows:

Sample No	Product	Dilution
DOC08008/01	Freshclean	1 scoop/750ml

The product is in a powder form in individual sachets to be added to the appropriate amount of water this can be 1 scoop per 750 ml for trigger spray or 3 scoops in 5 litres for mopping. The product was tested at its strongest working strength for the 'worse case scenario'.

3. DESCRIPTION OF WORK CARRIED OUT

Considering several aspects of its use the evaluation of the product has been carried out as follows:

- **Health and Safety**

The formulation of the products has been considered, taking into account the various components included. The hazards associated with each individual component have been studied as well as any additional hazards, which may occur due to their combination in single product. It has been noted that the inside of a coach has inherently poor ventilation when the air conditioning is not in operation. This has been assumed to be the case when making these evaluations.

In addition confidential information on the formulation of each product has been supplied to Scientifics. This assessment has taken into account this information.

- **Possible Damage to Surfaces**

Chemical resistance tests based on BS3900 Part G5 Method 2 to assess the likely effect of the products on a range of surfaces encountered within the railway environment. Substrates tested include GRP, Formica, rubber and current paint systems in use. The range of paints systems employed within the rail vehicle environment is becoming diverse and include the following systems:

2 pack water based paint, 2 pack direct gloss paint, 2 pack clear over base paint, Single pack BR specification 81 paint and Virgin Voyager paint systems.

Total immersion corrosion: Tests on materials at recommended working strength to determine the effect of the material on specific metals.

- **Environmental Considerations**

Assessment of the product's environmental impact. Test conducted to assess, where applicable, suitability for disposal via depot effluent systems. Tests include:

- * **Oil emulsification characteristics** to determine the likely effects from contact with oil and to establish whether any special arrangements for disposal are likely to be required.
- * **pH measurements** at recommended working strengths. pH tests are carried out to confirm manufacturers data and to establish health and safety implications.
- * **Chemical Oxygen Demand (COD)** – results would indicate whether the use of the product is likely to result in any infringement of local Consent to Discharge Limits, possibly leading to increased effluent charges.

- **Performance Tests**

The following laboratory based tests have been carried out. Where possible British Standard tests have been conducted and results have been compared with those results produced by current products successfully used by the railway businesses.

Standard cleaning efficiency tests – Oil/grease removal – cleaning efficiency based on BS 4948 “Method for the Assessment of the Visible Soiling by Bodily Contact of Upholstery Fabrics” adapted and developed by Scientifics to assess the effectiveness of cleaning formulations used within a railway environment.

Foaming characteristic test carried out to assess the level of foam produced. Information from the test would establish whether any problems relating to the production and persistence of foam would occur in practice.

Surface tension – to determine the products ability to “wet” the surface, thereby providing a good even coverage of product on the vehicle surface.

4. LABORATORY TEST RESULTS

The results are given in the following tables.

Product			Freshclean	Comments/BR Specification 698 Requirement
Sample No			DOC08008/01	
Dilution			1 sachet or 1 scoop/750ml	
pH	w/s		9.5	pH should be between 6-10.
Total Immersion Corrosion @ w/s (mils per year) [] Limits	Mild Steel	[10]	<0.1	Below the tolerated limits.
	Aluminium	[10]	<0.1	
	Copper	[5]	<0.1	
	Brass	[5]	<0.1	
Standard Cleaning Efficiency @ w/s			Comparable with current products.	Current products in use >94%
Foam Characteristics @ w/s (cm)			3cm	<5cm
Oil Emulsification @ w/s			Does not form stable oil/water emulsions.	Should not form stable oil/water emulsions.
Chemical Oxygen Demand @ w/s (mgO ₂ /litre)			2470	1000 BR 698 Limit
Effect on Air Hoses, Gangway Connectors, Decals etc			No detrimental effects.	Should have no detrimental effect on any of the substrates tested.
Chemical Resistance Tests @ w/s	<i>GRP</i>		No detrimental effects.	No defects apparent.
	<i>Formica</i>		No detrimental effects.	
	<i>Upholstery</i>		No detrimental effects.	
	<i>2 Pack Polyurethane Direct Gloss</i>		No detrimental effects.	
	<i>2 Pack Clear Over Base Paint</i>		No detrimental effects.	
	<i>2 Pack Water Based Paint</i>		No detrimental effects.	
	<i>Virgin Voyager Paint</i>		No detrimental effects.	
	<i>Spec 81 Single Pack alkyd paint</i>		No detrimental effects.	

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5. HEALTH AND SAFETY IMPLICATIONS

The information supplied on the formulation (from the MSDS) of all six products has been considered, taking into account the various components included. The hazards associated with each individual component have been studied as well as any additional hazards, which may occur due to their combination in a single product. In addition, the format and information supplied via the manufacturers safety data sheet (MSDS) has been reviewed and any amendments recommended where deemed necessary.

The product is classed as Irritant. It can cause irritation to the eyes, respiratory tract and skin if in contact with the product. It is recommended that personal protective clothing such as gloves be worn when handling/using the product. If there is a risk of splashing then goggles should be worn.

Any problems reported by staff should be fully investigated and the products' use reviewed on a regular basis.

6. CONCLUSIONS AND RECOMMENDATIONS

A laboratory evaluation has been carried out on a range of cleaning products from RJN Chemicals Ltd. The purpose of the evaluation was to assess the products suitability for use within the railway environment and is summarised below:

- No detrimental effects were visible on any of the paint systems.
- In laboratory based cleaning efficiency tests the product was comparable with current products.
- Total immersion corrosion test results for metals normally encountered in the railway environment were within the tolerated limits.
- The Chemical Oxygen Demand (COD) values are above normal Consent to Discharge Limits; however these do vary from place to place. If any remaining solution is to be disposed of down the drainage system further dilution will be required.
- The pH is within normal consent to discharge limits at its strongest dilution

Scientifics welcome an opportunity to discuss the results of this evaluation and the possibility of assistance in the near future.

Further advice relating to the above recommendations should be directed to Scientifics, Doncaster (Tel: 01302 380151) or alternatively email at doncaster@scientifics.com.

7. DISTRIBUTION LIST

Report No: LR DON 1808

Title: Technical Evaluation of Cleaning Product: Freshclean

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APPENDIX A
MANUFACTURERS SAFETY DATA SHEETS