



TECHNICAL DATA SHEET

AQUA 2000 JOINERY PRESERVATIVE (concentrate) **HIGH PERFORMANCE WATER BASED MICRO-EMULSION**

INTRODUCTION

The Aqua 2000 timber treatment products are based on microemulsion technology which gives fully water based products high levels of performance with minimal environmental impact and operator exposure.

The products are available in a 2.5L concentrate plastic container for application by brush, coarse spray, or for use in dip applications.

The products can combine a range of pesticidal active ingredients in systems which can also contain pigments and water repellents to give a very versatile range of liquid products for use in both amateur and professional applications.

PERFORMANCE CHARACTERISTICS

Penetration Profiles following Surface Application.

In these tests a range of product types were applied topically to timber surfaces at a rate of 250 ml per square metre. After being allowed to dry for 7 days at UK ambient temperature the timber samples were sectioned by microtome and the active ingredient extracted and analysed to allow us to build up a profile of pesticide deposition through the wood.

The results in Figure 1 below compare results obtained with micro emulsion, solvent solution and a conventional emulsion and clearly demonstrate that the water based micro emulsions used in the Aqua 2000 range give penetration results that are very similar to those achieved with conventional solvent solutions and much better (ie deeper penetration) than those achieved with a conventional emulsion product.

Depth (mm)	LOADING (g/m ³)		
	Aqua 2000	Solvent	Emulsion
0 - 1	350	320	440
1 - 2	80	80	85
2 - 3	40	55	10
3 . 4	30	35	2
4 . 5	15	15	0
5 . 6	5	5	0
6 - 7	2	2	0

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Biological Efficacy following Surface Application.

A range of EN (European Standard Tests) were carried out at the Building Research Establishment (BRE) to assess the effectiveness of micro emulsion formulations of synthetic pyrethroid insecticides and some of these are given in Figures 2-4 below. The results clearly demonstrate the efficacy of these systems even when used at levels much below the normal level of application (300 mg active per square metre).

Figure 2

Loading (mg/m ²)	EN118 TERMITES (R. SANTONENSIS)		
	Live Termites	% Mortality	Grade of Attack
0	164	36	4
100	0	100	1
200	0	100	0
300	0	100	0

Figure 3

Active Loading (mg/m ²)	EN46 HOUSE LONGHORN BEETLE (H. BAJULUS)			
	Larvae Retrieved			% Mortality
	Dead		Live	
	No Tunnel	Tunnel		
0	2.5	0	7.5	25
100	10	0	0	100
200	10	0	0	100
300	10	0	0	100

Figure 4

Active Loading (mg/m ²)	POST-TREATMENT EMERGENCE COMMON FURNITURE BEETLE (A. PUNCTATUM)		
	Emergence of Beetles		
	Exit Holes	Beetles Emerged	% Population
0	3.6	3.8	38
200	0	0	0
300	0	0	0

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Fluid Uptake following a 3 minute immersion (dip) test.

In these tests weighed blocks of timber measuring ca 25 x 3 x 1.5 cm, with the ends of the block sealed with wax (for water based fluids) or water based resins (for solvent based fluids) to prevent any uptake via the end grain, were immersed fully in the fluid for a period of 3 minutes. At the end of this period the blocks were removed and any excess fluid removed, the blocks were weighed and the uptake of fluid determined.

The weight uptake for a range of water based products in both smooth (planed) timber and rough (unplaned) timber are compared against a commercially available solvent based product in Figures 5 . 6 below. In the case of the planed timbers these were also examined for any signs of grain raising after treatment.

Figure 5

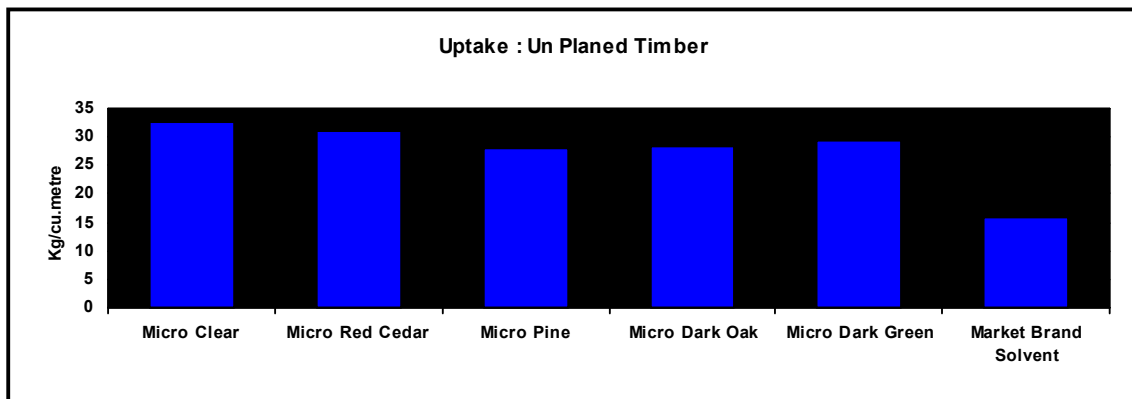
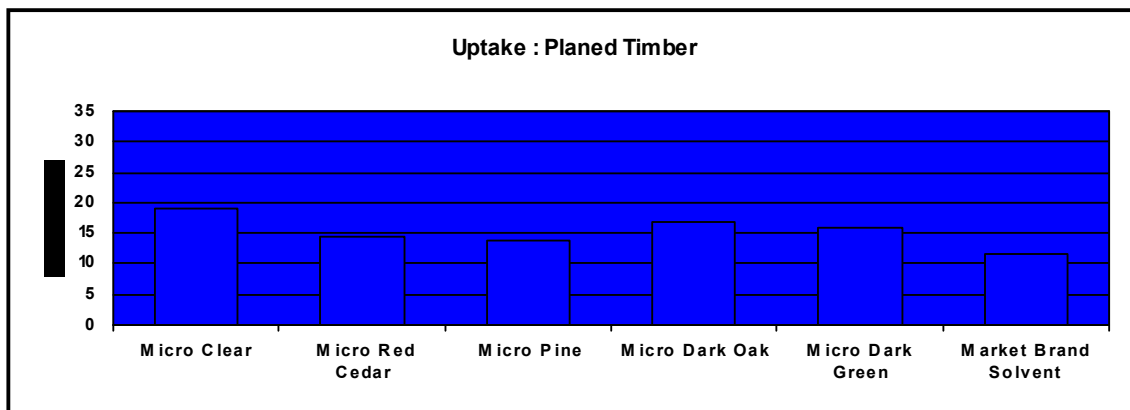


Figure 6



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PERFORMANCE CHARACTERISTICS

Drying Characteristics following 3 minute immersion.

Following determination of initial uptake as described in 2.3 above the individual blocks were periodically re-weighed over a period of 2 hours to determine the rate at which the absorbed fluid evaporated (dried) and the results for these tests are shown in Figures 7 . 8 below.

Figure 7

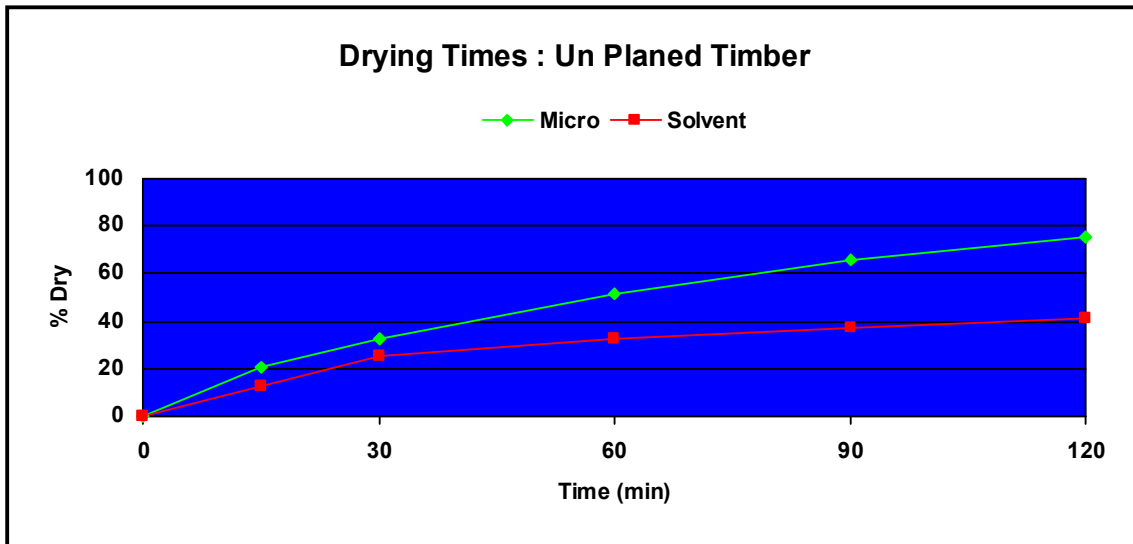
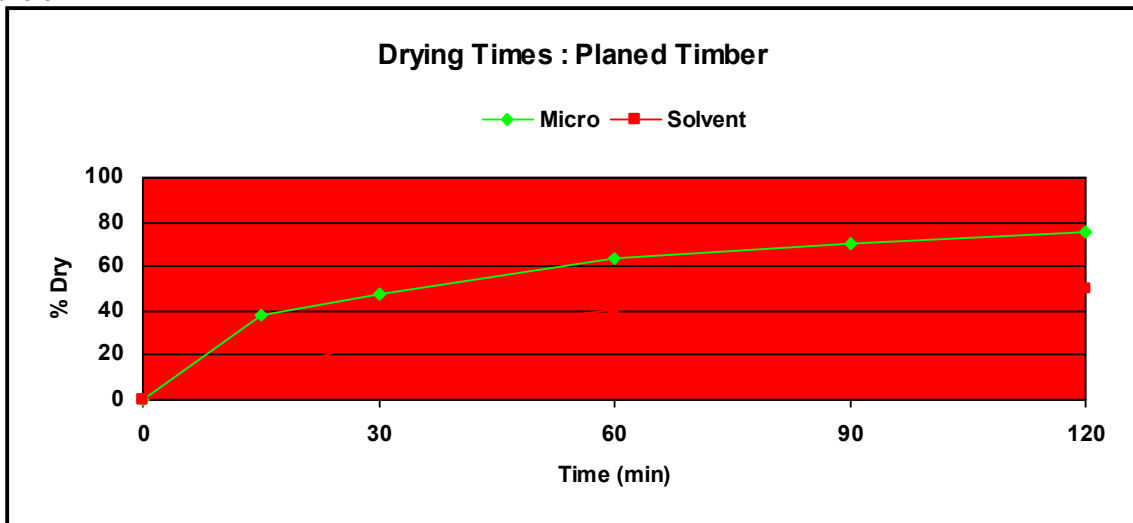


Figure 8



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Emissions of Volatile Organic Compounds (VOC's) during the drying process.

As treated timbers are allowed to dry out naturally following treatment either by a surface application (brush or spray) or by an immersion (dipping) process the carrier fluid evaporates into the atmosphere. In the case of micro emulsions this carrier fluid is water whilst in the case of commercially available solvent based products this fluid is comprised mainly of VOCs.

In Figure 9 below we compare the level of VOC emissions following surface treatment of 100,000 square metres of timber, at a rate of 250 ml product per square metre, for the Micro-Care micro emulsions and a commercially available solvent based product.

Figure 9

V.O.C Emissions following Surface Treatment of 100,000m ² of timber at 250ml/m ² .		
	Commercial Product	Aqua 2000
Product Type	Solvent Based RTU	Water Based Micro-emulsion RTU
VOC Rating	Very High	Minimal
VOC Content	>50%	0%
VOC Emission	20,000Kg	Zero
HSE Re-entry time	48 Hours	1 Hour
Classification		

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CONCLUSIONS

The data presented above clearly demonstrates that microemulsions can deliver all of the benefits of solvent based products without the inherent environmental & operator exposure issues associated with the latter type of product.

Indeed in some aspects of performance such as the rate of drying and rate of uptake following immersion treatments the microemulsions can produce clear improvements.

SUMMARY

The use of water based microemulsions as an alternative to the conventional solvent based products offers many significant benefits:

- **High levels of insect and fungal control**
- **Even and consistent treatment levels**
- **Lower levels of fluid irritancy and toxicity**
- **Improved levels of pigment dispersion giving enhanced surface finish**
- **Complete removal of VOC emissions to the environment before, during and after treatment**
- **Reduction in operator exposure to VOC emissions and the associated active ingredient volatilisation before, during and after treatment**
- **Lower re-entry times following treatment**
- **Improved levels of fluid (and active ingredient) uptake during immersion treatments**
- **Significant reductions in drying times following treatment resulting in much shorter “down times” for subsequent processing of timbers**
- **No Odours**
- **No grain raising associated with conventional water based products**