



MANALOX WB 10

WATER REPELLENT IN WOOD STAINS

Description

A degree of water repellency in a wood stain or similar finish is a desirable property. Substrates treated with water repellents will be less prone to swelling, cracking, dirt pick up and fungal attack. This data sheet describes the use of the water repellent **MANALOX WB10** as a hydrophobic additive for wood stains.

Guidance on the application of **MANALOX WB10** in clear water repellent systems is given in the data sheet **MANALOX WB10**.

MANALOX WB10 is a fully formulated water based water repellent system containing no organic solvents. The composition of **MANALOX WB10** has been optimised to give maximum dimensional stability to timber, whilst providing a high degree of surface water shedding (so called beading or “duck’s back” effect).

Formulations

MANALOX WB10 can be pigmented to produce a low solids stain formulation (10 % approx.) for application to fence panels or garden sheds. The formulations below have been evaluated alongside untreated controls and four commercially available water based products promoted for DIY woodcare treatment, all of which claim water repellent properties.

The effectiveness has been demonstrated in reduced swell and water pick up on western red cedar, PCP treated larch lap and pine.

Formulations (Cont.)

1 - 10 % solids fence / shed application

1.1 – Composition (%)

	Supplier	Low viscosity	Structured
MANALOX WB10	FedChem	99.00	71.00
Acrylic dispersion	Harlow Chemicals (Mowlith DM772)	-	5.35
Natrosol 250 HR	Aqualon	-	0.59
A/D Pigment Yellow 12	Holiday Dispersions	0.40	0.40
A/D Pigment Red 112	Holiday Dispersions	0.47	0.47
A/D Pigment Black 7	Holiday Dispersions	0.13	0.13
Acticide SR 928	Thor Chemicals	-	1.00
Water		-	21.06
Total		100.00	100.00

Formulations (Cont.) – 1.2 - Characteristics

The available physical data on all test materials are shown below :

	% Solids content	Viscosity (20 °C) mPa.s	
		Brookfield S3/20 RPM	Cone/Plate ICI
MANALOX WB10 Low viscosity	9.90	30	3
MANALOX WB10 structured	10.50	500	
Commercial			
Sample 1	8.40	1300	25
Sample 2	7.60	650	10
Sample 3	11.90	750	10
Sample 4	8.10	750	30

Application Results

a) Low viscosity **MANALOX WB10**

Western Red Cedar

Three 19mm cubes per product, all taken from the same piece of wood.

The cubes were placed in an environment of 65 % R.H. and allowed to stabilise for three days. The cubes were then submerged in each test solution for 30 seconds and the controls were immersed in water for the same period. After dabbing off the excess product all the cubes were allowed to dry overnight then placed in a controlled environment for three days at 65 % R.H. at a temperature of 20 ± 5 °C.

Application Results (Cont.)

The cubes were then totally submerged in water.

Swell in the tangential direction was continuously monitored electronically and water pick up noted at the end of the test period. Both swell and water absorbed are expressed as a % of the original weight and dimension of the cube prior to submergence in water.

	% swell (120 mins)	% water uptake (120 mins)	Cosmetic repellency
Control	0.85	42.0	V. poor
MANALOX WB10 Formulation	0.34	9.4	V. good
Commercial			
Sample 1	1.21	46.9	Poor
Sample 2	1.06	44.3	Poor
Sample 3	1.19	38.1	Poor
Sample 4	1.23	54.4	Poor

It should be noted that the commercially available samples cause the wood to swell and take up more water than the untreated wood. This is not the case with **MANALOX WB10**

b) Structured MANALOX WB10

	% swell (15 mins)	% water uptake (15 mins)	Cosmetic Repellency
Control	1.11	24.1	V. poor
MANALOX WB10 Formulation	0.16	2.5	V. good
Commercial			
Sample 1	0.31	17.3	Poor
Sample 2	0.50	17.3	Poor
Sample 3	0.29	17.9	Poor
Sample 4	0.20	17.1	Poor

Application Results (Cont.)

b) Structured MANALOX WB10

Progressive water pick up on Western Red Cedar and PCP treated larch lap :

In addition to the above testing field trials were simulated by submerging PCP treated larch lap and Western Red Cedar for 30 secs and dabbing off any excess material.

After drying overnight under atmospheric conditions all the test pieces were submerged in water. The water absorbed was then expressed as a % of the original weight of the panels over a 60 minute test period.

Western Red Cedar	% water uptake			
	1 min	5 mins	15 mins	60 mins
Control	21.0	30.8	34.4	39.9
MANALOX WB10 Formulation	1.0	2.6	4.4	8.5
Commercial				
Sample 1	7.2	14.2	20.0	28.3
Sample 2	7.6	15.2	19.1	27.1
Sample 3	5.8	13.0	17.8	26.4
Sample 4	4.8	11.9	19.0	28.2

PCP treated Larch	% water uptake			
	1 min	5 mins	15 mins	60 mins
Control	21.6	32.4	39.2	43.2
MANALOX WB10 Formulation	1.7	4.0	8.2	15.9
Commercial				
Sample 1	6.4	14.6	21.5	33.6
Sample 2	9.5	16.1	22.8	30.0
Sample 3	8.8	15.9	19.0	30.7
Sample 4	7.6	14.1	24.2	34.7

Application Results (Cont.)

d) Structured MANALOX WB10

Simulated rainfall on Ponderosa pine.

The effect of rainfall has been simulated by delivering 2 x 50cc aliquots of water in a stream over 95 secs, from a height of 20 cm onto the end grain of treated and untreated Ponderosa pine set at 45 °.

The pine was treated by submerging in the test solutions for 30 secs, excess product dabbed off and allowed to dry overnight under atmospheric conditions.

The controls were similarly treated in water.

Water absorbed was then expressed as a % of the original weight of the panels.

	% weight increase	
	1 x 50cc	2 x 50cc
Control	58.8	65.4
MANALOX WB10 Formulation	1.1	1.8
Commercial		
Sample 1	4.9	7.5
Sample 2	8.5	14.0
Sample 3	5.1	7.2
Sample 4	3.9	9.5



Formulations 2 – Solutions containing 33% dry matter for high grade wood stains

	<i>Supplier</i>	
HD WB 10	FedChem	19.10
Acrylic polymer	Harlow Chemicals (Mowlith DM 772)	67.50
Luconyl red	BASF	2.75
Luconyl black	BASF	2.75
Coatex BR 125	Croxtan & Garry	0.26
Water		10.35
Total		100.00

The solution described above was compared with a water-based wood-care product available in DIY stores. The physical data are compared below :

	WB 10 solution	Commercial product
Dry matter in %	33.7	33.0
Specific gravity	1.00	1.06
Viscosity (Ford B4 cup), ins.....	80 sec.	86 sec.
Pigment concentration by volume (%).	3.1	4.0

Application Results - Pines samples:test type:

A coat of the product was painted on the 10 cm x 6 cm pine samples using a brush.

After drying overnight, half of the samples were covered with a second coat, then left to dry again until the following day.

All the samples were then immersed in water. The quantity of water absorbed is expressed as a percentage of the initial weight of the specimens throughout the experiment.

It should be noted that all samples are taken from the same piece of wood.

Application Results (Cont.)

	Number Of coat	Water absorption (% of initial weight)			
		5 min.	10 min.	15 min.	60 min.
HD WB 10 solution	1	2.3	4.0	5.0	9.4
Commercial product	1	3.6	5.1	6.2	9.9
Control samples	-	6.2	8.5	9.8	13.8
HD WB 10 solution	2	0.1	0.1	0.2	0.8
Commercial product	2	0.2	0.4	0.5	1.3
Control samples	-	6.2	8.5	9.8	13.8

The water repellent action of HD WB 10 is found to be superior to existing grades.

The formulations given are for guidance only and should be optimised by yourselves in your own formulations.

Blanching is a phenomena occasionally encountered when using water borne water repellents. It is normally only associated with wooden substrates where positive hydrostatic pressure exists.

FedChem L. L. C. has investigated the blanching effect in depth and has determined a number of conditions under which the phenomena might occur.

Regardless of the condition, or combination of conditions, the blanching phenomena can in most instances be related to poor penetration of the treatment. Instances of blanching are rare and often require one or more of the following conditions to become prevalent :

- An application temperature of < 10°C
- Flood coating
- Sandblasting timber
- Substrate pretreatment
- A substrate that contains > 25 % moisture, above the atmospheric level.

Application Results (Cont.)

In view of the conditions listed above in the following water borne water repellent treatment conditions are recommended :

- Remove excess solution by wiping or redistribution.
- Do not preclean substrates by sandblasting or with detergents.
- Do not apply < 10°C.
- Do not apply to wet substrates or in rainy conditions.
- Use only on porous substrates.
- Do not apply over stained surfaces.

As previously stated blanching is a phenomena occasionally experienced with water borne water repellent systems. In view of this FedChem L. L. C. have investigated ways of removing the problem should it occur as a result of unsuitable **MANALOX WB10** application conditions. The most suited removal technique in terms of effectiveness and health and safety considerations is to wipe the substrate with 2 Ethyl Hexanol.

It should be stressed that all relevant health and safety considerations be applied when using 2 Ethyl Hexanol as a remedial treatment.

MANALOX WB10 is based on a novel water borne technology and is a very effective product which exhibits water repellent performance similar to that of solvent based systems.

Safety

A Material Safety Data Sheet is available for **MANALOX WB10** and users should refer to it before commencing work with the product.