

Oceanic

WB10

Waterborne Water Repellent Description WB10 is a fully formulated, ready to use as supplied, water repellent system. Although originally developed for the treatment of timber it will also impart repellency to masonry and other substrates. It is a low viscosity aqueous dispersion of hydrophobic substances containing no organic solvent. WB10 is one of a range of novel water repellent formulations for which patent applications have been filed in a number of countries. The composition of WB10 has been optimised to give maximum dimensional stability to timber, whilst providing a high degree of surface water shedding (so-called beading effect). Useful performance is demonstrated on other building materials such as brick, stone and concrete, or as a water repellent additive for latex wood stains (see data sheet "The Use of WB 10 as a Water Repellent in Wood Stains"). The formulation may not be totally suitable for other substrates e.g. textiles.

Please consult our Technical Department for advice concerning other applications.

Typical properties

- Solid contents, % 9.4
- Boiling point, °C 100
- Specific gravity 1
- Appearance milky white liquid
- Odour slightly ammoniacal
- Viscosity at 25 °C, mPa.s 10
- Freeze thaw stability

Stable after 5 cycles the above data should be regarded as TYPICAL only. Supply specifications are available on request.

Note: WB10 separates into two layers upon standing for a period of time. Formulators are advised to place a note 'Stir or Shake Gently before Use' on the can.

Advantages

WB10 is a state-of-the-art water repellent suitable for consumer and industrial applications. It has a number of distinct advantages over conventional water repellents.

- Water based product, zero VOC no organic solvent.
 - Suitable for interior and exterior use.
 - Penetrating, colourless treatment.
 - Significantly reduces the water uptake and swelling of wood but still allows the passage of water vapour.
 - Pronounced water beading effect.
 - Multicoating is possible, even over the dry water repellent treatment.
 - Unlike some water repellents, overcoating with solvent and water based paints and varnishes is possible.
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Application

WB10 has been developed as an alternative to solvent borne DIY water repellent treatments for timber (e.g. decking, cladding, fencing, etc.). It has other applications which include high performance latex wood stains and building materials such as brick.

The ready to use product as supplied may be brushed, dipped or spray applied. The rate of absorption of the product is dependent upon the nature of the substrate to be treated. The product is usually absorbed into softwoods in less than 10 minutes.

A degree of repellence may be observed after 30 minutes. Full repellence, depending on climatic conditions, will usually be observed after 48 hours.

Unlike many other water repellents WB10 may be successfully multicoated to provide greater protection. Subsequent coats may be applied after a minimum drying period of 30 minutes. Normally there will be little advantage in applying more than two coats.

Coverage will vary somewhat depending on the porosity of the substrate and the method of application. The following coverage rates were obtained on several different materials. One coat of WB10 was applied by brush in each case.

- Fired clay brick (lbstock), m²/litre6
- Concrete, m²/litre 7
- Pine, m²/litre15
- Red Cedar, m²/litre16

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.

OCEANIC UK 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 pre-treatment
- A substrate that contains > 25 % moisture, above the atmospheric level.

Application (cont.)

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

- Remove excess solution by wiping or redistribution.
- Do not pre-clean substrates by sandblasting or with detergents.
- Do not apply

Application results

- a) **The technology** involved in developing WB 10 has been evaluated by the University College of North Wales, a centre of excellence in wood technology. All samples tested have been shown to pass ASTM D4446 (Ponderosa Pine). A copy of the university report can be provided on request.

b) In-house testing

Six 19 mm cubes of Western Red Cedar (4 planed and 2 end grain faces) were treated with the WB 10 emulsion by dipping for 15 minutes. The cubes were allowed to air dry for 3 days prior to being conditioned at 65 % relative humidity for a further 3 days. The cubes were then submerged in water and the percentage swelling and percentage water absorption recorded.

As a comparison the same technique was used to evaluate two popular commercially available DIY solvent based water repellent systems from the UK and USA markets.

Blank determinations on untreated timber were carried out as a matter of course.

Application results (cont.)

The following are mean results of six determinations:

| Treatment | % swell (30 mins) | % swell (90 mins) | % water uptake (120 mins) |
|-------------------|-------------------|-------------------|---------------------------|
| Control | 0.96 | 1.68 | 43.12 |
| Solvent based UK | 0.41 | 0.92 | 6.34 |
| Solvent based USA | 0.36 | 0.72 | 5.89 |
| WB 10 | 0.26 | 0.60 | 6.39 |

The results show that WB10 has provided a reduction in swelling of some 64 % compared to the blank even after 90 minutes immersion, and a reduction of around 85 % for water absorption. This is a high level of performance which compares well with the commercially available solvent based products used as a control.

c) Durability – Wood

Exposure studies were conducted comparing a version of WB10 designed for the USA marked a leading commercial solvent based product and an untreated control. 3" x 5" wood blocks were prepared from pine, red cedar, and 5ply plywood. Single applications of the test materials were applied to the blocks and after a suitable drying period they were placed outdoors in Bethlehem PA facing south at 45° angles. After one year exposure, the results are as follows :

| Pine | | | Red Cedar | | Plywood | |
|-----------|---------|--------|-----------|--------|---------|--------|
| Sample | Beading | % Abs. | Beading | % Abs. | Beading | % Abs. |
| Untreated | Poor | 11.6 | Poor | 21.1 | Poor | 36.9 |
| Solvent | Poor | 4.8 | Fair | 4.9 | Good | 9.2 |
| Water | V. good | 4.6 | V. good | 3.4 | V. good | 23.3 |

The new water based formulation has retained most of its effectiveness after one year's exposure. Its beading properties were judged to be the overall best and the resistance to water absorption was equal to the solvent based product in all but the plywood samples. Because of the uneven edges of plywood, water based products generally do not seal them well, even though these products do a good job on the surface.

d) Durability

Clay brick Specimens of clay fired facing bricks were treated with WB10 Application was by brush and the durability of both one and

two coats were assessed by measuring the water absorption of the bricks after a period of time in the QUV apparatus.

Application results (cont.)

The following table shows the water absorption results after 1,000 and 2,000 hours exposure.

| | Initial | 1000 hours | 2000 hours |
|-------------------|------------|------------|------------|
| 1 coat | 0.57 (4.7) | 0.84 (6.9) | 0.75 (6.1) |
| 2 coats | 0.27 (2.2) | 0.31 (2.5) | 0.19 (1.6) |
| Untreated control | 12.2 (100) | 12.2 (100) | 12.2 (100) |

The data given shows the percentage of water absorbed after 15 minutes immersion and in brackets the relative water absorption performance expressed as a percentage. i.e. water absorption of treated brick x 100 water absorption of untreated control The WB10 treatment is still providing a high level of performance after 2,000 hours QUV equivalent to around 2 years natural weathering.

Safety Consult the Safety Data Sheet for WB10.

Warning to users

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