

Version 2.1
November 2007



Building Code External Moisture

Clause E2 Alternative Solution

Chevaline Dexx Membrane System

Equus Industries Limited
National Compliance Division
45 Hutt Road, Petone
PO Box 38 636
Wellington
Ph: 04 576 0333
Fax: 04 576 0334
www.equus.co.nz



TABLE OF CONTENTS

COMPANY PROFILE

- History
- Product Range
- Facilities
- Distribution Network
- Directorate
- Associate Companies
- Mission Statement

BUILDING CONSENT PROCESS

- Project Flow Chart
- Compliance Chain of Command
- Approved Chevaline Dexe Applicator List
- Applicator Certificate Sample

SPECIFICATIONS

DATA SHEET

- Chevaline Dexe

TECHNICAL KNOW HOW

- Chevaline Dexe to Plywood
- Chevaline Dexe to Wet Area

QUALITY ASSURANCE CHECKLISTS

WARRANTY

- Sample Warranty Request Form
- Sample Producer Statement Request Form
- Sample Warranty
- Sample Producer Statement
- Sample Applicator Warranty

TEST REPORTS

- Opus Evaluation of Performance
- Joyce Group Ltd - Verification of Chevaline Dexe Waterproofing System
- Evaluation of "Dexe Waterproofing System" with Reinforcement
- Ardex Technical Bulletin - Tiling over Chevaline Dexe Membrane System

Company Profile



Equus Industries Limited

COMPANY PROFILE

HISTORY

Equus Industries Limited is a private limited liability Company (#120201) incorporated in Blenheim New Zealand in 1982.

The Company commenced business, immediately after formation, as a manufacturer of specialist coating systems for commercial buildings. This remains the main thrust of the operation to this day, with additional high quality complementary products introduced to extend the range to encompass a full range of coating and waterproofing materials for all types of construction.

The Company has been an exporter of specialist lines from late 1983 to date. The Company has exported regularly to Australia, the South Pacific and South East Asia, and presently has strong links with distributors in Australia and South East Asia.

Since formation, growth has been steady and continuous at an average 15% annual compound rate. The Company now has a multi-million dollar turnover and is respected as a supplier of quality protection materials to the construction industry.

PRODUCT RANGE

Equus Industries markets a wide range of high build waterproof finishes, textured coatings, and protective coatings under the brand names Chevaline, Traxx, Protexx, Thermexx and Equus. Our expertise is particularly in the areas of high build acrylic coatings and membranes, waterborne epoxies and high solids one - and two component urethane coatings. The Company is most probably the leading Australasian manufacturer in the area of liquid-applied acrylic roofing membranes, and single-component moisture-cure urethane coatings. The Company has established very close relationships with its principal raw material suppliers in these fields, and operates in the forefront of technology in these areas.

Our prime object has been to place the Company in the position of being able to supply all finishes and waterproofing materials required to protect buildings from sub-basement to roof levels. Where the technology or manufacturing requirements are outside of our standard capabilities, the Company has secured distribution arrangements for appropriate products from leading manufacturers in their respective fields as noted under 'Agencies' later in this profile.

Where appropriate, materials are covered under a Warranty system which is operated in conjunction with the Certified Applicator from the Equus Network who carries out the work on any particular project.

All products are manufactured under strict Quality Assurance standards monitored and controlled by our in-house laboratory. The Company has a TQM philosophy and is at present working within the parameters of an ISO9002 framework.



FACILITIES

The Company's production facility, laboratory and Head Office are located on 1.2 hectares of land in the Riverlands Industrial Estate, Blenheim, New Zealand.

The production equipment is modern and standardised, and the Plant has a capacity of up to 1.2 million litres of product per annum when operated on a single-shift basis. There is considerable room for expansion of the facility to cope with all requirements in the foreseeable future.

Additionally, the Company operates stores in Auckland, Wellington, Christchurch, Tauranga and Melbourne where basic stocks of commonly used products are held for immediate supply. The Company regards itself as a custom-formulator, rather than a manufacturer of conventional products, and stock holdings of standard products are rationalised for maximum stock turnover.

Technical representatives service both Clients and Certified Applicators, working from offices associated with the stores in all areas. Full technical back up to the sales staff is provided from the Head Office/Laboratory facility in Blenheim.

DISTRIBUTION NETWORK

Equus Industries Limited is not directly involved in retail sales. Distribution of Equus products is normally to Certified Applicators who are familiar with and trained in the use of the Equus range of products either in part, as Specialist Applicators for product ranges within the Network, or in total for Major Applicators and those working in smaller centres.

A close relationship between Equus Certified Applicators and Equus Industries ensures that there is full co-operation on site between the Manufacturer's Supervisory/Technical Staff, and the Applicator's own staff. Quality Assurance Programmes instituted by the Manufacturer are therefore meaningful, noting that programmes are generally written for individual contracts to take in all aspects of work on that particular contract. This facet of the operation is controlled by the Company Compliance Manager. The Company is now operating within a similar framework in Australia.

DIRECTORATE

The Company was founded, and has been operated since inception, by the current Directors, who are:

Brian J Greenall BE (Chem), MNZIC, FTSC, AMiChemE
Managing Director

Marinus Wagenvoort BSc, MNZIC, ATSC
Technical Director

They have recently been joined by:

Dean Barr – Business Development Director

Rob Roxburgh – New Zealand Sales Director

Nikki Brown – Administration Director

These new Directors have all been associated with the Company for a number of years including time in Senior Management roles and bring youth, skills and vitality to ensure the continued strength of the organisation into the future.

It should be noted that the Directors and senior technical representatives have amongst them over 250 years combined experience in the surface coatings and construction industries.



ASSOCIATED PARTNER COMPANIES

As mentioned previously, Equus Industries Limited has formed a firm association with a number of companies outside New Zealand to ensure that the best possible products to fulfil market requirements, and to meet our objective of ensuring that we have available all protective materials required on a project, which can then be sourced from one supplier, generally through one Approved Applicator.

These companies include:

De Boer N.V – Belgium

Unique quality torch-on roofing and tanking membranes and ancillary products.

Tremco Pty Limited (subsidiary of Tremco Inc of USA) - Australia

Torch-on roofing and tanking membranes, construction sealants and liquid membranes.

Texmastic International Inc - USA

Self-adhesive membranes, protection board and associated materials.

Keimfarben GMBH & CO KG - Germany

Silicate paints and plasters.

Asahi Denka - Japan

Hydrophilic waterstops.

Shobond Construction Company - Japan

Epoxy Injection Systems for concrete repair.

Concept Chemicals Ltd – UK

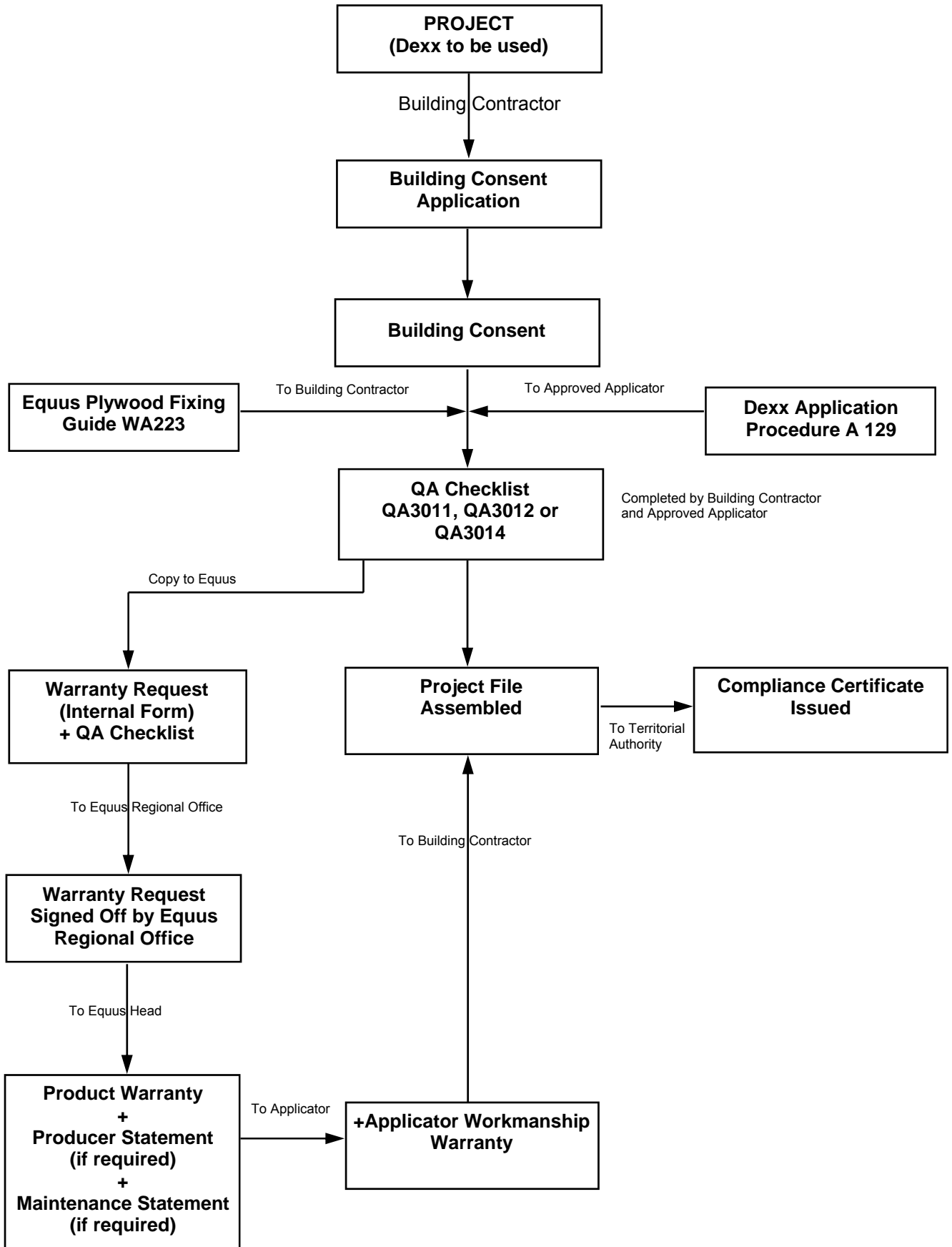
Cleaning Compounds

In all cases, Equus Industries Limited has the distribution rights for the New Zealand Market.

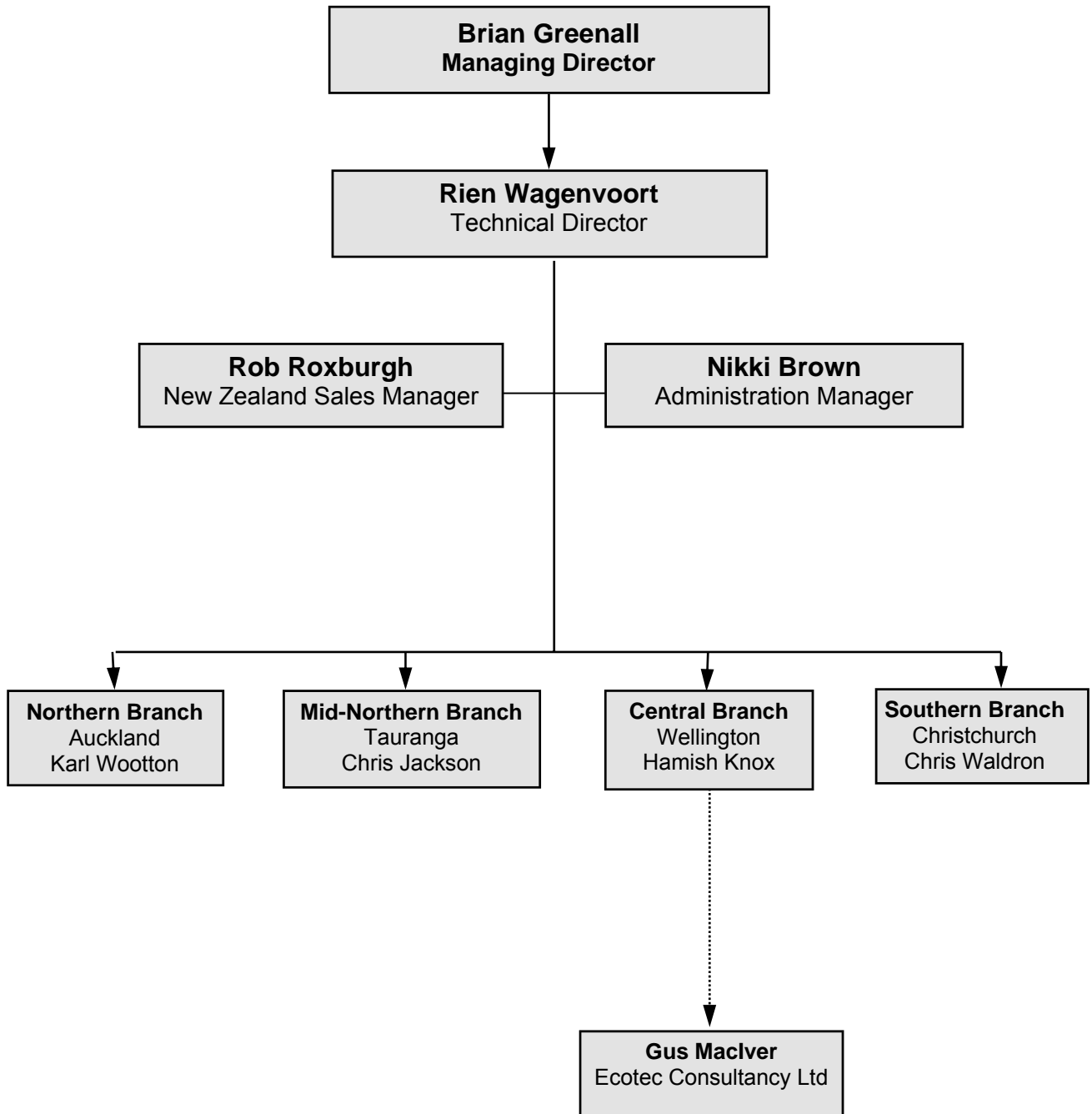
OUR MISSION STATEMENT

Through teamwork, to profitably manufacture and distribute the optimum in waterproofing and protective materials to the construction and allied industries.

Building Consent Process



Equus Compliance Chain Of Command




Approved Applicator List

Equus Industries Limited

Tick of Approval



Equus Industries is aware that the current market requires a high level of surety, not only for the performance of products that either have been manufactured locally by Equus over the last 22 years, or imported specifically for local conditions, but also that the Certified Applicator has the experience to perform the tasks covered by Equus technical requirements and also the requirements of all Regularity Authorities. The 'tick' represents our approval and certification of the applicator. The 'tick' is the achievement of experience within the industry being recognised by Equus Industries.


CERTIFIED APPLICATOR
This is to certify that

complies with our conditions of appointment as a Certified Applicator
and is authorised to apply the Equus Systems set out below


Brian Greenall
Managing Director
Equus Industries Limited

Gary Sill
National Compliance Manager
Equus Industries Limited

- Deboer Torch On Systems
- Chevaline Dexx
- Tremco Torch On Systems
- Vulkem Systems
- Chevaline Waterproofing Systems
- Thermexx Plaster Systems
- Flooring Systems

001
Certification Number

20/06/06
Renewal Date





Specification

Standard Specification Chevaline Dexx on plywood roofs and light-traffic decks.

Standard Specification: P3011

Dated: October 2004

Page 1 of 3

PREAMBLE

This specification is for the application of the **Chevaline Dexx** Waterproof Membrane System to plywood surfaces for new construction, **Chevaline Dexx** can be used for both roofing and trafficable deck areas. These areas generally occur in domestic and light commercial construction.

SURFACE PREPARATION:

General Responsibility:

Unless expressly agreed otherwise at time of contract pricing, all work in this section shall be the responsibility of the Main Contractor, whether carried out by his own staff, other sub-trades or the Specialist Finishes Sub-Contractor. In the latter case, such preparatory work shall be priced separately from work defined in Sections 3.0-5.0 inclusive.

2.2 Plywood Grade and Thickness:

Structural Underlay - general usage:

Plywood shall be minimum 18mm Cp-D treated structural plywood, unless otherwise expressly stipulated by the specifier.

2.3 Sheet Layout:

All sheets shall be laid out so as to maximise the use of whole sheets. All sheet joints shall be laid over framing members.

Back Priming:

Sheets used over spaces, which are not ventilated, may be back-primed with **Chevaline Dexx Primer** prior to installation.

Sheet Spacing:

Sheets shall be laid tight butt-jointed, with edges pre-primed with **Chevaline Dexx Primer**.

Sheet Fixing:

Plywood must be fixed in accordance with Manufacturers instructions taking into account wind-loading, frame spacing and ply thickness. Screw-fixing is preferred using countersunk corrosion-resistant screws. At the very least, on small deck areas, all corners must be screw-fixed, with screw nails for the balance.

All sheets shall be laid in a bead of construction adhesive along all framing members.

All fastener heads shall be recessed below the level of the sheet face.

All surface defects and fasteners shall be flushed out with approved filler such as **Epar Epoxy 801**.



Page 2 of 3
Ref: eqP3011

3. SURFACE PRETREATMENT:

Surface Defects:

All splits and surface defects shall be flushed with **Epar Epoxy 801**, which shall be allowed to dry before membrane application is begun. This shall include any gaps because of irregularities in sheet edges at tight-butt joints.

Treatment of Plywood Joints:

Apply a 150mm wide strip of 300gsm. chopped strand fibreglass mat centered over all joints, and firmly bedded in **Chevaline Dexx**. This shall be done after priming (see 4.1) and before membrane application.

Upstands, Junctions and Joints:

All vertical/horizontal transitions and joints shall have a minimum 150mm wide strip of 225 gsm or 300 gsm glass fibre mat embedded in **Chevaline Dexx** and centered on the transition/joint as additional stress reinforcement. This shall be done after priming and before application of the **Dexx** membrane layer.

MEMBRANE APPLICATION:

Priming:

All plywood surfaces to be coated shall be primed with **Chevaline Dexx Primer** onto dry surfaces or **Epistixx**. Where **Epistixx** is used, care shall be taken with mixing and dilution, and an overnight dry shall be allowed.

Membrane Application:

The membrane comprises **Dexx** and 300 gsm glass fibre mat applied in the following sequence:

- Bodycoat
- Glassfibre mat (laid into wet Bodycoat)
- Bodycoat
- Bodycoat

Application shall at all times be in accordance with Manufacturers instructions particularly with regard to spreading rates and dry times, to ensure a sound tight membrane is achieved.

Glazecoat:

All Surfaces:

These surfaces shall be sealed with one (1) full coat of **Chevaline Dexx Topcoat** applied by roller, brush or spray at a spreading rate of 10-11 sqm/litre as supplied.

GENERAL NOTES:

Upstands/Coves/Sumps/Downturns:

The **Dexx** Membrane shall be taken 100mm up all associated upstands, and turned into any rainwater sumps which may be incorporated in the deck. Where permanent ponding is likely in sumps and gutters, a finish coat of **Chevaline Colourcure** applied at 8-10 sqm/litre should be substituted for the chosen wear coat.

**Water Entry Points:**

Ensure that all likely construction details which may allow water entry to the area beneath the membrane are adequately sealed. This may necessitate extension of the **Dexx** Membrane or a compatible waterproof coating system to drip edges, particularly on associated stub walls and overhangs, where the **Dexx** membrane should be turned down the entire thickness of the roof/deck to a drip edge.

Colour and Gloss:

The colour of the membrane and glazecoat shall be the same in any area, and shall be nominated by the Architect. The gloss shall be stipulated by the Architect either Gloss, Satin, depending on service conditions and appearance required.

Placing in Service:

The treated areas may be placed in service 48 hours after glazecoat application.

MAINTENANCE & WARRANTY:**Maintenance:**

The **Chevaline Dexx** Membrane may be cleaned at any time by low pressure spraying/brooming and hosing off using a weak (0.1%) neutral detergent solution. Floor sweeping machines and/or abrasive cleaning agents shall not be used.

It is recommended that the surface be inspected at 4-5 yearly intervals, and, if necessary a further application of **Chevaline Dexx Topcoat** as appropriate be carried out to preserve the appearance and performance of the applied membrane.

Should mechanical damage occur because of undue wear, vandalism or associated building maintenance, the **Dexx** can be easily replaced by patching and/or resurfacing as required, after simple preparation.

Warranty:

The membrane system described in this specification may be warranted as waterproof for a period of up to 15 (fifteen) years, provided that:

All work is carried out by an Approved Equus Contractor.

All work is carried out in accordance with this specification or any amendments or additions therefore made by the Manufacturer.

The warranty is provided to the client by the Equus Contractor carrying out the work and is backed by the Manufacturer as to the fitness for the purpose of the materials supplied for the contract.

It should be noted that as the surface may be a wearing surface, certain provisions regarding mechanical damage and maintenance recoating may be incorporated within the warranty, depending entirely upon the declared intended use to which the surface is to be put.

-0000000-



Standard specification for the application of Chevaline Dexe on concrete, plaster and mastic asphalt surfaces

Page 1 of 4
Ref:P3012
November 2003

PREAMBLE:

This specification is for the application of the **Chevaline Dexe** Waterproof Membrane System to concrete, solid plaster and mastic asphalt surfaces in situations subject to foot traffic and minimal surface abuse. This generally applies to domestic and light commercial deck/patio areas, and most solid construction roof areas not used for car parking or intensive commercial activity (in this instance refer to Specification P3013).

2.0 SURFACE PREPARATION:

General- Responsibility:

Unless expressly agreed otherwise at time of contract pricing, all work in this section shall be the responsibility of the Main Contractor, whether carried out by his own staff, other sub-trades or the Specialist Finishes Sub-Contractor. In the latter case, such preparatory work shall be priced separately from work defined in Sections 3.0 - 5.0 inclusive.

Mosskilling Treatment:

All surfaces shall be treated with Equus **Mosskill** solution to kill all moss/mould spores and growths. Stipulated kill-times shall be observed.

Note: Badly affected surfaces may require treatment before and after waterblast cleaning to ensure a residual moss-kill treatment before coating application.

Cleaning:

All surfaces to be waterproof shall be waterblast cleaned to remove all construction detritus and laitance, providing a lightly profiled surface ready for coating application. Surfaces which have been power-floated should, if possible, be acid etched to "open" the surface and then thoroughly rinsed. Pebbled surfaces may require additional scarifying to remove all pebbles/binder back to a relatively smooth surface.

Patching:

Surface imperfections shall be patched, using either a **Thermexx** mortar for minor imperfections in concrete or a **Chevacryl Admix**-gauged patch mortar for larger irregularities in concrete or mastic asphalt. Other proprietary surface patch mixtures shall **not** be used.

Note: Irregular mastic-asphalt surfaces may require an asphalt-emulsion/cement/sand plaster application to level to falls prior to membrane application. If doubt exists as to correct treatment, Equus should be contacted for a detailed preparation procedure.



3.0 SURFACE PRETREATMENT:

Expansion/Movement Joints:

Such designed joints exceeding 6mm in width are not to be overlaid with **Chevaline Dexe**, but shall be sealed using **Tremflex 25** which shall remain exposed.

3.2 Shrinkage/Settlement Cracking and Construction Joints:

.1 Concrete /Solid Plaster:

Any regular cracks greater than 1mm width which appear likely to move regularly shall be saw-cut or chased to 5mm width and 8-15mm depth, primed and sealed with **Tremflex 25**. All such sealant joints shall be overlaid after surface priming, with a 150mm strip of 300 gsm. chopped strand fibreglass matt bedded in **Chevaline Dexe**. The **Dexe Membrane** shall be carried over such cracks.

.2 All Surfaces:

Irregular cracks for which saw-cutting or chasing is impractical, shall be pretreated after surface priming with **Chevaline Dexe** applied as a 100-150mm wide band, with 300 gsm glass-fibre mat or tape embedded as a reinforcement. This shall be allowed to dry overnight before membrane application is begun.

Upstands:

All monolithic horizontal/vertical transitions which are not already covered shall be rounded to 5mm minimum radius using **Tremflex 25** applied as a fillet at least 24 hours before membrane application. Where the transition is not monolithic, a plaster or timber fillet of 50x50 section shall be installed prior to **Dexe** application.

4.0 CHEVALINE DEXX APPLICATION:

Priming – All Surfaces:

All surfaces to be coated shall be primed with a **Chevaline Epistix** correctly mixed and diluted for roller or brush. Application of this shall include upstands to a minimum height of 100mm adjacent to all horizontal surfaces being coated. Spreading rate will depend on surface profile and porosity, generally in the range of 8-10sqm/litre of mix.

Note: If there is likely to be a delay in membrane application apply a Thin keycoat of **Dexe 80/20** within 24 hours of primer application, to ensure good bonding of the membrane system. Allow overnight dry before proceeding with membrane application.

Membrane Application:

The membrane comprises **Dexe** and 300 gsm glass fibre mat applied in the following sequence:

- Bodycoat
- Glassfibre mat (laid into wet Bodycoat)
- Bodycoat
- Bodycoat



Application shall always be in accordance with Manufacturers instructions particularly with regard to spreading rates and dry times, to ensure a sound tight membrane is achieved.

Extra Thickness - Traffic Areas:

In areas of high traffic use allowance shall be made for an additional thickness of glass fibre mat and an additional bodycoat within the membrane system, to ensure resistance to such traffic and increased likelihood of impact damage. Such areas shall be clearly delineated on plans.

4.4 Glazecoat:

.1 All High Traffic Use Surfaces:

These surfaces shall be sealed with a minimum of one (1) coat of **Traxx Colourseal** applied by soft broom, roller or spray at a spreading rate of approx 11-12 sqm/litre as supplied.

.2 All other Surfaces:

These surfaces shall be sealed with one (1) full coat of **Chevaline Dexx Topcoat** applied by roller, brush or spray at a spreading rate of 10-11 sqm/litre as supplied.

5.0 GENERAL NOTES:

Upstands/Coves/Sumps:

The **Dexx** Membrane shall be taken 100mm up all associated upstands, and turned into any rain-water sumps which may be incorporated in the floor slab or deck. Where permanent ponding is likely in sumps and gutters, a finish coat of **Traxx 2000 Wearcoat** applied at 8-10 sqm/litre should be substituted for the normal glazecoat.

Water Entry Points:

Ensure that all likely construction details which may allow water entry to the slab beneath the membrane are adequately sealed. This may necessitate extension of the DEXX Membrane or a compatible waterproof coating system to drip edges, particularly on stub walls and bare slab edges, where the **Dexx** membrane should be turned down the entire thickness of the slab/roof to a drip edge.

Colour and Gloss:

The colour of the membrane and glazecoat shall be the same in any area, and shall be nominated by the Architect.

The gloss shall be stipulated by the Architect as either Gloss, Satin, or Eggshell, depending on service conditions and appearance required.

Optional Wearcoat:

Where a non-slip surface is necessary, **Dexx Wearcoat** shall be used as an additional coat prior to application of **Colourseal** or **Dexx Topcoat**. This is recommended on stairs and landings in particular.



Placing in Service:

The treated areas may be placed in service 48 hours after Glazecoat application.

6.0 MAINTENANCE AND WARRANTY:

Maintenance:

- .1 The **Chevaline Dexx** Membrane may be cleaned at any time by low pressure spraying/ brooming and hosing off using a weak (0.1%) neutral detergent solution. Floor sweeping machines and/or abrasive cleaning agents shall **not** be used.
- .2 It is recommended that the surface be inspected at 4-5 yearly intervals, and, if necessary a further application of Glazecoat be carried out to preserve the appearance and performance of the applied membrane.
- .3 Should mechanical damage occur because of undue wear, vandalism or associated building maintenance, the **Dexx** can be easily required by patching and/or resurfacing as required, after simple preparation.

Warranty:

The **Chevaline Dexx** Membrane system described in this specification may be warranted as waterproof for up to Fifteen (15) years provided that:

- (a) All work is carried out by an Approved Equus Contractor.

All work is done in accordance with this specification or any written additions or amendments thereto issued by the Manufacturer.

For warranty periods in excess of ten (10) years, the warranty includes the appropriate Maintenance Statement.

Such a warranty is issued by the Approved Equus Contractor who does the work, and is backed by the Manufacturer as to the fitness for the purpose of the materials supplied by them for the contract.

It should be noted that as the surface is a wearing surface, certain provisions regarding mechanical damage and maintenance re-coating may be incorporated within the warranty, depending entirely upon the declared intended use to which the surface is to be put.

-oooOooo-

Standard Specification for the application of Chevaline Dexx on plywood and wet areas to receive tiles

Page 1 of 3

Standard Specification: P3014

Dated: November 2003

1.0 PREAMBLE:

This specification is for the application of the **Chevaline Dexx** Waterproof Membrane System to plywood surfaces, either in new construction, or where the plywood is used as an overlay on existing sarking, to trafficable deck areas and 'wet' areas which are to receive tiles as a wearing surface

These areas generally occur in domestic and light commercial construction. Note that this specification may also apply when compressed fibre-cement sheets are used as an underlay in similar situations.

2.0 SURFACE PREPARATION:

2.1 General Responsibility:

Unless expressly agreed otherwise at time of contract pricing, all work in this section shall be the responsibility of the Main Contractor, whether carried out by his own staff, other sub-trades or the Specialist Finishes Sub-Contractor. In the latter case, such preparatory work shall be priced separately from work defined in Sections 3.0-5.0 inclusive.

2.2 Plywood Grade & Thickness:

.1 *Structural Underlay - general usage:*

Plywood shall be minimum 18mm C-D treated structural plywood, unless otherwise expressly stipulated by the specifier. Note that tiling does impose an extra dead load on the surface, and in cases of doubt as to the total load, consideration should be given by the specifier to the use of 21mm C-D treated structural plywood to increase stiffness in the substrate.

.2 *Overlay to existing sarking only:*

Plywood shall be minimum 12mm C-D treated structural plywood, unless otherwise expressly stipulated by the specifier.

3. *Plywood Treatment:*

Treatment should be H3 or H1 + Boron. LOSP treated plywood is not recommended.

2.3 Sheet Layout:

All sheets shall be laid out so as to maximise the use of whole sheets. All sheet joints shall be laid over framing members. Framing should be in accordance with NZS3604 recommendation as a minimum. Generally framing shall be at 600 centres maximum in both directions.

2.4 Back Priming:

Sheets used over spaces which are not ventilated shall be back-primed with **Chevaprime PBT** or equivalent prior to installation.

2.5 Sheet Spacing:

Sheets shall be laid tight butt-jointed, with edges pre-primed with **Chevaprime PBT** or **Chevaline Epistix**.

**2.6 Sheet Fixing:**

Plywood must be fixed in accordance with Manufacturers instructions taking into account wind-loading, frame spacing and ply thickness. Screw-fixing is mandatory using countersunk stainless steel screws. Minimum screw length shall be 50mm for 18mm plywood. All sheets shall be laid in a bead of construction adhesive along all framing members.

All fastener heads shall be recessed below the level of the sheet face.

All surface defects and fasteners shall be flushed out with an approved filler such as **Traxx Filler** or Epar Epoxy Mortar.

3.0 SURFACE PRETREATMENT:**3.1 Surface Defects:**

All splits and surface defects shall be flushed with **Traxx Filler** or Epar Epoxy Mortar which shall be allowed to dry before membrane application is begun. This shall include any gaps occurring because of irregularities in sheet edges at tight-butt joints.

3.2 Treatment of Plywood Joints:

Apply a 150mm wide strip of 300gsm. chopped strand fibreglass mat centred over all joints, and firmly bedded in **Chevaline Dexx**. This shall be done after priming (see 4.1) and before membrane application.

3.3 Upstands, Junctions and Joints:

All vertical/horizontal transitions and joints shall have a minimum 150mm wide strip of 225 gsm or 300 gsm glass fibre mat embedded in **Chevaline Dexx** and centred on the transition/joint as additional stress reinforcement. This shall be done after priming and before application of the **Dexx** membrane layer. Timber fillets (ex 25 x 25 H3 treated timber) shall be fixed to the deck at all transitions prior to installation of the reinforcing strips. Where timber fillets cannot be used a minimum 10 x 10 fillet of **Tremflex 25** sealant shall be formed in place after priming and prior to reinforcing strip application.

4.0 MEMBRANE APPLICATION:**4.1 Priming:**

All plywood surfaces to be coated shall be primed with **Chevaprime PBT** or **Epistixx**. Where **Epistixx** is used, care shall be taken with mixing and dilution, and an overnight dry shall be allowed.

4.2 Membrane Application:

The membrane comprises **Dexx** and 300 gsm glass fibre mat applied in the following sequence:

Bodycoat
Glassfibre mat (laid into wet Bodycoat)
Bodycoat
Bodycoat

Application shall at all times be in accordance with Manufacturers instructions particularly with regard to spreading rates and dry times, to ensure a sound tight membrane is achieved.

If the treated area is to be left exposed for more than 6 months in an exterior situation prior to tiling, allow for the use of one (1) coat of **Traxx Colourseal** or **Chevaline Colourglaze** applied at 12sqm/litre as a protective glazecoat. This will protect the body of the membrane for up to 5 years.



5.0 GENERAL NOTES:

5.1 Upstands/Coves/Sumps/Downturns:

The **Dexx** Membrane shall be taken 100mm up all associated upstands, and turned into any rain-water sumps which may be incorporated in the floor slab or deck.

5.2 Water Entry Points:

Ensure that all likely construction details which may allow water entry to the area beneath the membrane are adequately sealed. This may necessitate extension of the **Dexx** Membrane or a compatible waterproof coating system to drip edges, particularly on associated stub walls and overhangs, where the **Dexx** membrane should be turned down the entire thickness of the roof/deck to a drip edge. Ensure that any unavoidable penetrations through the membrane for fixings, are correctly gasket sealed using **Tremflex 25** sealant when the fixing is installed.

5.3 Testing and Handover:

As membrane installation and tiling are generally separate sub-contracts, it is imperative that after the **Dexx** application has been completed and used, a minimum 24-hour pond-test is carried out. When the Applicator and Main Contractor are satisfied that the membrane is correctly detailed, sound and watertight, the installation shall be signed off on the Contract QA Sheet by both parties, prior to hand-over of the area to the Tiler.

5.4 Placing in Service/Tiling:

The treated areas may be placed in service 48 hours after the hand over pond test sign-off.

Note that tiling must be carried out using an approved thin-bed tile adhesive, generally of the acrylic-modified/cementitious type. The Tiler must exercise all due care during installation to ensure the integrity of the membrane is not compromised

6.0 MAINTENANCE & WARRANTY:

It is recommended that the installation be inspected at 4-5 yearly intervals, to ensure that the tiled surface is in good condition and that nothing has been done by way of alteration, installation or mechanical damage which may jeopardise the integrity of the total installation.

6.2 Warranty:

The membrane system described in this specification may be warranted as waterproof for a period of up to fifteen (15) years, provided that:

1. All work is carried out by an Approved Equus Contractor.
2. All work is carried out in accordance with this specification or any amendments or additions thereto made by the Manufacturer, and the installation has been signed off prior to tiling.

The warranty is provided to the client by the Equus Contractor carrying out the work and is backed by the Manufacturer as to the fitness for purpose of the materials supplied for the contract.

-oooOooo-

Data Sheets

Chevaline DEXX

Flexible Reinforced Roof and Deck Membrane

Key Benefits Summary:

- 20 years of Proven performance in New Zealand conditions
- Excellent durability
- Ease of use
- Applicable to a variety of surfaces in both horizontal and vertical situations
- Wide colour range available
- Ease of detailing even on complicated shapes
- Easy long-term maintenance
- Applied by Approved Equus Applicators

Limitations:

- Special design and maintenance criteria apply for vehicular traffic installations.
- May require weather protection for correct cure when applied in cold/damp ambient daytime temperatures
- Creasing may occur at plywood joints in correctly detailed installations.

Purpose & Areas Of Use:

A liquid applied, glassfibre mat reinforced membrane for use in sealing old and new flat and near-flat roofs, walk-out decks and patios. Particularly useful where areas are subject to foot traffic and light vehicular traffic. Topcoats are available for various service conditions. Can also be used on specified substrates as a waterproof membrane under tiles. **DEXX** is always used in conformance with Equus Standard Specifications.

Product:

The liquid **DEXX** material is a heavy-bodied water-borne acrylic paste ready to use from the container. It is formulated for high adhesion, and water resistance, also toughness combined with flexibility in the cured film. The Wear-coat contains graded silica for slip and wear resistance. **DEXX** is available in **FD** grade for application in adverse conditions.

Process Compatibility:

DEXX is always used in conjunction with 300gsm glassfibre E-mat as reinforcement except for parapet detailing where 225gsm E-mat may be used. **DEXX** is compatible with the following primers - depending on substrate and environment **DEXX Primer**, **Chevaprime PBT**, **Chevaprime-U** and **Epistixx**.

DEXX is compatible with the following topcoats, depending on environment and end-use. **DEXX Topcoat**, **DEXX Wearcoat**, **Colourglaze**, **Traxx Colourseal**, **Traxx 2000 Wearcoat**. Refer to Standard Specifications for guidance on primer and topcoat usage.

Colours:

DEXX is supplied as standard in 00-A-05 (grey) and white. Custom colours are available to match any colour chart. We do not recommend dark colours on plywood roofs/decks. Seek advice from Equus if in doubt.

Standard Pack:

15 litre plastic pail.

Physical Properties:

Liquid Material:	(DEXX Bodycoat)
Volume Solids:	47%
Specific Gravity:	1.30
Flash Point:	None
Shelf Life:	3 years in original sealed container, when stored in cool, dry conditions.
Applied Film:	Standard System
Flexibility:	Passes 3mm mandrel
Durability:	Excellent long term service
Chemical Resistance:	Excellent resistance to all normal environmental pollutants.
Fungus Resistance:	Chevaline DEXX contains a highly effective anti-fungal preparation.
Normal Film Thickness:	1.2-1.5mm depending on number of glass cloth layers used.

Performance:

When correctly detailed and installed, **DEXX** membranes comply with the following Clauses of the Building Code.

B2 Durability	E3 Internal Moisture
E2 External Moisture	F3 Hazardous Materials

Surface Preparation:

Concrete Roofs and Decks:

Mosskill if necessary, patch all holes and pretreat cracks (but not movement joints), by cleaning out, filling with **Thermexx Plaster** and overlaying with 300gsm fibreglass E-mat 150mm strip embedded in **DEXX**. Ensure surface is well cleaned, and dry before proceeding with application.

Mastic Asphalt:

Ensure surface is level, and all holes and cracks are filled with a bituminous patch mix or **Chevacryl Admix Plaster**, particularly those where blisters have been cut out.

Exterior Plywood:

Ensure sheets are tight-butted, well fastened (stainless steel screws) glued to bearers and adequately supported. If in doubt about adequate below-surface ventilation, include venting either at upstands (with over-flashing) or with built-in vents.

Priming:

Concrete, Mastic Asphalt, Previously coated surfaces: **DEXX Primer** or **Epistixx**.

Priming:

Plywood: **Chevaprime-U**, **DEXX Primer** or **Epistixx**. Prime sheet backs and edges.

Spreading rates will generally be dictated by surface profile and porosity, but all **Chevaline** primers should be applied at between 6-10sqm/litre of mix.

Application Method:

All **Dexx** bodycoats should be roller-applied with a medium/long nap-roller. Final topcoat, glazecoats or wearcoats may be rolled or sprayed, preferably using airless equipment. Application sequence is as follows (on primed surface)

1. Bodycoat
2. Glass Fibre Mat (laid into wet bodycoat)
3. Bodycoat
4. *Bodycoat
5. *Glass Fibre Mat
6. *Bodycoat
7. Bodycoat
8. Wearcoat/Glazecoat

(*optional items depending on service conditions)

Minimum spreading rate for the three-coat bodycoat system is 1.5 litres/sqm. Care must be taken to ensure that the reinforcing mat is well embedded in the wet material and that the bodycoat application of the mat is well worked in to eliminate air-trap.

Application Properties:

Spreading Rate:

3 coat system: 2.0-2.5sqm/litre/coat
(30-37.5sqm/15L pail/coat)

4 and 5 coat system: 2.25-2.4sqmlitre/coat
(34-36sqm/15L pail/coat)

Dexx Wearcoat: 3.0-6.0sqm/litre depending on texture
(45-90sqm/l15L pail/coat)

**Dexx Topcoat /
Colourglaze:** 10sqm/litre (150sqm/15L pail).
Spreading rates indicated must **not** be exceeded if satisfactory performance is to be achieved.

Dry Time:

Touch Dry: 1-2 hours)
Through Dry: 8-16 hours) at normal conditions
Full Hardness: 7 -10 hours)

Do not apply **Dexx** in air temperatures less than 8°C or when surface temperature is less than 4°C. Use **Dexx FD** in adverse conditions.

NOTE: Normal conditions are 18-23°C and 60-70% R.H. Cooler and/or more humid conditions may prolong dry times.

Recoat Time:

Self-recoat 4-8 hours or as soon as operator can walk over the surface. In adverse weather conditions, use **Dexx FD**.

Dexx Wearcoat: Allow 24 hours between coats.

Colourglaze/

Dexx Topcoat: 12-24 hours.

Traxx 2000 Wearcoat: Allow 48 hours minimum. At least 72 hours in winter.

Thinning/Clean Up:

Use clean water for both. Clean equipment immediately after use. Fully dried material is difficult to remove.

Maintenance:

When **Dexx** is used as an exposed membrane, topcoat renewal will be required at 5-10 yearly intervals, depending on topcoats type and service conditions. Clean by medium pressure water washing, with detergent injection on trafficable areas, and recoat. If mechanical damage to the membrane has occurred, this can be easily repaired prior to re-topcoating.

Warranty:

Up to 15 years depending on location and service conditions.

Health and Safety:

Chevaline Dexx is a waterborne material and contains no mammalian-toxic substances. It is non-flammable and requires no special storage conditions other than protection from frost or prolonged heat. However, we do recommend the use of barrier cream on hands, and safety spectacles when handling/applying this material.

EQUUS SAFETY CLASS 1.
Shipping Restrictions: None.

Equus Industries Ltd
PO Box 601
Blenheim
Phone: 03 578 0214 Fax: 03 578 0919
E-mail: admin@equus.co.nz
Web: www.equus.co.nz

© Equus Industries Ltd
Edition 4
July 2006

Technical Know Hows



Chevaline Dexx

Application of Chevaline Dexx to new plywood surfaces.

Surface Preparation And Sheet Fixing:

Back-priming:

All plywood should be back and edge-primed with **Dexx Primer** to dry surfaces, or **Epistixx** to damp plywood surfaces, before fixing.

Sheet layout:

Organise sheet layout to maximise the use of whole sheets and to keep joints as straight forward as possible. All sheet joints must be laid over deck/roof framing members. On large areas, lay plywood in a brick-bond pattern to minimise the number of 4-way joints.

Sheet spacing:

Sheets of plywood should be tight butt-jointed. This means that in practice the gap between individual sheets will vary from zero to 1.5mm depending on accuracy of edge-cutting.

Sheet fixing:

Plywood must be fixed in accordance with manufacturers' instructions taking into account wind-loading, frame spacing and ply thickness. Screw-fixing is preferred using countersunk corrosion-resistant screws. At the very least, on small deck areas, all corners must be screw-fixing with screw-nails for the balance.

All fastener heads shall be recessed below the level of the sheet face. In addition it is preferred that sheets be laid in a bead of construction adhesive on all framing members.

Sheet filling:

All surface defects and fasteners shall be flushed over with **Epar 801 Epoxy Filler**. Any gaps between sheets shall be similarly treated.

Priming:

When sheets have been fixed and stopped, all surfaces shall be primed with one full coat of **Dexx Primer** to dry surfaces or **Epistixx Primer** to damp surfaces, applied at 8-10 sqm/litre and allowed to dry overnight. Note that pre-priming is permitted, if this is a practical site consideration, but any cut or exposed surfaces of plywood must be patch-primed to ensure the surface is sealed.

Upstands:

Where upstands to walls occur, an ex 25 x 25 or 50 x 50 timber can't strip/fillet shall be installed, fixed to the deck and primed.

Plywood quality:

The minimum recommended standard for plywood is B-D Grade construction ply, with A-D Grade being preferred. The thickness of plywood used will depend to a large extent on construction details, but normally, for trafficable areas 17.5mm plywood is considered to be acceptable, with appropriate framing details. The better the face-grade of the plywood, the less the preparation needed prior to laying Dexx. **Use of treated plywood is preferred, but may depend on local building regulations.**

Joint Treatment And Detailing:

Plywood joint:

All tight-butted, stopped plywood joints should be overlaid with a 150mm strip 300gsm E-mat thoroughly bedded in and wetted out with Dexx. The strip should be centered over the joint. The pretreatment must be allowed to dry thoroughly before overlaying with the full **Dexx Membrane**. Both edges of the glass should be teased out.

Upstands:

All upstands should be sealed by the application of a strip of 300gsm E-mat glass-fibre mat bedded into **Chevaline Dexx** so that the glass is thoroughly wetted out. As a guide the glass strip should be cut so that at least 50-65mm of glass extends beyond the interface between the adjoining surfaces e.g. on cant strips use 150mm strips of glass, on posts etc., use 100-125 strips.

Penetrations:

All penetrations for plumbing, flues etc., which are not fixed permanently to the deck/roof being sealed, must be sleeved and overflashed, with the sleeve being treated as an upstand when applying the **Dexx**.

Detailing of sleeves and over-flashing should be the responsibility of the designer/builder. Make sure that this is done to your satisfaction before laying **Dexx**.

Weatherproofness:

When joints and upstands have been sealed as described above, working on to primed plywood, the deck/roof surface can be regarded as temporarily weather proof, and will resist rain showers without the need for further protection. It is important to have temporary protection on site until this stage is reached.

Dexx Application:

Primer:

This is required only if the pre-primed plywood has a very open-grained surface.

Mix **Dexx**/water into ratio 2 volumes **Dexx** to 1 volume water and brush evening on to all surfaces as a primer coat at a spreading rate of approx. 7 sqm/litre of mix. (This will take 1 litre of **Dexx** for every 10 sqm). Allow to dry.

Glass fibre mat:

Measure and pre-cut glass fibre mat into lengths that will fit neatly from upstand top line to drip edge (or equivalent end points). Where possible always lay glass fibre mat in strips down the fall of a roof/deck. Re-roll the glass fibre mat after cutting. On long runs pre-cutting is not always necessary. Take a little time to work out your glass-fibre mat layout - it will pay off in terms of easier laying and a neater finished job. Use a chalk line to establish a guide for rolling out. (See over).

Basecoat (Bedding coat):

Brush or roll on (rolling is preferred) a liberal coat of **Dexx Bodycoat** into which the glass-fibre mat is to be laid. Spreading rate should be approximately 2sqm/litre. Start at the top end with an area approximately 300-600mm down the run, and 1m wide. Use this area to anchor the top end of the mat which should be accurately positioned. It helps to work to a chalk line on the deck. Bed the mat thoroughly and treat the upstand similarly. Then unroll the mat into the liquid material laying **Dexx Bodycoat** about 1 metre in advance.

Do not work so far in advance of the glass that the **Dexx Bodycoat** is surface-dry before the glass is embedded. If this occurs, re-apply a thin layer of Dexx and embed the glass immediately.

Embedding:

When mat is anchored (embedded) use a "dry" roller (short nap) over top surface to ensure mat is evenly pressed into the basecoat and wetted out. Use a "dry" brush to push edges firmly into upstand corners and over down-turn to drip edge. **This step is most important** as it ensures a good job.

When laying succeeding rolls of mat, proceed in a similar fashion, using the "dry" brush to tease the mat edges into each other, rather than deliberately overlapping them.

It is inevitable that with roll irregularities and surface variations, some overlapping will occur. Minimise the effect by teasing the overlapping edge well out on to the underlying sheet. It is important not to have gaps between adjacent runs of glass fibre mat.

Bodycoat (1):

Leave basecoat and mat to dry at least 3-4 hours (up to 24 hours) so that you can safely work over it, and then apply by roller (medium/long nap) and brush (to fascias and upstands) a **Dexx Bodycoat** at approx. 2 sqm/litre. This coat should fill the weave of the mat completely although the mat pattern will be apparent. Allow this coat to dry.

Note: On large jobs it is quite practical, and preferred, to leave the surface overnight before applying this bodycoat. In this case, check the surface to ensure that there are no white patches of glass showing. If there are, or if the surface looks too 'open' in areas, roll a thin coat of **Dexx** over these areas to ensure the glass fibre mat is wetted out and sealed against dew or overnight rainfall.

Tidy up:

When bodycoat is dry trim any threads of glass fibre which may be sticking up from the surface or hanging down from drip edges etc. This is an important detail, as protruding glass fibres can lead to localised water penetration of the membrane.

Bodycoat (2):

Finally, apply by roller (and brush) as previously, a topcoat of **Dexx** again at approximately 2-2.25 sqm/litre. This coat completely encapsulates the surface and provides an even finish. Ensure that all areas where trimming has been done, particularly on drip edges or upstands are well sealed. Allow to dry at least 24 hours before walking on the surface, and 72 hours before leaving objects in one place on the deck.

Overglazing:

If the surface is to be kept clean, we recommend the use of an overglaze which will minimise dirt penetration and staining.

On domestic decks and roof areas:

Seal with one full coat 10-12 sqm/litre as supplied of **Chevaline Dexx Topcoat**.

On commercial decks, carparks and gutters:

Seal with two thin coats of **Traxx Colourseal** applied by spray foam roller or soft broom at 13-15 sqm/litre/coat, with at least 4 hours between coats.

On areas subject to considerable pollution: (including gutters and sumps etc.)

Allow Dexx to through dry at least 4-5 days and seal with one full coat of **Chevaline Colourcure** applied at 11-12 sqm/litre.

Equipment list:

Brushes 50/75/100mm
Roller trays
Medium/long nap rollers (for **Dexx** application)
Short nap (or foam) rollers (for 'dry' roller)
Soft split nylon yard broom (for **Colourseal**)
Stanley knife or retractable cutter (for cutting/trimming glass)
Large scissors (for cutting glass fibre mat)
Straight edge
Chalk line
10m and 2m tapes
75mm scraper
+sanding equipment, dust masks

Material list:

From Equus:

Chevaline Dexx Bodycoat

Chevaline Dexx Primer or Chevaline Epistixx Primer

Epar 801 Epoxy Filler

Epoxy or polyester filler

Xylol for cleaning

300 gsm e-mat glass fibre mat

Topcoat:

Chevaline Dexx Topcoat (Residential/Light Commercial) **or**

Traxx Colourseal (Medium/Heavy Commercial) **or**

Chevaline Colourcure (Ponding/High Pollution Areas)

Equus Industries Ltd

PO Box 601

Blenheim

Phone: 03 578 0214 Fax 03 578 0919

Email: admin@equus.co.nz

Web: www.equus.co.nz

Chevaline Dexx

WA224 - Fixing requirements for bathroom internal wet areas to suit Dexx Membranes.

In all cases please refer to relevant manufacturer's detailed specifications if the builder/applicator is unsure of methods to be employed. The following is a guide only.

1. We recommend compressed cement fibre sheet as an underlay over particle board and T&G substrates or CD H3-treated plywood as an alternative option (minimum 18mm thick). Other suitable water resistant board designed for use in wet areas may also be used as an underlay.
2. Shower floors: if you want a level access shower on a concrete floor, drop floor by 30mm. On a timber floor, drop floor 50mm. Alternatively, use a concrete hob (usually available from the water proofer) which means a small step about 65x65mm. The fall for the shower should be formed before waterproofing. The tiler is the best person to form shower floors. Normally done with sand-cement and admix. You should leave to cure 5-7 days depending on admix used. The alternative is to use a 24-hour full cure screed such as Rapid Set 45. Timber hobs are no longer acceptable as they sweat, swell and rot.
3. Wastes need to be set in the middle of the shower and packed up to allow for the thickness of the screed, approx. 10mm (confirm with your tiler). The screed can then finish level with the flange of the waste. Englefield-type wastes cause ponding/seepage problems as they won't let the water flow away from under tiles. Also, they cannot be waterproofed properly in some applications. Recommend Allproof, Metalcraft and McAlpine wastes only.
4. Baths (that are not checked into walls because they have a ledge) should be out until the box is waterproofed. It is not possible to waterproof the ledge at the back wall once the bath is fitted. If the bath is to be checked into the wall, you need to check out the studs as well. Make sure the tile does not hit curves in the bath before it gets to the point it sits on bath. (Bath will need to be fitted and sealed as per manufacturer's specifications before waterproofing in this situation).
5. Plastic shower trays should be fitted after waterproofing, as waterproofing may not hold on the shower tray. Solid nog around perimeter 150mm.
6. All waterproofing should finish with an upturn or downturn of no less than 75mm. The recommended is 150mm.
7. Note that T&G plywood still requires support under tongue. Ensure sheets are close butted with no gaps. Sand sheet joints to remove any difference in levels. Fill any gaps with construction grade epoxy filler such as Equus Epar Epoxy.
8. Schedule waterproofing before the stopper. If the stopper comes in first, base coat only to wall joints to be waterproofed, but not corner joints of the shower. This is a two-day application over a 3-day period. There is a minimum of 48 hours after the final coat is applied before areas can be tiled.
9. Recommended joist spacing for 18mm plywood is 400mm, with nogs up to 600mm. Maximum joist spacing is recommended for 18mm plywood with 600mm joist, and nogs up to 400mm. Note that if using T&G plywood, joint

still needs to be fixed and supported by joist. Glue and screw fixing is recommended at 150mm centres to the perimeter of sheets and 200mm centres down the middle or closer as per supplier's instructions. Rib shank galvanised nails are acceptable when glue is also used. Ensure all screws/nails are countersunk just below the surface.

10. Underfloor heating when used must be installed on top of waterproofing, not underneath, once waterproofing is fully cured.

Commonly asked questions:

Can you waterproof up to skirting?

No. Skirting and architraves must be left off until waterproofing is completed.

Will the membrane hide imperfections?

No. As it is a gel coating, it does not self-level and has a dry film thickness of between 1-1.5mm.

Can it be built up thicker to fix leveling problems?

No. For same reasons as above and also, the system would need drying between the multiply layers required.

If the substrate is wet, can you torch it dry?

No, not if it is wet through as the torch will only dry the surface. The moisture can slow the curing time and will get trapped in, only to reappear as bubbles later.

When my shower is running, there is water getting under the screen onto the floor...

This is a common problem if the wrong waste is used or screen is fitted after tiling and no flashings or sealant work was done prior to tiling to contain any water running under tiles. Very hard to fix.

My plumber says he has a better waste?

Check with applicator first. What might be good for him to fit may not be good to waterproof or drain water trapped under tiles properly.

Can I tile it tomorrow?

Only if tomorrow is 48 hours after the final coat without rain at 18-23°C and 60-70% Relative Humidity. Cooler and/or more humid conditions may prolong dry times.

Can you waterproof when bathroom fittings are already fitted?

No, not properly, unless we can waterproof up onto the fittings at least 70mm (not a good look).

Do you need to waterproof the whole floor?

Yes. It is very important to apply waterproofing to the entire floor area to ensure complete protection of the wet area. There are some exceptions, eg. ground floor concrete floors. However, water can track into/under walls and along saw cuts. So we recommend these areas also be waterproofed, particularly if a tiled walk-in shower is required.

Do you need to flood test bathroom or shower tray?

Yes. If practical, this should be done by builder/owner before tiling.

For more detailed explanations refer to your local plywood supplier's installation procedures. Extracts of the above have been taken from the BRANZ publications, "Good membrane roofing practice" and "Good tiling practice"; Carter Holt Harvey's "Ecoply Manual", "GIB Aqualine wet area systems", and Equus "Chevaline Dext to internal areas".

Equus Industries Ltd
PO Box 601
Blenheim
Phone: 03 578 0214 Fax 03 578 0919
Email: admin@equus.co.nz
Web: www.equus.co.nz

Quality Assurance



Chevaline Dexx

Application of Chevaline Dexx to new plywood surfaces.

Specification No: P3011

Building Consent No: _____

Project & Address:

Equus Applicator:

Building Contractor:

Territorial Authority:

1. Statement of Intent

- (a) This checklist is to be completed by both the Equus Applicator and the Building Contractor, as a step by step record of compliance with both the Equus Specification provided for the contract, and the requirements of the Building Consent applicable to the contract.
- (b) A copy of this checklist must be forwarded to the nearest Regional Office of Equus Industries Ltd with any request for a Warranty and/or Manufacturers Producer Statement. A Warranty will not be issued by Equus Industries Ltd. without a copy of this Checklist being filed.
- (c) A copy of this checklist should form part of the Contract Documentation filed with the Territorial Authority on job completion, for issuance of Code Compliance Certification.

2. Areas Treated

The areas to which Membrane is applied are detailed below, with reference to plans (where appropriate).

3. Sign Off

We confirm that all applicable processes listed in Section 4 have been correctly completed and that sign-off on each stage has been made by a person with the authority to do so.

For: _____ (Signature)
(Building Contractor) _____ (Name)

Date: ____ / ____ / ____ _____

For: _____ (Signature)
(Equus Applicator) _____ (Name)

Date: ____ / ____ / ____



4. Checklist And Method Statement

* Denotes those processes which must be signed off by the Building Contractor as well.

No.	Process	Completed On	Building Contractor	Equus Contractor
1.*	Plywood of correct thickness and treatment grade on site - back and edge primed.			
2.*	Timber framing correctly sized spaced and laid in accordance with NZS 3604.			
3.*	Plywood correctly laid - tight butted and screw fixed in adhesive bead with correct fixing spacings for site condition.			
4.*	Corrosion resistant fasteners used (stainless steel mandatory within 1km of coastline).			
5.*	Treated timber fillets installed at all upstand transitions. All plywood/timber edges chamfered. Outlets in place.			
6.*	Plywood surface accepted as satisfactory for Dexx installation by Equus Applicator.			
7.	All exposed surfaces correctly primed with _____ (Nominate primer used)			
8.	All Dexx detail strips in place at transitions, in doorways, plywood joints and at wall upstands.			
9.	First full Dexx coat in place with one layer of 300gsm E-mat embedded and wetted out and E-mat correctly laid.			
10.	First filling coat of Dexx laid and E-mat totally sealed off.			
11.	Final coat of Dexx applied at correct spreading rate to fill and cover surface.			
12.	Dexx surface checked for adequate cover and absence of pinholes, blemishes and 'proud' fibreglass.			
13.*	Dexx surfaces recoated where necessary to achieve required finish and base membrane complete.			
14.	Dexx Wearcoat correctly applied where a non-slip finish has been specified Fine/ Medium/Coarse (delete non-applicable).			
15.	Final topcoat(s) correctly applied using _____ (nominate topcoat used)			
16.*	Completed installation inspected and signed off.			

Equus Industries Ltd
 PO Box 601
 Blenheim
 Phone: 03 578 0214 Fax 03 578 0919
 Email: admin@equus.co.nz
 Web: www.equus.co.nz



Chevaline Dextt

Application of Chevaline Dextt to exterior concrete surface.

Specification No: P3012 rev

Building Consent No: _____

Project & Address:

Equus Applicator:

Building Contractor:

Territorial Authority:

1. Statement of Intent

- (a) This checklist is to be completed by both the Equus Applicator and the Building Contractor, as a step by step record of compliance with both the Equus Specification provided for the contract, and the requirements of the Building Consent applicable to the contract.
- (b) A copy of this checklist must be forwarded to the nearest Regional Office of Equus Industries Ltd with any request for a Warranty and/or Manufacturers Producer Statement. A Warranty will not be issued by Equus Industries Ltd. without a copy of this Checklist being filed.
- (c) A copy of this checklist should form part of the Contract Documentation filed with the Territorial Authority on job completion, for issuance of Code Compliance Certification.

2. Areas Treated

The areas to which Membrane is applied are detailed below, with reference to plans (where appropriate).

3. Sign Off

We confirm that all applicable processes listed in Section 4 have been correctly completed and that sign-off on each stage has been made by a person with the authority to do so.

For: _____ (Signature)
(Building Contractor) _____ (Name)

Date: ____ / ____ / ____ _____

For: _____ (Signature)
(Equus Applicator) _____ (Name)

Date: ____ / ____ / ____



4. Checklist And Method Statement

* Denotes those processes which must be signed off by the Building Contractor as well.

No.	Process	Completed On	Building Contractor	Equus Contractor
1.*	Concrete surface correctly laid to falls and cured 28 days.			
2.*	Concrete surface finish U3 (NZS3114) achieved and free of laitence/detritus.			
3.*	Plaster coves and/or treated timber fillets installed and concrete edges chamfered.			
4.*	Concrete surface accepted as satisfactory for Dexx installation by Equus Applicator.			
5.*	All exposed surfaces correctly primed with _____ (Nominate primer used)			
6.*	All Dexx detail strips in place at transitions, in doorways, and at wall upstands. Outlets in place.			
7.	First full Dexx coat in place with one layer of 300gsm E-mat embedded and wetted out and E-mat correctly laid with teased laps.			
8.	First filling coat of Dexx laid and E-mat totally sealed off.			
9.	Final coat of Dexx applied at correct spreading rate to fill and cover surface.			
10.	Dexx surface checked for adequate cover and absence of pinholes, blemishes and 'proud' fibreglass.			
11.*	Dexx surfaces re-coated where necessary to achieve required finish and base membrane complete.			
12.	Dexx Wearcoat correctly applied where a non-slip finish has been specified Fine/ Medium/Coarse (delete non-applicable grades).			
13.	Final top coat(s) correctly applied using _____ (Nominate top coat used)			
14.*	For surfaces to receive tile overlay—full 24 hour pond test carried out successfully.			
15.*	Completed installation inspected and signed off.			



Chevaline Dextt

Application of Chevaline Dextt to interior wet areas.

Specification No: P3014

Building Consent No: _____

Project & Address:

Equus Applicator:

Building Contractor:

Territorial Authority:

1. Statement of Intent

- (a) This checklist is to be completed by both the Equus Applicator and the Building Contractor, as a step by step record of compliance with both the Equus Specification provided for the contract, and the requirements of the Building Consent applicable to the contract.
- (b) A copy of this checklist must be forwarded to the nearest Regional Office of Equus Industries Ltd with any request for a Warranty and/or Manufacturers Producer Statement. A Warranty will not be issued by Equus Industries Ltd. without a copy of this Checklist being filed.
- (c) A copy of this checklist should form part of the Contract Documentation filed with the Territorial Authority on job completion, for issuance of Code Compliance Certification.

2. Areas Treated

The areas to which Membrane is applied are detailed below, with reference to plans (where appropriate).

Brand/Type of tile adhesive used/to be used:

3. Sign Off

We confirm that all applicable processes listed in Section 4 have been correctly completed and that sign-off on each stage has been made by a person with the authority to do so.

For: _____ (Signature)
(Building Contractor) _____ (Name)

Date: ____ / ____ / ____ _____

For: _____ (Signature)
(Equus Applicator) _____ (Name)

Date: ____ / ____ / ____



4. Checklist And Method Statement

* Denotes those processes which must be signed off by the Building Contractor as well.

No.	Process	Completed On	Building Contractor	Equus Contractor
1.*	Plywood of correct thickness and treatment grade on site - back and edge primed.			
2.*	Timber framing correctly sized spaced and laid in accordance with NZS 3604			
3.*	Plywood, or cellulose cement sheet lining correctly laid - butted in adhesive bead (refer to How To WA223)			
4.*	Corrosion resistant fasteners used (stainless steel mandatory within 1km of coastline).			
5.*	Treated timber or Tremflex PU-1 fillets installed at all upstand transitions. Outlets in place.			
6.*	Sheet substrate accepted as satisfactory for Dexx installation by Equus Approved Applicator.			
7.	All exposed surfaces correctly primed with _____ (Nominate primer used)			
8.	All Dexx detail strips in place at transitions, in doorways, plywood joints and at wall upstands.			
9.	First full Dexx coat in place with one layer of 300gsm E-mat embedded and wetted out and E-mat correctly laid with teased laps.			
10.	First filling coat of Dexx laid and E-mat totally sealed off.			
11.	Final coat of Dexx applied at correct spreading rate to fill and cover surface.			
12.	Dexx surface checked for adequate cover and absence of pinholes, blemishes and 'proud' fibreglass.			
13.*	Dexx surfaces recoated where necessary to achieve required finish and base membrane complete.			
14.	Final top coat(s) correctly applied using _____ (Nominate top coat used)			
15.	For surfaces to receive tile overlay - full 24 hour pond test carried out successfully.			
16.*	Completed installation inspected and signed off.			

Warranty



Equus Industries Ltd.
45 Hutt Road
Petone, Lower Hutt
PO Box 38 636
Wellington Mail Centre.
Phone: 04 576 0333
Fax: 04 576 0334
Email: central@equus.co.nz
Web: www.equus.co.nz



WARRANTY REQUEST FORM

Date: _____

Project: _____

Spec. No: _____

Owner: _____

Site Address: _____

Building Consent No: _____

Issuing Territorial Authority: _____

Building Contractor: _____

I/We _____ have undertaken work at the above address in accordance with Equus Specification No. P _____

I/We confirm that the work was completed in a tradesman like manner using products supplied by Equus Industries Ltd.

SPECIFIC AREAS PERTAINING TO WARRANTY:

Please use separate sheet if required (attach to this form).

COMMENTS IN RELATION TO PROJECT WHICH MAY AFFECT WARRANTY:

Please use separate sheet if required (attach to this form).

The undersigned agrees to comply with all conditions of his appointment as an **Approved Equus Applicator**.

Date: _____ Authorised Signatory: _____

Completed project sighted and signed off: _____ Equus Representative

Date: _____



Equus Industries Ltd.
45 Hutt Road
Petone, Lower Hutt
PO Box 38 636
Wellington Mail Centre.
Phone: 04 576 0333
Fax: 04 576 0334
Email: central@equus.co.nz
Web: www.equus.co.nz



PRODUCER STATEMENT REQUEST FORM

Date: _____

Project: _____

Spec. No: _____

Owner: _____

Site Address: _____

Building Consent No: _____

Issuing Territorial Authority: _____

Building Contractor: _____

I/We _____ have undertaken work at the above address in accordance with Equus Specification No. P _____

I/We confirm that the work was completed in a tradesman like manner using products supplied by Equus Industries Ltd.

SPECIFIC AREAS PERTAINING TO PRODUCER STATEMENT:

Please use separate sheet if required (attach to this form).

COMMENTS IN RELATION TO PROJECT WHICH MAY AFFECT OUR PRODUCER STATEMENT:

Please use separate sheet if required (attach to this form).

The undersigned agrees to comply with all conditions of his appointment as an **Approved Equus Applicator**.

Date: _____ Authorised Signatory: _____

Completed project sighted and signed off: _____ Equus Representative

Date: _____



**Project Name
Address
(Building Contractor -)
(Building Consent - ##### - Territorial Authority)
CHEVALINE DEXX MEMBRANE SYSTEM TO
DECK AND FLAT ROOF AREAS
(Standard Specification P3011rev)**

Dear Sir

Further to our discussions regarding a material warranty covering coating materials supplied for the above contact, we would confirm the Terms and Conditions of the Warranty as set out in this letter as follows:

1. Limitations of Cover:

The terms and conditions of Warranty as set out in this letter refer specifically to materials supplied by Equus Industries Limited to your Company as our Approved Contractor for this contract.

2. Warranty Cover:

The Warranty covers quality and suitability for use of materials supplied for exterior application and relates to film integrity in the sense that it covers waterproofing integrity of the applied membrane.

3. Warranty Period:

The maximum period for which such materials are covered by a materials warranty is fifteen (15) years from such date as stipulated in any form of warranty entered into by (Approved Applicator Name).

4. General Terms and Conditions:

- (a) This warranty is applicable only to materials manufactured by Equus Industries Ltd., and applied by (Approved Applicator Name) on the above contract.
- (b) This warranty is supplied to (Approved Applicator Name) as the purchase of materials. It is not an application or Process Performance Warranty and may not replace or supplant any warranty required of (Approved Applicator Name) for application/process performance.
- (c) The warranty is valid only for the satisfactory performance of materials which are applied to this contract strictly in accordance with specifications supplied for this contract, information contained in relevant Know How's, and any other specific written instructions supplied by Equus Industries Ltd., or amendments thereto.

5. Limitation of Liability:

No responsibility is taken by Equus Industries Ltd. for any failure of the applicator to apply materials in the correct manner to correctly nominated, prepared and designed surfaces. No responsibility is taken by Equus Industries Limited, for any alteration to performance of the materials caused by work carried out on the coated surfaces without prior written approval of Equus, or any change in the use of the coated structure from that pertaining at the time coating work was completed.



There shall be no liability for Equus Industries Limited in respect of damage to or deterioration in performance of the coatings caused by Act of God, exceptional weather conditions, fire or riot civil commotion, vandalism, nuclear explosions or fall out, damage caused by objects dropped from above, bursting or other forms of destruction or failure of gas or fluid carrying pipes or other vessels, electrical faults, negligence or willful damage by the main contractor, owner and/or occupier of the building and/or any visitors to the building on which the coatings are applied, or any criminal act, or any consequential damage, or any physical damage from mechanical causes, spillage of any substance or disruption of the surface to which the coatings are applied by any natural disturbance of the structure.

6. Indemnity:

If it is established that faulty materials have been supplied to (Approved Applicator Name), for this contract and the Terms and Conditions set out above have been satisfied, Equus Industries Limited, will there by indemnify (Approved Applicator Name), against the costs of rectification or upgrading of any coated surfaces where such materials have been used, so that the original warranty period and performance are met.

7. Payment for Materials:

This warranty shall not be binding on Equus until payment in full is received by Equus Industries Ltd for materials supplied to (Approved Applicator Name) for the contract described above.

8. Disputes:

Should there be any dispute in regard to any provisions of this warranty or the manner in which it is exercised or interpreted, the decision of an independently appointed arbitor will be accepted as final and binding.

Yours faithfully

EQUUS INDUSTRIES LTD
Brian J Greenall
Director



PRODUCER STATEMENT

CHEVALINE DEXX MEMBRANE TO PLYWOOD DECK AREAS

Location:
Building Contractor:
Equus Applicator:

Ref:

Date:

This statement confirms the following

1. Inspection

The above **Chevaline DEXX** installation has been inspected by an Approved Person employed by Equus Industries Ltd and the standard of installation has been found to be satisfactory.

2. Applicable Specification

The **Chevaline DEXX** membrane has been applied to plywood sheet over timber frame construction in accordance with Equus Standard Specification P3011rev which was the applicable specification at the time of installation.

3. Compliance

When the Equus **Chevaline DEXX** membrane has been applied to plywood sheeting in accordance with Standard Specification P3011rev and the recommendations of Equus Industries Ltd, it complies with and meets the relevant provisions of the New Zealand Building Code Clauses:

- B2 – Durability
- E2 – External Moisture
- E3 – Internal Moisture
- F2 – Hazardous Building Materials

4. Recommended Maintenance

It is recommended that the installation be inspected annually, to ensure that all drainage points are clear and working. It is required that between the 9th and 11th year of service, the installation is cleaned and re-top coated with an appropriate top coat from Equus Industries Ltd to maintain the integrity of the waterproof membrane. This is a requirement in terms of compliance with clause B2-Durability of the New Zealand Building Code.

For Equus Industries Ltd.

B J Greenall B.E.(Chem) AMIChemE MNZIC FTSC
Director

**WORKMANSHIP AND APPLICATION
WARRANTY**

Certified Number: _____
Consent Number: _____
Issuing Authority : _____

To _____ (the Client)

We ____ (Applicator Company Name) _____ an Approved Equus Applicator

having completed our contract on

_____ (Project Name/Location)

with the _____ (Name of Equus System)

Hereby undertake that we will rectify at our own cost, any failure in performance by the above mentioned system or systems resulting from defective workmanship and application or incorrect system nomination by the Applicator, which occurs within the period of years from the date of completion of our contract.

Namely

.....

The systems nominated in this Warranty have been applied as fully representative of the Manufacturer's current specification for each system to permit performance as claimed for that system.

Our liability under this Warranty is subject to the following terms and conditions:-

1. The Warranty shall not be binding on the Applicator until payment in full is received by the Applicator in respect of the above described contract.
2. This Warranty shall be void and of no effect, and the Applicator shall have no liability in respect thereof, if the Applicator is not given notice in writing of any alleged failure or fault or deterioration relating to the processes within seven days of the discovery by the Client if such alleged failure, fault or deterioration.
3. In the event of liability being established pursuant to this Warranty the Applicator shall repair and reinstate the systems as may be required to make good the areas requiring repair PROVIDED that the Applicator shall be entitled to demand and be reimbursed by the Client for all expenses incurred in the investigation of any alleged failure, fault or deterioration, if, on investigation and in accordance with the foregoing terms and conditions, it is found that this Warranty shall not apply, and it shall not be the responsibility under the terms of this Warranty for the Applicator to rectify such alleged failure, fault or deterioration.
4. The Applicator does not warrant that any repair work carried out pursuant to the terms of this Warranty when completed shall exactly match the existing applied systems in respect to colour and/or texture.
5. All other warranties, guarantees or conditions of whatsoever nature, relating to the application of the systems and whether expressed, implied or given to be expressed, implied or given by any agent or employee of the Applicator, or implied or prescribed, or to be implied or to be prescribed by law are hereby excluded.

6. There shall be no liability for the Applicator in respect of this warranty for any damage to the applied processes caused by act of God, exceptional weather conditions, fire, war, riots, civil commotion, vandalism, nuclear explosion and/or fallout, damage caused by objects dropping or falling from aeroplanes or other airborne devices, bursting or other forms of destruction or failure of gas or fluid carrying pipes or other vessels, electrical faults including fusion and short circuits, negligence or wilful damage by the main contractor, owner and/or occupier of the building and/or visitors to the building on which the processes are placed, and any criminal act or illegal act or any consequential damage.
7. There shall be no liability for the Applicator for any deterioration of the applied system resulting from physical damage by point loads or mechanical causes, spillage of any substance onto the surface however caused whether during construction work or thereafter which were not allowed for in the original design and specification contract documents or arising from any natural disturbance of the structure.
8. This Warranty is null and void if any work is carried out on the applied system without prior written consent of the Applicator or if a change in use of the building from that of which it was designed at the time of completion of the Applicator's contract affects the performance of the application.
9. The benefit of this Warranty is not assignable without prior written consent of the Applicator.

Signed

For
(APPLICATOR COMPANY)

A copy of the Warranty from Equus Industries Limited WW

Dated, for materials supplied for this contract, is appended herewith.

Reports



Central Laboratories Report 94-27390

**EVALUATION OF PERFORMANCE OF
DEXX MEMBRANE ON CARPARK DECKS**

V.K. Dravitzki

January 1994

Central Laboratories
P O Box 30-845
Lower Hutt
Telephone (04) 568-3119
Fax (04) 568-3169

Opus: *an accomplished work,
a creation, an achievement*

COPY
From original
11/3/05

Central Laboratories Report 94-27390

**EVALUATION OF PERFORMANCE OF
DEXX MEMBRANE ON CARPARK DECKS**

V.K. Dravitzki

January 1994

Central Laboratories
P O Box 30-845
Lower Hutt
Telephone (04) 568-3119
Fax (04) 568-3169

CLIENT: Equus Industries
P O Box 601
BLENHEIM

CONTACT: Brian Greenall, Director
Phone: (03) 578-0214

1.0 BRIEF

The brief was to view a sample of vehicle decks in Wellington where the Chevaline DEXX system for concrete carparking decks had been used as a trafficked waterproof membrane and to:

- form an opinion as to its ability to withstand trafficking;
- to ascertain the ability of the system to bridge cracks which may form in the substrate (the deck);
- to ascertain the nature and extent of damage which may occur.

2.0 THE DEXX SYSTEM

The DEXX system as now specified is set out in detail in the Equus Specification P3013, dated January 1990. Appendix 1 of Specification P3013 details the associated TRAXX NS system for ramp areas. In summary, it consists of a primer coat, followed by the membrane proper, followed by a protective topcoat to the membrane.

The membrane is made up of four successive coats of Chevaline DEXX, an acrylic material, which are alternated with two layers of 300 g/m² glass fibre matt. The Chevaline DEXX is applied as a waterborne liquid material at a total rate of 0.5 m²/l, and the glass fibre matts are generally applied at right angles to each other.

The vehicle decks included in this study had been constructed (from the viewpoint of membrane application) over the period 1984 to 1990. The client stated that over this period there had been a progressive refinement of the system, in particular:

- a significant reformulation of the primer;
- a moderate reformulation of the top seal coat;
- the normal iterative changes to the formulation of the main membrane Chevaline DEXX that could be expected with a formulation over such a seven year period;
- a progressive development of the system that was applied to ramp areas from TRAXX (a polyurethane coating containing grit for non-slip and applied directly to the concrete base) to the current method of applying the TRAXX/non-slip layers over the DEXX membrane.

However, the main membrane system of four coats of Chevaline DEXX and two layers of fibreglass were stated as being present on all decks inspected.

3.0 DECKS INCLUDED IN STUDY

The decks included in this study were selected by the client who was in attendance during the first inspection, and who provided a description of the systems applied and a brief history of the subject. It is considered that the buildings selected are reasonably representative of the buildings constructed in Wellington in the period of the mid 1980's to 1990.

(1) Whitcoulls, Lambton Quay - Upper Level Deck Accessed from Gilmer Terrace

Deck construction - plywood.

System: Old primer
Four layers acrylic/two layers fibreglass
No sealer

Laid in late 1985/early 1986. Was a carpark but is now covered and a storage area.

(2) Carparking Building Adjacent the Settlement, Willis Street

Deck construction - mixture of Stalton and Double Tee concrete beam.

System: Decks Primer
Four layers acrylic/two layers fibreglass
Acrylic sealer

Ramps Primer
Three layers acrylic/two layers fibreglass
Acrylic sealer

Membrane on entrance, first and top levels. Laid in 1984/85, and same system laid on extension in 1987. The extension was intended to have touchup coats after its temporary use as a construction deck for an adjacent building.

(3) Digital House, Victoria Street - First Level Carpark Accessed from Bond Street

Deck construction - Stalton.

System: Decks Primer
Four layers acrylic/two layers fibreglass
Acrylic seal coat

Ramps Not treated

Laid in August 1987.

(4) Salvation Army, Cuba Street - Upper Deck of Carpark at Building Rear Accessed from Vivian Street

Deck construction - concrete Double Tee and Dycor.

System: Decks WB epoxy primer
Four layers acrylic/two layers fibreglass
Urethane seal coat

Ramps TRAXX urethane/non-slip grit/Colourcure over concrete

Laid in mid 1990.

(5) Mainzeal Building, Vivian Street - First Level Carpark Accessed from Walter Street

Deck construction - Double Tee beams.

System: Decks WB epoxy primer
Four layers acrylic/two layers fibreglass
Acrylic seal coat

Ramps TRAXX urethane/non-slip grit over concrete

Laid November 1987.

(6) Data General, Boulcott Street - Washdown Area, First Level (Over Plant Rooms)

Deck construction - rough concrete slab.

System: WB epoxy primer
Four layers acrylic/two fibreglass
Urethane sealer

No coated ramps. Laid in late 1988.

(7) No. 3 The Terrace - Deck at Street Level

Deck construction - various.

System: WB epoxy primer
Three layers acrylic/two fibreglass
Acrylic sealer

Laid in late 1990/early 1991. This is believed to be a semi-public carpark.

(8) Bowen House - Third Level Carpark and Ramp, Accessed by Single Ramp from Bowen Street

Deck construction - not stated.

<u>System:</u>	Decks	WB epoxy primer Four layers acrylic/two layers fibreglass Urethane sealer
	Ramps	WB epoxy primer Four layers acrylic/two layers fibreglass TRAXX urethane

Laid in November 1990.

4.0 AMOUNT OF TRAFFIC

For all sites except site 2, traffic volumes were light to moderate, being mainly staff and/or client vehicles. Traffic for site 2 was heavy as the building is a well used central city public carparking building.

5.0 GENERAL CONDITION

The general condition of the membrane was that the system had remained tightly adhered to the deck surfaces. There was no evidence of delamination or rucking that could be associated with vehicle use evident on any of the eight decks sighted. There was some localised damage to the membrane. This damage was, in aggregate terms, very small and appeared related to the amount of trafficking/amount of misuse received by the decking. The damage was characteristically a wearing through of the membrane through some or all of the layers.

Tyre blackening was pronounced on some ramps and high use areas, though its effect on membrane performance is negligible.

The standard of construction of a number of the decks did not appear to be high as they exhibited a number of cracks in the slab surface which have formed subsequent to construction. However, the membrane appeared to be able to bridge these fine cracks, as the cracks were not reflected through the membrane immediately above or adjacent.

Figures 1 to 7 show some characteristic aspects of the membrane's performance.

Figures 1 and 2 show general views of both a highly trafficked (site 2) and medium trafficked (site 3) deck after nine and six years use respectively. Overall the membrane is in sound condition and is well adhered.

Figure 1 (The Willis Street public carpark) shows tyre blackening, some of which appears to be from "joy riding". In both decks of Figures 1 and 2 there is some localised damage shown in more detail in Figures 3 and 4. Figure 3 shows where (possibly deliberate) wheel spinning has first softened the membrane, then allowed it to be immediately worn away down to the concrete substrate. This is the action of a single vehicle in a very short time. Figure 4 shows a more general wearing through of the membrane which has occurred at the top of the ramp, probably due to the progressive effects of the slight accelerating and turning action of vehicles in this position.

Figure 5 shows the ramp area of site 2, the Willis Street carpark. This ramp, which is relatively steep, was not finished with the non-slip system. Some wheel spin has occurred as is evidenced by the tyre blackening and partial wear through. In contrast, the Bowen House ramp, which is more gradual and finished in non-slip, did not show this aspect.

Figure 6 (Willis Street parking building) shows two aspects. This view is at the top of the first level ramp which is relatively steep and a very tight turn for incoming vehicles. Traffic is very heavy as almost all vehicles using the building traffic this area. Over the eight years the high shear action of the turning vehicles has worn away the membrane through to the substrate. The successive layers comprising the membrane are visible at the edges. However, even in this high shear area, the remaining membrane is still tightly adhered. The second aspect shown in Figure 6 is the crack in the concrete surface, and that it has been bridged by the membrane. Cracks similar to this one were visible on uncoated decks at other levels. They corresponded to the edges of the double T beams and run the full length of the beam. It is reasonable to conclude that the crack in Figure 6 extends beneath the membrane.

Figure 7 shows an isolated example of non-vehicle induced failure where it appears that lack of detailing at the ramp edge has allowed water to ingress beneath the membrane which is now delaminating.

The client stated that in all cases normal maintenance procedures could restore the membrane. In summary, these would consist of either cutting out the affected area to give clean edges, then applying the same system as before and overlapping it onto the existing membrane or, if more appropriate, applying additional coats over partial worn areas. In the instances shown in the figures, maintenance is the responsibility of the building owner who had not undertaken the work. However, the inspection indicates that the maintenance as set out in Section 6 and part of Section 7 of Equus Specification P3013 would be reasonable for normal use.

Two other aspects are not shown in the figures. At site 3 some crazing of the clear seal coat was evident. Maintenance procedures of renewing this periodically did not appear to have been carried out by the building owner. At site 7 some scuffing of the membrane was occurring at upstands where it has been impacted by skate boarders' unauthorised use of the vehicle decks.

6.0 NEW ZEALAND BUILDING CODE

The requirements of the New Zealand Building Code in Clause B2, Durability is for building elements, with only normal maintenance to satisfy the performances of the code for the lesser of the specified life of the building or for the building envelope 15 years. Acceptable solution B2/AS1 in Table 1 also lists roofs as requiring a 15 year durability.

7.0 CONCLUSION

The evidence of the eight sites inspected is that the DEXX membrane system is able to withstand vehicle trafficking, with damage being minor and localised such that

maintenance to repair the membrane is feasible. It is also evident that the nature of the damage that occurs is readily detectable by simple inspection.

Several of the sites demonstrated that the system can accommodate cracks forming in the slab such as those which often form in slabs over double T beams or Stalton construction.

None of the sites visited have been in place for 15 years. However, after 3-8 years' exterior weathering, none of the sites indicate that a rapid breakdown of the coating is imminent. Reasonable expectations are for the system to have a 15 year durability but only if the normal specified maintenance, as set out in Equus Specification P3013, is undertaken and only if worn or damaged areas are repaired as they occur.



V.K. DRAVITZKI
Section Head (Building Science)

Reviewed by



F.D. EDMONDS
Manager

January 1994



FIGURE 1: Upper Deck, Willis Street Carpark



**FIGURE 2: First Level Deck, Digital House
(beige colouring is reflection of adjacent building in the surface water)**

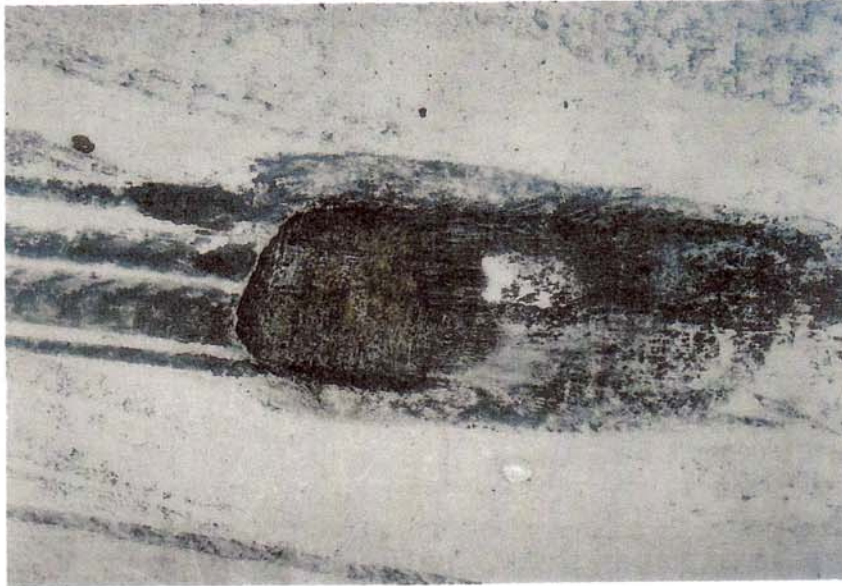


FIGURE 3: Wear Through from Wheel Spin of Single Vehicle, Willis Street Parking Building



FIGURE 4: Wear Through at Top of Ramp, Digital House

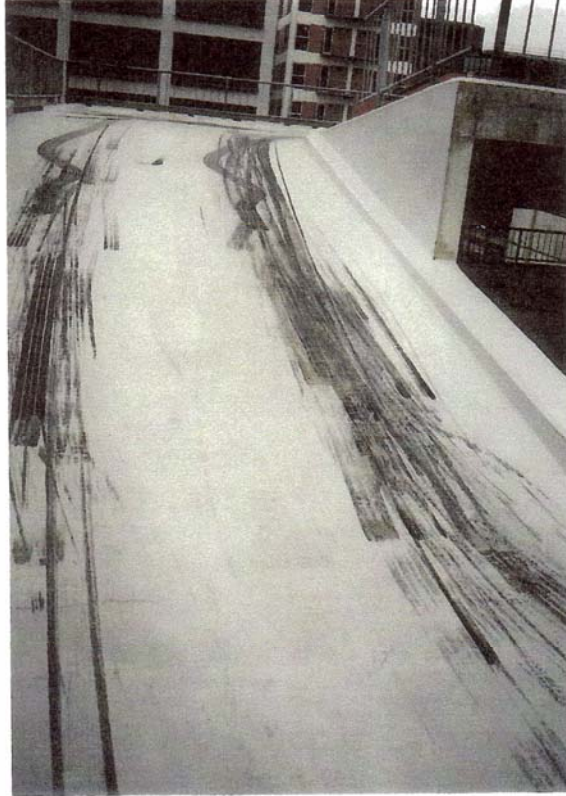


FIGURE 5: Ramp (Willis Street) Showing Blackening and Wheel Spin Areas



FIGURE 6: High Stress Area at Level 1, Willis Street Showing:
- crack and its bridging by membrane
- removal of membrane but no delamination



FIGURE 7: Delamination in Localised Area of Water Ingress

Joyce Group Report



VERIFICATION OF CHEVALINE DEXX WATERPROOFING SYSTEM

FOR
EQUUS
INDUSTRIES LTD

.....
PROJECT MANAGERS
ARCHITECTS
ENGINEERS
BUILDING CONSULTANTS
REGISTERED IOPS



MAY 2005

JN: 6419

.....
LEVEL 1, 90 GHUZNEE ST
P.O. BOX 1715, WELLINGTON
NEW ZEALAND
TEL. 64 4 385 7574
FAX. 64 4 385 7610

**VERIFICATION OF
CHEVALINE DEXX WATERPROOFING SYSTEM
FOR EQUUS INDUSTRIES LTD**

CONTENTS

- 1.0 INTRODUCTION**
- 2.0 SCOPE**
- 3.0 BUILDINGS TO NZBC ACCEPTABLE SOLUTION E2/AS1 FEBRUARY 2005**
- 4.0 STRUCTURE**
- 5.0 DURABILITY**
- 6.0 MAINTENANCE**
- 7.0 OUTBREAK OF FIRE**
- 8.0 SPREAD OF FIRE**
- 9.0 EXTERNAL MOISTURE**
- 10.0 INTERNAL MOISTURE**
- 11.0 APPLICATION SKILL LEVEL**
- 12.0 SYSTEMS INSTALLATION**
- 13.0 SUBSTRATE PREPARATION ON NEW PLYWOOD SURFACES**
- 14.0 MEMBRANE INSTALLATION**
- 15.0 HEALTH AND SAFETY**
- 16.0 BUILDING REGULATIONS**
- 17.0 QUALITY**
- 18.0 TESTS**
- 19.0 APPENDICES**

1.0 INTRODUCTION:

The Joyce Group Ltd as been commissioned by Mr Gary Still of Equus Industries Ltd to assess the capability of the **Chevaline Dextx** waterproofing system to be approved as an “Alternative Solution” in respect of the NZ Building Code External Moisture E2/ASI February 2005.

1.1 THE ASSESMENT

The assessment has been prepared to determine compliance with the following clauses of the NZ Building Code.

B2 Durability
E2 External Moisture
E3 Internal Moisture
F2 Hazardous Agents on Site

2.0 **SCOPE**

2.1 **Chevaline Dextx** has been assessed for use in sealing old and new flat and near-flat roofs, walk out decks and patios

- Within the scope limitations of NZBC Acceptable Solutions E2/ASI
- The product has been assessed for use as a waterproof membrane on nominally flat, curved and sloping roofs and decks when fully bonded to substrates of either reinforced or ply wood sheets.
- The product has been assessed for use as a waterproof membrane in internal wet areas such as: showers and bathrooms, both as an exposed membrane and as an under tile membrane.

2.2 DESCRIPTION

The liquid Dextx material is a heavy-bodied water –borne acrylic paste. It is formulated for high adhesion, and water resistance, and toughness combined with flexibility in the cured film.

The wear coat contains graded silica for slip and wear resistance.

An FD grade product is available for application in adverse conditions.

The standard system consists of a primer and three applications of **DEXX Bodycoat**, with one layer of embedded glass fibre mat.

Various topcoats are available, depending on end use. These include **Colour Glaze Dextx Top-coat** and **Traxx 2000 Wearcoat**.

2.3 PHYSICAL PROPERTIES

Liquid material: (Dexx bodycoat).

Volume Solids: 47.%

Specific Gravity: 1.3.

Flash Point: None – waterborne system.

Shelf Life: Three years in original sealed pails when stored in cool dry conditions.

Applied film: (standard system).

Flexibility: Passes 3mm mandrel

Durability: Excellent long term service may be expected from the membrane. During formulation care is taken to produce a membrane with excellent adhesion, high chalk resistance, low dirt pick-up and good colour retentions.

Fungus Resistance: Contains a highly effective anti-fungal preparation which does not contain toxic metals or phenols.

Normal Film Resistance: 0.8 – 1.2mm, depending on number of fibre glass cloth layers.

Glass Cloth: 300gsm glass fibre E-mat.

Primer: Depending on the situation chosen for, **Chevaline Epistixx**, **Dexx Primer** or **Chevaprime PBT**.

2.4 Dexx liquid materials are manufactured at the Equus Plant in Blenheim.

2.5 HANDLING and STORAGE

Handling and storage of all materials whether on or off site shall be in accordance with the recommendations of Equus Industries Ltd or under the strict control of Equus Industries Ltd trained and approved applicators.

3.0 **BUILDINGS TO NZBC ACCEPTABLE SOLUTION E2/AS1 FEBRUARY 2005.**

3.1 **Concrete Substrate**

3.1.1 CLEANING

All surfaces to be waterproof shall be waterblasted to remove all construction detritus and laitence, providing a lightly profiled surface ready for coating application. Surfaces which have been power-floated should, if possible, be acid etched to "open" the surface and then be thoroughly rinsed.

3.1.2 PATENT EXPANSION JOINTS

Allowance shall be made for installation of any patent mechanical expansion joints prior to application of the **CHEVALINE DEXX**. Where appropriate a chase shall be left for sealing of the **CHEVALINE DEXX** using **TRAXX FLOORJOINT** or **TREMFLEX PU1** as a standard perimeter detail.

3.1.3 CONCRETE IMPERFECTIONS

Surface imperfections shall be patched, using either an approved epoxy mortar for minor holes, or a **CHEVACRYL ADMIX** gauged patch mortar for larger irregularities, in accordance with the Manufacturer's recommendations.

3.1.4 MORTAR FILLETS

50 x 50 minimum mortar fillets shall be installed at transitions between decks and adjacent pre-cast elements so as to provide a bridge for installation of the membrane.

3.1.5 EXPANSION/MOVEMENT JOINTS

Such designed joints exceeding 6mm in width are not to be overlaid with **CHEVALINE DEXX**, but shall be sealed using an approved elastomeric sealant, such as **TREMCO THC-901** or **TREMFLEX PU1** which shall remain exposed.

3.1.6 SHRINKAGE/SETTLEMENT CRACKING and CONSTRUCTION

1. Regular Moving Cracks:

Any regular cracks greater than 1mm in width which appear likely to move regularly shall be saw-cut or chased to 5mm width and 8-15mm depth, primed and sealed with **TRAXX FLOORJOINT** or **TREMFLEX PU1**.

All such sealant joints shall be overlaid after surface priming, with a 150mm strip of 300gsm chopped strand fibreglass mat bedded in **CHEVALINE DEXX**. The **DEXX MEMBRANE** shall be carried over such cracks.

1. Irregular Cracks:

Irregular cracks, for which saw-cutting or chasing is impractical, shall be pre-treated after surface priming with **CHEVALINE DEXX** applied as a 100-150mm wide band, with 300 gsm chopped strand fibreglass mat embedded as reinforcement.

This shall be allowed to dry overnight before membrane application is begun. Note: This step is most important on decks built up on precast elements, e.g. Stahlton or Dycore systems.

3.1.7 UPSTANDS

All monolithic horizontal/vertical transitions which are not already covered shall be rounded to 8mm minimum radius using **TREMFLEXX PU1** applied as a fillet at least 24 hours before membrane application.

Where the transition is not monolithic, a plaster or treated (H3.1) dry timber fillet of 50 x 50 x 45 degrees in section shall be installed prior to DEXX application.

3.2 **Plywood Substrate**

3.2.1 PLYWOOD QUALITY

The minimum recommended standard for plywood is B-D Grade construction ply, with A-D Grade being preferred. The thickness of plywood used will depend to a large extent on construction details, but must be not less than 17.5mm thick (H3.1 treated) with appropriate framing details to comply with NZS3604 as a minimum.

The better the face-grade of the plywood, the less the preparation needed prior to laying **DEXX**. H3.1 treated plywood shall be installed.

3.2.2 SHEET LAYOUT

All sheet joints must be laid over deck/roof framing members. On large areas, lay plywood in a brick-bond pattern to minimise the number of 4-way joints. Sheets are generally laid across bearers.

3.2.3 SHEET SPACING

Sheets of plywood should be tight butt-jointed.

3.2.4 SHEET FIXING

Plywood must be fixed in accordance with manufacturer's instructions taking into account wind-loading, frame spacing and ply thickness. Screw-fixing is required using countersunk corrosion-resistant screws. Stainless steel screws shall be used in accordance with E2/AS1.

3.2.5 BACK PRIMING/PRIMING

All plywood should be back and edge-primed with **CHEVAPRIME PBT**, **DEXX PRIMER** or **EPISTIXX**. In installation over "wet" areas, back priming is mandatory.

When sheets have been fixed and stopped, all surfaces shall be primed with one full coat of **CHEVALINE PBT**, **DEXX PRIMER** or **EPISTIXX** applied at 9-12 sqm/litre and allowed to dry overnight.

Note that pre-priming is permitted, if this is a practical site consideration, but any cut or exposed surfaces of plywood must be patch-primed to ensure the surface is sealed.

3.2.6 UPSTANDS

Where upstands to walls occur, an ex 25 x 25 or 50 x 50 treated (H3.1) timber strip/fillet shall be installed, fixed to the deck and primed.

All upstands should be sealed by the application of a strip of 300 gsm E-mat glass-fibre bedded into **CHEVALINE DEXX**.

As a guide to wetting out, this is achieved when the entire glass mat has changed from white to the colour of the **DEXX** being used. It is important to ensure that the glass is firmly bedded back to the surface at the transition, with no tendency to “balloon” leaving a void behind. If necessary, use a ‘dry’ brush to push the glass in securely.

3.2.7 SHEET FILLING

All surface defects and fasteners shall be flushed over with **EPAR S025 EPOXY FILLER** or in some circumstances **THERMEXX DETAIL PLASTER** or **EQUUS SUPERFLUSH**. Any gaps between sheets shall be similarly treated.

3.2.8 PLYWOOD JOINT

All tight-butted, stopped plywood joints should be overlaid with a 150mm strip of 300gsm E-mat glass-fibre bedded into **CHEVALINE DEXX**.

3.2.9 PENETRATIONS

All penetrations for plumbing, flues etc., which are not fixed permanently to the deck/roof being sealed, must be sleeved and overflashed, with the sleeve being treated as an upstand when applying the **DEXX**.

Detailing of sleeves and overflashing should be the responsibility of the designer/builder. Make sure that this is done to your approval before laying **DEXX**.

3.2.10 WEATHERPROOFNESS

When joints and upstands have been sealed as described above, working on to primed plywood, the deck/roof surface can be regarded as temporarily weather-proof, and will resist rain showers without the need for further protection.

It is important to have temporary protection available on site until this stage is reached.

3.2.11 ROOF/DECK DRAINAGE

Roofs and decks must be constructed so that falls and drainage comply with paragraph 8.5.6 of NZBC Acceptable Solution E2/AS1 February 2005.

Roofs, decks and internal gutters must be constructed with minimum falls. Roofs 1:40, Decks 1:80 and Gutters 1:25.

3.2.12 JUNCTIONS AND PENETRATION

Junctions of the roof to walls must comply with paragraph 8.5.6 of NZ BC Acceptable Solutions E2/AS1 February 2005, and penetrations must comply with paragraph 8.5.9.

4.0 **STRUCTURE**

General

The pre-requisite for the application to all substrates is that the substrate is capable of carrying the loads, is graded to the correct fall and does not deform.

Structural movement of the substrate must be adequately allowed for, and movement joints provided. The configuration and location of the joints in the substrate should be carefully considered.

Conventional construction and movement (including seismic) joint details may be used. The BRANZ Good Practice Guide for Membrane Roofing gives guidance in this area. In general for plywood roofs, spacing of dwangs/nogs shall be 600 x 600mm or 400 x 800mm. For decks spacing shall be 400 x 400mm.

The membrane needs to be considered as part of the total roof design, and as such will need to be stopped at formed waterproof construction and movement joints where these are installed.

In common with any roof membrane system, the ability of the product to resist structural movement will decrease with age. As a result, premature failure may occur at structural movement joints if these are not designed and installed correctly.

5.0 **DURABILITY**

5.1 **CHEVALINE DEXX**, membranes are expected to have a serviceable life of at least 15 years, provided they are installed and maintained in accordance with this Assessment and the Technical Literature. Exposed DEXX Membranes must include a top coat as part of the total system.

5.2 CHEMICAL/FUNGAL RESISTANCE

Industrial air pollutions and windborne salt deposits should not significantly affect the durability of the membranes. However, the long-term properties of the material may be affected by contact with petroleum-based products such as oils, greases and solvents.

The bodycoat includes a highly effective anti-fungal preparation.

6.0 MAINTENANCE

The membrane roof system must be regularly (at least annually) checked for damage to ensure drainage points are clear and working and to remove rubbish or debris.

Mechanical damage to the membrane must be repaired as recommended by Equus Industries Ltd.

When DEXX is used as an exposed membrane it is required that between the eight and eleventh year of service the areas be cleaned and re-top coated with an appropriate Equus Industries Ltd top coat to maintain the weathering integrity of the membrane.

7.0 OUTBREAK of FIRE

Separation or protection must be provided to the membranes and plywood substrate from heat sources such as flues and chimneys.

NZBC Acceptable Solution C/AS1 Part 9 and Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

8.0 SPREAD of FIRE

The membranes may be used on roofs of buildings intended for all Purpose Groups, including SC and SD, subject to the requirements of NZBC Acceptable Solution C/AS1 part 7. Paragraph 7.11.1.

The membranes may be used for cladding fire-rated roof construction, providing the roof construction complies with the requirements of NZBC Acceptable Solution C/AS1 part 7.

9.0 EXTERNAL MOISTURE

DEXX Membranes, when installed in accordance with this Assessment and the Technical Literature, will provide a roof or deck that will shed precipitated water and melted snow, and prevent the penetration of water that could cause undue dampness or damage to building elements.

The membrane systems must be installed and maintained in a weatherproof state.

At penetrations, the membrane must be raised to a level above that of any possible ponding that may be caused by blockage of roof drainage facilities.

9.1 PROVISION FOR SNOW

Specific weathertightness design for preventing the ingress of snow melt water is required in accordance with the requirements of NZBC Acceptable Solution E2/AS1 February 2005. Paragraph 1.3.

10.0 INTERNAL MOISTURE

The impermeability of the membranes requires that consideration must be given to the effective control of moisture in the roof structure, and closed-in construction spaces under the membrane must have adequate ventilation to prevent the accumulation of moisture.

Venting and vapour barrier requirements will depend on the level of moisture that is present in the construction at the time of installation, the nature of the ceiling/roof construction, and the type of occupancy.

Roof construction that is dry and over areas of low moisture levels, such as found in offices shops and domestic buildings will generally require very little venting, and a painted ceiling will suffice as a vapour barrier.

However, over areas of high moisture levels, such as found in laundries, commercial kitchens, internal swimming pools and spa rooms, the roof space will require venting, coupled with the proper use of vapour barriers.

The BRANZ Good Practice Guide for Membrane Roofing provides details that should followed in regard to vapour barrier installation and the venting of roof spaces.

The membrane must not be installed over wet construction. New concrete substrates must be allowed to cure and dry before applying the membrane. The membrane must not be applied to screed over substrates impermeable to water vapour until the screeds are completely dry.

11.0 APPLICATION SKILL LEVEL

Installation of the membrane must be completely by applicators trained and approved by Equus industries Ltd.

For identification purposes each approved applicator is awarded a numbered certificate issued by Equus Industries Ltd. Refer appendix 1 for copy of the certificate.

Reviews of approved applicators will occur once per year.

Applicator approval certificates will be available for presentation as part of a building consent application.

12.0 SYSTEMS INSTALLATION

Substrate Preparation on concrete plaster and mastic asphalt surfaces.

12.1 GENERAL-RESPONSIBILITY

Unless expressly agreed otherwise, all substrate preparation work shall be the responsibility of the Main Contractor.

12.2 MOSSKILLING TREATMENT

All surfaces shall be treated with **EQUSS MOSSKILL** solution or other approved moss-kill to kill all moss/mould spores and growths. Stipulated kill-times shall be observed.

Note: Badly affected surfaces may require treatment before and after waterblast cleaning to ensure a residual moss-kill treatment before coating application.

12.3 CLEANING

All surfaces to be waterproofed shall be waterblasted to remove all construction detritus and laitence, providing a lightly profiled surface ready for coating application. Surfaces which have been power-floated, to a standard beyond U3 NZS 3114:1987 Specification for Concrete Surface Finishes, should, if possible, be acid etched or mechanically treated to "open" the surface and then thoroughly rinsed.

Pebbled surfaces may require additional scarifying to remove all pebbles/binder back to a relatively smooth surface.

12.4 PATCHING

Surface imperfections shall be patched, using either **THERMEXX MORTAR** for minor imperfections in concrete or a **CHEVALINE ADMIX** gauged patch mortar for larger irregularities in concrete or mastic asphalt.

Proprietary surface patch mixtures shall not be used.

Note: Irregular mastic-asphalt surfaces may require an asphalt-emulsion/ cement/sand plaster application to level to falls prior to membrane application.

12.5 EXPANSION/MOVEMENT JOINTS

Such designed joints exceeding 6mm in width are not to be overlaid with **CHEVALINE DEXX**, but shall be sealed using an approved elastomeric sealant, such as **TREMCO THC-901** or **TREMFLEX PU1** which shall remain exposed.

12.6 SHRINKAGE/SETTLEMENT CRACKING and CONSTRUCTION JOINTS

1. **Concrete and Solid Plaster**

Any regular cracks greater than 1mm in which appear likely to move regularly may be saw-cut or chased to 5mm width and 8-15mm depth, primed and sealed with **TRAXX FLOORJOINT** or **TREMFLEX PU1**.

All such sealant joints may be overlaid after surface priming, with a 150mm strip of 300 gsm chopped strand fibreglass mat bedded in **CHEVALINE DEXX**.

The **DEXX MEMBRANE** shall be carried over such cracks.

2. **All Surfaces**

Irregular cracks for which saw-cutting or chasing is impractical, shall be pre-treated after surface priming with **CHEVALINE DEXX** applied as a 100-150mm wide band, with 300 gsm glass-fibre mat embedded as a reinforcement. This shall be allowed to dry overnight before membrane application is begun.

12.7 UPSTANDS

All monolithic horizontal/vertical transitions which are not already coved shall be rounded to 5mm minimum radius using **TREMFLEX - 1** applied as a fillet at least 24 hours before membrane application.

Where the transition is not monolithic, a plaster or dry timber (H3.1 treated) fillet of 50 x 50 x 45 degrees in section shall be installed prior **DEXX** application.

13.0 **SUBSTRATE PREPARATION ON NEW PLYWOOD SURFACES**

13.1 BACK-PRIMMING

All plywood should be back and edge-primed with **CHEVAPRIME PBT, DEXX PRIMER** or **EPISTIXX**.

13.2 SHEET LAYOUT

Organise sheet layout to maximise the use of whole sheets and to keep joints as straight forward as possible. All sheets joints must be laid over deck/roof framing members. On large areas lay plywood in a brick-bond pattern to minimise the number of 4-way joints.

13.3 SHEET SPACING

Sheets of plywood should be tight butt-jointed. This means that in practice the gap between individual sheets may vary from zero to 1.5mm depending on accuracy of edge-cutting.

13.4 SHEET FIXING

Plywood must be fixed in accordance with manufacturer's instructions taking into account wind-loading, frame spacing and ply thickness. Screw-fixing is required using countersunk corrosion-resistant screws.

At the very least, on small deck areas less than 5m², all corners must be screw-fixed with screw-nails for the balance.

All fasteners heads shall be recessed below the level of the sheets and the sheets laid in a bead of construction adhesive on all framing members.

Sheets should be fixed across supports.

13.5 SHEET FILLING

All surface defects and fasteners shall be flushed over with **EPAR S502 EPOXY FILLER, SUPERFLUSH**, or **THERMEXX DETAIL PLASTER**. Any gaps between sheets shall be similar treated.

13.6 PRIMING

When sheets have been fixed and stopped, all surfaces shall be primed with one full coat of **CHEVAPRIME PBT, DEXX PRIMER** or **EPISTIXX** applied at 9 – 12 sqm/litre and allowed to dry overnight.

Note that pre-priming is permitted, if this is a practical site consideration, but any cut or exposed surfaces of plywood must be patch-primed to ensure the surface is sealed.

13.7 UPSTANDS

Where upstands to walls occur, an ex 25 x 25mm or 50 x 50mm (H3.1 treated) timber strip/fillet shall be installed, fixed to the deck and primed.

13.8 PLYWOOD QUALITY

The minimum recommended standard of plywood is B-D Grade construction ply, with A-D Grade being preferred. The thickness of plywood used will depend to a large extent on construction details, but normally, for trafficable areas 17.5mm plywood is considered to be acceptable, with appropriate framing details.

The better the face-grade of the plywood the less the preparation needed prior to laying **DEXX**. Use of H 3.1 treated plywood is required unless Marine Plywood is used.

13.9 JOINT TREATMENT AND DETAILING

Plywood Joint:

All tight-butted, stopped plywood joints should be overlaid with a 150mm strip of 300gsm E-mat thoroughly bedded in and wetted out with **DEXX**. The strip should be centred over the joint.

This pre-treatment must be allowed to dry thoroughly before overlaying with the full **DEXX** Membrane. Both edges of the glass should be teased out.

13.10 UPSTANDS:

All upstands should be sealed by the application of a strip of 300 gsm E-mat glass-fibre mat bedded into **CHEVALINE DEXX** so that the glass is thoroughly wetted out.

As a guide the glass-strip should be cut so that at least 50-65mm of glass extends beyond the interface between the adjoined surfaces e.g. on fillets use 150mm strips of glass on posts, upstands etc, use 110-125mm strips (minimum). As a guide to wetting out, this is achieved when the entire glass mat has changed from white to the colour of the **DEXX** being used. It is important to ensure that the glass is firmly bedded back to the surface at the transition, with no tendency to “balloon” leaving a void behind. If necessary, use a ‘dry’ brush to push the glass in securely.

13.11 PENETRATIONS

All penetrations for plumbing, flues which are not fixed permanently to the deck/ roof being sealed, must be sleeved and overflashed, with the sleeve being treated as an upstand when applying the **DEXX**.

Detailing of sleeves and overflashing should be the responsibility of the designer/ builder. Make sure that this is done to your satisfaction before laying **DEXX**.

14.0 **MEMBRANE INSTALLATION**

DEXX APPLICATION

14.1 POST - PRIMER:

This is required only if the pre-primed plywood has very open-grained surface.

Mix **DEXX**/water in ratio 2 volumes **DEXX** to 1 volume water and brush or roll evenly on to all surfaces as a primer coat at a spreading rate of approximately, 7 sq/litre of mix.

(This will take 1 litre of **DEXX** for every 10 sqm). Allow to dry.

14.2 GLASS FIBRE MAT

Measure and precut glass fibre mat into lengths that will fit neatly from upstand top line to drip edge (or equivalent end points). Where possible, always lay mat in strips down the fall of a roof/deck. Reroll the glass fibre mat after cutting.

On long runs pre-cutting is not always necessary. The glass fibre mat layout is to be planned to allow ease of laying and for a neat finish.

Use a chalk line to establish a guide for rolling out (see below).

14.3 BASECOAT (Bedding Coat):

Brush or roll on (rolling is preferred) a liberal coat of **DEXX** into which the glass-fibre mat is to be laid. Spreading rate should be approximately 300-600mm down the run, and 1m wide,

Use this area to anchor the top end of the mat which should be accurately positioned. Bed the mat thoroughly and treat the upstand similarly. Then unroll the mat into the liquid material laying **DEXX** about 1 metre in advance.

14.4 EMBEDDING:

When mat is anchored (embedded) use a “dry” roller (short nap) over top surface to ensure mat is evenly pressed into the basecoat and wetted out. Use a “dry” brush to push edges firmly into upstand corners and over down-turn to drip edge. **This step is most important** as it ensures a good job. Lay the first roll with the “teased” edge outwards.

When laying succeeding rolls of mat, proceed in a similar fashion, using the “dry” brush to “tease” the mat edges onto each other. The “teased” edge of the roll is always laid onto the “cut” roll edge already laid and teased. As a guide overlay by 40-75mm.

It is inevitable that with roll irregularities and surface variations, some variations in overlapping will occur. Minimise the effect by teasing the overlapping edge well out on to the underlying sheet. It is important not to have gaps between adjacent runs of glass fibre mat. Make sure the fibreglass mat is wetted out.

14.5 FILLING COAT:

Leave basecoat and mat to dry at least 3-4 hours (up to 24 hours) so that you can safely work over it, and then apply by roller (medium/long nap) and brush (to fascias and upstands) a **DEXX** Bodycoat at approximately 2 sqm/litre.

This coat should fill the weave of the mat completely although the mat pattern will still be apparent. Allow this coat to dry.

Note: On large jobs it is quite practical, and preferred, to leave the surface overnight before applying this bodycoat. In this case, check the surface to ensure that there are no white patches of glass showing.

If there are, or if the surface looks too 'open' in areas, roll a thin coat of **DEXX** over these areas to ensure the glass fibre mat is wetted out and sealed against dew or overnight rainfall.

14.6 TIDY-UP:

When the bodycoat is dry trim threads of glass fibre which may be sticking up from the surface or hanging down from drip edges. This is an important detail, as protruding glass fibres can lead to localised water penetration of the membrane.

14.7 BODYCOAT:

Finally, apply by roller (and brush) as previously, a topcoat of **DEXX** again at approximately 2-2.25 sqm/litre. This coat completely encapsulates the surface and provides an even finish. Ensure that all areas where trimming has been done, particularly on drip edges or upstands are well sealed.

Allow to dry at least 24 hours before walking on the surface, and 72 hours before leaving objects in one place on the deck.

14.8 TOPCOAT:

If surface is exposed to weathering it is required that a topcoat be applied which will minimise dirt penetration and staining.

1. ON DOMESTIC ROOF AREAS:

Seal with one full coat (10-12 sqm/litre as supplied) **CHEVALINE COLOUR-GLAZE**.

2. ON DOMESTIC DECKS:

Seal with one full coat (10-12m sqm/litre per litre as supplied) **DEXX TOP-COAT**.

1. ON COMMERCIAL DEXX CARPARKS AND GUTTERS:

Seal with two thin coats of **TRAXX COLOURSEAL** applied by spray, foam roller or soft broom (13-15 sqm/litre/coat) with at least 4 hours between coats.

2. ON AREAS SUBJECT TO CONSIDERABLE POLLUTION, OR HEAVY TRAFFIC. (Including Industrial Gutters and Sumps)

Allow **DEXX** to thoroughly dry at least 4-5 days and seal with one full coat of **TRAXX 2000 WEARCOAT**. (Apply at 11-12 sqm/litre).

15.0 HEALTH and SAFETY

CHEVALINE DEXX is a waterborne material and contains no mammalian-toxic substances. It is non-flammable and requires no special storage conditions other than protection from frost or prolonged heat.

It is recommended barrier cream be applied to hands and safety spectacles be used when handling/applying the material.

16.0 BUILDING REGULATIONS

16.1 In my opinion of the **Equus Chevaline Dexx Waterproofing System** if designed, used, installed and maintained in accordance with the statements and conditions of the manufacturer's technical data and conditions of this report will meet or contribute to meeting the following provisions of the NZ Building Code.

Clause B2 Durability

Performance B2.3.1 (b) 15 years

Chevaline Dexx Waterproofing and systems meet this requirement. Refer paragraphs 5.1 and 5.2 of this report.

Clause E2 External Moisture

Performance E2 3.1 and E2 3.2

Chevaline Dexx Waterproofing Systems meet this requirement. Refer paragraphs 12.1 to 12.5 of this report.

Clause E3 Internal Moisture

Performance E3.3.2

Chevaline Dexx Waterproofing Systems meet this requirement. Refer paragraphs 10 of this report.

Clause F2 Hazardous Agents on the Site

Performance F1.3.1 and F1.3.2

Chevaline Dexx Waterproofing Systems meet this requirement. Refer clause 15 of this report.

17.0 QUALITY

17.1 The manufacture of the materials forming the system has not been examined in this assessment.

17.2 The quality of materials supplied by Equus Industries Ltd is the responsibility of Equus Industries Ltd.

17.3 Quality on site is the responsibility of independent installers approved and trained by Equus Industries Ltd.

17.4 Designers are responsible for the building design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of Equus Industries Ltd.

17.5 Building owners are responsible for the maintenance of the membrane systems in accordance with the instructions of Equus Industries Ltd.

18.0 TESTS

Testing of **CHEVALINE DEXX** has been undertaken by

- Singapore Institute of Standards and Industrial Research to establish if the material meets the criteria of the Singapore Government for use in Singapore.
- Opus International: for Slip Resistance Qualities.
- Opus International: Evaluation of Performance of **DEXX** membrane on Car-park Decks.
- **EQUUS LABORATORIES**
- Crack Bridging Ability.
- Tensile Strength.
- Resistance to the Effects of Rapid Deformation (impact)
- Weathering Resistance.
- Fungus Resistance.

Ron Thurlow
JOYCE GROUP LIMITED

19.0 APPENDICES

1. Product Performance Warranties
2. Quality Assurance Checklists
3. Chevaline Dexe Performance Data
4. Chevaline Dexe Standard Specifications
5. Review of completed projects with Chevaline Dexe Waterproofing Systems.

APPENDIX 5

PERFORMANCE OF CHEVALINE DEXX WATERPROOFING SYSTEMS



1.0 INTRODUCTION

As a component of the verification of the Chevaline DEXX Waterproofing system site visits were made to investigate systems which have been installed for a period of years.

2.0 SITES

2.1 Wellington City Council
Library Building
Victoria Street
Wellington

2.1.1 The Chevaline DEXX System installed on the roof in 1991/1992.

2.1.2 The system has been applied over concrete and plywood substrates, with upturned finishes to parapets and building structure and down turns into gutters and rain water heads.

Roof vents have been installed.

2.1.3 The system over the concrete substrate is performing extremely well.

2.1.4 Some puckering at plywood substrate joints is evident. With two small exceptions no damage to the membrane is evident. The control joints appear to be performing to expectation. No substrate sheet fastening popping is evident.

Repairs have been made on the plywood substrate at the control joint to the angle of the building and at an external wall corner towards the south east corner. The repair work has been neatly carried out.

2.1.5 The roof was reglazed during 2003.

2.1.6 The system is performing effectively.

2.2 13-27 Manners Street
Wellington

2.2.1 The Chevaline DEXX Waterproofing System is installed 17 years ago on a multi level roof system.

2.2.2 The system has been applied over a plywood substrate with upturned finish at parapets, building structure and mechanical equipment plinths and down turns into gutters. The system has also been applied to the roof and walls of the plant room over a plywood substrate.

- 2.2.3 Some puckering at substrate sheet joints and some fastener popping is evident. No damage to the membrane was evident.
- 2.2.4 Some mechanical damage probably as a consequence of servicing mechanical services plant is evident. Repairs have been made and these repairs have been made to a good finish. Some areas of the roof have been over coated.
- 2.2.5 The maintenance history is not known. Clearly some recoating has been carried out. The exposed surfaces should be recoated to maintain integrity.
- 2.2.6 The system is performing effectively.



Ron Thurlow
JOYCE GROUP LIMITED

Evaluation of “Dexx
Waterproofing System”
with Reinforcement

TEST REPORT

SINGAPORE
INSTITUTE OF
STANDARDS AND
INDUSTRIAL
RESEARCH

Your Ref : Date 1995-01-12

Our T-15395/ST/CLK/YPK,AL,LHF Page 1 of 6
(Please quote our ref. no. in reply)

DD 870 1267 Fax 779 4339



(SISIR is established as a statutory and testing authority by an Act of Parliament, the SISIR Act No 48 of 1973).

NOTE: This Report is issued subject to the "Terms and Conditions Governing Technical Services" set out in the "Request for Technical Services" form. The terms and conditions governing the issue of this report are set out overleaf. This report is not a Certificate of Quality. It only applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results shall not be used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that SISIR approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that SISIR in any way "guarantees" the later performance of the product/equipment.

EVALUATION OF "DEXX WATERPROOFING SYSTEM" WITH REINFORCEMENT

Client :

Sime Tremco
18 Enterprise Road
Singapore 2262

Attn : Mr Bobby Chew

Background :

The following water-based liquid applied waterproofing system, described as "Dexx Waterproofing System" with reinforcement, was cast as follows by the client at SISIR Premises. The system was left to cure at 25 ± 2°C, 75 ± 15% Relative Humidity for at least 1 month prior to testing.

Sample Dimensions :

The liquid applied waterproofing system, "Dexx Waterproofing System" with reinforcement was cast as shown in Table 1.

Handwritten signature or initials.



Table 1 : Sample Dimensions for "Dexx Waterproofing System" with reinforcement

Dimension	Quantity	Date of Casting
1. 510 mm x 300 mm x 1.45 mm thick tensile panel	2 pieces) 1994-10-24) 1994-10-25) 1994-10-26
2. 200 mm x 200 mm x 50 mm thick grade 30 concrete	4 pieces) 1994-10-24) 1994-10-25) 1994-10-26

Test Methods :

1. Volatile Content

Test Procedure :

Two specimens of the liquid sample were spread over flat aluminium dishes and weighed accurately. The specimens were dried in the oven for 3 hrs and re-weighed immediately. The volatile content for each specimen was then calculated by the weight of volatile loss from the specimen divided by the weight of the specimen before the drying. The calculated value was multiplied by 100 % to obtain the results in percentage volatile content.

Polymer Content by Thermogravimetric Analysis (TGA)

Testing Conditions :

- 1) Heating from 30°C to 550°C in Nitrogen, at 20°C/min heating rate.
- 2) Holding at 550°C for 10 mins in Nitrogen.
- 3) Cooling from 550°C to 300°C.
- 4) Heating from 300°C to 750°C in Oxygen, at 20°C/min heating rate.
- 5) Holding at 750°C for 10 mins in Oxygen.

ASTM D412 : 1992

Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension

Testing Conditions

- A) Before ageing
- B) After ageing at 50°C for 3 weeks

KLK



Parameters :

Type of specimen	:	Rectangular
Specimen width	:	50 mm
Grip separation	:	150 mm
Crosshead speed	:	50 mm/min
No of determinations	:	5 per longitudinal and transverse directions

Adopted from ASTM D4541 : 1985
Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion

Testers

Parameters :

Speed	:	1.2 kN/min
Test area	:	100 mm x 100 mm
Substrate	:	Grade 30 Concrete
No of determinations	:	3

KLK

Test Results :

The results on "Dexx Waterproofing System" with reinforcement are tabulated as shown in Table 2.

Table 2 : Results on "Dexx Waterproofing System" with reinforcement

Characteristics	"Dexx Waterproofing System" with reinforcement
1. Volatile Content (%) (Average)	40.67
2. Polymer Content (%)	29.17
3. Tensile Strength (Maximum) (N/mm ²) (Median)	
a) Longitudinal direction	
i) Before ageing	7.03 (0.84)
ii) After ageing at 50°C, 3 weeks % Change in tensile strength	8.49 (3.33) +20.8 %
b) Transverse direction	
i) Before ageing	2.63 (1.13)
ii) After ageing at 50°C, 3 weeks % Change in tensile strength	5.68 (3.49) +116.0 %
4. Elongation at Break (%) (Median)	
a) Longitudinal direction	
i) Before ageing	2.3 (1.4)
ii) After ageing at 50°C, 3 weeks % Change in elongation at break	2.8 (6.4) +21.7 %
b) Transverse direction	
i) Before ageing	28.2 (8.5)
ii) After ageing at 50°C, 3 weeks % Change in elongation at break	16.7 (11.3) -40.8 %



Cont'd

Characteristics	"Dexx Waterproofing System" with reinforcement
5. Adhesion Strength (N/mm ²) a) Original as cast Mode of Failure	0.69 (3/3 : Major bond failure between sample and concrete substrate)

Remarks :

1. Unless otherwise stated, the test samples were conditioned @ $25 \pm 2^\circ\text{C}$, $75 \pm 15\%$ Relative Humidity and tested @ $23 \pm 2^\circ\text{C}$, $65 \pm 5\%$ Relative Humidity.
2. The values in parentheses are the respective standard deviations.
3. "+" sign denotes increase in property from the original
 "-" sign denotes decrease in property from the original
4. "3/3" denotes three of the three samples tested

KOH LAY KOON (MISS)
TECHNICAL OFFICER

DANIEL YIP (DR)
MANAGER
POLYMER TECHNOLOGY CENTRE

APPENDIX 1 A

Revised Provisional Specifications for Water-based Liquid Applied Waterproofing Systems For Rooftop with Secondary Roofing Slabs

Provisional Specifications

1. Number of coats used with reinforcement

At least one separate layer of fabric woven reinforcement or equivalent is to be laid in between the waterproofing membrane.

No of coats shall be specified by suppliers. The primary material or polymer used in the waterproofing system shall be specified by suppliers and tested.

2. Minimum dried film thickness

1.3 mm

3. Polymer content

20% minimum

4. Volatile content

40% maximum

5. Adhesion to substrate
(direct pull-off test)

0.4 N/mm² minimum

6. After ageing at 50°C for 3 weeks, followed by

a) Tensile strength (Average of two directions)
- at minimum dried film thickness of 1.3 mm

1.2 N/mm² minimum

b) Elongation at break (Average of two directions)
- at minimum dried film thickness of 1.3 mm

65% minimum

c) Water vapour transmission test

Less than 30 g/m²/24 hours

d) Crack bridging

Shall be able to bridge crack up to minimum 2 mm in width

e) Hardness

40 - 85 Shore A

UV Exposure at 340 nm

The sample shall show
no signs of cracking
after 2000 hours.

Remark : * - Detail descriptions pertaining to the number of coats and type of reinforcement must be supplied by manufacturer/supplier prior to testing.



Table 1 ; Sample Dimensions for "Dexx Waterproofing System"

Dimension	Quantity	Date of Casting
1. 510 mm x 300 mm x 1.38 mm thick tensile panel	3 pieces) 1993-11-01) 1993-11-02) 1993-11-03
720 mm x 300 mm tensile panel	2 pieces) 1993-11-04)
2. Crack Bridging T-Block	12 pieces) 1993-11-01) 1993-11-02) 1993-11-03) 1993-11-04
3. 200 mm x 200 mm x 50 mm thick grade 30 concrete	4 pieces) 1993-11-01) 1993-11-02) 1993-11-03) 1993-11-04
4. 304 mm x 76 mm x 2 mm thick aluminium panel	4 pieces) 1993-11-01) 1993-11-02) 1993-11-03) 1993-11-04

The no. of coats applied for "Dexx Waterproofing System" were listed as follows :

- | | |
|--|-----------------------|
| A) Premier coat (for concrete substrates only) | Drying time : 3 hrs |
| B) First body coat + Reinforcement | Drying time : 15 mins |
| C) Second body coat | Drying time : 3 hrs |
| D) Third and Fourth body coat | Drying time : 3 hrs |
| E) Fifth body coat | Drying time : 3 hrs |
| F) Top coat : Colour Glaze | Drying time : 3 hrs |

Test Methods :

- Verification of Base Polymer by Infra-red Spectroscopy
The sample was scanned from 4000 cm^{-1} to 400 cm^{-1} .
- Polymer Content by Thermogravimetric Analysis (TGA)

Testing Conditions :

- Heating from 30°C to 550°C in Nitrogen, at $20^\circ\text{C}/\text{min}$ heating rate.
- Holding at 550°C for 10 mins in Nitrogen.
- Cooling from 550°C to 300°C .
- Heating from 300°C to 750°C in Oxygen, at $20^\circ\text{C}/\text{min}$ heating rate.
- Holding at 750°C for 10 mins in Oxygen.



Volatile Content

Test Procedure :

Approximately 6.0 g of the liquid sample was weighed and spread over a flat aluminium dish. The sample was dried in the oven for 3 hrs and weighed. Volatile content is then calculated by the weight of volatile in the sample divided by the weight of the sample before drying. The calculated value is multiplied by 100 % to obtain the results in percentage form.

ASTM D2240 ; 1991

Standard Test Method for Rubber Property - Durometer Hardness

Testing Conditions

- A) Before ageing
- B) After ageing at 50°C for 3 weeks

Parameters :

No of ply	:	(A) 5	(B) 6
Thickness	:	(A) 6.7 mm	(B) 6.8 mm
No of determinations	:	5	

Adopted from ASTM C836 ; 1989a - Crack Bridging
Standard Specification for High Solids Content, Cold Liquid-Applied
Elastomeric Waterproofing Membranes for Use with Separate Wearing Course

Testing Conditions

- A) Before ageing
- B) After ageing at 50°C for 3 weeks

Parameters :

Speed	:	0.05 mm/min
Width of gap opening	:	2 mm
No of determinations	:	3

Handwritten signature or initials in the bottom right corner.



ASTM D412 : 1992
Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension

Testing Conditions

- A) Before ageing
 B) After ageing at 50°C for 3 weeks

Parameters :

Type of specimen	:	Rectangular
Specimen dimension	:	150 mm length x 50 mm width
Grip length	:	150 mm
Crosshead speed	:	50 mm/min
No of determinations	:	5 per longitudinal and transverse directions

Adopted from ASTM D4541 : 1985
Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

Parameters :

Speed	:	1.2 kN/min
Test area	:	100 mm x 100 mm
Substrate	:	Grade 30 Concrete
No of determinations	:	3

ASTM G53 : 1988
Standard Practice for Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials

Parameters :

Specimen dimension	:	304 mm x 76 mm
Testing condition	:	8 hrs UV at 55°C and 4 hrs condensation at 45°C
Light source	:	UV fluorescent lamps (UVA 340 nm)
Total exposure time	:	2000 hrs
No of specimens	:	2
Reference standard	:	BS 2262 : 61 Grey scale for assessing change in colour

[Handwritten signature]



Test Results :

The results on "Dexx Waterproofing System" with reinforcement were tabulated as shown in Table 2.

Table 2 : Results on "Dexx Waterproofing System" with reinforcement

Characteristic	"Dexx Waterproofing System" with reinforcement
1. Verification of Base Polymer	Acrylic Polymer
2. Polymer Content (%)	26.14
3. Volatile Content (%)	41.33
4. Hardness (Shore A)	
a) Before ageing	63
b) After ageing at 50°C for 3 weeks	75
5. Crack Bridging	
a) Original as cast Average thickness : 1.88 mm)) Able to bridge crack) width up to 2 mm) (Passed))
b) After ageing at 50°C for 3 weeks Average thickness : 1.82 mm	

[Handwritten signature]



Cont'd

Characteristic	"Dexx Waterproofing System" with reinforcement
<p>Tensile Strength (Maximum) (N/mm²) (Median)</p> <p>Longitudinal direction</p> <p>i) Before ageing - 11.11</p> <p>ii) After ageing at 50°C, 3 weeks % Change in tensile strength 17.45 (+57.1%)</p> <p>Transverse direction</p> <p>i) Before ageing 10.68</p> <p>ii) After ageing at 50°C, 3 weeks % Change in tensile strength 16.27 (+52.3%)</p>	
<p>Elongation at Break (%) (Median)</p> <p>Longitudinal direction</p> <p>i) Before ageing 30.3</p> <p>ii) After ageing at 50°C, 3 weeks % Change in elongation at break 8.0 (-75.6%)</p> <p>Transverse direction</p> <p>i) Before ageing 30.7</p> <p>ii) After ageing at 50°C, 3 weeks % Change in elongation at break 8.0 (-73.9%)</p>	
<p>Adhesion Strength (N/mm²)</p> <p>Original as cast 0.15</p> <p>Mode of Failure (3/3 : Failure within the reinforcement)</p>	



Cont'd

Characteristic	"Dexx Waterproofing System" with reinforcement
9. UV Exposure using wavelength of 340nm a) Exposure time of 500 hrs b) Exposure time of 1000 hrs c) Exposure time of 1500 hrs d) Exposure time of 2000 hrs) Grey scale rating 5) (No visible cracks,) disintegration and) change in colour))) Grey scale rating 4) (Slight change in colour) as shown in Figure 6)

Remarks :

1. Unless otherwise stated, the test samples were conditioned @ $25 \pm 2^\circ\text{C}$, $75 \pm 15\%$ Relative Humidity and tested @ $23 \pm 2^\circ\text{C}$, $65 \pm 5\%$ Relative Humidity.
2. "+" sign denotes increase in property from the original
 "-" sign denotes decrease in property from the original
3. "3/3" denotes three of the three samples tested
4. The grey scale rating starts from R5 to R1
 R5 corresponds to zero contrast (two patterns of identical colour)
 R1 corresponds to greatest degree of contrast

Koh Lay Koon
 KOH LAY KOON (MISS)
TECHNICAL OFFICER

TAN-FONG LAI CHANG (MRS)
SENIOR SCIENTIFIC OFFICER
POLYMER TECHNOLOGY CENTRE

c.c. E M Services Pte Ltd
 Blk 201, #03-400
 Kim Tian Road
 Singapore 0316

Attn : Mr Kua Soo Chong

Ardex Technical Bulletin
Tiling over Chevaline Dextr Membrane Systems



ARDEX AUSTRALIA PTY LTD
TECHNICAL SERVICES REPORT
TSD 054 – v2

Date: 14 October 2005
Prepared By: Ardex Australia Pty Ltd
Technical Services Department
Prepared For: Equis Industries Ltd
4 North Street, Blenheim, NZ
Product Tested: Equis Dexx Membrane
System Tested Undertile tile adhesive compatible with Equis Dexx Membrane

RECOMMENDATION OVERVIEW

Ardex Australia Pty Ltd have tested the compatibility of three Ardex adhesives for use in conjunction with the Equis Dexx membranes classified and “internal” and “external”.

Ardex Optima Adhesive and has been found to be suitable over the Equis Dexx internal and external membranes and the bond strengths achieved conform to AS/NZ4992.

Ardex STS8 + Ardion 90 has been deemed to be suitable over Equis Dexx internal membranes and external membranes, provided the latter is thoroughly sanded prior to installation of the Ardex STS8 + Ardion 90. An alternative to sanding of external membranes would be to omit the finish glaze coat from the system which would, we understand, render the membrane to being equivalent to the internal type.

TABLE OF CONTENTS

TECHNICAL SERVICES REPORT TSD 054	1
RECOMMENDATION OVERVIEW.....	1
1.0 INTRODUCTION	2
2.0 REFERENCED DOCUMENTS	2
3.0 PRODUCT IDENTIFICATION	2
4.0 SYSTEMS TESTED	2
5.0 TEST PROCEDURE	2
6.0 TEST RESULTS	3
7.0 ASSESSMENT	4
8.0 CONCLUSION	4
9.0 Reference Contacts and Data	5
<u>Appendix 1 - Photographs</u>	



1.0 INTRODUCTION

- 1.1 Equus Industries Ltd, NZ market a waterproofing membrane designed to be used in wet areas, decks and roofs. The membrane consists of a water borne acrylic liquid and is designed to be used in conjunction with glass fibre matting to form a laminate.
- 1.2 Ardex have been requested to recommend a suitable adhesive to be used in conjunction with this membrane system to conform to AS/NZ standards. Relevant testing has been carried out to confirm these recommendations.

2.0 REFERENCED DOCUMENTS

- 2.1 All relevant manufacturers' product data sheets
- 2.2 AS/NZ 3740 – 2004 – Waterproofing of wet areas within residential buildings.
- 2.3 AS/NZ 4992.1 – Ceramic Tiles – Products for Installation – Adhesives: Definitions & Specifications.

3.0 PRODUCT IDENTIFICATION

- 3.1 The products tested are understood to be proprietary products and were supplied by Equus Industries Ltd in a ready for testing form.
- 3.2 Two pre-prepared samples of the membrane applied to concrete pavers were supplied, one being nominated as suitable for internal purposes while the second was nominated as being suitable for external purposes.

4.0 SYSTEMS TESTED

- 4.1 Half the surface area of each of the two types of membrane samples was prepared by sanding with 40 grit emery paper prior to testing.
- 4.2 Adhesives used in conjunction with each membrane type included Ardex Optima, Ardex STS8 + Ardion 90 and Ardex Abaflex. Other adhesive types were not tested due to limited test area of the membrane surface.

5.0 TEST PROCEDURE

- 5.1 The two samples of Chevaline Dext Membrane were prepared by coarse sanding half the panel with 40 grit emery paper. 50mm x 50mm test specimen were then adhered to the various membrane sections using various Ardex tile adhesives.
- 5.2 The adhered samples were allowed to cure at ambient temperatures for 14 days before half the test specimen were tested for tensile bond strength.
- 5.3 The remaining test specimen were then immersed in water for 14 days before determining the tensile bond strength.
- 5.4 The results were then assessed in consideration of the 0.5MPa minimum bond strength required of AS/NZ4992

6.0 TEST RESULTS

6.1 The pull-off bond strength of Ardex STS8+Ardion 90 and Optima when used to bond tiles to Equiss Dexx internal and external membrane systems are listed in the following table:-

Test	Membrane Type	Adhesive	Surface Preparation	Conditioning	Tensile Bond Strength Mpa	Bond Failure Type
1	Internal	STS8+A90	Wiped Clean	14DD	1.20	20%-AF-T:80%-AF-S
2				14DD+14DW	0.62	45%-AF-AT:10%-CF-A: 37.5%-AF-MA:12.5%-CF-Mat
3			Cleaned & Sanded	14DD	1.07	40%-AF-T:60%-AF-S
4				14DD+14DW	0.53	50%-AF-T:37.5%-AF-S: 12.5%-CF-MAT
5	Internal	Optima	Wiped Clean	14DD	1.13	20%-AF-T:10%-CF-A: 70%-CF-M
6				14DD+14DW	0.70	32.5%-AF-AT:5%-CF-A: 62.5%-CF-mat
7			Cleaned & Sanded	14DD	1.31	25%-AF-T:75%-CF-M
8				14DD+14DW	0.67	40%-AF-T:60%-CF-Mat

9	External	STS8+A90	Wiped Clean	14DD	0.89	15%-AF-T:80%AF-S: 5%-CF-Mat
10				14DD+14DW	0.32	10%-AF-T:17.5%-AF-S: 72.5%-CF-Mat
11			Cleaned & Sanded	14DD	1.00	15%-AF-T:85%-AF-S
12				14DD+14DW	0.48	72.5%-AF-S:17.5%-AF-T: 10%-CF-Mat
13	External	Optima	Wiped Clean	14DD	0.79	40%-AF-T:5%-AF-S: 55%-CF-Mat
14				14DD+14DW	0.52	5%-AF-T:20%-AF-S: 75%-CF-Mat
15			Cleaned & Sanded	14DD	0.87	45%-AF-T:5%-AF-S: 50%-CF-Mat
16				14DD+14DW	0.61	40%-AF-S:60%-

AF – adhesive failure
CF – cohesive failure
EF – epoxy adhesive failure

A – adhesive failure
S – substrate
T – tile
E – epoxy failure
Matt – Membrane mat

DD – days dry
DW – days wet



7.0 ASSESSMENT

- 7.1 Ardex Optima Adhesive produced bond strength results that were in excess of the requirements of the Australian Standard.
- 7.2 Ardex STS8 + Ardion 90 produced results in excess of the requirements of the Australian Standard in all cases except in the case of the "external" membrane when conditioned for 14 days at ambient conditions followed by 14 days immersed conditions.
- 7.3 In the case of the Ardex STS8 + Ardion 90 the bond strength was only marginally below the requirements of the standard when applied to the sanded surface of the "external" membrane.
- 7.4 In the case of the Ardex STS8 + Ardion 90 the bond strength was significantly below the requirements of the standard however 70-75% of the failure mode was cohesive within the membrane within the glass layer.
- 7.5 It was concluded that Ardex STS8 + Ardion 90 would be satisfactory for application over the "external" membrane provided the surface was thoroughly sanded with a coarse abrasive between 24 and 40 grit size.
- 7.6 As an alternative to sanding the external membrane prior to installation of the Ardex STS8 + Ardion 90 the finishing glaze coat applied to the external membrane could be omitted which we understand would render the membrane surface to be equivalent to the internal membrane. Ardex STS8 + Ardion 90 would, under these conditions, be deemed to be a satisfactory adhesive to be applied directly to the membrane surface.
- 7.7 The Ardex Abaflex failed to achieve the bond strength sufficient to conform to the Australian Standard of 0.5 Mpa in too many instances to be considered as an alternate adhesive.

8.0 CONCLUSION

- 8.1 Based on the results achieved, Ardex Optima ceramic tile adhesive was found to produce adhesion results conforming to AS/NZ4992 under both wet and dry conditions when applied over cleaned and sanded Chevaline Dexx "internal" and "external" membranes.
- 8.2 Ardex STS8 + Ardion 90 produced satisfactory performance in conjunction with the Chevaline Dexx "internal" membrane under both wet and dry conditions when applied over surface preparations involving both cleaning and sanding.
- 8.3 Ardex STS8 + Ardion 90 produced marginal results over the "external" Equus Dexx membrane under wet conditioning and it is concluded, that while the test results were marginally low over sanding preparation, the product is deemed to be suitable in these conditions.
- 8.4 Ardex STS8 + Ardion 90 is not recommended for use in conjunction with the Equus Dexx "external" membrane unless the surface is prepared by thorough sanding.
- 8.5 **By omitting the final glaze coat of the external membrane, the customer has advised that the finish would be identical to that of the internal membrane. Under these circumstances the Ardex STS8 + Ardion 90 would be deemed to be an acceptable adhesive without the need for sanding.**

Appendix I

Photo 01

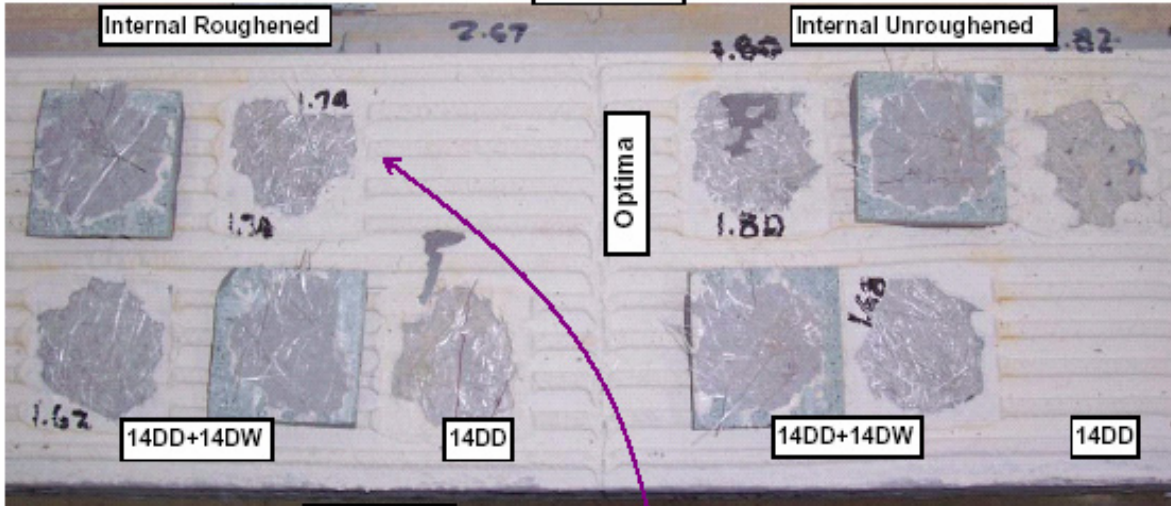


Photo 02

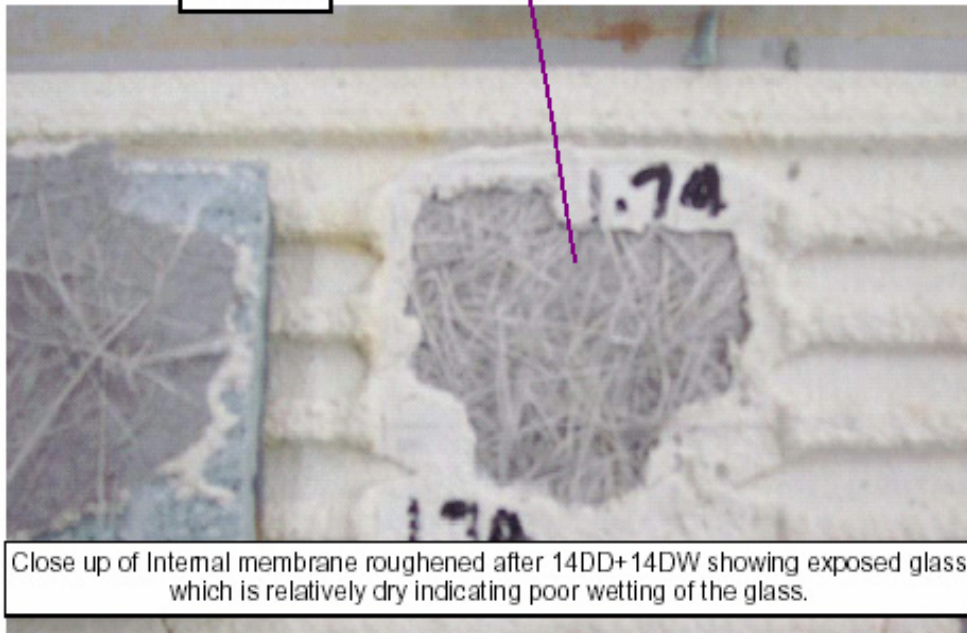
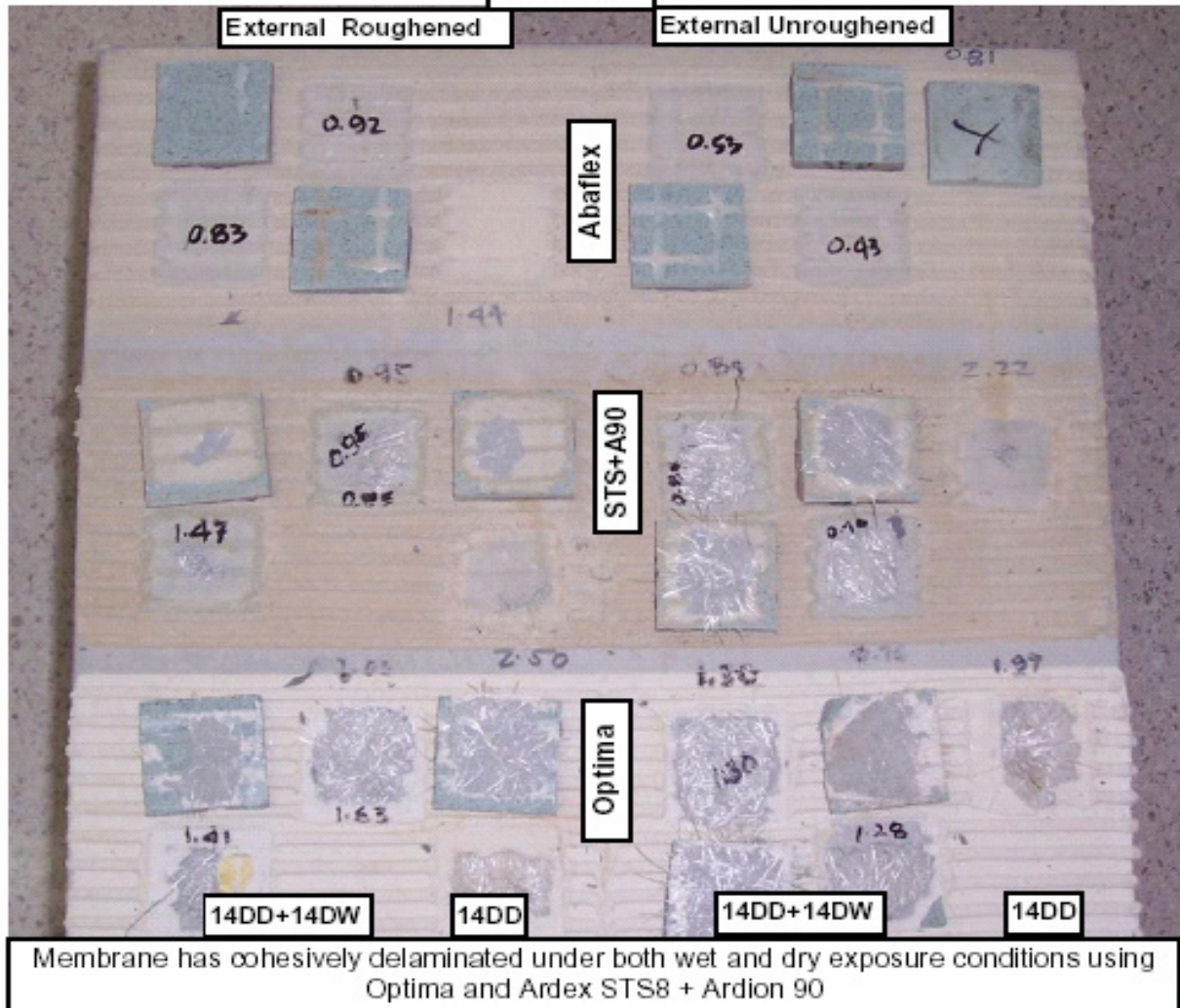
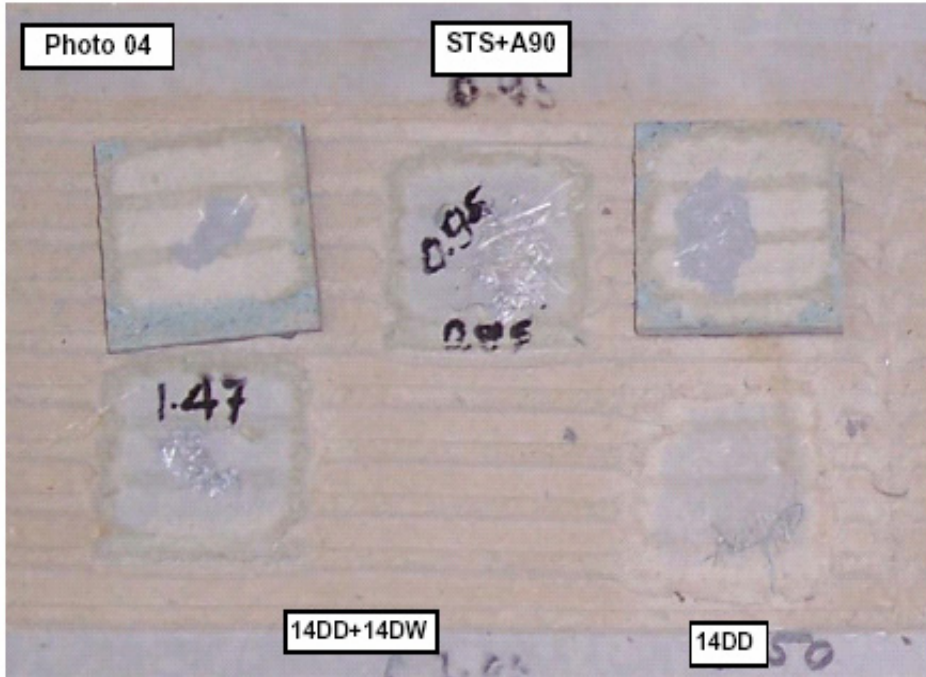
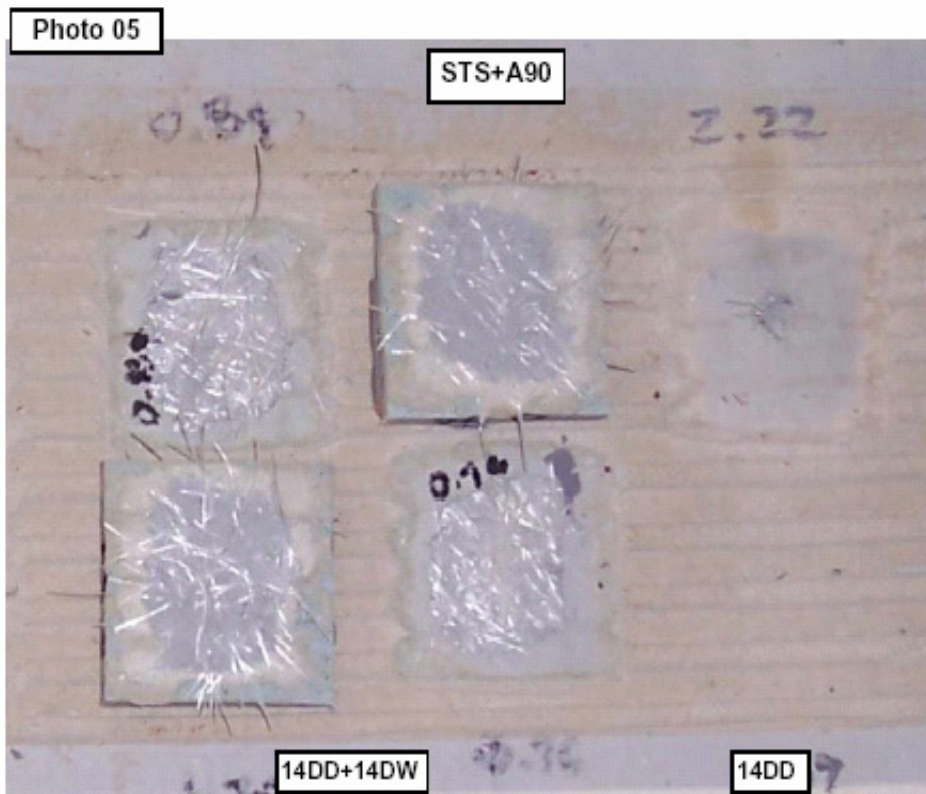


Photo 03





STS8+A90
 14DD+14DW
 Roughened
 Bond strength of
 .48 Mpa slightly
 below standard
 required.



STS8+A90
 14DD+14DW
 Un-Roughened
 Bond strength of
 .32 Mpa below
 standard required
 although 70-75%
 failure mode was
 membrane
 cohesive within mat
 layer.