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4421ED EQUUS DUOTHERM WARM ROOF & DECK SYSTEM BY SOPREMA

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4421ED EQUUS DUOTHERM WARM ROOF & DECK SYSTEM BY SOPREMA

1 GENERAL

NOTE: Formerly known as *Equus De Boer Duotherm Warm Roof*.

This section relates to the supply and installation of the Equus Industries Ltd - Equus SOPREMA Duotherm warm roof system.

It includes:

- vapour barrier
- thermal PIR rigid insulation or thermal mineral wool insulation
- two layer Soprema Duo waterproofing membrane system
- and accessories necessary to complete the warm and/or green roof system.

1.1 RELATED WORK

Refer to ~ for ~

1.2 ABBREVIATIONS AND DEFINITIONS

Refer to the general section 1232 INTERPRETATION & DEFINITIONS for abbreviations and definitions used throughout the specification.

The following abbreviations apply specifically to this section:

PIR	Polyisocyanurate
SBS	Styrene-Butadiene-Styrene
APP	Atactic polypropylene
BMT	Base metal thickness

The following definitions apply specifically to this section:

TPO modified bitumen membrane	Thermoplastic Polyolefin modified bitumen which have an excellent UV-resistance
SBS modified bitumen	Elastomer modified bitumen which are more elastic and have a better adhesion compared to APP modified bitumen. Ideal for colder climate application.
APP modified bitumen	Plastomer modified bitumen which have a higher melting point and are harder compared to SBS modified bitumen. Ideal for warmer climate application

Documents

1.3 DOCUMENTS

Refer to the general section 1233 REFERENCED DOCUMENTS. The following documents are specifically referred to in this section:

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
NZS 1170.2:2011	Structural design actions - Wind actions
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1562.1	Design and installation of sheet roof and wall cladding - Metal
AS 2122.1	Determination of Fire Propagation- Surface Ignition of Vertically Oriented Specimens of Cellular Plastics.
BS 476-3	Fire tests on building materials and structures. Classification and method of test for external fire exposure to roofs
BS 476-7	Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products
EN 13501.5	Fire classification of construction products and building elements. Classification using data from external fire exposure to roof tests
HB39-1997	Installation code for metal roof and wall cladding

WMAI CoP Waterproofing Membrane Association New Zealand – Reinforced
Modified Bitumen Membrane Systems for Roofs and Decks Code
of Practice
CodeMark [CMNZ70151](#) Soprema NZ Ltd Waterproofing Membrane Systems

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
SOPREMA Roofer's Guide Bituminous Membranes 2021
Equus SOPREMA Product Technical Data Sheets and Safety Data Sheets
Equus SOPREMA standard warm roof details
Equus SOPREMA Quality Assurance (QA) Checklist
Duo Durability report for New Zealand
[BRANZ Appraisal 685](#) - SOPREMA DuO Roof and Deck Membrane Systems
[BRANZ Appraisal 1169](#) - Equus Soprema Warm Roof System
BBA Appraisal 20/5843 - SOPREMA DuO Roof and Deck Membrane Systems
WMAI torch-on Code of Practice

Manufacturer/supplier contact details

Company: **Equus Industries Ltd**
Web: <https://equus.nz/>
Email: info@equus.co.nz
Telephone: Northern Branch, Auckland 09 415 4314
 Central Branch, Wellington 04 576 0333
 Southern Branch, Christchurch 03 353 2434

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material Equus Industries Ltd warranty:
20 years For Equus SOPREMA Duotherm warm roof system and proprietary
 products. It includes an appropriate Maintenance Statement and
 schedule.

Note: SOPREMA provide an additional material manufacturer warranty to the above. Refer to Equus SOPREMA Waterproofing Solutions for details.

- Provide this warranty on the Equus Industries Ltd standard form (if unavailable, use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of Practical Completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Note: Soprema provides an additional "insurance backed" material manufacturer warranty to the above. Refer to Equus Industries Ltd and Soprema for details.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an Equus certified applicator warranty:
10 years For application of Equus SOPREMA Duotherm warm roof system

- Provide this warranty on the applicator standard form (if unavailable, use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of Practical Completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Equus system, or associated components and product.

1.8 QUALIFICATIONS - MANUFACTURER / SUPPLIER REQUIREMENTS

Work to be carried out by certified applicators approved by Equus Industries Ltd. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.9 PRE-INSTALLATION MEETING

Convene a meeting between the applicator, contractor, all associated consultants and Equus Industries Ltd where appropriate to ensure all parties know what is required for effective performance of the system.

1.10 SPECIAL DETAILS

Where a standard Equus SOPREMA Duotherm warm roof detail does not exist, or if a standard warm roof detail cannot be applied, an approved alternative must be obtained from Equus Industries Ltd before proceeding with the installation.

1.11 INFORMATION FOR OPERATION AND MAINTENANCE

Provide Equus Industries Ltd and SOPREMA inspection, maintenance and cleaning instructions to the owner at completion of the work.

Compliance information

1.12 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Applicator's approval certificate from the manufacturer / importer / distributor
- Importer's warranty
- Manufacturer's warranty
- Applicator's warranty
- Producer Statement - Construction from the applicator
- Other information required by the BCA in the Building Consent Approval documents.

Performance

1.13 WEATHER-TIGHTNESS

Accept responsibility for the weather-tight performance of the completed membrane roofing system, including all penetrations through the roof and junctions with walls and parapets. All penetrations to comply with [NZBC E2/AS1](#) clause 8.5.9 - 'Penetrations' and Equus' recommendations.

1.14 PERFORMANCE - DURABILITY

Equus Soprema Duo membrane roof system complies with [NZBC B2/AS1](#) when maintained to Equus Industries Limited requirements.

1.15 ENERGY EFFICIENCY - PIR INSULATION

Equus PIR rigid thermal insulation board Eurothane Silver or Soprema Sopra-Iso, has an aged thermal resistance (R Value) to [AS/NZS 4859.1](#). Refer to SELECTIONS for R-values.

1.16 ENERGY EFFICIENCY - MINERAL WOOL INSULATION

Equus SOPREMA Mineral Wool thermal insulation board has an aged thermal resistance to [AS/NZS 4859.1](#). Refer to SELECTIONS for R-values.

1.17 FIRE SAFETY

The fire-retardant performance of the Equus Duo Firecare by SOPREMA waterproofing cap sheet is in accordance with European Norm EN13501-5:2016 Test 1, 2 and 4 (Broof(t1), (t2) and (t4)) and achieves an EXT.F.AA rating in accordance with BS476.3.

Equus PIR thermal insulation board complies with AS 2122.1 'Determination of Fire Propagation - Surface Ignition of Vertically Oriented Specimens of Cellular Plastics', has a classification of Class 1 according to BS 476-7 or shall be FM approved.

Equus SOPREMA Mineral Wool insulation is not flammable.

Performance - Wind

1.18 WIND DESIGN PARAMETERS – NON-SPECIFIC DESIGN

The installation to be in accordance with Equus Industries Limited requirements and as appropriate for the project wind design stated in the general section 1220 PROJECT.

Suitable for design wind pressures up to and including Extra High Wind Zone to [NZS 3604](#).

1.19 WIND DESIGN PARAMETERS – SPECIFIC DESIGN

Equus and Soprema provide job-specific wind load calculations to [NZS 1170.2](#) for all specifically designed buildings using Equus Soprema waterproofing systems. Refer to the project wind design stated in the general section 1220 PROJECT.

Quality control and assurance

1.20 QUALITY ASSURANCE

Maintain quality necessary to assure that work is performed in accordance with this specification and the qualifying requirements of Equus Industries Ltd.

1.21 TESTING - FLOOD

Where practical flood test horizontal applications with a minimum 50mm depth of water for 24 hours to Equus Industries Limited requirements. Make good any lack of water tightness when the surface is completely dry and repeat water test process after making any necessary repairs.

1.22 TESTING - ELECTRONIC LEAK DETECTION

Carry out leak detection test using selected electronic leak detection system.

Test the waterproof membrane using Electronic Leak Detection procedure upon completion of membrane installation and prior to any covering. Test to be carried out by experienced operator.

Make good any lack of water tightness when the surface is completely dry. Depending on conditions, repeat a total or localised test process after making repairs.

2 PRODUCTS

Materials - Equus SOPREMA Duotherm warm / green roof system

2.1 VAPOUR BARRIER

Equus SOPREMA SBS modified bitumen vapour barrier membrane.

2.2 PIR FLAT THERMAL INSULATION BOARD

Equus PIR Insulation boards are comprised of a polyisocyanurate (PIR) core faced on both sides with multi-layer composite aluminium foil facing or a coated glass-fibre tissue facing. Standard board size is 1200mm x 2400mm.

2.3 PIR TAPERED THERMAL INSULATION BOARD

Equus PIR Insulation boards are comprised of a polyisocyanurate (PIR) core faced on both sides with multi-layer composite aluminium foil facing or a coated glass-fibre tissue facing. Standard board size is 1200mm x 2400mm.

2.4 MINERAL WOOL FLAT THERMAL INSULATION BOARD

Equus SOPREMA Soprarock HD60 is a non-flammable water-repellent mineral wool thermal and sound insulation board. Soprarock HD60 is compatible with SOPREMA's mechanically fastened base sheet membranes. Available in several thicknesses. Standard board size is 1200mm x 2400mm.

2.5 WATERPROOFING BASE SHEET

Equus DeboFlex 2.5mm T/F C175 is a flexible waterproofing membrane consisting of elastomer (SBS) modified bitumen and reinforced with a layer of 175g/m² non-woven polyester with glass-fibre scrim. The membrane has an overlap of 80mm. It is used as a base sheet on top of Equus thermal insulation boards or roof cover boards. All laps are heat welded. Supplied in 1m x 10m rolls.

2.6 WATERPROOFING BASE SHEET - SELF ADHERED, PARTIALLY BONDED

Equus SopraStick Venti Tack Plus (formerly known as DeboTack 2.5mm T/F C175 Aero) is a flexible waterproofing membrane consisting of elastomer (SBS) modified, self-adhesive bitumen and reinforced with a layer of 175g/m² non-woven polyester with glass scrim. The membrane has a pattern of self-adhesive stripes at the back. The membrane is used as a base sheet partially bonded to the Equus PIR thermal insulation boards or the Roof Cover Boards. All laps are heat welded. Supplied in 1m x 11.25m rolls.

2.7 CAP SHEET - TWO-LAYER SYSTEM, FIRE RETARDANT

Equus Duo HT 4 Slates/F C180 Firecare (FC) a 4mm thick flexible waterproofing membrane system in a two-layer configuration, comprised of a cap sheet with a TPO modified bitumen upper coating with mechanically pressed in coloured slates, a SBS modified bitumen under-coating and a composite reinforcement of 180g/m² polyester and glass-fibre scrim. The membrane has an overlap of 80mm. The cap sheet is installed on top of the base sheet by fully bonded torch application. Laps of base and cap sheet to be staggered for optimal two-layer security.

The cap sheet is fire-retardant according to European Norm EN13501-5 Tests 1, 2 and 4 (Broof(t1), (t2) and (t4)) and achieves an EXT.F.AA rating in accordance with BS 476-3. Supplied in 1m x 8m rolls. Standard colours available are Grey/White (GW), White/Green/Grey (WGG) and Black (AGR). Brown Oxide (BO) available on request. Refer to SELECTIONS for options.

2.8 CAP SHEET - ROOT RESISTANT FOR EXTENSIVE OR SEMI-INTENSIVE GREEN ROOF, FIRE RETARDANT

Equus Duo HT 4 Slates/F C180 Firecare Landscape (FC LC) is a 4mm thick flexible waterproofing membrane comprised of TPO modified bitumen upper coating with mechanically pressed-in coloured slates, a SBS modified bitumen under coating and a composite reinforcement of 180g/m² polyester and glass-fibre scrim. The membrane has an overlap of 80mm. The cap sheet is installed on top of the base sheet by fully bonded torch on application.

The membrane is root-resistant according to European Norm EN13948. The cap sheet is fire retardant to European Norm EN13501-5 Tests 1,2 and 4 (Broof(t1), (t2) and (t4)) and achieves an EXT.F.AA rating in accordance with BS 476-3. Supplied in 1m x 8m rolls. Standard colour available is White/Grey/Green (WGG). Refer to SELECTIONS for options

Components

- 2.9 METAL TRAY ROOFING
Dimond metal tray, reverse run, as manufactured by Dimond Roofing, comprised of G550 aluminium-zinc AZ150, 0.75mm BMT, to AS 1397. Refer to SELECTIONS for options.
- 2.10 PRIMER - SOPRADERE QUICK PRIMER
Equus Sopradere Quick by SOPREMA primer, a bitumen primer for torch-applied membranes.
- 2.11 PRIMER - EQUUS PEEL & STICK
Equus Peel and Stick Primer, a rubber based adhesive primer for self-adhered, membranes.
- 2.12 BITUMINOUS SEALANT
Equus Alsan Mastic 2200 by SOPREMA bitumen sealant.
- 2.13 MINERAL CHIP DRESSING
Equus SOPREMA Duo Mineral Chip scattered as needed to form uniform appearance.
- 2.14 EQUUS PRE-FORMED ANGLE FILLETS
Equus pre-formed mineral wool angle fillets or PIR angle fillets of minimum 50mm x 50mm in all internal corners.
- 2.15 ROOF COVER BOARD
PermaBase Dek, roof cover board is a high performance roof board to add extra load resistance to the warm roof or green roof system.
- 2.16 FASTENERS
Equus SOPREMA fasteners appropriate to the substrate on which the Duotherm system will be installed. Refer to SELECTIONS.
- 2.17 THERMAL INSULATION BOARD ADHESIVE
Equus Easy Foam PU by SOPREMA rapid curing gun grade polyurethane adhesive for use of adhering thermal insulation only.
- 2.18 ROOF EDGE PROFILE
Equus SOPREMA roof edge profile is used to terminate the cap sheet at roof edges.

- 2.19 **C-PROFILE**
Equus SOPREMA C-Profile to terminate the cap sheet to walls or upstands.
- 2.20 **EQUUS WATERPROOFING - LIQUID**
Equus liquid applied waterproofing for membrane penetrations and other details as per detail drawings.
- 2.21 **DRAINAGE CELL - GREEN ROOF**
Equus drainage & filter layer to ensure retention of soil and provide sufficient water to support plant growth while draining excess water.

Accessories

- 2.22 **OUTLETS - ROOF DRAINS AND OVERFLOWS**
Allproof roof drains and overflows. Refer to SELECTIONS.
- 2.23 **OUTLETS - SCUPPER**
Equus Stainless Steel Scupper 200mm width x 75mm high aperture.
- 2.24 **FLOATING DECK AND PAVER SUPPORT SYSTEM**
Refer to 4381EF EQUUS FIXPLUS DECK & TILE SUPPORT SYSTEM for Equus Fixplus range of pedestals and tile supports. Pedestals are customisable to be compatible with a range of flooring materials such as concrete pavers or timber decking.
- 2.25 **RUBBER WALKWAY TILES**
Equus Kraitec Step by SOPREMA are rubber walkway tiles designed for protection of waterproofing membranes on flat roofs, balconies and terraces. The tiles allow water to drain underneath and are inter-locked. Available in 500mm x 500mm x 30mm thick. Standard colour: Grey with black, green and red available on request. Refer to SELECTIONS.
- 2.26 **EQUUS SOPREMA SOPRASOLAR FIX EVO TILT**
Non-penetrating support system for solar photovoltaic panels.

3 EXECUTION

Conditions

- 3.1 **DELIVERY, STORAGE & HANDLING OF PRODUCTS**
Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of Equus Industries Limited products.
Take delivery of waterproofing membranes, thermal insulation boards and accessories undamaged. Include for site handling facilities where required. Store, on a level surface, off floors, out of direct sunlight and with the required accessories under conditions that ensure no deterioration or damage. Store rolls upright to maintain roll shape. Protect thermal insulation boards from rain and wind. Store primer in a shaded and ventilated space.
- 3.2 **ROUTINE MATTERS**
Refer to the general section 1250 TEMPORARY WORKS & SERVICES for protection requirements. Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.
- 3.3 **PRE-INSTALLATION REQUIREMENTS**
Check work previously carried out and confirm it is of the required standard for this part of the work. Ensure moisture content is:
Timber substrate: 20% maximum
Concrete substrate: 75% maximum Relative Humidity

Confirm that the substrate, including sumps, outlets and projections, will ensure work of the required standard. Ensure the falls are the correct falls to rainwater outlets to avoid ponding.
- 3.4 **INSTALLATION SEQUENCE - WARM ROOF SYSTEMS**

Install SOPREMA DUOTHERM system components, vapour barrier, insulation sheets with membrane in sections to produce a weather-tight section each day complete with all joint seams, edge flashings and terminations. Cover off exposed edge at the end of each workday or of rain is imminent to ensure complete system remains dry.

Application

3.5 GENERALLY

All work and materials to comply with Equus Industries Ltd installation instructions, [NZBC E2/AS1](#) - 'External moisture', SOPREMA Roofer's Guide Bituminous Membranes 2021 and the WMAI Code of Practice for Reinforced Modified Bitumen Membrane Systems for Roofs and Decks.

3.6 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements

3.7 PRELIMINARY WORK

Ensure that preliminary work, including formation of falls, flashing rebates, grooves, ducts, roof penetrations and fixing of outlets is complete and properly constructed to enable the system to work as intended. This work and the substrate to be smooth, clean, dry and stable.

3.8 MINIMUM FALLS

Ensure minimum falls for SOPREMA DUOTHERM warm roof membrane systems are:

- minimum fall for a roof and deck is not less than 1:80 (0.7°), to CodeMark [CMNZ70151](#).
- minimum fall for a gutter is not less than 1:100 (0.57°), to CodeMark [CMNZ70151](#).

Installation Requirements - Plywood substrate

3.9 PLYWOOD SUBSTRATE - GENERAL

Plywood shall be a minimum of 17mm for roofs, and 21mm for decks. Sheets shall be laid tight butt jointed to maximise the use of whole sheets with sheet joints laid over framing members, in a staggered brick-bond pattern, running across the fall of the roof.

Fix plywood in accordance with the Manufacturer's instructions using countersunk stainless-steel screws, with all sheets laid in a bead of construction adhesive. Screws shall be fixed at 150mm centres on sheet perimeter and 200mm through the body of the sheet. Tongue and Groove plywood does not negate any of the above requirements.

3.10 PLYWOOD CORNERS

Chamfer all leading edges of plywood with a 5mm radius corner.

Installation Requirements - Concrete substrate

3.11 CONCRETE SUBSTRATE - GENERALLY

Confirm concrete structures are specifically engineered to meet the requirements of the [NZBC B1/VM1](#), 3.0 - 'Concrete'. Inspect the existing substrate and structure to ensure that they will not affect the performance of the membrane when applied.

Ensure concrete substrate has been allowed to cure for at least 28 days before commencing application. The relative humidity of concrete substrates must be 75% or less before membrane application to [NZBC E2/AS1](#), 11.0 - 'Construction moisture'. **Equus** do not recommend the use of curing compounds; however, when used ensure all traces of compound are gone or removed. Concrete to be finished to [NZS 3114](#), U3 with a light trowel texture.

3.12 CONCRETE CORNERS

Chamfer all leading edges to 5mm radius.

Installation Requirements - Cross Laminated Timber (CLT)

3.13 CROSS LAMINATED TIMBER SUBSTRATE GENERALLY

All sections shall be laid to manufacturer's instructions with all edges fully supported. Ensure joints are flush with edges chamfered and the surface is even and left clean and free of debris and dry before membrane application.

Installation Requirements - Metal Tray Deck

3.14 METAL TRAY SUBSTRATE GENERALLY

Confirm metal tray substrate is minimum 0.7mm gauge reverse profile run metal roofing to AS 1562.1-1992 and HB 39-1997. Installed in accordance with manufacturer's and Equus requirements.

Installation - Equus Soprema Duotherm warm roof system**3.15 CONTROL AND EXPANSION JOINTS**

For control and expansion joints refer to details on the drawings.

3.16 APPLY PRIMER

Prime all dried and prepared substrates with relevant Equus primer to suit vapour barrier, as per manufacturer's instructions. Ensure a good even coverage and penetration as recommended by Equus Industries Ltd. Consumption rates will depend on surface profile and porosity. Allow primer to fully dry.

3.17 APPLY PRIMER TO UPSTANDS

Apply selected primer to all upstands, to 50mm past the top of insulation panel.

3.18 APPLY VAPOUR BARRIER

Install selected Equus Soprema vapour barrier in accordance with manufacturers instructions, found in the relevant Product Technical Data Sheet. To upstands, the vapour barrier shall be taken up 50mm past the top of the insulation board.

3.19 INSTALL PIR THERMAL INSULATION BOARD

Install Equus PIR insulation boards over the vapour barrier in a brick-lay pattern. Secure boards using selected Equus SOPREMA stainless steel fasteners to suit substrate or Easy Foam PU adhesive and install in accordance with manufacturer's instructions. Add pre-formed angle fillets in internal corners.

The angle fillets can be temporarily fixed by Alsan Mastic 2200 sealant or Easy Foam PU adhesive.

Roof cover board may be installed over PIR thermal insulation.

PIR thermal insulation board is also available in tapered insulation boards.

3.20 INSTALL MINERAL WOOL THERMAL INSULATION BOARD

Install Soprarock HD 60 Mineral Wool insulation boards over the vapour barrier in a brick-lay pattern. Secure boards using Equus SOPREMA fasteners to suit substrate and install in accordance with manufacturer's instructions. Add pre-formed angle fillets in internal corners. The angle fillets can be temporarily fixed by Alsan Mastic 2200 bitumen sealant. Roof cover board to be installed over mineral wool thermal insulation. Mineral Wool insulation board is also available in tapered insulation boards.

3.21 INSTALL ROOF COVER BOARD

Install PermaBase Dek boards over the insulation board in a brick-lay pattern. Secure boards using Equus SOPREMA fasteners to suit substrate and install in accordance with manufacturer's instructions. Add pre-formed angle fillets in internal corners. The angle fillets can be temporarily fixed by Alsan Mastic 2200 sealant.

Application - Electronic Leak Detection - conductive surface (by membrane installer)**3.22 INSTALL ELECTRONIC LEAK DETECTION CONDUCTIVE SURFACE**

Install electronic leak detection conductive surface, in accordance with manufacturer's requirements. Refer to SELECTIONS.

Installation - Equus Soprema Duotherm membrane**3.23 APPLY WATERPROOFING BASE SHEET**

Unroll and align DeboFlex 2.5mm T/F C175 base sheet in the most suitable direction. Discard all packaging prior to installation. The membrane is loose laid on top of the thermal insulation boards and mechanically fastened by means of Equus SOPREMA stainless steel fasteners to suit substrate. The membrane is fully-bonded by torch-on application on top of the roof boards. Repeat in sequence with all rolls maintaining side laps of 80mm and end laps of 150mm. All laps are to be heat welded. Offset end laps by minimum 500mm in adjacent runs.

3.24**APPLY WATERPROOFING BASE SHEET - SELF-ADHESIVE APPLICATION PARTIALLY BONDED**

Unroll and align Soprastick Venti Tack Plus (formerly known as DeboTack 2.5mm T/F C175 Aero) base sheet in the most suitable direction. Remove back covering and self-adhere evenly to the PIR thermal insulation boards. Repeat in sequence with all rolls, maintaining side laps of 80mm and end laps of 200mm. All laps are to be heat welded. Offset end laps by minimum 500mm in adjacent runs.

3.25 APPLY CAP SHEET - FIRE RETARDANT WARM ROOF

Unroll and align Duo HT 4 Slates/F C180 Firecare (FC) cap sheet, offsetting half sheet from base sheet to create staggered laps. Cut the cap sheet to length as required. Re-roll both ends to the middle and torch evenly overall to the base sheet as it is unrolled. Ensure even heat application.

Repeat in sequence with all rolls, maintaining side laps of 80mm and end laps of 150mm. Ensure all laps are offset to prevent coincidence with the base sheet laps. Following application of the cap sheet, inspect all laps separately to ensure they are neatly and correctly closed.

Where required scatter Duo Mineral Chip carefully over the bitumen joint while welding in order to provide a uniform appearance. Scatter Duo Mineral Chip where detailing of the cap sheet has been carried out to provide protection and uniformity of finish where required.

3.26 APPLY CAP SHEET - ROOT RESISTANT FOR EXTENSIVE OR SEMI-INTENSIVE GREEN ROOF

Unroll and align Duo HT 4 Slates/F C180 Firecare Landscape (FC LC) cap sheet, offsetting half sheet from base sheet to create staggered laps. Cut the cap sheet to length as required. Re-roll both ends to the middle and torch evenly overall to the base sheet as it is unrolled. Ensure even heat application. Repeat in sequence with all rolls, maintaining side laps of 80mm and end laps of 150mm. Ensure all laps are offset to prevent coincidence with the base-sheet laps. Following application of the cap sheet, inspect all laps separately to ensure they are neatly and correctly closed.

Refer to the appropriate GREEN ROOF section(s) for the supply and construction of growing medium and planting as required by the project-specific requirements.

3.27 DETAILING

Detail all outlets, pipe penetrations, gutters, parapet up-stands, machinery plinths and any other details that come into contact with the Duothermsystem. Detailing is carried out before, during or in some cases after the membrane is laid depending on the detail type. All detailing to be done in accordance with the manufacturer's technical literature and application manual current at the time of design, use, installation and maintenance. Note that roof vents are not permitted to be fitted on a warm roof concept

Finishing

3.28 COMPLETION INSPECTION

Inspect the system upon completion and leave up to 2-3 weeks to stabilise. Recheck the entire system prior to any warranties being issued.

Main contractor to arrange appropriate protection for the completed installation. Damage caused to the completed installation, by other trades working over the membrane after the initial inspection, to be the responsibility of the main contractor.

3.29 INSTALL PHOTOVOLTAIC PANEL SUPPORTS

Where photovoltaic panels are to be installed, SOPRASOLAR FIX EVO TILT for bitumen roofs are to be installed as per the installation sheet provided by Equus Industries.

3.30 INSTALL RUBBER WALKWAY TILES

For protection of the Duo Membrane on flat roofs (e.g. walkways for roof maintenance), balconies and terraces. Start the installation of the tiles in a corner of the area and connect the Kraitec Step tiles using the pre-integrated connector pins. Where required, apply SOPRACOLLE 300 N adhesive to tiles at a rate of 250g per tile (5x 50g dots per tile, 1 dot in each corner and one in the centre). Install the first row across the full length of the area and check for proper alignment. It is recommended that the tiles are installed in a masonry type configuration, with every second row starting with a half tile to stabilise the placement. Tiles can be cut to size with a low-speed sabre saw or carpet knife.

3.31 DRAINAGE - GREEN ROOF

Lay drainage cell and overlap adjacent sheets with the 100mm filter fleece overlap. At the edges and at details, lay the geotextile filter fabric across the top of the drainage cell ensuring fabric is lapped 100mm to prevent ingress of soil. Tape the geotextile filter fabric to the wall to prevent soil entering the drainage cell. Ensure the entire area is covered and that there is sufficient drainage to remove excess water from the installation. Do not place heavy materials on the drainage cell.

Once geo-textile cloth drainage layer is in place overlay surface with 25mm grit sand prior to covering with soil.

3.32 GROWING MEDIUM AND PLANTING - GREEN ROOF

Refer to appropriate GREEN ROOF section(s) for supply and construction of green roof.

Completion - general

3.33 ACCEPTANCE

- Arrange for an inspection of the completed work.
- Protect the membrane until completion of the contract works.

3.34 COMPLETION MATTERS

Refer to the general section 1270 CONSTRUCTION for completion requirements and if required, commissioning requirements.

4 SELECTIONS

For further details on selections go to <https://equus.nz/>

Substitutions are not permitted to the following **Equus** product, unless stated otherwise.

Materials

4.1 EQUUS SOPREMA DUO MEMBRANE - WARM ROOF SYSTEM

Location:	~
Supplier:	Equus Industries Ltd
Substrate:	~
Type:	Equus SOPREMA Duotherm
Primer:	Equus Primer to suit vapour barrier selection
Vapour barrier:	Equus Soprema SBS modified bitumen membrane
Insulation type:	~ / ~ fixed
Thickness/R value:	~
Roof Cover Board:	~
Base sheet:	~
Cap sheet:	Duo HT 4 Slates/F C180 FC (Firecare) by SOPREMA
Colour:	~

4.2 EQUUS SOPREMA DUO MEMBRANE - GREEN WARM ROOF SYSTEM

Location:	~
Supplier:	Equus Industries Ltd
Substrate:	~
Type:	Equus SOPREMA Duotherm
Primer:	Equus Primer to suit vapour barrier selection
Vapour barrier:	Equus Soprema SBS modified bitumen membrane
Insulation type:	~ / ~ fixed
Thickness/R value:	~
Roof Cover Board:	~
Base sheet:	~
Cap sheet:	Duo HT WGG/F C180 Firecare Landscape (FC LC) by SOPREMA
Drainage cell:	Equus drainage cell with integrated geotextile fabric of 140gsm
Growing medium:	~
Colour:	White-Grey-Green

Accessories

4.3 ROOF DRAIN

Location: ~
 Type/Brand: ~
 Size: ~
 Downpipe diameter: ~
 Grill: ~

4.4 OVERFLOW

Location: ~
 Type/brand: ~
 Size: ~
 Grill: Overflow

4.5 OUTLETS - STAINLESS STEEL SCUPPERS

Location:
 Type/brand: Equus Stainless Steel Scupper
 Size: 200mm wide x 75mm high aperture

4.6 EQUUS SOPREMA KRAITEC STEP RUBBER TILES

Location: ~
 Type/Brand: Equus Soprema Kraitec Step
 Size: 500mm x 500mm x 30mm
 Colour: ~

4.7 EQUUS SOPREMA SOPRASOLAR FIX EVO TILT SOLAR PANEL SUPPORTS

Location: ~
 Type/brand: Equus Soprasolar

Electronic Leak Detection

4.8 ELECTRONIC LEAK DETECTION SYSTEM

Location: ~
 Substrate: ~
 System: ~