

NBS Specification

Supporting deck	Concrete
Type of roof	Inverted under green roofs
Application	Partial bond
System reference	FORCE 3000 Trafic

J41 Reinforced bitumen membrane roof coverings

To be read with Preliminaries/General conditions.

TYPES OF COVERING

120 BUILT-UP REINFORCED BITUMEN MEMBRANE INVERTED ROOF COVERING

Two layer partially adhered, inverted roof waterproofing system for use under intensive or extensive green roofs.

Reinforced bitumen membranes should only be applied over a continuous substrate which provides full support. Substrate Materials used to form the roof deck in flat roofs should be those listed in BS 6229 : 2003 and conform to the relevant requirements in BS 8217 : 2005.

Designers must ensure that the roof structure can support the imposed load of the green roofing. Saturated weights can be as low as 50 kg/m² for a lightweight extensive roof up to 500 kg/m² or more for an intensive green roof with hard surfacing,

- Substrate: Concrete deck.
 - Preparation: Prime deck with Axter's VERNIS ANTAC quick drying primer, or contractor's choice, and allow to dry thoroughly.
- Waterproof covering:
 - System manufacturer: Axter Ltd, West Road, Ransomes Europark, Ipswich, IP3 9SX, Tel 01473 724056, Fax 01473 723263, email info@axterltd.co.uk, internet www.axter.co.uk.
 - First layer: THERMECRAN perforated membrane.
 - Attachment: Loose laid except for a strip to be 10% of the roof width around roof edges and all major penetrations.
 - Intermediate layer: HYRANGER 25/25 TS, a non-tissue glass reinforced SBS modified bitumen membrane (3.53 kg/m² nom.) with a sand finished top surface and thermo fusible film to the underside and selvedge.
 - Attachment: Torch-on bonding.
 - Top layer/ Capsheet: 15 year warranty: FORCE 3000 TRAFIC a polyester reinforced self-finished membrane (4.79 kg/m² nom.), manufactured with a polymer (SBS) modified bitumen binder
or
20 year warranty - FORCE 4000 TRAFIC a polyester reinforced self-finished membrane (5.125 kg/m² nom.), manufactured with a polymer (SBS) modified bitumen binder.
 - Attachment: This layer must be fully bonded by torching and on all laps a 2 mm bitumen bead must be visible.
 - Flashings and detail work: FORCE LINE 4.5 as field sheet.
 - Insulation: Extruded polystyrene board.

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- Filter layer: Geotextile fabric as recommended by insulation manufacturer.
- Surface protection: Extensive or biodiverse green roof: Install Axter BAC CANALIS reservoir board and filter layer prior to application of growing medium and planting (sedum mat, wildflower mat, plug planting, seeding, etc,.....)

or

Intensive green roof: Install AXTER DRAIN drainage board and filter layer prior to the installation of growing medium, plants, hard surfaces etc.

- Accessories: Retention and erosion barriers etc. as drawing _____

PERFORMANCE

210 ROOF PERFORMANCE

- General: Secure, free draining and weathertight.

230 INSULATION

- Requirement: Determine type and thickness of insulation and integral or separate overlay to satisfy the following criteria:
 - Thermal transmittance of roof (maximum): As required.
 - Compressive strength of insulation (minimum) at 10% compression: min 150 kPa.
 - Finished surface: Suitably even, stable and robust to receive the covering.
 - Insulation compliance: To relevant British Standard, or Agrément certified.

PRODUCTS

320 PRIMER

- Type: Bitumen cut back with volatile solvent.
- Characteristics when tested to BS EN 13357:
 - Volatile solvent content (minimum): 40% by mass.
 - Viscosity (maximum) (STV at 25°C, 4 mm orifice): 10s.

330 TIMBER TRIMS, ETC

- Quality: Planed. Free from wane, pitch pockets, decay and insect attack (except ambrosia beetle damage).
- Moisture content at time of covering (maximum): 22%.
- Preservative treatment: As drawing _____

335 ANGLE FILLETS

- Material: As supplied by insulation manufacturer.
 - Size (minimum): min 50 x 50 mm, triangular in section.
- Restriction: Fillets under torch-on bitumen sheets to be non-combustible.

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345 PERIMETER TRIMS

- Type: GRP.
- Manufacturer: Contractor's choice.
 - Product reference: as required.
- Colour: To choice.
- Size: As drawing _____
 - Lengths (maximum): 3 m.

385 FILTER LAYER

- Type: Geotextile fabric .
- Manufacturer: Axter Ltd
 - Product reference: Axter Filter Layer
- Grade: As drawing _____

440 EXTRUDED POLYSTYRENE (XPS) INVERTED ROOF INSULATION

- Standard: To BS EN 13164.
- Manufacturer: Contractor's choice.
 - Product reference: as required.
- Grade: As recommended by insulation manufacturer for traffic loading.
- Edges: Rebated.
- Thickness: as required to meet u value.
- Integral topping: Not required.

460 STONE BALLAST

- Type: Washed, round aggregate.
- Supplier: Contractor's choice.
- Size: Graded 40-60 mm, free from fines and sharps.
- Colour: As drawing _____
- Recycled content: Contractor's choice.

465 PRECAST CONCRETE PAVING SLABS

- Standard: To BS EN 1339, hydraulically pressed.
- Manufacturer: Contractor's choice.
 - Product reference: as required.
- Colour: As drawing _____
- Finish: As drawing _____
- Size: As drawing _____
- Recycled content: Contractor's choice.

467 SUPPORT SYSTEM FOR PRECAST CONCRETE PAVING SLABS

- Manufacturer: Axter Ltd.
 - Product reference: Axter adjustable paving slab supports.
- Size: As drawing _____
- Accessories: Not required.

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EXECUTION GENERALLY

515 ADVERSE WEATHER

- General: Do not lay coverings in high winds, wet damp conditions or in extremes of temperature unless effective temporary cover is provided over working area.
- Unfinished areas of roof: Keep dry. Protect edges of laid membrane from wind action.

520 INCOMPLETE WORK

- End of working day: Provide temporary seal to prevent water infiltration.
- On resumption of work: Cut away tail of membrane from completed area and remove from roof.

530 APPLYING PRIMERS

- Coverage per coat (minimum): 0.2 L/m².
- Surface coverage: Even and full.
- Coats: Fully bond. Allow volatiles to dry off thoroughly between coats.

SUBSTRATES/ VAPOUR CONTROL LAYERS/ WARM DECK ROOF INSULATION

610 SUITABILITY OF SUBSTRATES

- Substrates generally: Secure, clean, dry, smooth, and free from frost, contaminants, voids and protrusions.
- Preliminary work: Complete including:
 - Grading to correct falls.
 - Formation of upstands, kerbs, box gutters, sumps, grooves, chases, expansion joints.
 - Fixing of battens, fillets and anchoring plugs/ strips.
- Moisture content and stability of substrate: Must not impair roof integrity.

WATERPROOF MEMBRANES/ ACCESSORIES

710 LAYING REINFORCED BITUMEN MEMBRANE GENERALLY

- Direction of laying: Unrolled up the slope.
 - Where practicable, install so that water drains over and not into laps.
- Side and end laps: As recommended by bitumen membrane manufacturer.
- Head and side laps: Offset.
- Intermediate and top layer/ capsheet: Fully bond.
- Successive layers: Apply without delay. Do not trap moisture.
- Strips of bitumen for 'linear' details: Cut from length of roll.
- Completed coverings: Firmly attached, fully sealed, smooth, weatherproof and free draining.

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730 PARTIAL BONDING OF REINFORCED BITUMEN MEMBRANE

- Venting first layer: Loose lay, align and cut to length. Do not carry up angle fillets and vertical surfaces or through details.
 - Long edges: Overlap minimum 50 mm.
 - Ends: Butt together.
- Intermediate layer: Fully bond to first layer and through to substrate.

740 TORCH-ON BONDING OF REINFORCED BITUMEN MEMBRANES

- Bond: Full over whole surface, with no air pockets.
- Excess compound at laps of top layer/ capsheet: Leave as continuous bead.

775 SKIRTINGS AND UPSTANDS

- Angle fillets: Fix by bitumen bonding or nailing.
- Venting first layer of bitumen membrane: Stop at angle fillet. Fully bond in bitumen for 300 mm around perimeters. Overlap onto upstand with strips of BS 8747, class S1P1 bitumen membrane, fully bonded.
- Other layers of bitumen membrane: Carry in staggered formation up upstand, with each layer fully bonded. Where practicable, carry top layer over top of upstand.
- Upstands:
 - At ends of rolls: Form with bitumen membrane carried up without using separate strip.
 - Elsewhere: Form with matching strips of bitumen membrane, maintaining laps.
 - Additional fixing of bitumen membranes: Not required.

780 WELTED DRIPS

- Material: as top layer.
 - Length: Form using maximum length strips.
 - Height at external gutter (minimum): 75 mm.
- Welt tail: Nail to face of drip batten. Fold neatly.
- Welt: Bond together, carry minimum 100 mm onto roof. Overlap with top bitumen membrane.

785 FIXING PERIMETER TRIMS

- First/ Intermediate layers bitumen membrane: Lay over roof edge upstand. Project free edge 25 mm from wall or fascia.
- Trim:
 - Setting out (minimum): 3 mm clear from wall or fascia.
 - Fasteners: ____mm stainless steel countersunk wood screws to BS 1210.
 - Fixing: 30 mm from ends and at 300 mm (maximum) centres.
- Jointing sleeves: Fix one side only.
- Corner pieces: Purpose made.
- Completion:
 - Contact surfaces: Prime.
 - Joints: Cover with 150 mm long pads of bitumen membrane, bonded to trim.

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- Completion of bitumen membrane:
 - Top layer/ Capsheet: Butt joint to rear edge of trim.
 - Cover strip: Fully bond to trim and top layer/ capsheet of bitumen membrane. Carry over roof edge upstand and lap 75 mm onto roof.
Cover strip material: As top layer/ cap sheet bitumen membrane.

SURFACING (For specific specifications on the greening elements consult Axter)

810 LAYING INVERTED ROOF INSULATION

- Condition of substrate: Clean.
- Setting out: Loose lay with staggered joints.
 - Cutting: Minimize.
 - Small cut pieces: Avoid at perimeters and penetrations.
 - Joints: Butt together.
- Projections, upstands, rainwater outlets, etc: Cut insulation cleanly and fit closely around.
- Completion:
 - Boards must be in good condition, well fitting and stable.
 - Cover as soon as practicable to prevent wind uplift and flotation.

820 LAYING STONE BALLAST

- Condition of substrate: Clean.
- Gravel guards: Fit to outlets.
- Previously laid materials: Protect during laying of ballast.
- Laying: Spread evenly. Do not pile to excessive heights.
 - Depth (minimum): As drawing _____

840 LAYING PRECAST CONCRETE PAVING SLABS

- Condition of substrate: Clean.
- Setting out: Minimize cutting.
- Joints: Open.
 - Width: Predetermined by support system.
- Perimeter/ Upstands margins: 100 mm wide, stone ballast filled.
- Completion: Slabs must be level and stable.

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COMPLETION

910 INSPECTION

- Interim and final roof inspections: Submit reports.

940 COMPLETION

- Roof areas: Clean.
- Outlets: Clear.
- Work necessary to provide a weathertight finish: Complete.
- Storage of materials on finished surface: Not permitted.
- Completed membrane: Do not damage. Protect from chemicals, traffic and adjacent or high level working.

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