

0423P LYSAGHT ROOFING – PROFILED SHEET METAL

Branded worksection

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Worksection abstract

This branded worksection *Template* is applicable to the provision of roof coverings of LYSAGHT profiled sheet metal and roof plumbing. It also covers skylights, roof hatches, roof windows, roof ventilators and roof plant access.

Background

The Australian profiled sheet steel industry is organised as follows:

- BlueScope manufactures Colorbond® prepainted steel and Zinalume® steel coils.
- Rollformers use steel coils and proprietary machinery to shape steel into different profiles and cut sheets to length.
- Distributors break down steel coils into smaller coils and onsell. Distributors also slit coils into various widths.
- Installers take off material quantities, order and install, often as subcontractors to the contractor.

How to use this worksection

Customise this worksection *Template* for each project. See A guide to NATSPEC worksections (www.natspec.com.au) for information on *Template* structure, word styles, and completing a worksection.

Related material located elsewhere in NATSPEC

If a listed worksection is not part of your subscription package and you wish to purchase it, contact NATSPEC.

Related material may be found in other worksections. See for example:

- *0193 Building access safety systems.*
- *0343 Tensioned membrane structures* for suspended fabric roofing.
- *0411 Waterproofing – external and tanking* for membrane roofs.
- *0461 Glazing* for glass roofing and skylights.
- *0471 Thermal insulation and pliable membranes* for thermal insulation, thermal break strips and vapour permeable membranes.
- *0472 Acoustic insulation* for bulk, board and flexible insulation.
- *0552 Metalwork - fabricated* for ladders, platforms and balustrades.
- *0802 Hydraulic design and install* for stormwater and rainwater storage systems.

Each of the following worksections contains a single roofing system and may be used where appropriate in addition to this worksection:

- *0424 Roofing – seamed sheet metal.*
- *0425 Roofing – shingles and shakes.*
- *0426 Roofing – slate.*
- *0427 Roofing – tiles.*
- *0428 Roofing – insulated panel systems.*
- *0429 Roofing – glazed.*

Related branded worksections include:

- *0341p LYSAGHT purlins and girts in structural steelwork.*
- *0436p LYSAGHT cladding – profiled sheet metal.*

Material not provided by LYSAGHT

This branded worksection *Template* includes generic material which may not be provided by the Product Partner, including:

- Glazed roofing.
- Plastic sheet roofing.
- Skylights.
- Roof hatches.
- Roof windows.
- Roof ventilators.

- Roof access.

Documenting this and related work

You may document this and related work as follows:

- Locate the extent of roofing types, accessories, and finishes on drawings to your office documentation policy.
- Show on the drawings the arrangement of the rainwater plumbing system, including the type and size of the main components (gutters, downpipes, sumps, rainheads, etc.) and the size and spacing of supports and fixings. In high wind areas, consider the degree of exposure of gutters and downpipes and the need to provide additional fixings.
- If documenting stormwater disposal, rainwater tank and related products, use *0802 Hydraulic design and install*.
- If documenting electric fan powered roof ventilators, document the necessary electrical connection in *0902 Electrical design and install*.
- Where insulation is required for internal downpipes, document in *0471 Thermal insulation and pliable membranes* or show on drawings.
- If required, state the minimum thermal resistance (R-Value) ($m^2.K/W$). See NATSPEC TECHnote DES 031 for information on specifying R-Values.
- If required, state the minimum thermal transmittance (U-Value) ($W/(m^2.K)$). See NATSPEC TECHnote DES 031 for information on specifying thermal transmittance.
- Check lead time for imported selections and consider adding a requirement, in **SUBMISSIONS**, for the builder to verify availability.
- In bushfire-prone areas, document bushfire protection requirements to AS 3959 (2018) and the NCC. See NATSPEC TECHnote DES 018 for information on bushfire protection.
- For guidelines on the design of roofs in snow areas, see AS/NZS 1170.3 (2003) and SA HB 106 (1998).
- For information on air, moisture and condensation, see NATSPEC TECHnote DES 004.
- For guidelines on green roof design and construction considerations, see NATSPEC TECHnote DES 026. Use *0411 Waterproofing – external and tanking* and *0471 Thermal insulation and pliable membranes* worksections to document roofing membrane requirements.

The *Normal* style text of this worksection may refer to items as being documented elsewhere in the contract documentation. Make sure they are documented.

Search acumen.architecture.com.au, the Australian Institute of Architects' practice advisory subscription service, for notes on the following:

- Birds and buildings.
- Green roofs.
- Guarantees and warranties.
- Site planning and design for bushfire.
- Waterproofing.

Specifying ESD

The following may be specified by retaining default text:

- Skylights, roof windows.

The following may be specified by using included options:

- Recycled material content, e.g. steel and aluminium roofing has high recycled content and is easily recycled post-use.

The following may be specified by including additional text:

- Green roofs. See NATSPEC TECHnote DES 026.
- High performance roofing systems to extend building service life.
- Roofing systems with high thermal mass to reduce heating/cooling load.
- Fibre cement composite with waste paper or wood fibres.
- Recycled plastic roofing materials.
- Rainwater tanks. See NATSPEC TECHnote DES 011 on rainwater harvesting.

Refer to NATSPEC TECHreport TR 01 on specifying ESD.

1 GENERAL

LYSAGHT has a proven track record supplying quality steel roofing, walling, rainwater, fencing, home improvement and structural products. Made from 100% Australian steel, our products are extensively performance-tested, come with a BlueScope warranty, and offer our customers confidence and peace of mind.

Our quality products are only part of our unique offer - our commitment to genuine, helpful customer service, and unmatched technical support and expertise has helped us become the trusted experience in steel.

1.1 RESPONSIBILITIES

General

Requirement: Provide a LYSAGHT profiled sheet metal roofing system and associated work, as documented.

Documented is defined in *0171 General requirements* as meaning contained in the contract documents.

Ambient climatic conditions

Design rainfall intensity (mm/h) to AS/NZS 3500.3 (2021): [complete/delete]

See AS/NZS 3500.3 (2021) Appendix D for selected place references or the Hydrometeorological Advisory Services of the Bureau of Meteorology (HAS) at www.bom.gov.au for rainfall data.

Corrosion resistance

Material: To the manufacturer's recommendations for distance from marine influence.

Distance from marine influence: [complete/delete]

The distance from marine influence can be used as a guide to determine the finish and grade of steel required, however other factors may also need consideration. For information on determining corrosivity categories in relation to environmental influences, see AS 2312.1 (2014) Table 2.1, AS 4312 (2019) Table 2.1 and Table 4.1. Refer to **CORROSION RESISTANCE, Atmospheric corrosivity category** in *0171 General requirements*, for the project corrosivity categories to AS 4312 (2019). Refer also to BlueScope Technical bulletins BlueScope TB-01A (2023) and BlueScope TB-01B (2022), which discuss the selection of steel roofing and walling products, and the correlation of distance to marine influence to the corrosion categories defined in AS 4312 (2019).

Roof access

Type: [complete/delete]

e.g. Normal roof maintenance, Access to plant rooms (if by restricted paths, show on the drawings).

1.2 COMPANY CONTACTS

LYSAGHT technical contacts

Website: www.lysaght.com/content/contact-us

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

0171 General requirements contains umbrella requirements for all building and services worksections.

List the worksections cross referenced by this worksection. *0171 General requirements* references the *018 Common requirements* subgroup of worksections. It is not necessary to repeat them here. However, you may also wish to direct the contractor to other worksections where there may be work that is closely associated with this work.

NATSPEC uses generic worksection titles, whether or not there are branded equivalents. If you use a branded worksection, change the cross reference here.

1.4 STANDARDS

General

Standard: To AS 1562.1 (2018).

1.5 INTERPRETATION

Definitions

General: For the purposes of this worksection, the definitions given in AS 1562.1 (2018) apply.

Edit the **Definitions** subclause to suit the project or delete if not required. List alphabetically.

1.6 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: professionals.lysaght.com/resources/manuals

1.7 TOLERANCES

Sheet metal roofing

Supporting members: To AS 1562.1 (2018) clause 4.2.3.

1.8 SUBMISSIONS

Edit the **SUBMISSIONS** clause to suit project requirements.

Operation and maintenance manuals

Requirement: Submit manual to **COMPLETION, Operation and maintenance manuals.**

Products and materials

Type tests: As appropriate for the project, submit evidence of conformity to the following:

- Metal roofing generally: Roof sheeting and fastenings to AS 1562.1 (2018) clause 5.4 for resistance to concentrated loads and to AS 1562.1 (2018) clause 5.5 for resistance to wind pressures.
- Metal roofing in AS/NZS 1170.2 (2021) cyclonic regions: Roof sheeting and fastenings to AS 1562.1 (2018) clause 5.6.
- Plastic sheet roofing: Roofing and fastenings to AS 1562.3 (2006) Section 5 for resistance to wind forces and resistance to impact.

Type tests are carried out off-site. However, submission of evidence of a successful type test may be called up here for requirements specified in SELECTIONS or PRODUCTS, when there are no SELECTIONS.

Recycled material content: Submit documentation from the roofing material manufacturer showing the following:

- Post-consumer recycled content: [complete/delete]
- Pre-consumer recycled content: [complete/delete]

e.g. BlueScope, on average, produces steel that contains 25% scrap material. Of this, the post-consumer recycled content is 8.5% and the pre-consumer recycled content is 6.5%.

If a certain percentage of recycled material content is required, consider including this *Optional* style text by changing to *Normal* style text and completing the prompts.

Samples

Approved samples that define the acceptable limits of colour and texture variations are retained on site. If particular or additional samples are required, list them here.

Requirement: Submit samples of the following, showing the range of variation available:

- Trim and accessories with a colour finish.
- Custom profiled flashings and cappings.
- Sheet metal finishes.
- Sealants.

Shop drawings

Shop drawings are necessary if some or all of the system is to be designed by the contractor or a specialist subcontractor to meet the performance criteria specified. If this is not the case, delete **Shop drawings**.

General: Submit shop drawings to a scale that best describes the detail, showing the following:

- [complete/delete]

e.g. Methods of fixing, required end and side laps, acoustic insulation, suppression of impact noise, provisions for thermal movement, birdproofing, flashing, ridge cappings, roof water disposal, thermal insulation, vapour barrier, control joint treatment, isolation of incompatible metals, access for maintenance, provision for traffic.

Tests

Detail the tests required in PRODUCTS or EXECUTION, as appropriate, and list the submissions required here.

Internal downpipes: Submit test results to **TESTING, Internal downpipe tests.**

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

1.9 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Roof supports before covering up or concealing.
- Glazing products before they are installed.
- The parts of the roofing, sarking, vapour barrier, insulation and roof plumbing installation before covering up or concealing.

Amend to suit the project, adding critical stage inspections required.

Hold points, if required, should be inserted here.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to **SUBSTITUTIONS** in 0171 *General requirements*.

SUBSTITUTIONS in 0171 *General requirements* sets out the submissions required if the contractor proposes alternative products. Refer also to NATSPEC TECHnote GEN 006 for more information on proprietary specification.

Storage and handling

Storage: To the manufacturer's recommendations and as follows:

- Keep clean, dry and unexposed to weather.
- Store away from uncured concrete and masonry, on a level base and not in contact with other materials that cause staining, denting or other surface damage.
- Stack flat and off the ground on at least 3 evenly placed bearers.

Handling: Handle metal roofing materials as follows:

- Use gloves when handling precoated metal roofing material.
- Use soft soled shoes when fixing or working on roofs.
- Protect edges and surfaces from damage. Do not drag sheets across each other or over other materials.

Storage area conditions: Allocate a safe and trade free area.

Product identification

General: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

Edit the list to suit the project or delete if not required.

Welded safety mesh

Standard: To AS/NZS 4389 (2015).

Welded safety mesh may be used for fall arrest if required by WHS authorities. Coordinate with 0471 *Thermal insulation and pliable membranes*, which also cites AS/NZS 4389 (2015). Mesh support for roof insulation may not be required where fall arrest sarking is used.

2.2 PROFILED SHEET METAL ROOFING

See SA HB 39 (2015) Sections 2 and 7 for general advice on material selection for steel sheet roofing.

Standards

Design and materials: To AS 1562.1 (2018).

Product

Proprietary steel roofing: LYSAGHT steel roofing.

Proprietary aluminium roofing: Permalite aluminium roofing.

Fasteners

Prefinished exposed fasteners: Finish with an oven baked polymer coating to match the roofing material.

Fastenings to timber battens: Fastenings long enough to penetrate the thickness of the batten without piercing the underside.

LYSAGHT steel roofing fasteners:

- Type, size, corrosion resistance class and spacing: To LYSAGHT recommendations.

Refer to LYSAGHT Roofing and walling installation manual and BlueScope TB-16 (2023) guide on selecting fasteners for roofing and walling.

Permalite aluminium roofing fasteners:

- Type, size, corrosion resistance class and spacing: To Permalite recommendations.

Refer to Permalite® Aluminium Roofing Solutions manual.

Profiled fillers

Type: Purpose-made closed cell polyethylene foam profiled to match the roofing profile.

Location: Provide profiled fillers under flashings to the following:

- Ridges.
- Eaves.
- Lapped joints in roof sheeting.

Add locations as required.

Insulation spacers

Description: Proprietary spacer system to prevent excessive compression of insulation between roof sheeting and framing.

Size spacers to suit the required insulation thickness documented and/or create an air space as required.

Components

Sealant: 100% neutral cure non-acid based silicone rubber to match roofing.

2.3 ROOF PLUMBING

General

See SA HB 39 (2015) Section 5 for the manufacture and fitting of internal and external metal gutters, downpipes, sumps and rainheads, AS/NZS 3500.3 (2021) Section 3 for method of sizing gutters and downpipes, and AS/NZS 3500.3 (2021) clause 4.9 for support systems of roof drainage systems. Show particular requirements, if any, on the drawings.

See NATSPEC TECHnote DES 011 for more information on rainwater harvesting.

Description: Flashings, cappings, gutters, rainheads, outlets, downpipes and accessories necessary to complete the roofing system.

Flashing and capping: Notched to match profile of roofing.

Matching fascia/arge capping: If the selected eaves gutter is a proprietary high front pattern forming part of a combined system of gutter, fascia and barge, provide matching proprietary fascias and barge cappings to roof verges and edges.

Delete if not required.

Standards

Roof drainage: To AS/NZS 3500.3 (2021).

Metal rainwater goods: To AS/NZS 2179.1 (2014).

Flashings and cappings: To AS/NZS 2904 (1995).

See SA HB 39 (2015) Section 8 for recommended practice for metal flashings and cappings.

2.4 SKYLIGHTS

General

Standard: To AS 4285 (2019).

Description: A proprietary skylight system for installation in roofs pitched less than 15°, including framing, fixing, trim, seals, accessories and flashings.

2.5 ROOF HATCHES

General

Description: A proprietary roof hatch system, including framing, fixing, trim, seals, accessories and flashings.

Check if your roofing and associated access hatches are required to be fire rated or non-combustible. Refer to BCA (2022) Section C and the ABCB Fire performance of external walls and cladding advisory note (2020).

2.6 ROOF WINDOWS

General

Standard: To AS 4285 (2019).

Description: A proprietary window system designed for non-vertical installation in roofs pitched greater than 15° and less than 90°, consisting of the following:

- Timber frame and sash, shop clear primed or prefinished.
- External anodised aluminium protective profiles.
- Sealed double glazing.
- Horizontally pivoted sash, 180° reversible, on patent friction hinges.
- Opening and locking by patent control bar.
- Ventilation flap.

2.7 ROOF VENTILATORS

General

Document any particular requirements, material, type (e.g. static, wind driven, electric fan powered), size, etc. if not shown on the drawings. For roof mounted heat exhaust vents, see AS 2427 (2004). For design of smoke/heat venting systems, see AS 2665 (2001).

Description: A proprietary roof ventilator system including framing, fixing, trim, seals, accessories and flashings.

2.8 ROOF ACCESS

Walkways

Description: A proprietary roof walkway system including fixings.

3 EXECUTION

3.1 GENERAL

Preparation

Substrates or framing: Before fixing roofing, check the alignment of substrates or framing and adjust if required.

Flexible underlay: Check that the underlay or insulation is restrained.

Roofing: Make sure the roofing is clean and free of dust and loose particles.

3.2 INSTALLATION

Protection

General: Keep the roofing and rainwater system free of debris and loose material during construction.

Protection: Protect surfaces and finishes, including the retention of protective coatings during installation.

Thermal movement

Requirement: Allow for thermal movement in the roof installation and the structure, including movement in joints and fastenings.

Pan type sheets

Removal: Install sheets so that individual sheets can be removed without damage.

Curved corrugated sheet

General: Form by rolling from material recommended for curving or bullnosing. Minimise crimping or creasing across the face of the sheet. Trim off crimped or creased edges and ends.

Metal separation

Make sure of compatibility or detail separation.

See AS 1562.1 (2018) Appendix C Table C3 for guidance on the compatibility of metals. See also SA HB 39 (2015) Section 2 on material selection. It is primarily a design responsibility that incompatible metals are not documented or shown to be in contact. Preferably show the separation method on the drawings.

Corrosion can result from water run-off between incompatible surfaces. See AS 1562.1 (2018) clause 3.4.3 and AS 1562.1 (2018) Appendix C Table C4. There are four conditions to be avoided:

- Run-off from copper and copper alloys onto aluminium, zinc, galvanized, or aluminium/zinc-coated surfaces.
- Run-off from glass onto stainless steel, zinc or galvanized surfaces.
- Run-off from plastic onto zinc or galvanized surfaces.
- Run-off from inert catchment surfaces such as glazed terracotta, prepainted steel, aluminium and aluminium/zinc onto zinc or galvanized surfaces.

In marine or high humidity environments, separate green hardwood from aluminium and coated steel.

Typical methods for metal separation include:

- Applying an anti-corrosion, low moisture transmission coating such as zinc or barium chromate primer or aluminium pigmented bituminous paint to contact surfaces.
- Inserting a separation layer such as polyethylene film, adhesive tape or bituminous felt.

Requirement: Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by one of the following methods:

- Applying an anti-corrosion, low moisture transmission coating to contact surfaces.
- Inserting a separation layer.

3.3 PROFILED SHEET METAL ROOFING

Roof sheet installation

Standard: To AS 1562.1 (2018).

LYSAGHT steel roofing: To the manufacturer's recommendations.

Refer to the LYSAGHT Roofing and walling installation manual.

Permalite aluminium roofing: To the manufacturer's recommendations.

Refer to the Permalite Aluminium roofing solutions manual.

Set-out point: [complete/delete]

Note the elevation that will allow laying to proceed in a direction from the leeward to the windward side of the prevailing wind.

Fixing: **PROPRIETARY ITEMS** in 0171 General requirements requires all products to be fixed to the manufacturer's recommendations.

Fastener type, size, corrosion resistance class, and spacing: To LYSAGHT's recommendations.

Swarf: Remove swarf and other debris as soon as it is deposited.

Accessories: Provide accessories with the same finish as roofing sheets to complete the roofing installation.

Expansion joints: [complete/delete]

Consult manufacturer for recommended maximum expansion joint spacing. Typical spacings are 35 m in sheet length for roofs with concealed fixings and 24 m in sheet length for roofs with exposed fixings.

Provide expansion joints every 12 m in Permalite Aluminium sheet length for roofs.

Ridges and eaves

Sheet ends: Treat as follows:

- Project sheets 50 mm into gutters.
- Close off ribs at bottom of sheets using mechanical means or with purpose-made fillers or end caps.
- Turn pans of sheets up at tops and down into gutters by mechanical means.
- Pre-cut notched eaves flashing and birdproofing if required.
- Close off ridges with purpose-made ridge fillers of closed cell polyethylene foam.

Ridge and barge

Capping: Finish off along ridge and verge lines with purpose-made ridge capping or barge rolls.

Sprung curved ridge

General: Lay the roofing sheets in single lengths from eaves to eaves by naturally curving the sheets over the ridge.

Ridge: Seal side laps at the ridge and extend the sealant to the point where the roof pitch equals the recommended pitch of the roofing profile.

This is possible only with certain sheeting profiles and roof slopes. Consult the manufacturer about recommended purlin spacings at the ridge to achieve the required curvature. Show the purlin locations on the drawings.

End laps

General: If end laps are unavoidable, and the sheet profile is not suitable for interlocking or contact end laps, construct a stepped type lap.

Length of lap (mm): [complete/delete]

Document the laps required, if applicable. End laps are not suitable for all roofing profiles.

3.4 ROOF PLUMBING

Jointing sheet metal rainwater goods

See AS/NZS 3500.3 (2021) clause 2.7 for information on joint materials and products.

Butt joints: Make joints over a backing strip of the same material.

Soldered joints: Do not solder aluminium or aluminium/zinc-coated steel.

Sealing: Seal fasteners and mechanically fastened joints. Fill the holes of blind rivets with silicone sealant.

Jointing system: [complete/delete]

e.g. Blind rivet and seal as follows:

- Prepainted stainless: Stainless steel blind rivets with stainless steel mandrels.
- Prepainted or zinc-aluminium alloy coated steel: Aluminium blind rivets.

Flashings

Installation: Flash roof junctions, upstands, abutments and projections through the roof. Preform to required shapes if possible. Notch, scribe, flute or dress down as necessary to follow the profile of adjacent surfaces. Mitre angles and lap joints 150 mm in running lengths. Provide matching expansion joints for every two lengths of flashing, at a maximum of 12 m centres.

Upstands: Flash projections above or through the roof with two part flashings, consisting of a base flashing and a cover flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection.

Large penetrations in low pitch roofs: Extend the base flashing over the roofing ribs to the ridge to prevent ponding behind the penetrating element.

This situation often occurs with mechanical plant. Consider documenting it on the drawings.

Wall abutments: Where a roof abuts a wall, provide overflashing as follows:

- In masonry walls, planked cladding or concrete: Step in courses to the roof slope. Interleave with damp-proof course, if any.
- Raking in masonry: Build into the full width of the outer leaf. Turn up and across the cavity and fix to or build into the inner leaf at least 75 mm above the roofing line.
- Raking in concrete: Turn 25 mm into joints or grooves, wedge at 200 mm centres with compatible material and point up.

Fixing to pipes: Solder or seal with neutral cure silicone rubber and secure with either of the following:

- Clamping ring.
- Proprietary flexible clamping shoe with attached metal surround flashing.

Gutters

Document the material, profile and size on the drawings or in a schedule.

Gutter and sump support: Provide framing and lining to support valley gutters, box gutters and sumps. Line the whole area under the gutters and sumps.

Support: [complete/delete]

e.g. Proprietary metallic-coated adjustable strap and channel system.

Lining: [complete/delete]

e.g. Square corrugated profiled metal roof sheeting.

Box gutter: Prefabricate box gutters to the required section and shape as follows:

- Form stop ends, downpipe nozzles, bends and returns.
- Dress downpipe nozzles into outlets.

- Hail guards: Install grating over the whole of the box gutter, over all box gutter sumps and over the edges of roofing sheeting entering box gutters.
- Overflows: Provide overflows to prevent back-flooding. Size to pass 100% of the design rainfall. Discharge overflows in visible locations and so water does not enter the building or cause damage to the building.
- Sumps: Minimum 150 mm deep and the full width of the box gutter.

This is a typical minimum size. Coordinate with hydraulic design.

Valley gutters: Profile to suit the valley boarding. Turn back both edges 180 x 6 mm radius. Nail or screw to the valley boarding at the top end to prevent the gutter creeping downwards.

Expansion joints in guttering longer than 30 m: Provide as follows:

- Type: [complete/delete]

e.g. As detailed or proprietary elastic expanding adhesive fixed type.

Gratings: Install removable gratings over rainheads and sumps.

Leaf guard location: All gutter outlets.

External downpipes

Document the material, profile and size on the drawings or in a schedule. In high wind areas consider the degree of exposure of gutters and downpipes to wind actions and the need to provide additional fixings.

General: Prefabricate downpipes to the required section and shape where possible. Connect heads to gutter outlets and, if applicable, connect feet to rainwater drains.

Access cover: Provide a removable watertight access cover at the foot of each downpipe stack.

- Size: Not less than the diameter of the downpipe.

Downpipe support: Provide supports and fixings for downpipes.

Internal downpipes

Joining method: [complete/delete]

e.g. Sealant joint or Bolted gland joint to AS 1631 (1994) (ductile iron), Screwed fittings to AS 1589 (2001) (copper), Solvent cement jointing (PVC-U), etc.

Access: Provide access openings as follows:

- At each junction and bend.
- At the foot of each stack.
- At every second floor level.

Modify locations to suit the project.

Type of access opening: [complete/delete]

e.g. Cast iron inspection openings to AS 1631 (1994) (or AS/NZS 1260 (2017) for PVC-U, AS 1589 (2001) for copper).

Acoustic insulation: Mineral fibre pipe insulation 50 mm thick, spirally bound on with 1.5 mm wire at 150 mm pitch.

Delete if not required.

Building in: If pipes are built into masonry or concrete, spiral wrap the pipe (and insulation, if any) with building paper.

Rainwater disposal

System: [complete/delete]

If not shown on the drawings, document method of disposal. Alternatives include Connection to stormwater drains, Discharge to rainwater tanks or Discharge to soakage pits.

3.5 SKYLIGHTS

Installation

Standard: To AS 4285 (2019).

Fixing: [complete/delete]

Specify and detail to the recommendations of the skylight manufacturer.

3.6 ROOF HATCHES

Installation

Fixing: [complete/delete]

Specify and detail to the recommendations of the roof hatch manufacturer.

3.7 ROOF WINDOWS

Installation

Standard: To AS 4285 (2019).

Fixing: [complete/delete]

Specify and detail to the recommendations of the roof window manufacturer.

3.8 ROOF VENTILATORS

Installation

Fixing: [complete/delete]

AS 2428.1 (2004) covers the testing of smoke and heat release ventilators to determine resistance to leakage during rain.

Specify and detail to the recommendations of the roof ventilator manufacturer.

3.9 ROOF ACCESS

Walkway

Installation: [complete/delete]

AS 1657 (2018) covers the design, construction and installation of roof walkways and platforms.

For ladders, platforms and balustrades, cross reference the appropriate worksection, e.g. *0552 Metalwork - fabricated* and *0341 Structural steelwork*.

3.10 TESTING

0171 *General requirements* defines different tests in **INTERPRETATION**, **Definitions** and calls for an inspection and testing plan in **TESTING - GENERALLY**, **Inspection and testing plan**.

Internal downpipe tests

Standard: To AS/NZS 3500.3 (2021) clause 9.3.1.

Internal downpipes: Test each stack hydrostatically in stages, each test to run over two storeys high for two hours. Remedy defects and retest if necessary.

AS/NZS 2033 (2008) clause 7.3 notes test requirements for non-pressure polyethylene (PE) pipelines.

3.11 COMPLETION

Reinstatement

Extent: Repair or replace damage to the roofing and rainwater system. If the work cannot be repaired satisfactorily, replace the whole area affected.

Damage to prepainted finish: Replace panels with scratches in the prepainted finish greater than 2 mm in width visible from the ground.

LYSAGHT does not recommend the use of touch-up paint to repair damage or scratches to the painted surface of COLORBOND® or ZINCALUME® steel. See BlueScope TB-02 (2022).

Fasteners: Make sure weathertight and external panel facings are not distorted.

Cleaning

Roofing and rainwater drainage system: Remove debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidation.

Roof plumbing: Clean out spoutings, gutters and rainwater pipes after completion of roof installation.

Protection: After completion, remove protective coatings using methods to the manufacturer's recommendations.

Operation and maintenance manuals

Requirement: Prepare a manual that includes recommendations from the roofing manufacturer or supplier for the maintenance of the roofing system including frequency of inspection and recommended methods of access, inspection, cleaning, repair and replacement.

Compliance with this clause targets the Operations and Maintenance requirement within the Minimum Expectation level of the Verification and Handover credit in Green Star Buildings (2021).

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the manufacturer and the installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the manufacturer and the installer.

Use only if warranties extending beyond the defects liability period are available for the particular system. Insert the required warranty period and terms, which should be negotiated beforehand. If the warranty is in the form of separate material and installation warranties, the signatures of both manufacturer and installer are required.

BlueScope has an internet based system Warranty Estimator and Management System that allows access to warranty advice for BlueScope building products and pre-approved warranties at warranties.bluescopesteel.com.au for steel products or permalite.com.au/tools/warranty-estimation/ for aluminium products.

4 SELECTIONS

Schedules are a tool to specify properties required for products or systems. If the principal permits documentation of the product or system by proprietary name, some of the properties may be unnecessary and can be deleted. Document the product or system's location or application here and/or on the drawings with a matching project code. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

4.1 PERFORMANCE**Roofing performance schedule**

	A	B	C
Solar absorptance			
Light Reflectance Value (LRV)			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Solar absorptance: Select from manufacturer's range. Light (< 0.40), Medium (0.40 to 0.60), Dark (> 0.60). See BCA (2022) J3D7 for roofs to a Class 2 building or a Class 4 part of a building.

Light Reflectance Value (LRV): If required, nominate the light reflectance value. Some local government authorities limit the light reflectance value for building exteriors. Refer to the relevant local government authority for any requirements.

4.2 PRODUCT**LYSAGHT profiled sheet steel roofing schedule**

	A	B	C
Profile			
Material			
Base metal thickness (BMT) (mm)			
Colour			
Fasteners			
Insulation spacer type			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Profile: Select from the following for concealed fixed roof sheeting:

- LYSAGHT Klip-Lok® 406.

- LYSAGHT Klip-Lok® 700 Hi-strength. For overlapping sheets use the Lok-Klip® joint system.
- LYSAGHT Klip-Lok Classic® 700.
- LYSAGHT Longline 305®.

Profile: Select from the following for screw crest fixed roof sheeting:

- LYSAGHT Custom Orb®.
- LYSAGHT Custom Orb Blue®.
- LYSAGHT Custom Orb Accent® 21.
- LYSAGHT Custom Orb Accent® 35.
- LYSAGHT Spandek®.
- LYSAGHT Spanrib®.
- LYSAGHT Trimdek®. For overlapping sheets use the Trim-Klip® joint system.

Material: Select from the following with reference to the Location exposure severity category:

- Benign: Colorbond® steel, Colorbond® Coolmax steel, Colorbond® Metallic steel or Zinalume® steel.
- Moderate: Colorbond® steel, Colorbond® Coolmax steel, Colorbond® Metallic steel or Zinalume® steel.
- Marine: Colorbond® steel or Zinalume® steel or Permalite aluminium.
- Severe marine: Colorbond® Ultra steel or Permalite aluminium.
- Very severe marine: Colorbond® Stainless steel or Permalite aluminium.

Document Permalite aluminium in Permalite profiled sheet aluminium roofing schedule.

Base Metal Thickness (BMT) (mm): Refer to LYSAGHT product brochures. Select from the following:

- Generally: 0.42 or 0.48.
- Custom orb blue®: 0.60 or 0.80
- Klip-Lok® 700 Hi-strength: 0.42, 0.48 or 0.60.
- Longline 305®: 0.70.

Colour: Consult the BlueScope COLORBOND® Colour Chart.

Fasteners: e.g. Concealed or Pierced: Crest or Valley.

Insulation spacer type: Select a product that is fixed to the purlin and raises the roof sheeting to suit the required insulation thickness.

Permalite profiled sheet aluminium roofing schedule

	A	B	C
Profile			
Base metal thickness (BMT) (mm)			
Finish			
Colour			
Fasteners			
Insulation spacer type			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Profile: Select from the following for concealed fixed roof sheeting:

- Permalite V-rib®.
- Permalite Alspan®.
- Permalite Waveline®.
- Permalite LT7®.

Base Metal Thickness (BMT) (mm): Refer to Permalite product brochures. Select from the following:

- Generally: 0.70, 0.90 or 1.20.
- Waveline®: 0.70 or 0.90.

Finish: Refer to Permalite product brochures. Select from the following:

- Mill finish.
- Stucco finish (0.90 mm BMT only).

- Paint finish.

Fasteners: e.g. Concealed or Pierced: Crest or Valley.

Insulation spacer type: Select a product that is fixed to the purlin and raises the roof sheeting to suit the required insulation thickness.

4.3 ROOF PLUMBING

Flashing and capping schedule

	A	B	C
Type			
Product			
Material			
Thickness and grade			
Colour			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Document proprietary profiles as proprietary items and custom profiles on drawings. If sizes are not shown on the drawings document here.

Type: e.g. Ridge capping, Roll top ridge capping, Change of pitch flashing, Apron flashing, Barge capping, Saddle flashing, Custom flashing, Barge roll, Spear point.

Product: Select for LYSAGHT steel roofing or Permalite aluminium roofing, and edit the schedule to suit.

Material: e.g. Metallic-coated steel, Soft zinc, Aluminium annealed sheet, Bitumen (or polyethylene) coated aluminium, Stainless steel, PVC, Butyl rubber and Neoprene rubber. Lead is not compatible with aluminium or aluminium/zinc coated steel. For malleable flashings, consider soft zinc or plastic sheet. Select the material recommended by the Rollformer or Distributor with reference to the atmospheric corrosivity category nominated for the project in *0171 General requirements*. Refer also to NATSPEC TECHnote DES 010.

Thickness and grade: Minimum thickness and grade for commonly used materials are given in AS/NZS 2904 (1995). If other thicknesses are required, document them here.

Colour: e.g. Match roofing or consult the nominated Rollformer or Distributor's colour chart.

Roof plumbing schedule

Item	Type	Product	Material	Thickness/ Grade	Colour/Shape/Size
Eaves gutter					
Valley gutter					
Box gutter					
Rainhead					
Sump					
Downpipe					
Vent					
Hail guard					
Grate					
Leaf screen					

Document requirements here if not shown on the drawings.

Type: LYSAGHT® eaves gutters. Refer to the LYSAGHT website for information on state by state availability.

- Quad: Hi-front, Lo-front or Square bead.
- Sheerline®.
- Trimline®.
- Fitfast®.
- Emline®.
- Half round.

- Flat back.
- Ranceline®.
- Colonial.
- Ogee.
- Quarter round.
- Shoreline.

Type: Permalite eaves gutters: Select from Half round or Quad.

Type:

- Box gutters: Internal box gutters are usually difficult to clean and replace. Add requirements for siphonic systems separately, as appropriate.
- Rainhead: e.g. Standard, Tapered, Custom made square, Custom made round, Corner ogee, Ogee, Chinaman's hat.
- Downpipe: e.g. Internal or External and Rectangular or Circular. Internal downpipes are mainly for multi-storey applications. Acoustic insulation will not be required where downpipes are built into sound rated ducts. For plastic rainwater goods, use proprietary brand names.
- Hail guard: Nominate type of mesh and fixing method.
- Gratings: e.g. Wire netting ball or Hemispherical wire mesh dome. Document the metal and coating. Check if leaf screens are required.

Product: Nominate a proprietary system or product and edit the schedule to suit.

Material:

- Metal rainwater goods: Select the product material recommended by the Rollformer or Distributor with reference to the atmospheric corrosivity category nominated for the project in *0171 General requirements*. Refer also to NATSPEC TECHnote DES 010.
- Box gutter: Nominate material and base metal thickness (BMT)(mm). Plain zinc-coated steel is not recommended for internal box gutters, Welded stainless steel is recommended.
- Internal downpipe: e.g. Cast iron to AS 1631 (1994) (may be bitumen-coated, epoxy-coated or cement-coated, if required), Copper Type D to AS 1432 (2004), Stainless steel type 304, PVC-U to AS/NZS 1260 (2017). PVC-U may not be acceptable for fire-resistance rating.
- Leaf screen: e.g. Plastic mesh or proprietary metal guards to match the gutter profile. Combustible leaf guards are not permitted for bushfire-prone areas.

Thickness/Grade: Minimum thickness and grade for commonly used materials are given in AS/NZS 2179.1 (2014). If other thicknesses are required, specify them here. See AS 1397 (2021) Appendix D for information and guidance on the selection of steel grades and coating classes.

Colour/Shape/Size:

- Box gutter: Nominate cross-section dimensions (mm) and sump size.
- Downpipe: Nominate colour and size (mm).
- Rainhead and vents: Nominate colour, shape and pattern.

4.4 ROOF ACCESSORIES

Skylight schedule

	A	B	C
Product			
Type			
Size (mm)			
Light shaft			
Ceiling diffuser			
Total system solar heat gain coefficient (SHGC)			
Total system U-Value (W/m ² .K)			
WERS for Skylights energy rating % heating			
WERS for Skylights energy rating % cooling			

	A	B	C
Hail guard			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Product: Nominate a proprietary system or product and edit schedule to suit.

Type: e.g. Fixed, Opening, Retractable, Tubular, Ventilated.

Light shaft: Used to bring light through the roof structure and help control light distribution. Local solar geometry, surface reflectance (influenced by structural material and colour) and shape are basic considerations (see AS 4285 (2019) Appendix C for more information on skylights shaft or lightwell).

Ceiling diffuser: Translucent polymer or glass installed at ceiling level of a lightwell shaft to diffuse or redirect incoming light. Also used to control heat gains (ventilated skylights) or losses (non-ventilated skylights) and glare. Open cell diffusers are also used with ventilated skylights.

Solar heat gain coefficient (SHGC) and U-Value ($W/m^2.K$): Add if required in BCA (2022) J4D5 or BCA (2022) H6D2(1)(b)(i).

WERS for Skylights energy rating %: The % heating and % cooling refers to the percentage improvement in performance of the window compared with using a base-case Generic Window 1 (3 mm clear glazing in a standard aluminium frame).

Contact Window Energy Rating Scheme operated by the Australian Glass and Window Association
awa.associationonline.com.au.

Roof hatch schedule

	A	B	C
Product			
Size (mm)			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Product: Nominate a proprietary system or product and edit schedule to suit.

Roof window schedule

	A	B	C
Product			
Type			
Size (mm)			
Total system solar heat gain coefficient (SHGC)			
Total system U-Value ($W/m^2.K$)			
WERS for Skylights energy rating % heating			
WERS for Skylights energy rating % cooling			
Hail guard			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Product: Nominate a proprietary system or product and edit schedule to suit.

Type: e.g. Fixed, Opening.

Solar heat gain coefficient (SHGC) and U-Value ($W/m^2.K$): Add if required in BCA (2022) J4D5 or BCA (2022) H6D2(1)(b)(i).

WERS for Skylights energy rating %: The % heating and % cooling refers to the percentage improvement in performance of the window compared with using a base-case Generic Window 1 (3 mm clear glazing in a standard aluminium frame).

Roof ventilator schedule

	A	B	C
Product			

	A	B	C
Size (mm)			
Throat diameter (mm)			
Material			
Finish			
Capacity			
Options			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Product: Nominate a proprietary system or product and edit schedule to suit.

Material: Select the material recommended by the Rollformer or Distributor with reference to the atmospheric corrosivity category nominated for the project in *0171 General requirements*. Refer also to NATSPEC TECHnote DES 010.

Finish: e.g. Match roofing.

Roof access schedule

	A	B	C
Product			
Size (mm)			
Material			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Product: Nominate a proprietary system or product and edit schedule to suit.

REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS/NZS 1170		Structural design actions
AS/NZS 1170.2	2021	Wind actions
AS 1562		Design and installation of sheet roof and wall cladding
AS 1562.1	2018	Metal
AS 1562.3	2006	Plastic
AS/NZS 2179		Specifications for rainwater goods, accessories and fasteners
AS/NZS 2179.1	2014	Metal shape or sheet rainwater goods, and metal accessories and fasteners
AS/NZS 2904	1995	Damp-proof courses and flashings
AS/NZS 3500		Plumbing and drainage
AS/NZS 3500.3	2021	Stormwater drainage
AS 4285	2019	Rooflights
AS/NZS 4389	2015	Roof safety mesh

The following documents are mentioned only in the Guidance text:

AS/NZS 1170		Structural design actions
AS/NZS 1170.3	2003	Snow and ice actions
AS/NZS 1260	2017	PVC-U pipes and fittings for drain, waste and vent applications
AS 1397	2021	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1432	2004	Copper tubes for plumbing, gasfitting and drainage applications
AS 1589	2001	Copper and copper alloy waste fittings
AS 1631	1994	Cast grey and ductile iron non-pressure pipes and fittings
AS 1657	2018	Fixed platforms, walkways, stairways and ladders - Design, construction and installation
AS/NZS 2033	2008	Installation of polyethylene pipe systems
AS/NZS 2312		Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS 2312.1	2014	Paint coatings
AS 2427	2004	Smoke/heat release vents
AS 2428		Methods of testing smoke/heat release vents
AS 2428.1	2004	Determination of resistance to leakage during rain
AS 2665	2001	Smoke/heat venting systems - Design, installation and commissioning
AS 3959	2018	Construction of buildings in bushfire-prone areas
AS 4312	2019	Atmospheric corrosivity zones in Australia
SA HB 39	2015	Installation code for metal roof and wall cladding
SA HB 106	1998	Guidelines for the design of structures in snow areas
BCA H6D2	2022	Class 1 and 10 buildings - Energy efficiency - Application of Part H6

BCA J3D7	2022	Energy efficiency - Elemental provisions for a sole-occupancy unit of a Class 2 building or a Class 4 part of a building - Roofs and ceilings of a sole-occupancy unit of a Class 2 building or a Class 4 part of a building
BCA J4D5	2022	Energy efficiency - Building fabric - Roof lights
BCA Section C	2022	Fire resistance
ABCB Fire performance	2020	Fire performance of external walls and cladding advisory note
BlueScope TB-01A	2023	Steel roofing products - Selection guide
BlueScope TB-01B	2022	Steel walling products - Selection guide
BlueScope TB-02	2022	Overpainting and restoration of exterior BlueScope coated steel products
BlueScope TB-16	2023	Fasteners for roofing, walling and accessory product - selection guide
GBCA Buildings	2021	Green Star Buildings
NATSPEC DES 004		Air, moisture and condensation
NATSPEC DES 010		Atmospheric corrosivity categories for ferrous products
NATSPEC DES 011		Rainwater harvesting
NATSPEC DES 018		Bushfire protection
NATSPEC DES 026		Living walls and roofs
NATSPEC DES 031		Specifying R-Values
NATSPEC GEN 006		Product specifying and substitution
NATSPEC GEN 024		Using NATSPEC selections schedules
NATSPEC TR 01		Specifying ESD