

## 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.

### 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.

### Guidance text

All text within these boxes is provided as guidance for developing this worksection and should not form part of the final specification. This *Guidance* text may be hidden or deleted from the document using the NATSPEC Toolbar or the hidden text *Hide* and *Delete* functions of your word processing system. For additional information visit FAQs at [www.natspec.com.au](http://www.natspec.com.au).

### Optional style text

Text in this font (blue with a grey background) covers items specified less frequently. It is provided for incorporation into *Normal* style text where it is applicable to a project.

### 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.*
- *0341p LYSAGHT purlins and girts in structural steelwork.*
- *0343 Tensioned membrane structures.*
- *0411 Waterproofing – external and tanking.*
- *0424 Roofing – seamed sheet metal.*
- *0425 Roofing – shingles and shakes.*
- *0426 Roofing – slate.*
- *0427 Roofing – tiles.*
- *0436p LYSAGHT cladding - profiled sheet metal.*
- *0461 Glazing for glass roofing and skylights.*
- *0471 Thermal insulation and pliable membranes for thermal insulation and vapour barriers.*
- *0802 Hydraulic design and install for stormwater and rainwater storage systems.*

### 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 and roof access systems.

### 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 added thermal resistance (R-Value) ( $m^2 K/W$ ). See NATSPEC TECHnote DES 031 for information on specifying R-Values.

- Check lead time for imported selections and consider adding a requirement, in **SUBMISSIONS**, for the builder to verify availability.
- Document bushfire protection to conform AS 3959 and the BCA. 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 and SAA HB 106.
- For information on air moisture and condensation, see NATSPEC TECHnote DES 004.

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](http://acumen.architecture.com.au), the Australian Institute of Architects' practice advisory subscription service, for notes on the following:

- Guarantees and warranties.

Search [www.environmentdesignguide.com.au](http://www.environmentdesignguide.com.au), the Australian Institute of Architect's environmental advisory subscription service for notes on the following:

- Green roofs.
- Birds and buildings.

### Specifying ESD

The following may be specified by retaining default text:

- Skylights, roof windows.

The following may be specified using included options:

- Recycled material content.
- Rainwater tanks. See NATSPEC TECHnote DES 011 on rainwater harvesting.

The following may be specified by including additional text:

- High performance roofing systems to extend building service life.
- Recycled plastic roofing materials.

Refer to the 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: [complete/delete]

See AS/NZS 3500.3 Table E1 for selected place references or the Hydrometeorological Advisory Services of the Bureau of Meteorology (HASBM) at [www.bom.gov.au](http://www.bom.gov.au) for rainfall data. SAA/SNZ HB 114 provides worked examples of roof drainage calculations.

#### Location exposure severity

Exposure severity determines the grade of Colorbond® steel and Zinalume® steel. Refer to BlueScope TB-01A on selecting steel roofing products. Delete if not using profiled steel roofing.

Exposure severity category: [complete/delete]

Select from the following exposure severity category:

- Benign: > 1000 m from breaking surf/exposed marine or > 1000 m from calm marine.
- Moderate: 401 to 1000 m from breaking surf/exposed marine or 201 to 1000 m from calm marine.
- Marine: 201 to 400 m from breaking surf/exposed marine or 101 to 200 m from calm marine.
- Severe marine: 101 to 200 m from breaking surf/exposed marine or 0 to 100 m from calm marine.
- Very severe marine: 0 to 100 m from breaking surf/exposed marine.

For organic coating used in sheet steel, there are additional corrosivity categories. Add, if appropriate. They are:

- Tropical inland - North Queensland, Northern Territory, North-West Western Australia, Papua New Guinea and the Pacific Islands, except where affected by salinity, and
- Very high - offshore and beach front locations and aggressive industrial environments where pH may be less than 5.

Refer to 0171 General requirements for the designation of the Exterior atmospheric corrosivity category of the project.

### 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: [professionals.lysaght.com/contact-us](https://professionals.lysaght.com/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 MANUFACTURER'S DOCUMENTS

### Technical manuals

Website: [professionals.lysaght.com/resources/manuals](https://professionals.lysaght.com/resources/manuals)

## 1.5 TOLERANCES

### Sheet metal roofing

Supporting members: To AS 1562.1 clause 4.2.3.

The NCC cites AS 1562.1:1992.

## 1.6 SUBMISSIONS

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

### Certification

Design of glazed roofing: Submit an engineer's certificate confirming conformance to AS 1288.

### Operation and maintenance manuals

On completion: Submit a manual of 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.

### Products and materials

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

- Metal roofing generally: Roof sheeting and fastenings to AS 1562.1 clause 5.4 for resistance to concentrated load and AS 1562.1 clause 5.5 for resistance to wind pressure.
- Metal roofing in cyclonic regions to AS/NZS 1170.2: Roof sheeting and fastenings to AS 1562.1 clause 5.6.
- Plastic sheet roofing: Roofing and fastenings to AS 1562.3 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**, if 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 17 to 20% scrap material. Of this, the post-consumer material content is estimated to be 3 to 3.5% and the preconsumer material content is less than 1%.

### Samples

Approved samples which define acceptable limits of colour and texture variations are retained on site. If particular or additional samples are required, e.g. samples for testing, list them here.

Requirement: Submit samples of the following:

- Custom profiled flashings and cappings.
- Sheet metal finishes showing the range of variation available.
- Sealants.
- Trims and accessories with a colour finish.

### 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.

### Test

0171 *General requirements* covers tests in **Definitions** and calls for an inspection and testing plan under **SUBMISSIONS, Tests**.

Site tests: Submit results as follows:

- Internal downpipe hydrostatic testing: [complete/delete]

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

### Warranties

Requirement: Submit the following:

- [complete/delete]

Describe the requirement of warranties in **PRODUCTS** or **EXECUTION**, as appropriate, and list the submissions required here.

Roofing materials: Submit the manufacturer's product warranties.

## 1.7 INSPECTION

### Notice

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

- Roof supports.
- 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 **PRODUCTS, GENERAL, Substitutions** in *0171 General requirements*.

The 0171 *General requirements* clause 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: Store metal roofing materials, as follows:

- 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.

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.

## 2.2 COMPONENTS

### Fasteners

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

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

### LYSAGHT fasteners

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

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

### Permalite fasteners

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

Refer to Permalite<sup>®</sup> 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.

### Safety mesh

Standard: To AS/NZS 4389.

Coordinate with the 0471 *Thermal insulation and pliable membranes* worksection. Do not call up welded safety mesh in more than one spot.

### Insulation spacer

Product: [complete/delete]

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

## 2.3 LYSAGHT SHEET METAL ROOFING

If there are a number of profiled sheet metal roofing types, repeat this clause.

See SA HB 39 Section 2 and SA HB 39 Section 7 for general advice on material selection for steel sheet roofing.

### Standards

Design and materials: To AS 1562.1.

### Proprietary steel roofing

Product brand: LYSAGHT steel roofing.

Profile: [complete/delete]

Select from the following for concealed fixed roof sheeting:

LYSAGHT Klip-Lok<sup>®</sup> 406.

LYSAGHT Klip-Lok<sup>®</sup> 700 Hi-strength. For overlapping sheets use the Lok-Klip<sup>®</sup> joint system.

LYSAGHT Klip-Lok Classic® 700.  
 LYSAGHT Longline 305®.  
 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.

**Product material type: [complete/delete]**

Refer to BlueScope TB-01A guide on selecting steel roofing products. Select from the following:  
 COLORBOND® steel.  
 COLORBOND® Coolmax steel.  
 COLORBOND® Metallic steel.  
 COLORBOND® Ultra steel.  
 COLORBOND® Stainless steel.  
 ZINCALUME® steel.

**Thickness, Base Metal Thickness (BMT) (mm): [complete/delete]**

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: [complete/delete]**

Consult the BlueScope COLORBOND® Colour Chart.

**Location: [complete/delete]**

### **Proprietary aluminium roofing**

Product brand: Permalite aluminium roofing.

**Profile: [complete/delete]**

Select from the following for concealed fixed roof sheeting:  
 Permalite V-rib®.  
 Permalite Alspan®.  
 Permalite Waveline®.  
 Permalite LT7®.

**Thickness, Base Metal Thickness (BMT) (mm): [complete/delete]**

Refer to Permalite product brochures. Select from the following:  
 Generally: 0.70, 0.90 or 1.20.  
 Waveline®: 0.70 or 0.90.

**Finish: [complete/delete]**

Refer to Permalite product brochures. Select from the following:  
 Mill finish.  
 Stucco finish.  
 Paint finish.

**Colour: [complete/delete]**

Consult the Permalite Colour Chart.

**Location: [complete/delete]**

## 2.4 ROOF PLUMBING

See SA HB 39 Section 5 for the manufacture and fitting of internal and external metal gutters, downpipes, sumps and rainheads, AS/NZS 3500.3 Section 3 for method of sizing gutters and downpipes and SAA/SNZ HB 114 for worked examples, and AS/NZS 3500.3 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 roof sheeting.

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.

Metal rainwater goods: To AS/NZS 2179.1.

Flashings and cappings: To AS/NZS 2904.

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

## 2.5 GLAZED ROOFING

### General

Description: Sloped overhead glazing fixed to glazing bars or directly to the roof framing with the required necessary supports, trim, flashings and sealants.

Glass selection: To AS 1288.

- Certification: Required.
- Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

To verify this, search for AS/NZS 2208 in the JAZ-ANZ directory at [www.jas-anz.com.au/our-directory/certified-organisations](http://www.jas-anz.com.au/our-directory/certified-organisations).

## 2.6 PLASTIC SHEET ROOFING

### Materials

Unplasticised polyvinyl chloride (PVC-U) sheet: To AS 4256.2.

Glass fibre reinforced polyester (GRP) sheet: To AS 4256.3.

Polycarbonate: To AS 4256.5.

Select either extruded PVC-U, GRP or document the material required. The BCA cites AS/NZS 4256.2:1994, AS/NZS 4256.3:1994 and AS/NZS 4256.5:1996.

Sealants: Neutral curing silicone or modified silane (MS) polymer based sealant to the roofing manufacturer's recommendations.

## 2.7 SKYLIGHTS

### General

Standard: To AS 4285.

General: A proprietary skylight system including framing, fixing, trim, seals, accessories and flashings.

## 2.8 ROOF HATCHES

### General

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

## 2.9 ROOF WINDOWS

### General

Standard: To AS 4285.

General: A proprietary window system designed for non-vertical installation in roofs pitched between 15° and 85°, 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.

## 2.10 ROOF VENTILATORS

For electric fan powered ventilators, document the necessary electrical connection in the electrical services worksection. 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. For design of smoke/heat venting systems, see AS 2665.

### 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. For design of smoke/heat venting systems, see AS 2665.

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

## 2.11 ROOF PLANT ACCESS

### Walkways

Description: A proprietary roof walkway system including fixings.

## 3 EXECUTION

### 3.1 INSTALLATION

#### Protection

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

#### 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 Appendix C Table C3 for guidance on the compatibility of metals. See also SA HB 39 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 clause 3.4.3 and AS 1562.1 Appendix C Table C4. There are two conditions to be avoided:

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

### 3.2 SHEET METAL ROOFING

#### Roof sheet installation

Standard: To AS 1562.1.

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.

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]

Provide expansion joints every 35 m in sheet length for roofs with concealed fixings and 24 m in sheet length for roofs with exposed fixings.

### 3.3 BUILDING ELEMENTS

#### 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.

### 3.4 ROOF PLUMBING

#### Jointing sheet metal rainwater goods

See AS/NZS 3500.3 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 at 6 m maximum intervals.

6 m corresponds to the manufacturing length. Movement at these joints would be less than 1 mm so all may not need to be fully-fledged expansion joints.

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 flashing 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 within cavity, slope inward 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 cured 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. 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 for 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.

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 (ductile iron), Screwed fittings to AS 1589 (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 (or AS/NZS 1260 for PVC-U, AS 1589 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 GLAZED ROOFING****Installation**

Standard: To AS 1288.

Fixing: [complete/delete]

Document and detail to the recommendations of the glazing bar manufacturer.

**3.6 PLASTIC SHEET ROOFING****Installation**

Standard: To AS 1562.3.

AS 1562.3 covers the installation of plastic cladding materials. See also SA HB 39 Section 9. The BCA cites AS/NZS 1562.3:1996.

Fixing: [complete/delete]

e.g. Roofing screws with neoprene washers in oversized holes. Consult the manufacturer.

Fixing to timber: 30 mm minimum penetration.

**3.7 SKYLIGHTS****Installation**

Standard: To AS 4285.

Fixing: [complete/delete]

Specify and detail to the recommendations of the skylight manufacturer.

### 3.8 ROOF HATCHES

#### Installation

Fixing: [complete/delete]

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

### 3.9 ROOF WINDOWS

#### Installation

Standard: To AS 4285.

Fixing: [complete/delete]

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

### 3.10 ROOF VENTILATORS

#### Installation

Fixing: [complete/delete]

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

### 3.11 ROOF PLANT ACCESS

#### Walkway

Installation: [complete/delete]

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

### 3.12 TESTING

0171 *General requirements* covers tests in **Definitions** and calls for an inspection and testing plan under **SUBMISSIONS, Tests**.

#### Site tests

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.

### 3.13 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.

Touch up: If it is necessary to touch up minor damage to prepainted metal roofing, do not overspray onto undamaged surfaces.

#### 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.

#### Warranties

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

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

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 [www.bluescopesteel.com.au/warranties](http://www.bluescopesteel.com.au/warranties) for steel products or [permalite.com.au/tools/warranty-estimation](http://permalite.com.au/tools/warranty-estimation) for aluminium products.

The form(s) required should be provided as part of the contract documentation.

## 4 SELECTIONS

**Schedules** are a way of documenting a selection of proprietary or generic products or systems by their properties. Indicate their locations here and/or on the drawings. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

### 4.1 PRODUCT

#### Flashing and capping schedule

Property	A	B	C
Type			
Product			
Material			
Thickness and grade			
Colour			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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, Lead, Copper, 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. 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					

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings. 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.
- Permalite eaves gutters: Select from Half round or Quad.
- 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 (may be bitumen-coated, epoxy-coated, or cement-coated if required), Copper Type D to AS 1432, Stainless steel type 304, PVC-U to AS/NZS 1260. 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. Plastic 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. If other thicknesses are required, specify them here. See AS 1397 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.

### Glazed roofing schedule

Property	A	B	C
Product			
Type of glass			
Glass thickness (mm)			
Surface film			
Supports			
Solar heat gain coefficient (SHGC)			
U-Value (W/m <sup>2</sup> .K)			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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

Type of glass: e.g. Toughened: Laminated.

Glass thickness (mm): Nominate thickness for each lamination.

Supports: Proprietary framing or patch fitting system.

Solar heat gain coefficient (SHGC) and U-Value ( $W/m^2.K$ ): Add if required in BCA 3.12.1.3 or BCA J1.4.

### Plastic sheet roofing schedule

Property	A	B	C
Product			
Material			
Material class or grade			
Material type			
Profile			
Translucency			
Colour			
Impact resistance			
Fire performance			
Solar heat gain coefficient (SHGC)			
U-Value ( $W/m^2.K$ )			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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

Material: Select either PVC-U, GRP, Polycarbonate.

Material class or grade:

- PVC-U: Class D (domestic) or I (industrial).
- GRP: GP (general purpose), FR (fire retardant) or CR (chemical resistant).
- Polycarbonate, Grade S (sold flat sheet), P (profiled sheet) or M (multi-layered).

Material type:

- PVC-U: ST (surface treated), GP (general purpose).
- GRP: CT (surface tissue present), ST/SX (surface treated).
- Polycarbonate: ST (surface treated), GP (general purpose).

Profile: Describe the profile or, if required to match adjacent roofing, use the proprietary name.

Translucency: Transparent, Translucent, Opaque.

Colour: If applicable, use the manufacturer's name.

Fire performance: If fire-resisting plastic roofing is required, document the Spread-of-Flame Index and Smoke-Developed Index.

Solar heat gain coefficient (SHGC) and U-Value ( $W/m^2.K$ ): Add if required in BCA 3.12.1.3 or BCA J1.4.

### Skylight schedule

Property	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			

Property	A	B	C
Hail guard			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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 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 3.12.1.3 or BCA J1.4.

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 Window Association [www.wers.net](http://www.wers.net).

#### Roof hatch schedule

Property	A	B	C
Product			
Size (mm)			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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

#### Roof windows schedule

Property	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			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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 3.12.1.3 or BCA J1.4.

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

Property	A	B	C
Product			



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

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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 plant access schedule

Property	A	B	C
Product			
Size (mm)			
Material			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

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 1170		Structural design actions
AS/NZS 1170.2	2011	Wind actions
AS 1288	2006	Glass in buildings - Selection and installation
AS 1562		Design and installation of sheet roof and wall cladding
AS 1562.1	2018	Metal
AS 1562.3	2006	Plastics
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	2015	Stormwater drainage
AS 4256		Plastic roof and wall cladding materials
AS 4256.2	2006	Unplasticized polyvinyl chloride (uPVC) building sheets
AS 4256.3	2006	Glass fibre reinforced polyester (GRP)
AS 4256.5	2006	Polycarbonate
AS 4285	2007	Skylights
AS/NZS 4389	2015	Safety mesh

The following documents are mentioned only in the **Guidance** text:

AS 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 application
AS 1397	2011	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 1562		Design and installation of sheet roof and wall cladding
AS 1562.1	1992	Metal
AS/NZS 1562.3	1996	Plastic
AS 1589	2001	Copper and copper alloy waste fittings
AS 1631	1994	Cast grey and ductile iron non-pressure pipes and fittings
AS/NZS 2179		Specifications for rainwater goods, accessories and fasteners
AS/NZS 2208	1996	Safety glazing materials in buildings
AS 2427	2004	Smoke/heat release vents
AS 2665	2001	Smoke/heat venting systems- Design, installation and commissioning
AS 3959	2009	Construction of buildings in bushfire prone areas
AS 4256		Plastic roof and wall cladding materials
AS/NZS 4256.2	1994	Unplasticized polyvinyl chloride (uPVC) building sheets

AS/NZS 4256.3	1994	Glass fibre reinforced polyester (GRP)
AS/NZS 4256.5	1996	Polycarbonate
SA HB 39	2015	Installation code for metal roof and wall cladding
SAA HB 106	1998	Guidelines for design of structures in snow areas
SAA/SNZ HB 114	1998	Guidelines for design of eaves and box gutters
BCA 3.12.1.3	2016	Acceptable construction - Energy efficiency - Building fabric - Roof lights
BCA J1.4	2016	Energy efficiency - Building fabric - Roof lights
BlueScope TB-01A	2016	Steel roofing products - Selection guide
BlueScope TB-16	2017	Fasteners for Roofing and Walling Products - Selection Guide
NATSPEC DES 004	2005	Air, moisture and condensation
NATSPEC DES 010	2009	Atmospheric corrosivity categories for ferrous products
NATSPEC DES 011	2007	Rainwater harvesting
NATSPEC DES 018	2008	Bushfire protection
NATSPEC DES 031	2014	Specifying R-Values
NATSPEC GEN 006	2007	Product specifying and substitution
NATSPEC GEN 024	2015	Using NATSPEC selections schedules
NATSPEC TR 01	2017	Specifying ESD