Skylight
Industry
Association

INDUSTRY CODE OF PRACTICE

Design considerations for the performance of skylights, tubular skylights and roof windows

JUNE 2009

The document is also available on the SIA website at http://siai.com.au

Foreword

This Industry Code of Practice details design considerations for the performance of skylights, tubular skylights and roof windows with a particular emphasis on the sustainability benefits achieved through the use of well-designed systems.

Skylight Industry Association Incorporated (SIAI) members have actively developed the Code of Practice which reflects their extensive practical expertise gained during the manufacture and installation of the majority of skylights installed throughout Australia in the many diverse geographical and climatic locations.

The information is intended to provide guidance to the SIAI members, their customers, designers, specifiers and regulatory authorities for the design, selection, installation and performance of skylights, tubular skylights and roof windows to achieve the full potential of such products.

This document references the Operational Manual of WERS for Skylights. The Commonwealth Government of Australia provided valuable assistance to develop the WERS for Skylights Manual. It contains extensive technical algorithms developed over 2003 – 2009 by Peter Lyons & Associates and by Ian Bennie & Associates, in close collaboration with CSIRO Sustainable Ecosystems (Dr Angelo Delsante and Dr Dong Chen) and the Australian Window Association, Inc.

This Industry Code of Practice reflects current best practice at the time the document was published. The SIAI envisages that this document will be reviewed and developed in line with changes within the skylight Industry due to both technological and legislative requirements.

Peter Lyons, Ph.D.

Peter Lyons & Associates
NFRC Partner Country Certified Trainer

ACKNOWLEDGEMENTS

The publishing of this Industry Code of Practice (ICP) has come about due to assistance provided by the Commonwealth Government of Australia, and the diligence of the SIA Technical Committee.

There has also been significant contribution of a number of people, especially Robert Cussigh, Steve Lynch, Ian Murphy, Peter Lyons, Ian Bennie, Harry Porrins, and Laurie Baker.

Their efforts over a long period of time are much appreciated by the SIA.

The SIA also gratefully acknowledges the review contribution of Stuart McLennan.

Contents

1. Preliminary

1.1 Scope

This Industry Code of Practice has been developed to provide advice on the design, selection and installation of skylight products to ensure the full benefit and potential of the installed skylight is achieved.

The Industry Code of Practice applies to:

a. Commercial and residential buildings.

b. Manufactured natural lighting systems installed into roofs including skylights (rooflights), roof windows and tubular skylights (tubular rooflights).

This Industry Code of Practice does not apply to complex overhead roof glazing systems including barrel vaults, atriums, conservatories and roof systems constructed from light transmitting materials.

The term “skylight” is used throughout this document. When used in a generic sense it includes skylights, roof windows, tubular skylights and roof lights.

1.2 Introduction

Skylights are widely viewed as a desirable feature for buildings that have human occupation during daylight hours. Daylight is essential for our psychological sense of well-being and skylights and “windows are a natural for one and two-storey construction (and) places where human happiness matters" (Heschong 1998). They increase the amenity of internal spaces that have no windows or low natural light levels and they promote architectural freedom.

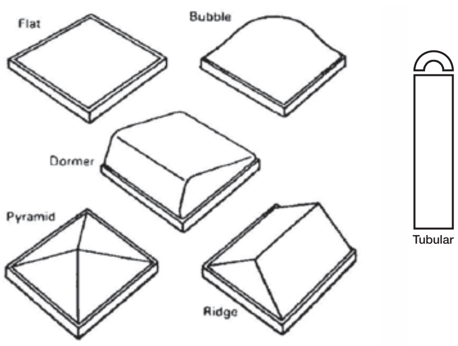
The list of building types that can benefit from skylights is long and includes houses, schools, hospitals, offices, libraries, factories, airport terminals and so on. It has long been recognised that daylight is an excellent source of ‘cool light’, meaning that a given amount of light is accompanied by less heat gain than almost any type of artificial light.

1.3 What are skylights

Skylights come in many combinations of shape, size, glazing, frame and installation details. Skylights can use transparent or translucent glazing, in glass or polymer of various configurations to achieve the twin goals of even light distribution and solar control.

Roof windows are popular as they typically offer double glazing and controllable ventilation. Sealed insulating glass units (IGU's), or double glazing reduce heat losses through skylights while minimizing condensation. Some Skylight units are electrically operable, manually operable or permanently ventilated (ideal for wet areas such as laundries and bathrooms) to promote air flow.

Figure 1. Common skylights (AAMA 1987)



1.4 A wide range of choices

A variety of skylight shapes exist for applications on sloping or flat roofs. Glazing may be flat, glass or twin wall polymer/ polycarbonate, polymer moulded domes, single-glazed (clear or tinted), or single-glazed diffuse (opal), in various materials. Refer to Figure 1.

Double-glazed skylights are available in a similar range of configurations, and in the case of glass, also provide the ability to use spectrally selective optical coatings which modify solar transmission and emittance.

Skylights can use diffuse polymer or glass glazing, to achieve the twin goals of even light distribution and solar control. Diffusely transmitting glazing has a strong back-scattering effect on incoming solar radiation. This reduces overall visible transmittance slightly but assists in reducing solar heat gain. At the same time, the diffuse transmission serves to scatter light over a wide range of angles. This promotes soft, glare-free lighting.

All of the advantages and benefits of using skylights have their exceptions and with good design and thoughtful planning you can avoid problems. Consideration of roof aspect, skylight-to-floor area ratio, light well material and length, glazing material, glazing translucency and light distribution are all important.

2. Sustainability

2.1 Introduction

New research proves conclusively that skylights can save energy in many applications.

A well designed building with a good spread of natural light will benefit from passive solar gain and a reduction in artificial lighting. Skylights enhance the interior appearance of a building and if done correctly will save money, save energy, promote psychological well-being, add life and excitement to visual space, provide a connection to the outside world and contribute to the reduction in emissions of CO_2.

In practice, the actual energy burden imposed by a skylight on a house is rarely more than a few percent. This is because they are usually only a few percent of the floor area of the building, compared with 20 to 30 percent for typical windows.

The use of sealed insulating glass allows inert gas to be used in the gap instead of air, which reduces conducted and convected heat across the space. Frames may be aluminium, steel, timber or composites such as aluminium-clad wood or uPVC.

Some inbuilt solar control may be desirable in hotter climates, such as solar-control glazing or a solar control shading device. If solar control glazing is used then to preserve visible transmission it should have a high performance body tint (good) or a spectrally selective low-e coating (better).

A light well reduces solar heat gain because solar-heated air tends to collect at the top of the well, while daylight is transmitted by multiple reflections down into the space below.

2.2 Skylights

Skylights offer excellent daylighting and have the potential to displace electric lighting commonly used in the building during daylight hours, thus saving on energy costs and, potentially, cooling energy. However they must be selected carefully to prevent undue heat loss or heat gain.

Some skylights function as roof windows, as they typically offer double glazing and controllable ventilation. Sealed IGU's (insulating glass units) reduce heat loss whilst minimising condensation.

Some skylights are permanently ventilated and are ideal in non-conditioned spaces such as bathrooms and sanitary compartments and are energy efficient as they can overcome the need for powered exhaust fans. However they can contribute to drafts and heat loss, so they should be used thoughtfully in living areas in cold climates.

Skylights with long shafts often have diffuser panels fitted at ceiling level. Some light wells (shafts) exert nearly as much influence over the energy properties as the actual skylight itself. However a diffuser at ceiling level can minimise this influence.

In living areas in heating climates, (i.e cold geographic areas) permanently ventilated skylights may contribute to drafts and heat loss, so they should be used with caution.

In cooling climates (i.e. hot geographic areas) permanently ventilated skylights can be desirable to help promote constant airflow. In addition some inbuilt solar control may be desirable in warmer climates to reduce solar radiation entering the building, such as solar-control glazing or blinds.

2.3 Tube skylights

Well designed Tubular Skylights reduce absolute heat loss and heat gain because of their smaller cross-sectional area. Their overall efficiency relies on their ability to 'capture' direct-beam solar radiation and the efficiency of the lightwell material. They work best in climates with a high incidence of clear, sunny days.

Tubular Skylights capture sunlight, bounce the light down the highly reflective light well and diffuse it at ceiling level. However, on cloudy days the amount of daylight admitted is less than for a conventional skylight with a larger throat or opening size.

A specularly-reflecting tube is typically used to carry the sunlight downward, with best results being achieved by a silvered lining[1] (highly specularly reflective). Preferably, these light wells should have a visible reflectance of 85% or greater (AS 4285-2007).

Silver rather than aluminium results in the best colour rendition, since silver is a more uniform reflector of all colours in the solar spectrum. This also results in the best colour rendition, since the solar spectrum is not modified much by the progressive reflections the sunlight makes as it passes down the tube.

Diffusers should be fitted to these tubular skylights to eliminate glare and ensure good light distribution.

Customers should seek the manufacturer's recommendations on individual products as the performance characteristics of these products differ considerably.

2.4 Daylighting in buildings

Recent overseas and local experience shows that very large energy savings are possible using daylighting in buildings. Savings on lighting energy translate to reductions in greenhouse gas emissions from power stations. In Australia most electricity comes from coal-fired generators which release, on average, one kilogram of carbon dioxide equivalent (CO_2-e) into the atmosphere for every kilowatt-hour of electricity produced.

The most effective form of daylighting is achieved using correctly specified skylights, because they illuminate from above. Residential buildings present small but collectively significant, opportunities to reduce lighting energy consumption.

Almost every home has a 'dark corner' such as a hallway or other rooms without enough daylight. The conventional solution is to illuminate them with electric light, usually by means of a cheap energy inefficient incandescent globe. Typically in Australia a skylight

[1] Specular reflectivity means that rays of light are reflected without deviation or scattering. In contrast to diffuse reflectivity where transmitted rays are scattered over a wide range of angles within the light well.

representing 5 percent of the floor area of the building, and in the case of high-performance tubular skylights even less, will adequately light the required area.

Daylight has many advantages over artificial light - not least being that it is a completely free and unlimited natural resource. Whilst artificial light is at times essential, its provision uses much energy. Therefore reducing the requirement for artificial lighting will dramatically cut energy use and CO_2 emissions.

Delivery of daylight via skylights is quite different from using windows.

For a window to be an effective light source, a good rule of thumb is that outdoor obstructions should be no higher than 25 degrees above the horizon. This is very hard to achieve in many urban environments or where large trees are close by. A corollary is that areas of the room with no view of the sky have a low level of daylight, particularly if the walls are dark. A skylight's roof glazing faces the sky and is potentially, a far superior source of natural light compared with windows.

Daylight is free…why not use it?

3. WERS for Skylights

The skylight module of the Window Energy Rating Scheme (WERS) is known as WERS for Skylights (WERfS). WERfS is due for release later in 2009. It provides a compatible, yet distinct, system for the energy rating of skylights. The scheme takes account of key differences between the energy performance of windows and skylights and the differing responses of buildings to these fenestration products.

To ensure this performance advantage is realised a rigorous process is being developed to assist end users and specifiers with the selection, sizing and spacing of the overhead glazing elements in a room. The scheme is called WERS for Skylights (the Skylight Energy Rating Scheme) and is an extension of the Window Energy Rating Scheme (WERS).

WERS for Skylights generates data for specific, custom product ratings to assess compliance with BCA (Building Code of Australia) and also for use in AccuRate. The latter is the new CSIRO-developed energy rating software tool for residential buildings. AccuRate is the reference tool of the Nationwide House Energy Rating Scheme (NatHERS). The provision of product data to AccuRate allows manufactured skylights to be included in house energy ratings by designers and accredited HERS assessors.

WERS for Skylights provides comparative values for skylight systems for:

- U-value (thermal transmittance) [2]
- Solar heat gain coefficient (SHGC) [3]
- Visible transmittance (VT)
- Luminous efficacy (k_e = VT/SHGC) - the 'cool daylight' rating

WERS for Skylights is designed to cater for the following categories of manufactured skylight products:

- roof windows, without a shaft (light well);
- moulded polymer glazed skylights (subject to approximations), with or without a shaft;
- tubular skylights

WERS for Skylights is not specifically designed for very large skylights, atria, conservatories or sunspaces. In such cases, some WERS for Skylights algorithms may be applicable but these should be assessed on a case-by-case basis. Also excluded are tubular products having concentrating mirrors or lenses, and roof windows having a shaft.

[2] ***U-value***: Rate of heat flow through a window or other building element, driven by a temperature difference across the element. Measured as heat flow per unit area, per degree of temperature difference, W/m^2.K. Also called the thermal transmittance, overall heat transfer coefficient or U-factor.

[3] ***SHGC***: Solar heat gain coefficient - the total solar heat gain divided by exterior solar irradiance. Composed of the solar direct transmittance plus the inward-flowing fraction of absorbed solar energy that is re-radiated, conducted, or convected into the space. Also known as g-value (European usage).

4. Design and selection

4.1 Overview

Careful attention to the design and selection of skylights is important as this will save energy, help to avoid problems and ensure a pleasing result for your living or working environment. The following factors should be considered to ensure the end result achieves light levels amenable to a safe and happy environment and the full potential of the product is realised.

When deciding on the type of skylight consideration should be given to relevant state, territory and local authority requirements.

Typically most of the statutory requirements are detailed in the Building Code of Australia (BCA). Assistance with the requirements of the BCA can be obtained from your local council building department.

Effective skylight design can be based on empirical information derived from past successful installations, making due allowance for the deviation of the parameters of the new installation under consideration, such as,

a. WERS for Skylights (Refer Section 3 of this Industry Code of Practice)
b. The size of the area to be lit
c. Ventilation Requirements
d. Fire Protection
e. Structural Considerations
f. The geometry of the shaft and shaft lining materials
g. Aspect and shielding of the skylight
h. Glazing and diffuser material
i. Colour and reflectivity of walls, flooring, furnishings and ceiling
j. Visual comfort
k. Light distribution

The parameters (other than the actual area to be lit), in the absence of measured data can be estimated and allowance made. The allowance can be generous as overestimation of required size is preferable and the associated cost increase will in most situations be very minimal. This approach will ensure success.

The more rigorous alternative is dependant on the availability of measurements and data to determine the physical parameters relating to the skylight installation including room served, orientation, location, product preference and the like in order to define the exact characteristics of the installation.

The reader who desires or needs a more scientifically based treatment is referred to “Skylight Handbook design guidelines” of the American Architectural Manufacturers Association. This publication provides a more detailed analysis of the subject.

4.2 Sizing for adequate light

Sizing of a skylight is dependant on the level of illumination required and general guidance can be obtained from AS 4285 – SKYLIGHTS, Appendix D Table D1 Skylight Selection.

This Table, (included in this document under Appendix B), provides guidance for average installations under average related conditions. It also assumes that some other form of lighting, such as borrowed light from a window, contribute to the overall result in the living areas for a satisfactory result.

The figures provided should be adjusted to fine tune the specific installation for optimum results. The sizes or numbers recommended in the Table should be adjusted upwards for:

a. Roof Aspect

b. Longer shafts

c. Low reflectivity shaft surfaces such as timber

d. Glazings that may be shielded by trees or structures

e. Low reflectivity wall surfaces and furnishings

f. Low sun angles in Southern areas

g. Extra high level of illumination requirements

The sizes or numbers in the Table can be adjusted downwards for:

a. Rooms where adequate general level of lighting exists and supplementary light is required only in a specific spot such as a work surface.

b. Rooms where low level of lighting is adequate, such as storerooms walk in robes etc.

In general terms, the area of daylighting found to provide adequate lighting levels is related to the floor area of the room and ranges from about 5 percent in the tropics to above 10 percent of the floor area in the southern parts of Australia.

(Note: At the time of publishing this Industry Code of Practice (ICP) in June 2009, a SIA proposal to vary the minimum floor area ratios downwards, has been accepted by the ABCB for inclusion in the BCA 2010)

With the aid of good ventilation, air conditioning or variable shading these areas can be increased substantially for excellent results and many examples exists particularly in commercial situations.

Generally it is better to have a more light than not enough as adequate levels of natural lighting will be provided over longer periods of the day reducing the need for artificial lighting. In addition the internal environment of the building will be enhanced as the added brightness is conducive to a feeling of well being and the eye will easily adjust to compensate for the conditions unless the level is grossly excessive.

4.3 Ventilation requirements

The BCA has requirements for ventilation in both commercial and domestic buildings. In some instances local authorities may also have requirements. These provisions should be considered and adopted as necessary when selecting the appropriate sized roof lights.

Skylights provide an important option in achieving compliance with the BCA ventilation provisions.

Passive ventilation in permanently ventilated skylights is provided by fixed openings built into the structure of the unit, or the skylight can be the operable (manual or electric) type or by the combination of the two methods.

Active ventilation is available by the inclusion of fans into the dome of the skylight, the diffuser at ceiling level or as built into the structure of the skylight at ceiling or roof level.

Some manufacturers include into their range skylights ventilation assisted by rotary ventilators. The manufacturers provide information on the passive free ventilation areas and performance figures of the fans to enable selection to meet the requirements of the BCA.

4.4 Fire protection

Fire separation for buildings as detailed in the BCA should be considered when planning placement of skylights. The BCA places limitations on the location of skylights near property boundaries and adjacent adjoining buildings to reduce the likelihood of fire spread between buildings. Generally the provisions are based on nominated distances from the fire source feature. This distance will vary depending on the type of building.

Compliance with the BCA requirements can usually be achieved by the use of non combustible skylights, fire rated light shafts or fire dampers if the skylight encroaches into the specified distance.

Some skylights will be installed in bushfire areas. The BCA and local government town planning departments may have requirements for these skylights. Generally for bushfire protection, compliance with AS3959 – Construction of Buildings in Bush Fire Prone Areas, is required. Skylights used in bushfire areas are usually required to be fire resistant and the ventilation areas must be protected with a wire mesh to stop the ingress of embers.

4.5 Structural considerations

The selection of the size or shape of the skylights should give due regard to the location of the structural elements of the building in the area where the skylight is to be installed. Alterations to the roof structure, where needed, should be done in accordance with the BCA. Once again advice on the BCA requirements can be obtained from the local government building department.

In the case of larger skylights adequate provisions should be made to accommodate the size and load of the skylight during the initial design to avoid expensive structural modifications at the time of installation. Most manufacturers consulted at the design stage will provide the necessary information about the support details required.

In domestic truss roof construction, the truss cannot be cut without strengthening of the adjoining trusses to the manufacturer's recommendation. In all cases it is essential that roof penetrations are designed to minimise the impact on the roof structure.

4.6 Location of skylights

The skylight should be located on the roof in such a manner that it is clear of overhanging trees and depending on aspect, is configured to meet lighting requirements of the room. They should also be located clear of obstructions including hips, valleys, air conditioning, vent pipes , solar hot water service etc.

As skylights do not rely on direct sunlight, but also work well on the ambient light, it is possible to compensate easily for a less than perfect aspect by selecting a larger skylight, flaring the light shaft or varying the glazing material. Selecting a larger sized skylight is generally not overly expensive provided it is from the manufacturer's standard range.

The facing of tubular skylights north is more important for maximum light as it allows the throat to face the sun directly for optimum efficiency. Although some products are not aspect dependent as their throat is horizontal to allow for year round performance.

Where there are difficulties in achieving optimum orientation, some manufacturer's products provide assistance to the collection of light from non-optimum orientation by the incorporation in their designs reflective or prismatic elements.

Another issue to consider when selecting the location of the skylight is to ensure the roof space is inspected. Inspection of the roof space before determining of the final location of the skylight and the opening of the ceiling will avoid expensive relocation of the services such as electrical wiring, plumbing or air conditioning.

As with any building work, co-ordination of the work with other trades is a must prior to commencement of any installation work to avoid unnecessary costs.

4.7 Shaft materials

The materials used for light shafts are many and varied depending on the effects required to be achieved and the geographic area where they are used.

The skylight shaft should be a secure and sealed structure that transmits light from the glazing down to the intended area within the building.

The reflectivity of the light shaft surface should be considered as part of the total performance of the system, as some light is lost whenever the light rays are reflected from the surface.

Generally skylights with larger cross sections will use diffuse reflective light wells (typically white) and those with relatively small cross sections use specular reflective (mirror like) lightwells.

5. Installation

The pages that follow provide typical methods on installing a skylight unit into a roof.

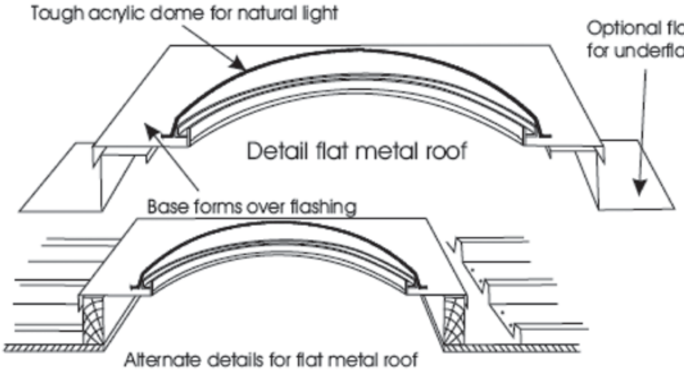
They are intended as examples only, providing basic information and techniques to achieve a successful outcome and complement accepted practice. It is important that the requirements are read in conjunction with any relevant legislative requirements such as the BCA and roof plumbing regulations especially as the statutory requirements will take precedence over the suggestions in this Code of Practice.

The Skylight Industry Association strongly recommends that skylight installations should only be carried out by qualified and suitably licensed tradespeople who are also experienced in skylight installations.

Purchasers of skylight products should always seek advice from the original manufacturer or product reseller, prior to commencing any skylight installation activities so that the scope of obligations and procedures are fully understood.

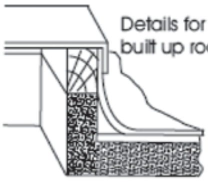
Unflashed Steel Deck Tubelight

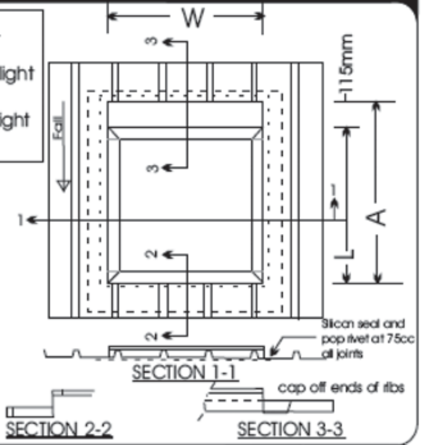
INSTALLATION INSTRUCTION SHEET



CUTOUT SIZES TABLE

L = Length of tubelight base down roof.
W = Width of tubelight base across roof.

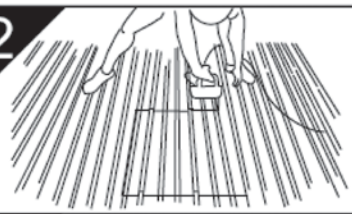




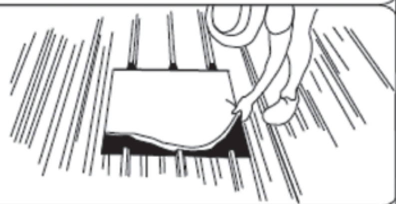
Raw edges of components of Regent Tubelights and cut edges of roofing iron are sharp. Care must be exercised to avoid injury during installation.

1 Locate and mark position of tubelight on ceiling. Break small opening and inspect roof space for obstructions. Check that work is clear of electrical and other hazards. Mark position of centre of tubelight by drilling through roof sheet. Mark internal size and position of tubelight and use as set out line on roof sheet. Mark on outside a line parallel to set out line with 70mm allowance for each flashing. Allow 115mm for soaker tray at top.

2 Cut out opening in roof sheet using power nibbler or tin snips. Do not use disc saw. Take care not to cut electrical flex. Remove all swarf.

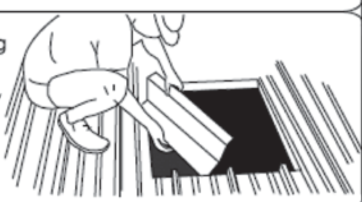


3 Remove insulation.

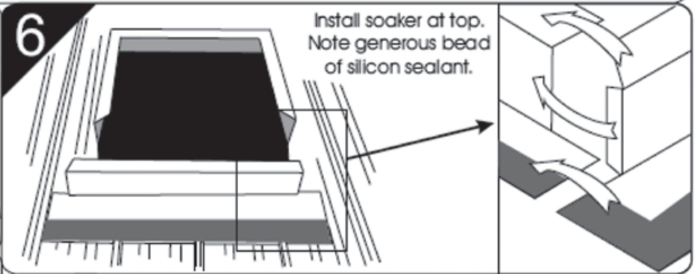


4 Prepare ends of flashing kit to form lapped mitre corners on top and allow for laps on sides.

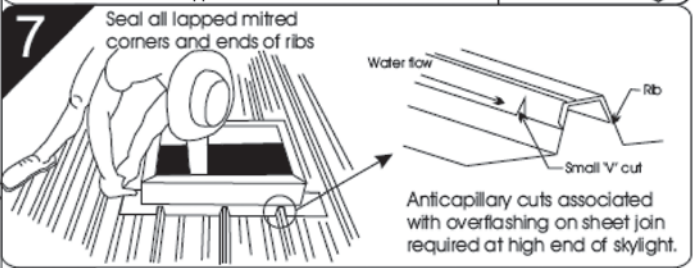
5 Install flashing kit into opening using generous beads of silicon sealant at all overlapping sections, pop rivet at 75mm centres along length of pan and at least 3 pop rivets across pan.



6 Install soaker at top. Note generous bead of silicon sealant.



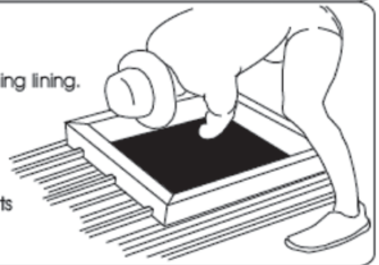
7 Seal all lapped mitred corners and ends of ribs



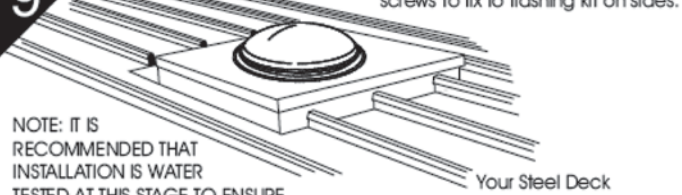
Anticapillary cuts associated with overflashing on sheet join required at high end of skylight.

8 Cut out ceiling joists and ceiling lining.

Note: Before cutting ceiling joists, ensure adequate structural supports are provided.



9 Fit tubelight base. Pop rivet or use self-tapping screws to fix to flashing kit on sides.



NOTE: IT IS RECOMMENDED THAT INSTALLATION IS WATER TESTED AT THIS STAGE TO ENSURE THAT ALL JOINTS WERE ADEQUATELY SEALED.

Your Steel Deck Tubelight is complete.

The product described herein is protected by one or more of the following: Australian Patent Nos 688444, 686419 and 712432: Australian Registered Design Nos 127024, 118780 and 107995.

They are intended as providing basic information and techniques, and by no means overrule any existing Roof Plumbing Regulations or Accepted Practices.
The Skylight Industry Association strongly recommends that Skylight Installations should only be carried out by qualified and suitably Licenced Tradespeople who are also experienced in Skylight Installations.
Purchasers of Skylight Products should always seek advice from the Original Manufacturer or product Reseller, prior to commencing any skylight installation activities.
It is the responsibility of the user to ensure that the selected skylight system complies with the relevant building codes and authorities requirements.

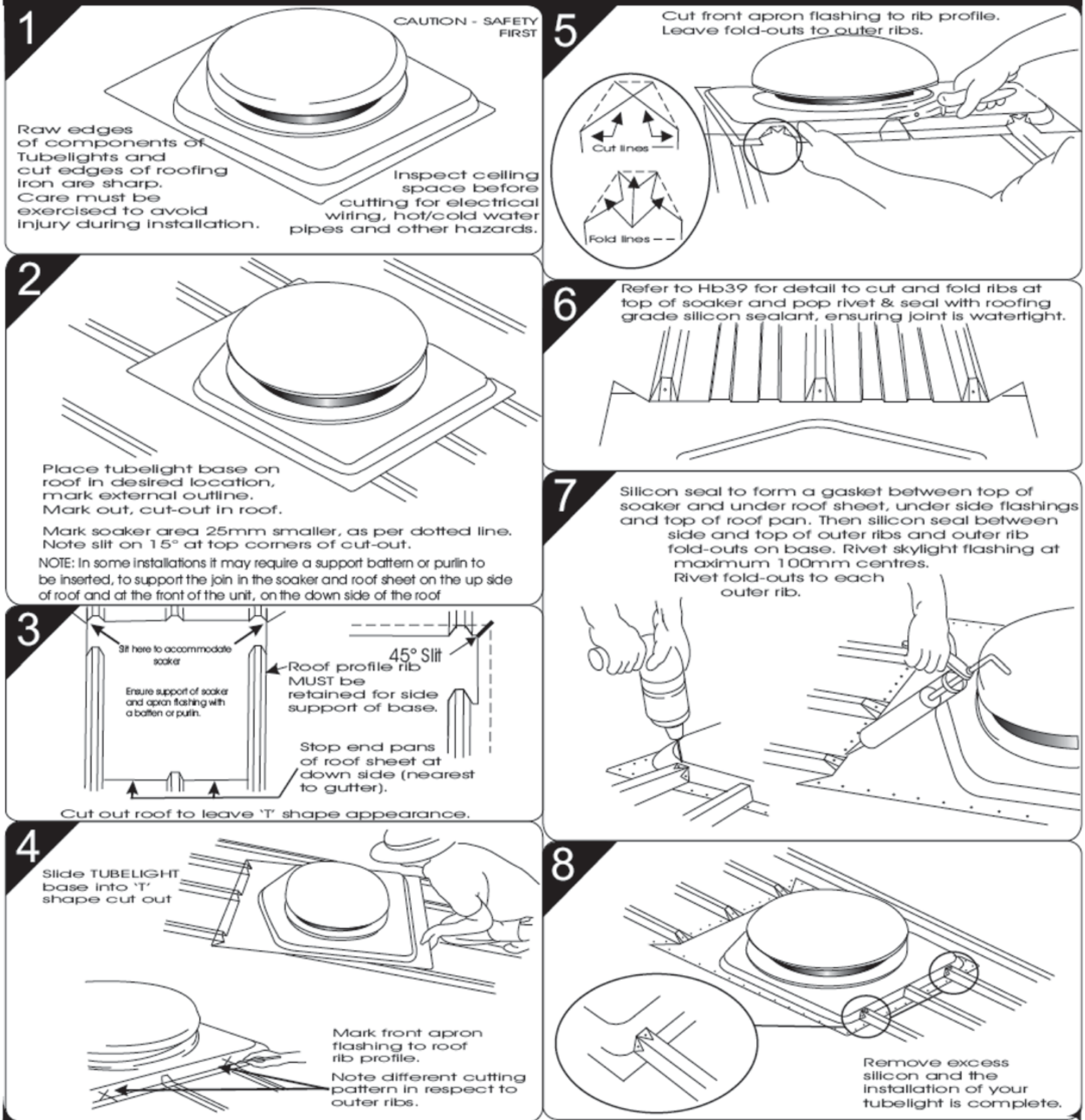
Skylight Industry Association

SKYLIGHT INDUSTRY ASSOCIATION INC.

Universal* Steel Deck Tubelight

* FITS MOST DECK ROOF PROFILES

INSTALLATION INSTRUCTION SHEET



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Skylight Industry Association

SKYLIGHT INDUSTRY ASSOCIATION INC.

Lead-Free Tile Tubelight

* FITS MOST TILE ROOF PROFILES

* Adaptors are supplied on request for Wunderlich Swiss and similar high profile tiles.

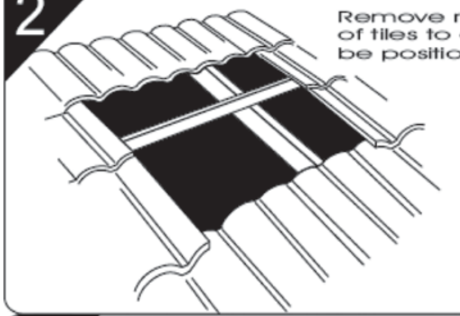
INSTALLATION INSTRUCTION SHEET

1

Raw edges of components of Tubelights and cut edges of roofing iron are sharp. Care must be exercised to avoid injury during installation.

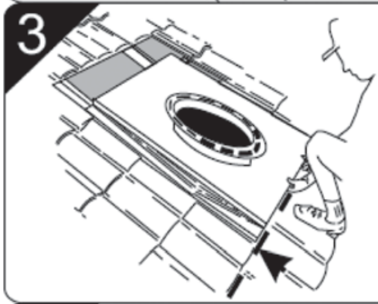
REVERSE SIDE FLASHING BEFORE INSTALLATION

2



Remove required amount of tiles to allow base to be positioned correctly.

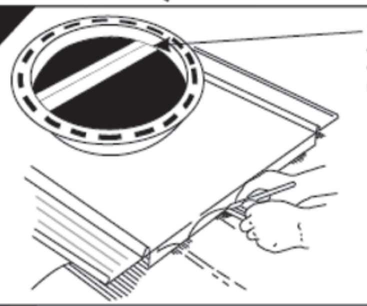
3



Place base in position, making sure the front apron is in line with the tile row.

NOTE:
Alignment of front of skylight is important for correct appearance.

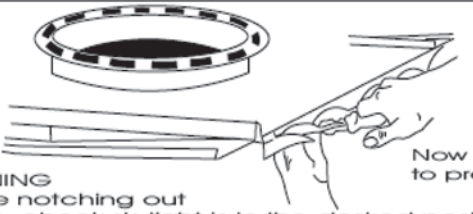
4



Mark batten in way of tube and saw off section not required.

Mark front apron to tile profile using a small piece of timber to follow the profile shape.

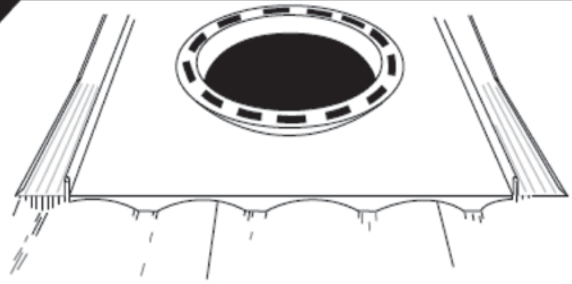
5



Now notch to profile.

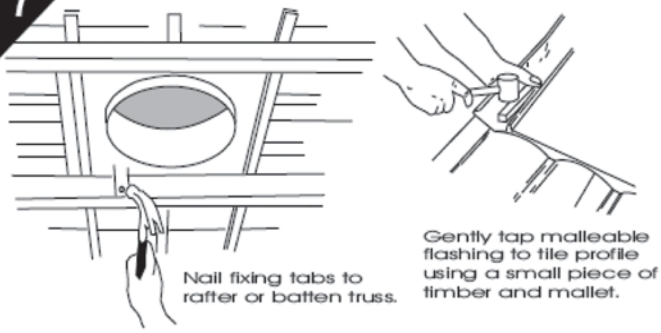
WARNING
Before notching out profile, check skylight is in the desired position, as once notching is completed, the unit cannot be moved sideways.

6



Make sure front apron is in line with tile fronts before proceeding. Base should now be in position, with profile correct.

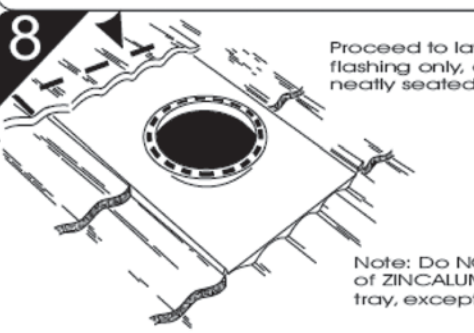
7



Nail fixing tabs to rafter or batten truss.

Gently tap malleable flashing to tile profile using a small piece of timber and mallet.

8



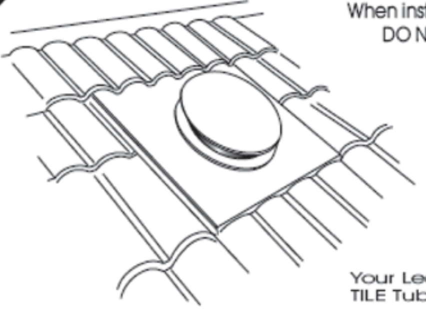
Proceed to lay tile over side flashing only, ensuring tiles are neatly seated against tray.

Cut out battens to leave clear opening.

Note: Do NOT lay tiles over top of ZINCALUME steel flashing tray, except at rear of skylignt.

9

When installing tubelight dome, DO NOT overtighten screws.



Your Lead-Free TILE Tubelight is complete.

The product described herein is protected by one or more of the following: Australian Patent Nos 688444, 686419 and 712432: Australian Registered Design Nos 127024, 118780 and 107995.

They are intended as providing basic information and techniques, and by no means overrule any existing Roof Plumbing Regulations or Accepted Practices.
The Skylight Industry Association strongly recommends that Skylight Installations should only be carried out by qualified and suitably Licenced Tradespeople who are also experienced in Skylight Installations.
Purchasers of Skylight Products should always seek advice from the Original Manufacturer or product Reseller, prior to commencing any skylight installation activities.
It is the responsibility of the user to ensure that the selected skylight system complies with the relevant building codes and authorities requirements.

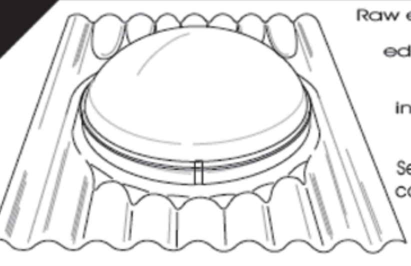
Skylight Industry Association

SKYLIGHT INDUSTRY ASSOCIATION INC.

CORROLUX™ CORRUGATED IRON TUBELIGHT

INSTALLATION INSTRUCTION SHEET

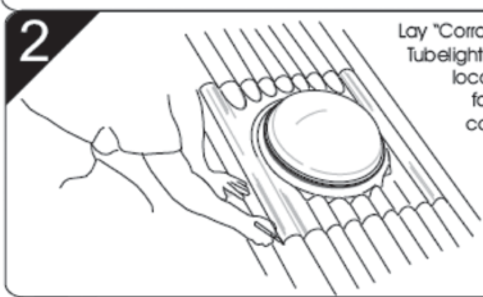
1



Raw edges of components of Tubelights and cut edges of roofing iron are sharp. Care must be exercised to avoid injury during installation.

Select location of "Corrolux" corrugated iron tubelight on roof clear of obstruction, rafters and battens.

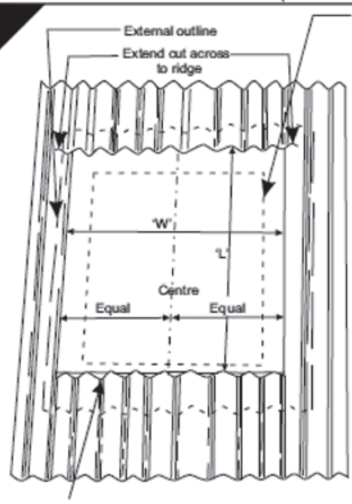
2



Lay "Corrolux" Corrugated Iron Tubelight onto roof at desired location with soaker tray facing ridge, ensuring correct alignment with corrugations. Mark roof along outside edges of base.

Mark cutout using chart in Step 3.

3



Turn up bottom of corrugations on low end of cutout.

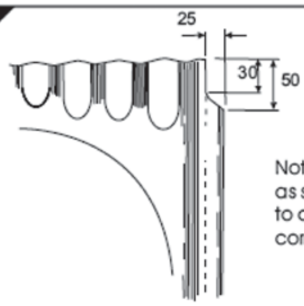
SET OUT DIAGRAM

Model size	'W'	'L'
300	532 square	
400		
500	700	840

Cut out roof to set out diagram using nibblers or tin snips. Cutting by abrasive discs not recommended.

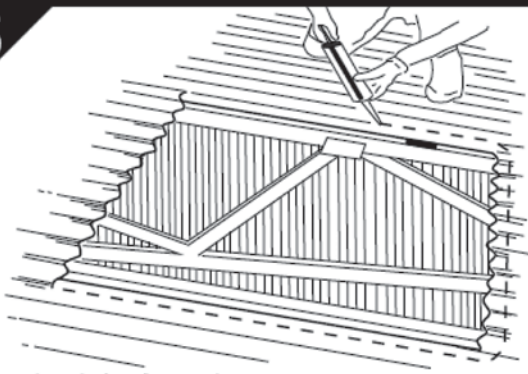
Ensure that the cuts along the sides are on the bottom of corrugations.

4



Notch TWO upper corners as shown (Roof ridge end of base), to allow flashing to slip under corrugated iron roof.

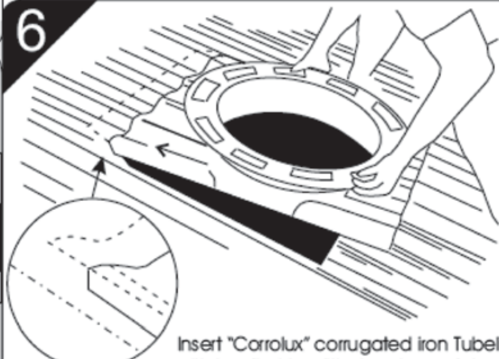
5



Place bead of roofing grade silicone sealant along top of skylight (ridge side) only, this will provide sealing between underside of roof and skylight as shown in step 6.

Spread silicone sealant on roof sheet along both sides and bottom (gutter) edge within the confines of the external outline marked in step 3.

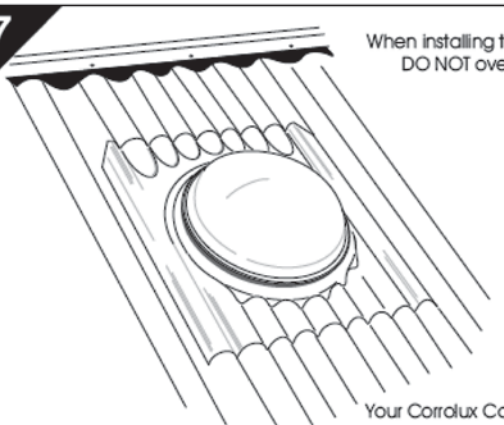
6



Insert "Corrolux" corrugated iron Tubelight into opening with top flashing fitted under roof sheet. Fix through each ridge, top and bottom, and ridge corrugation down each side. Rivets at approximate 300mm centres.

7

When installing tubelight dome, DO NOT overtighten screws.



Your Corrolux Corrugated Iron Tubelight is complete.

Skylight Industry Association

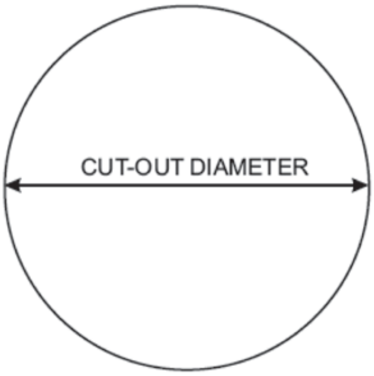
SKYLIGHT INDUSTRY ASSOCIATION INC.

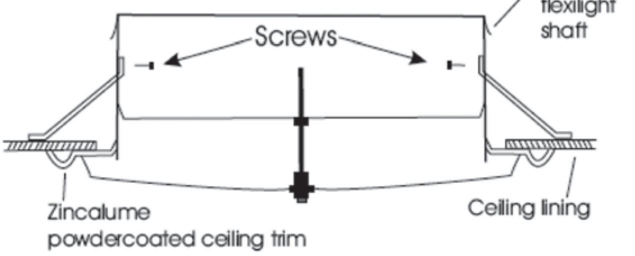
Tubelight Ceiling Trim & Diffuser

INSTALLATION INSTRUCTION SHEET

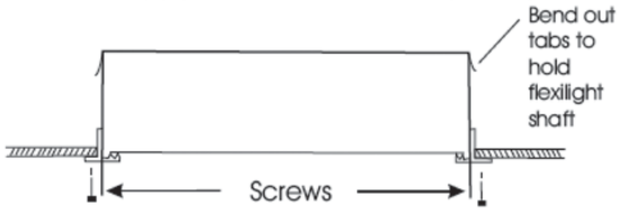
CEILING TRIM CUT-OUT DETAILS

TUBELIGHT DIAMETER	VENTING/ NON-VENTING	CEILING CUT-OUT DIAMETER
300mm	NON-VENTING ADJUSTABLE VENTING	315 300
400mm	NON-VENTING ADJUSTABLE VENTING	415 400
500mm	NON-VENTING ADJUSTABLE VENTING	515 500



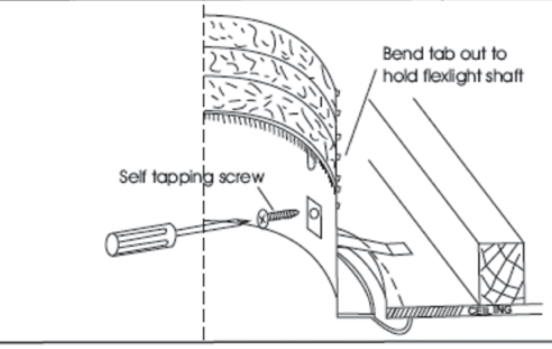


ADJUSTABLE VENTED MODELS

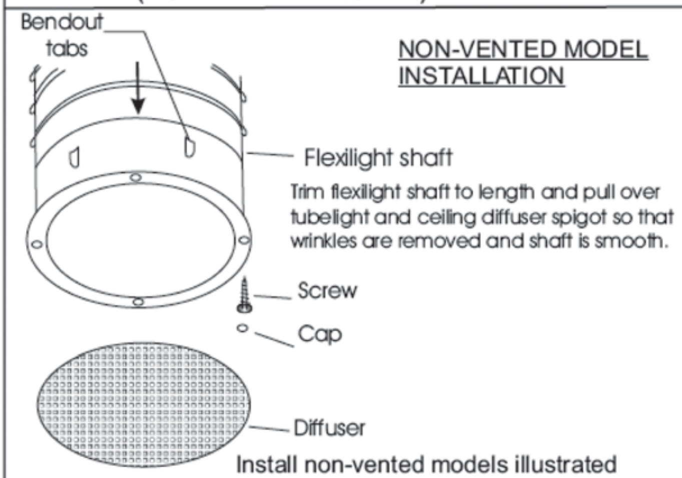


NON-VENTED MODELS

TUBELIGHT CEILING TRIM FIXING DETAIL (ADJUSTABLE VENT MODELS)



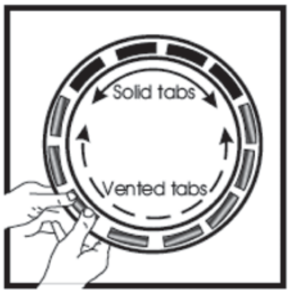
TUBELIGHT CEILING TRIM FIXING DETAIL (NON-VENTED MODEL)



Install non-vented models illustrated above with diffuser

VENTILATION / INSECT TAB INSTALLATION INSTRUCTIONS

(for VENTILATING tubelights only)



If venting tabs not already installed, remove dome from tubelight.

Insert SOLID tabs into soaker side of tubelight. Insert vented tabs into lower (gutter) side of tubelight.

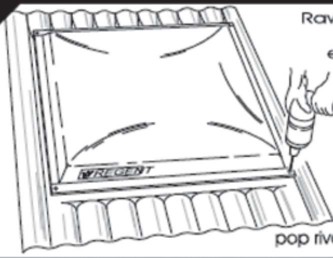
Skylight Industry Association

SKYLIGHT INDUSTRY ASSOCIATION INC.

CORROLUX™ CORRUGATED IRON SKYLIGHT

INSTALLATION INSTRUCTION SHEET

1



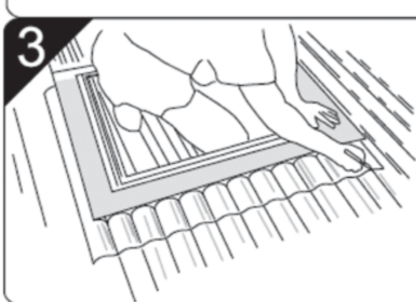
Raw edges of components of Skylights and cut edges of roofing iron are sharp. Care must be exercised to avoid injury during installation.

Remove dome glazing from skylight base by drilling out pop rivets, from trim glazing section.

2

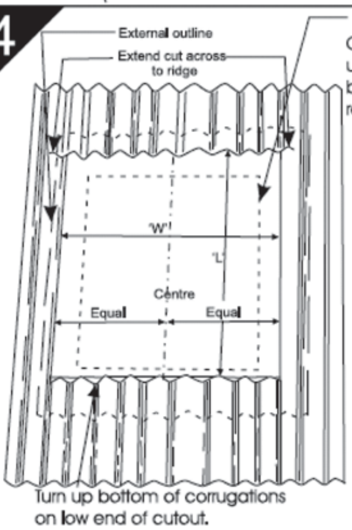
Remove roofing screws over area where skylight is to be installed.

3



Lay "Corrolux" Corrugated Iron Skylight onto roof at desired location with soaker tray facing ridge, ensuring correct alignment with corrugations. Mark along roof, inside and outside edges of base.

4



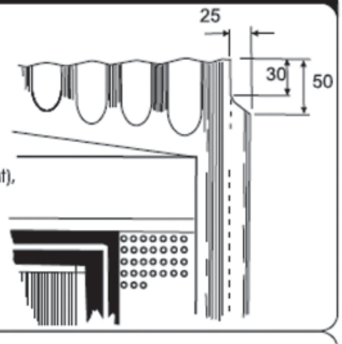
Cut out roof to set out diagram using nibblers or tin snips. Cutting by abrasive discs not recommended.

SET OUT DIAGRAM

Model size	'W'	'L'
500X500	700mm	710mm
500X800	700	1010
500X1200	700	1410
600X600	860	810
600X800	860	1010
600X1200	860	1410
800X800	1010	1010
800X1200	1010	1410

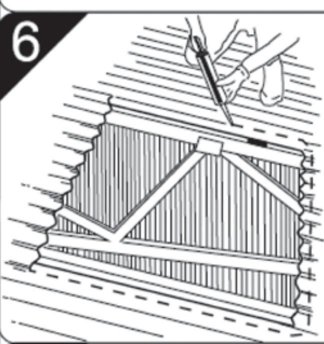
Note: Ensure batten is under top lap to support ends of roofing sheet and skylight soaker tray.

5



Notch TWO upper corners as shown (Roof ridge end of skylight), to allow skylight to slip under corrugated iron roof.

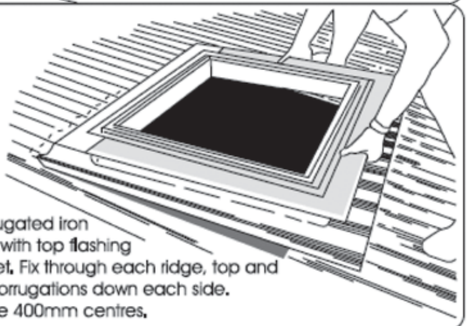
6



Place bead of roofing grade silicone sealant along top of skylight (ridge side) only, this will provide sealing between underside of roof and skylight as shown in step 7.

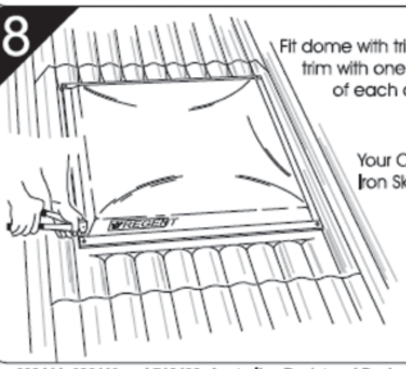
Spread silicone sealant on roof sheet along both sides and bottom (gutter) edge within the confines of the external outline marked in step 4.

7



Insert "Corrolux" corrugated iron skylight into opening with top flashing fitted under roof sheet. Fix through each ridge, top and bottom, and ridge corrugations down each side. Rivets at approximate 400mm centres.

8



Fit dome with trims supplied. Join corners of trim with one pop rivet at the intersection of each corner only. Take care not to fix through acrylic dome.

Your Corrolux Corrugated Iron Skylight is complete.

The product described herein is protected by one or more of the following: Australian Patent Nos 688444, 686419 and 712432: Australian Registered Design Nos 127024, 118780 and 107995.

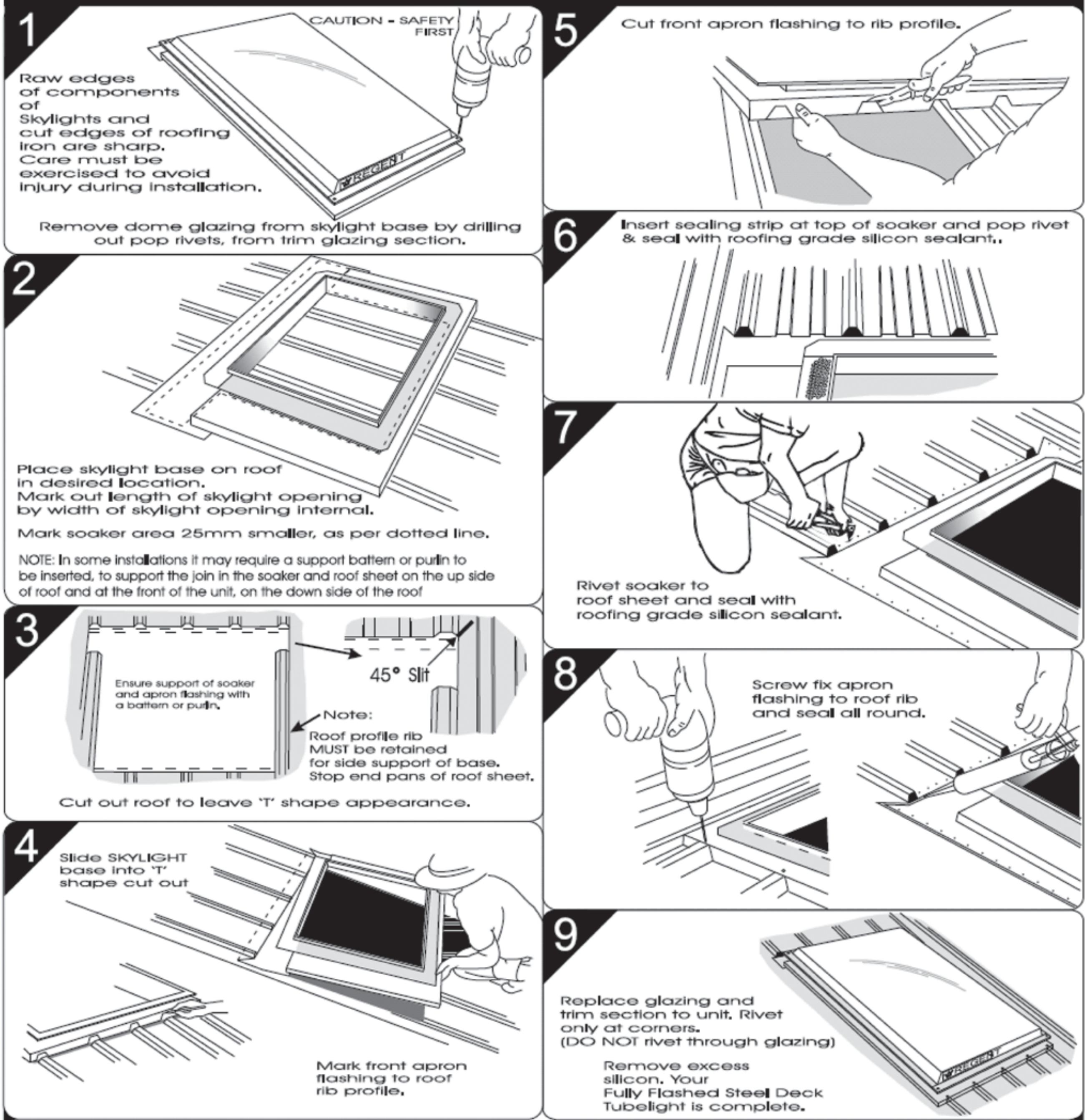
 It is the responsibility of the user to ensure that the selected skylight system complies with the relevant building codes and authorities requirements.

Skylight Industry Association

SKYLIGHT INDUSTRY ASSOCIATION INC.

PRE-FLASHED STEEL DECK SKYLIGHT

INSTALLATION INSTRUCTION SHEET



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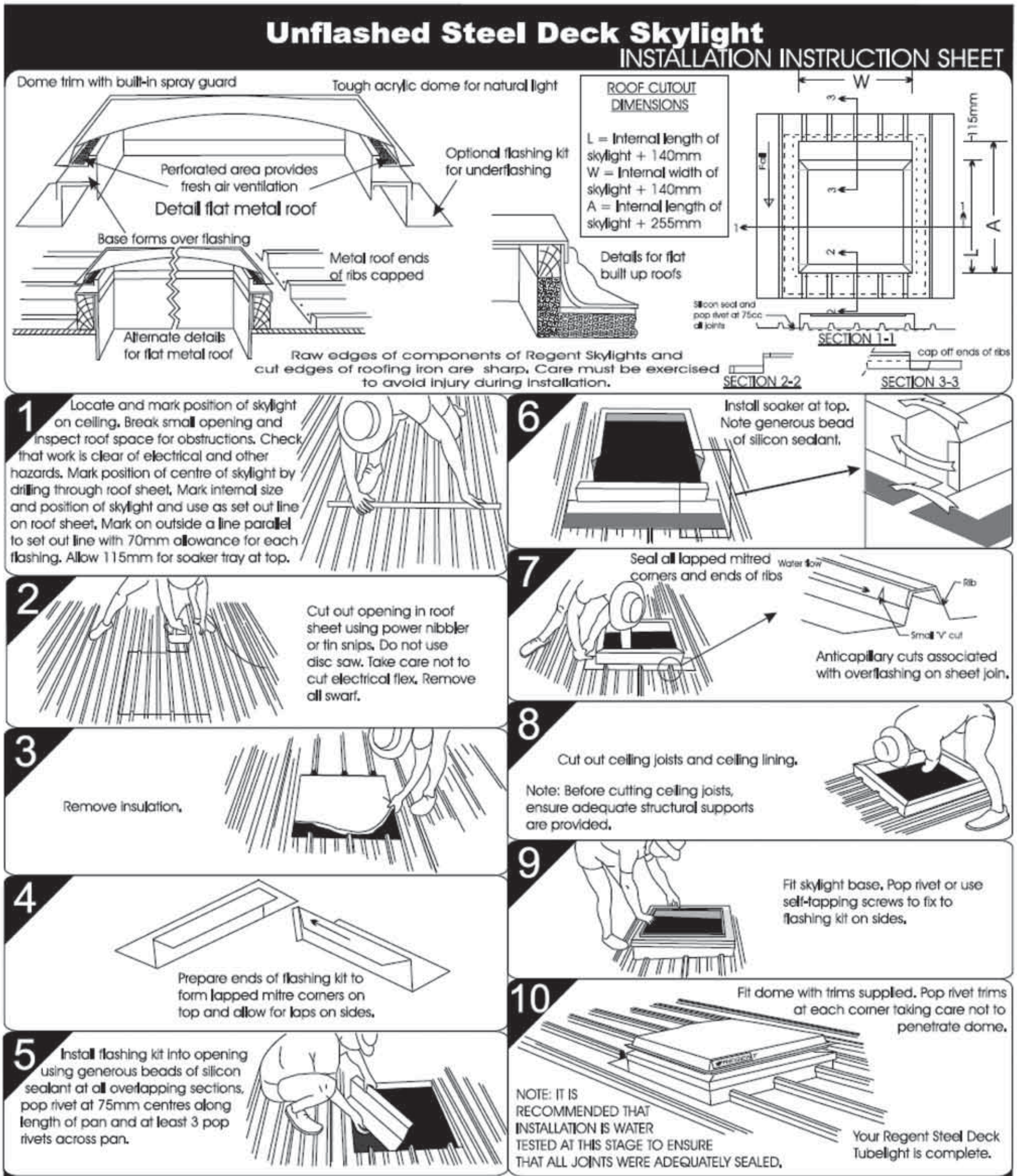
Skylight Industry Association

SKYLIGHT INDUSTRY ASSOCIATION INC.



Skylight Industry Association

SKYLIGHT INDUSTRY ASSOCIATION INC.

Universal* Steel Deck Skylight

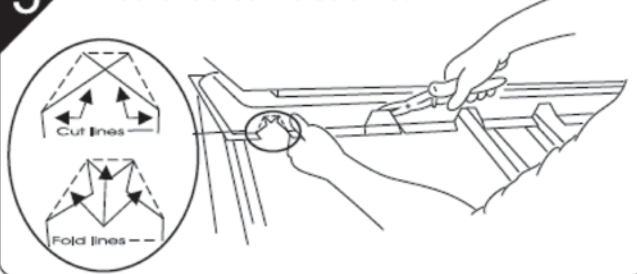
* FITS MOST DECK ROOF PROFILES

INSTALLATION INSTRUCTION SHEET

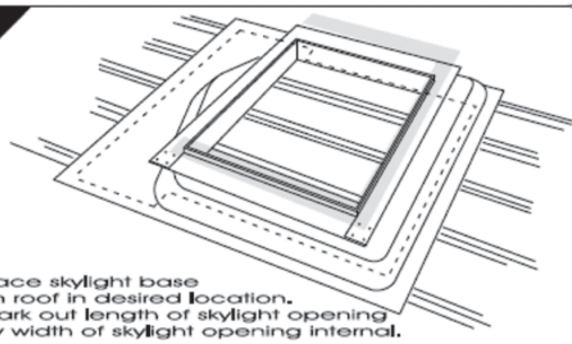
1 Raw edges of components of Skylights and cut edges of roofing iron are sharp. Care must be exercised to avoid injury during installation.

Remove dome glazing from skylight base by drilling out pop rivets, from trim glazing section

5 Cut front apron flashing to rib profile. Leave fold-outs to outer ribs.



2

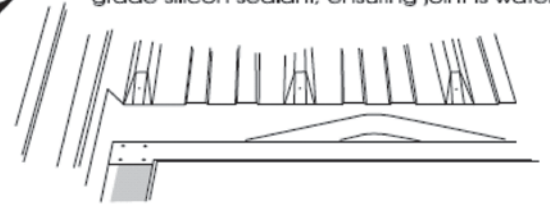


Place skylight base on roof in desired location. Mark out length of skylight opening by width of skylight opening internal.

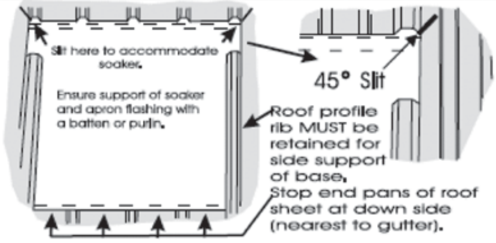
Mark soaker area 25mm smaller, as per dotted line.

NOTE: In some installations it may require a support battern or purlin to be inserted, to support the join in the soaker and roof sheet on the up side of roof and at the front of the unit, on the down side of the roof

6 Refer to HB39 for detail to cut and fold ribs at top of soaker and pop rivet & seal with roofing grade silicon sealant, ensuring joint is watertight.



3

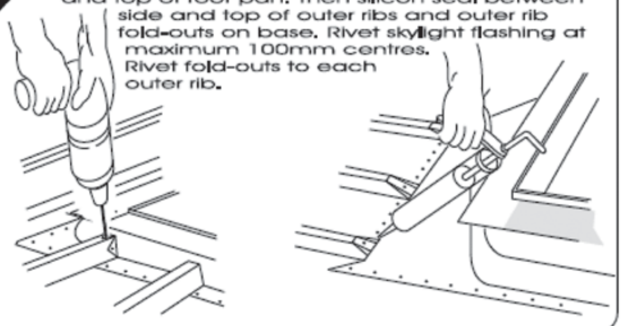


Roof profile rib MUST be retained for side support of base.

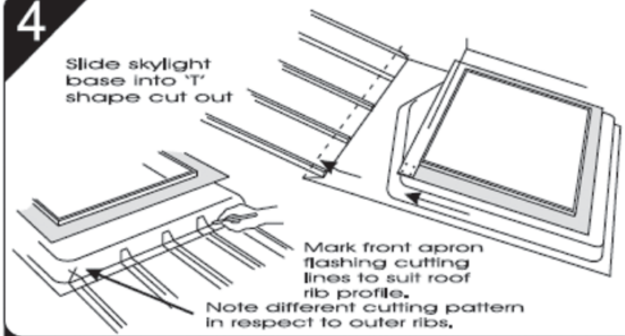
Stop end pans of roof sheet at down side (nearest to gutter).

Cut out roof to leave 'T' shape appearance.

7 Silicon seal to form a gasket between top of soaker and under roof sheet, under side flashings and top of roof pan. Then silicon seal between side and top of outer ribs and outer rib fold-outs on base. Rivet skylight flashing at maximum 100mm centres. Rivet fold-outs to each outer rib.



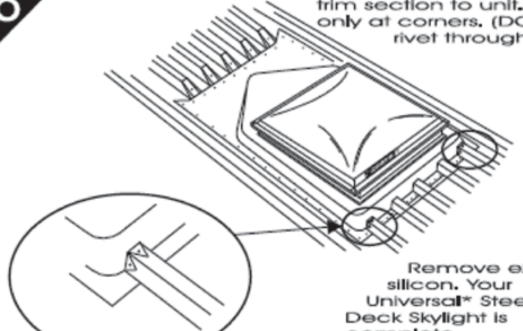
4 Slide skylight base into 'T' shape cut out



Mark front apron flashing cutting lines to suit roof rib profile.

Note different cutting pattern in respect to outer ribs.

8 Replace glazing and trim section to unit. Rivet only at corners. (DO NOT rivet through glazing)



Remove excess silicon. Your Universal* Steel Deck Skylight is complete.

The product described herein is protected by one or more of the following: Australian Patent Nos 688444, 686419 and 712432: Australian Registered Design Nos 127024, 118780 and 107995.

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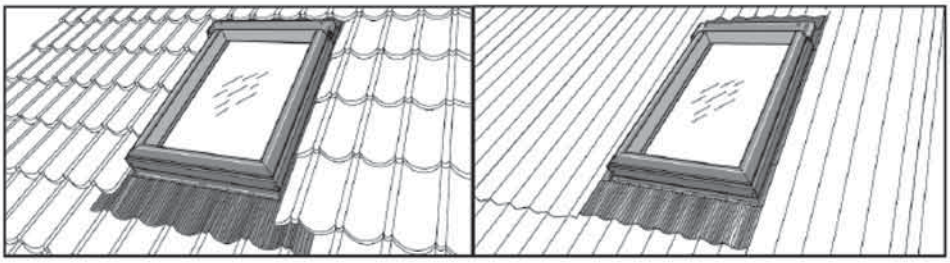
Skylight Industry Association

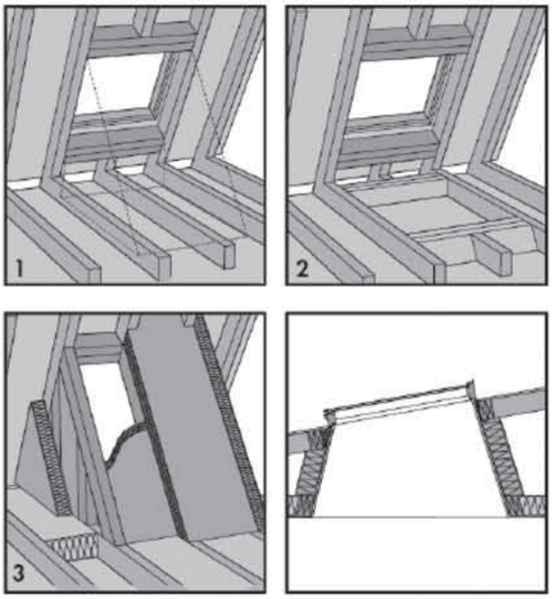
SKYLIGHT INDUSTRY ASSOCIATION INC.

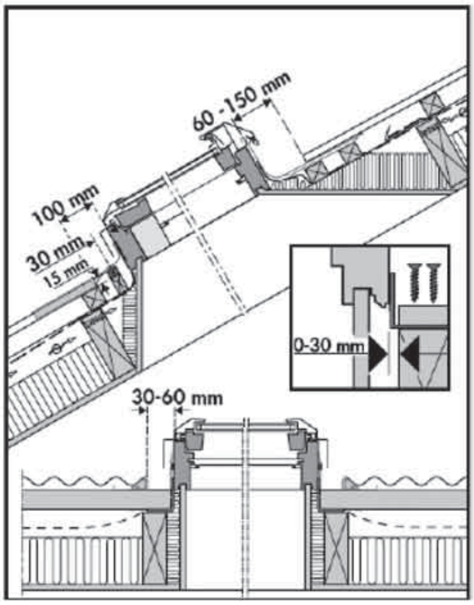
Roof Window Installation For Tile and Metal Roof



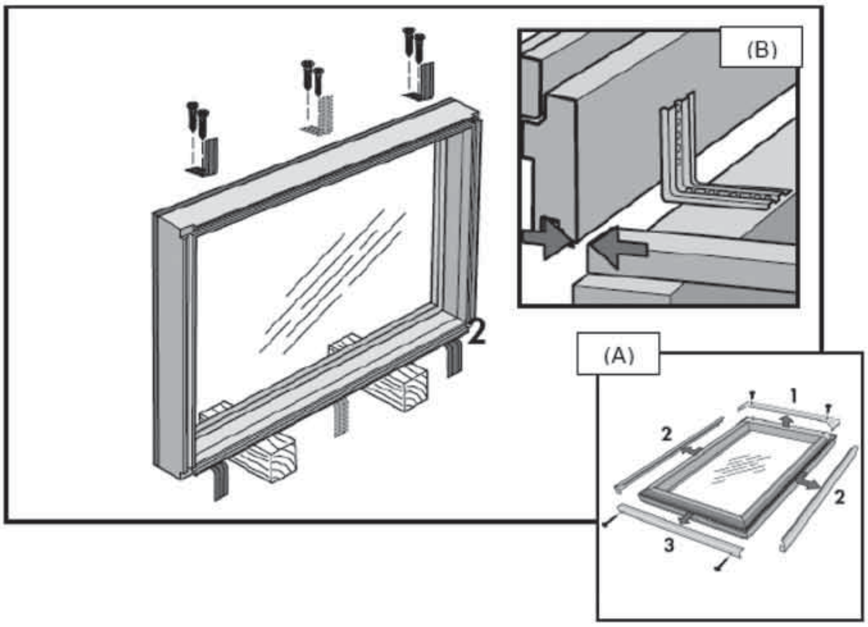
1. Planning your light shaft

Determine the position of the light shaft in relation to the skylight already installed (1). Install trimmers in the ceiling (2), following the procedure used when installing trimmers in the roof.
Frame the light shaft if necessary. Insulate carefully around the light shaft and finish the inside, including vapour barrier etc. (3).





2. Prepare the window

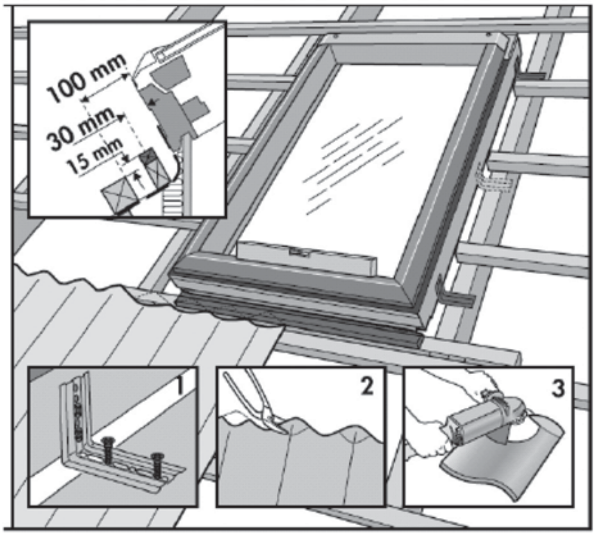


A) Remove aluminium covers

B) Attach mounting brackets -

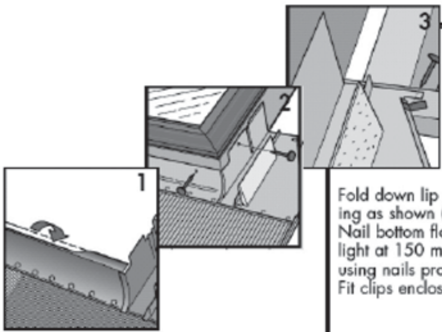
Fix the angle brackets to the frame with two screws, ensuring that they are positioned to rest on the rafters. The bottom of the skylight frame must be level with the top of the batten (1). Some skylight sizes are supplied with six fixing brackets: In these cases position three brackets on each side frame.

3. Mounting the window to the roof

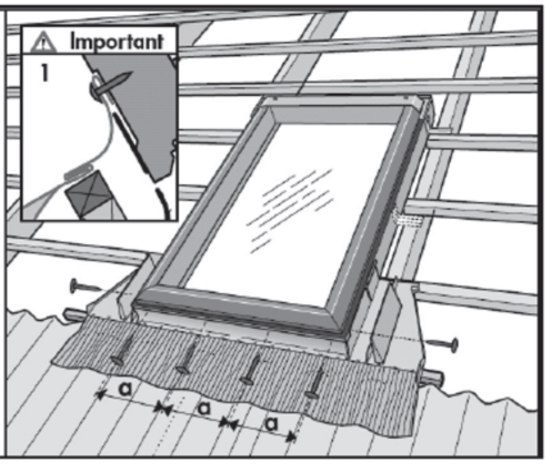


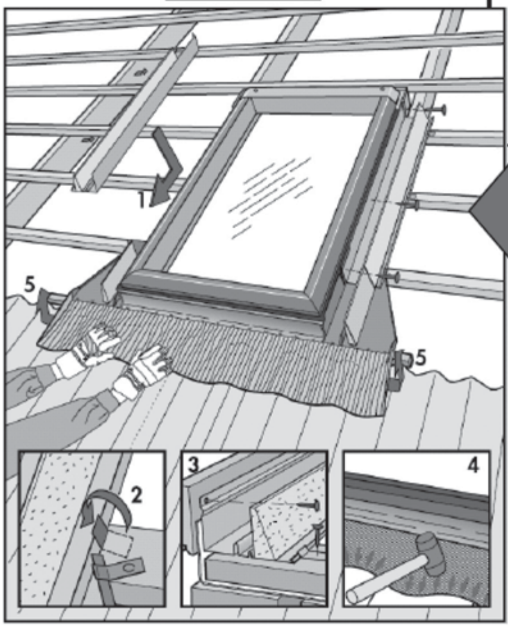
Position skylight on roof and take care to maintain the correct distance from the edge of metal sheet to the bottom of the frame.
For tiles, ensure that the bottom frame is fitted above a complete course of tiles.
Check for level.
Attach each bracket to the rafters with two screws **(1)**.
Metal roof **(2)** or tiles **(3)** should be chamfered if necessary.
Position extra batten 30 mm below the frame to support the bottom flashing section.
Within the width of the skylight only, the supporting batten must be 15 mm higher than the top level of the remaining battens.

4. Flashing



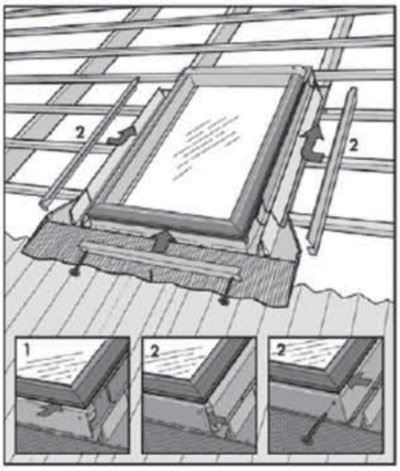
Fold down lip on bottom flashing as shown **(1)**.
Nail bottom flashing to skylight at 150 mm intervals **(a)** using nails provided **(2)**.
Fit clips enclosed **(3)**.



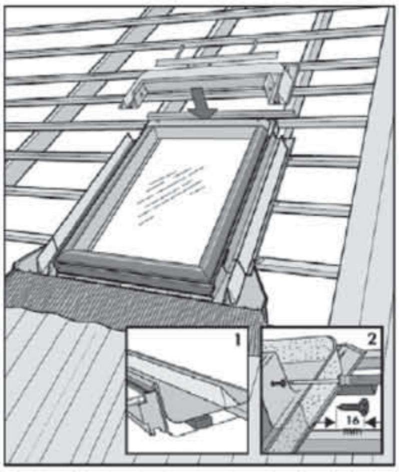


Slide side flashing sections to interlock with bottom section **(1)**, then bend over flap to secure **(2)**. Pin the side sections to frame and to battens with clips **(3)**. Dress bottom flashing section over roofing material to ensure water runs down onto roofing material (make sure to maintain an even slope).
Use rubber hammer to dress down side of flashing apron **(4)**. Make sure to fold flashing apron over to form a water check **(5)**.

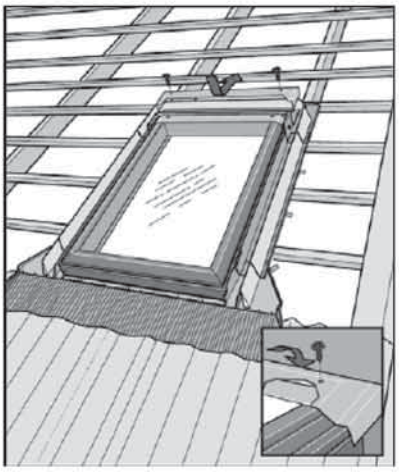
4. Flashing Continued.......



Replace three of the cladding parts starting at the bottom. Interlock side frame claddings with bottom frame cladding as shown. Secure the cladding using the screws supplied with the skylight.



Position extra batten above the skylight to support the top flashing section (1). Fix the top flashing section with screws (2).

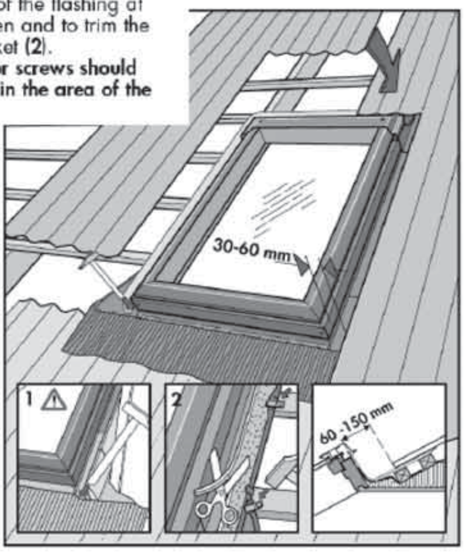


Replace top frame cladding part.

5. Finishing off

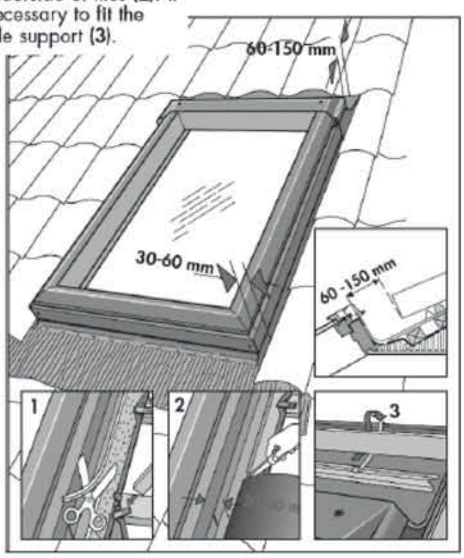
METAL

Fit remaining metal sheet maintaining 30-60 mm distance at sides of frame and 60-150 mm at top.
To allow the metal sheets to lie correctly, it may be necessary: to flatten down the front edge piece of the flashing to the level of the top of the batten from the side frame to the highest seam on the side of the bottom flashing section (1), to bend down the upstand on the edge of the flashing at each batten and to trim the foam gasket (2).
No nails or screws should penetrate in the area of the flashing.



TILES

Position roofing material maintaining 30-60 mm distance at sides of frame and 60-150 mm at top. Cut roofing material if necessary. To allow the tiles to lie correctly, it may be necessary to bend down the upstand on the edge of the flashing at each batten and to trim the foam gasket (1). Slit foam gasket just above each tile to allow gasket to seal against underside of tiles (2). It may be necessary to fit the optional tile support (3).



6. Safety

Workplace health and safety is the responsibility of all parties involved in the building process. The scope of safety practices contained in this Code of Practice is based on basic practical commonsense approaches and is not exhaustive.

There is extensive information on suitable work practices relating to state and territory occupational health and safety requirements in Code's of Practice for safe work on roofs. Most of this information is readily available from the internet.

Of particular relevance to work on roofing is the various regulations governing "Risk of Fall" and these need close and very serious consideration, as contravening any such regulation can involve significant prosecutions and fines.

Therefore the user of this manual must refer to the information provided under state and territory occupational safety legislation to ensure that any legal requirements are satisfied.

However, there are some very basic requirements which need to be noted.

Personal Protection

a. Sun protection, (sunglasses, clothing, sunscreen cream)

b. Eye Protection

c. Suitable Footwear

d. Hearing Protection

e. Gloves

f. Provision of safe access including elimination of trip & slip hazards

Risk of Fall Protection

a. Safety Harness and Fall Arrest Systems

b. Scaffolding

c. Perimeter Guards

d. Secure Ladders

e. Safety mesh

Appendix A Definitions

The following definitions are intended to cover a variety of terms used in the Skylight Industry, not only those used within this Code of Practice.

.55 Zinc	0.55mm Base Metal Thickness "Zincalume" steel sheet
ABCB	abbreviation for Australian Building Codes Board
Acrylic	thermoformable polymer. The technical name is PMMA and is commonly referred to as plastic
AFRC	abbreviation for Australian Fenestration Rating Council
AGO	abbreviation for Australian Greenhouse Office (now known as DEHWA)
All metal hatch	openable metal hatchway fitted into roof covering to allow roof access and egress
Argon	an inert, non-toxic odourless and colourless gas used in insulating glass units to reduce heat transfer
AS1288	Australian Standard AS1288 – Glass in Buildings
AS3959	Australian Standard AS3959 – Construction of Buildings in Bushfire Prone Areas
AS4285	Australian Standard AS4285 – Skylights
Australian Standard	generally refers to publications as issued by Standards Australia
AWA	abbreviation for Australian Window Association
Back flashing	roof flashing between roof penetration and roof hip or ridge, normally used on metal roof applications
Back gutter	gutter flashing arrangement on high side of roof penetration to disperse water, normally used on metal roof applications. Also referred to as Soaker Tray
Base assembly	refers to the roof interface assembly of a skylight
Battens	a wood strip applied over boards or roof structural members; used as a base for the attachment of the external roofing material
BCA	abbreviation for the Building Code of Australia
Bi-metallic reaction	corrosion that occurs between two metals that have differing potentials
Bituminous membrane	tar like material used to seal flat roofs
Bushfire prone area	as defined in AS3959 or local government town planning schemes

CAD drawing	refers to Computer Aided Drafting
Capillary cut	to prevent leaks caused by capillary action
Ceiling frame	frame at interface of skylight shaft and ceiling, sometimes used to support ceiling diffuser
Ceiling ring	see ceiling frame
Cceiling trim	see ceiling frame
CGI	abbreviation for Corrugated Iron roof sheeting
Condensation lip	normally a formed barrier to prevent entry of condensation
Condensation trap	normally a formed gutter or the like to prevent entry of condensation
Corrosion	damage caused to metal surfaces caused by chemical reaction
DEWHA	Department of Environment, Water, Heritage and the Arts (formerly AGO)
Diffuse reflectivity	describes a surface that reflects light in a scattered direction
Diffuser	the panel at the base of a skylight shaft used to spread natural light over the area below
Diverter	used to spread water flow at high end of installation
Dome	moulded polymer external glazing of a Skylight
Dome trims	strips or rings retaining dome to skylight base
Double glazing	two translucent panels with an air space in between
Dry pan flashing	flashing installed to top level of metal roof sheet to prevent water entry to covered pans
Egg crate	generic term for open cell panel used on vented skylights at ceiling level
Energy rating	independent scientific and authorative third party rating of building products
Fire rating	fire resistance rating of products as determined under third party test conditions
Flashed upstand	a raised structure above the roof line to accommodate a roof penetration with adequate flashing
Flashing	waterproofing method around the skylight that maintains the overall watertightness of the roof
Flat panned	Flat flashing to skylight base to facilitate on-site adaptation
Flexible light shaft	generic term used for reflective skylight shaft material
Galvanic reaction	see bi-metallic reaction
Galvanised steel	steel that has a corrosion protective finish
Gyprok	brand name for solid plasterboard

HIA	abbreviation for Housing Industry Association
Hip	part of a roof structure
Hob	see flashed upstand
IGU	abbreviation for Insulated Glass Unit, usually consisting of two layers of glass sealed with an inert gas in between
Impact resistance	the ability of a material to withstand impact without permanent damage
Light shaft	the portion of a skylight installation that connects the throat underside of the skylight to the ceiling material
Light well	see light shaft
Low e	Low-emittance or low- emissivity (Low-E) coating. Microscopically thin, virtually invisible, metal or metallic oxide layers deposited on a glazing surface primarily to reduce the U-factor
Lumens	A unit of measurement of the amount of brightness that comes from a light source
Lux	is the International System metric unit of illumination for measuring the amount of light that falls on an object. The amount of visible light per square metre incident on a surface. Equal to one lumen per square metre
Malthoid	black tar matting
MBA	abbreviation for Master Builders Association
MDF	Medium Density Fibreboard
Melamine	prefinished coating, typically applied to compressed timber board
Metal deck	a metal roof characterized by flat pans & ribs
NFRC	abbreviation for National Fenestration Rating Council (USA)
Opal	generic reference to white opaque translucent coloured materials
Polycarbonate	thermo plastic polymer sheet, extremely high impact and light weight
Polymer	any of numerous natural and synthetic compounds
Pop rivet	mechanical fastening system form of fixing rivet
Prismatic	generic term given to translucent sheet materials with compound prisms to maximise light distribution
Purlins	structural roof frame members
Rafters	structural roof frame members
Reflectivity	the ability to reflect
Roof pitch	otherwise referred to as the fall in the roof

Rooflight	another term for skylight
Roof window	generic term for a flat glazed skylight in either operable or fixed form
Sarking	thin thermally effective material laid directly under roofing materials
Shaft	see light shaft
SHGC	abbreviation for Solar Heat Gain Coefficient
SIA	abbreviation for Skylight Industry Association (Incorporated)
Skylight	factory glazed assembly for the transmission of natural light
Soaker tray	part of factory glazed assembly roof flashing designed to direct and shed water from the high side of the roof around the skylight
Specular reflectivity	describes a surface that reflects light in a forward direction of, resembling, or produced by a mirror
Throat size	open space directly below a skylight glazing
Translucent	material that transmits light but diffuses it sufficiently so that an image cannot be seen through the material clearly
Transparent	material capable of transmitting light so that objects or images can be seen as if there were no intervening material
U Value	a measure of heat transmission through a material
UV resistance	the ability of a material to resist damage due to ultra violet light
Ventilation area	measurement of the area of the open space in a vented skylight
WERS	abbreviation for Window Energy Rating Scheme owned and maintained by the AWA

AS4285 – 2007

SIZE OF SKYLIGHTS

(Informative)

Table D1 refers to skylight sizes commonly available throughout Australia. For practical purposes this table shows them as applied to typical rooms in Australian residential buildings where the skylights are not the only natural source of light. This table is based on many years of industry experience. Other points to be considered when determining the correct skylight size for a room is the aspect of the skylight location on the roof, geographic location within Australia, length, shape and reflectivity of the light shaft and ventilation requirements. Reference should be made to the Building Code of Australia (BCA) or local authority requirements for final selection.

TABLE D1

SKYLIGHTS SELECTION

Room	Approximate room size (m2)	Minimum recommended skylight size
Living/family	17.0	800 × 800 or 2 × 400 mm tubular
Dining	13.0	550 × 550 or 1 × 400 mm tubular
Kitchen	9.5	550 × 550 or 1 × 400 mm tubular
Bathroom main	7.0	550 × 550 or 1 × 400 mm tubular
Bedroom	11.0	550 × 550 or 1 × 400 mm tubular
Bathroom—ensuite	2.5	400 × 400 or 1 × 250 mm tubular
Hallway*	4.0	400 × 400 or 2 × 250 mm tubular
Laundry	3.5	400 × 400 or 1 × 250 mm tubular
Toilet	1.5	400 × 400 or 1 × 250 mm tubular
Walk-in wardrobe	2.0	400 × 400 or 1 × 250 mm tubular
Pantry	2.0	400 × 400 or 1 × 250 mm tubular

* Hallway 1.5 metres wide, exceeding 3.5 metres long one 400 × 400 mm or one 250 mm tube type per 4 m of hallway

** Recommendation based on specular reflectivity for tubular skylights and diffuse for other types.

Appendix C Reference documents

The following Reference Documents are considered as part of the Code of Practice.

AS1288 – Glass in Buildings – Selection and Installation

AS1684 – Residential timber-framed construction standard

AS3959 – Construction of buildings in bushfi re prone areas

AS4285 – Skylights

Building Code of Australia (as published by the Australian Building Codes Board)

WERS for Skylights Operational Manual

American Architectural Manufacturers Association (AAMA) Skylight Manual

NOTES

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