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Performance of Velux glass skylights with respect to the NCC Vol 1 and Vol 2 requirements for non-combustible roof coverings

Advisory Report

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Copyright and disclaimer

Important disclaimer

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1 Description of Proposed Elements

The Proposed construction system comprises:

- VELUX Skylight manual;
- Material sheets numbered FS, A21 FCM, A21 VSS, VS/VSE, V21 GGL, V21 GHL, V22 GGL, and V22 GPL, VSS;
- Material sheet numbered VCM, VCE dated 3 January 2011.

Figure 1. Skylight with solar panel attachment

Figure 2. VCM, VCE skylight

Figure 3. VCS skylight showing solar panel, VSS similar

Figure 4. V22 GGL skylight

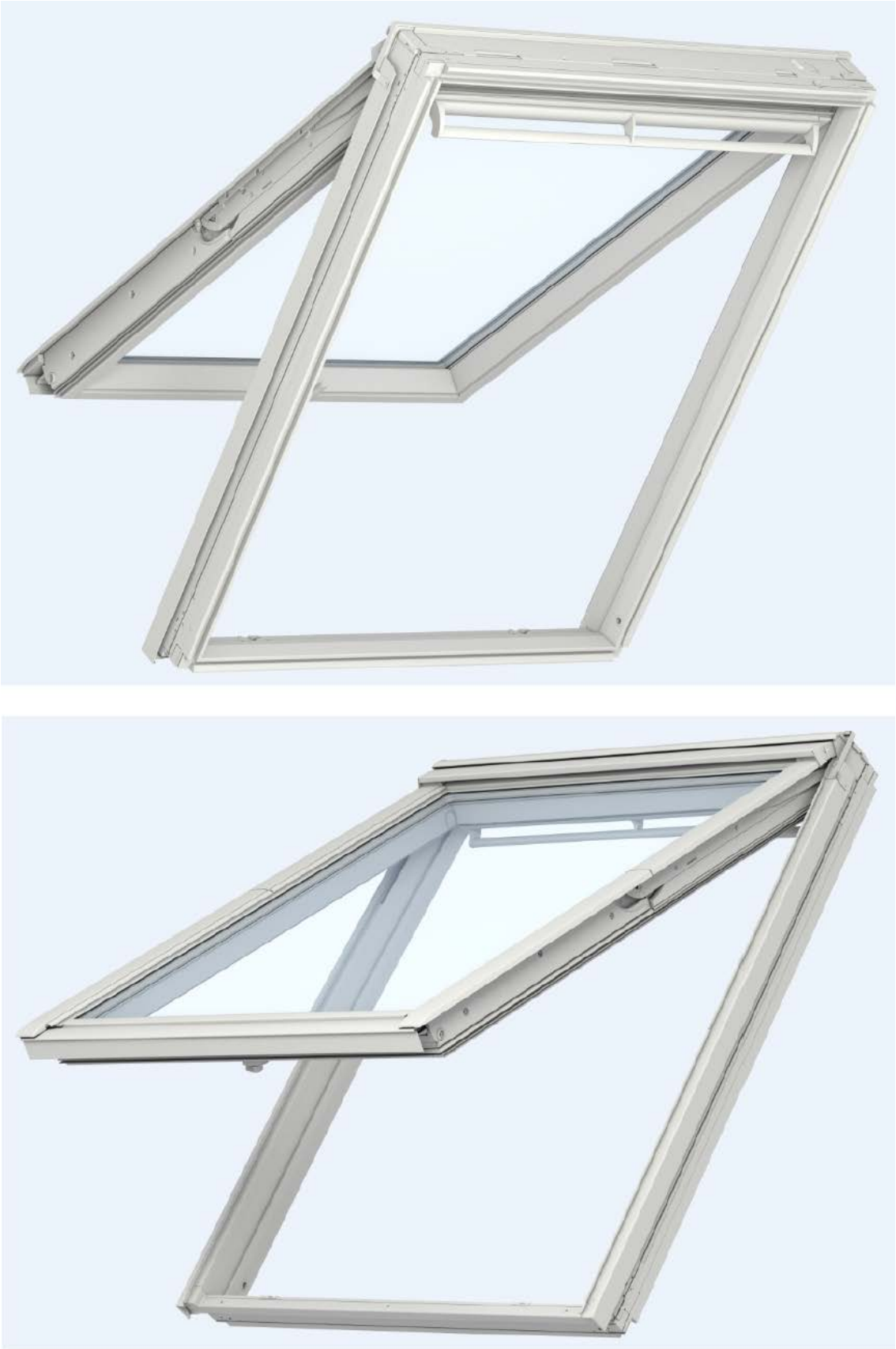

Figure 5. V22 GPL skylight

Velux Skylights Construction Material

Velux FS

The fixed skylight system (model A21 FS) comprises a timber framed skylight with external cladding of 1.0-mm thick aluminium. The external frame and cladding are formed by the 1.0-mm thick aluminium extruded sections joined at the four corners using ASA Luran S 778 T resin corner key mouldings or equivalent. The skylight is pre-glazed with a double-sealed insulating glass unit with a thickness between 17.2-mm – 18.2-mm. The special glazing of either tempered or laminated glass is available as an alternative with argon filling for additional insulation. All external exposed surfaces are therefore metal or glass with the exception of the ASA corner keys which comprise nominally 1% of the total surface area of the skylight.

Velux FCM

The fixed curb mount skylight (model A21 FCM) comprises an aluminium frame which is screw fixed to a roof mounted timber curb. The external frame and cladding are formed by the aluminium extruded sections joined at the four corners using ASA Luran S 778 T resin corner key mouldings. The skylight is pre-glazed with a double-sealed insulating glass unit with a thickness between 17.2-mm – 19-mm. The special glazing of either tempered or laminated glass is available as an alternative with argon filling for additional insulation. All external exposed surfaces are therefore metal or glass with the exception of the ASA corner keys which comprise nominally 1% of the total surface area of the skylight.

Velux VS, VSE and VSS

Openable skylights models Ventilating Skylight A21 VS, A21 VSE and A21 VSS comprise a timber framed skylight with pivot-hung roof window with external cladding of 0.65 – 0.80-mm thick aluminium, with extruded aluminium sections joined at the four corners using ASA Luran S 778 T resin corner key mouldings. The skylight is pre-glazed with a double-sealed insulating glass unit with a thickness between 17.2-mm – 18.2-mm. The special glazing of either tempered or laminated glass is available as an alternative with argon filling for additional insulation. All external exposed surfaces are therefore metal or glass with the exception of the ASA corner keys which comprise nominally 1% of the total surface area of the skylight.

Velux VCM, VCE and VCS

Openable skylights models Ventilating Skylight A21 VCM, A21 VCE and A21 VCS comprise an aluminium frame skylight with pivot-hung roof window with external cladding of 1.5-mm thick aluminium, with extruded aluminium sections joined at the four corners using ASA Luran S 778 T resin corner key mouldings. Internal frames are PVC. The skylight is pre-glazed with a double-sealed insulating glass unit with a thickness between 17.2-mm – 19-mm. The special glazing of either tempered or laminated glass is available as an alternative with argon filling for additional insulation. All external exposed surfaces are therefore metal or glass with the exception of the ASA corner keys which comprise nominally 1% of the total surface area of the skylight.

Velux GGL and GPL

Openable Roof Window models V21 GGL, V21 GHL, V22 GGL and V22 GPL comprise a timber framed skylight with pivot-hung roof window with external cladding of 0.65 - 1.20-mm thick aluminium or 0.60-0.80-mm thick copper. The skylight is pre-glazed with a double-sealed insulating glass unit with a thickness of 16-mm - 24-mm. The special glazing of either tempered or laminated glass is available as an alternative with argon filling for additional insulation. All external exposed surfaces are therefore metal or glass.

Solar Panel on VSS and VCS

The openable skylight model A21 VSS and VCS are fitted with a solar panel attachment, as shown in Figure 1 and Figure 3, replacing the mains powered electric operation of the closing mechanism. The skylight design is identical to the mains powered openable skylight models with the solar panel as an addition. The solar panel comprises combustible components, however, it does not compromise the non-combustible exposed surfaces of the skylights. The solar panel has a cable that penetrates the metal frame of the skylights. The BCA does not specify the diameter of penetrations when discussing non-combustible roof coverings. The test performance to AS 1530.8.1 BAL 40, as described in EWFA Report No: 31154800.1, indicates that neither the solar panel nor the power cable compromise the performance of the system when exposed to a significant fire scenario.

Weatherproofing Seals

The weatherproofing seals, which are combustible, are also protected externally so as to not form part of the external face. The exception to this is the ASA corner keys used on skylight models A21 FS, A21 FCM, A21 VS, A21 VSE, A21 VCM and A21 VCE which forms a surface area of nominally 1% of the total skylight. This area is considered insignificant and a similar situation would exist for any steel roof sheeting that is fixed with screws which incorporate combustible weather seals.

Summary of the form of construction for Velux skylights

Based on the above it is confirmed that the proposed Velux skylight constructions meet the following specification:

- The external face of the proposed skylight is formed by the toughened or laminated glass along with the aluminium or copper formed framing sections;
- Weatherproofing seals when present, forms a surface area of nominally 1% of the total skylight;
- Solar panels when present, does not form part of the roof covering rather is attached to it.

2 Referenced Standards

Reference is made to the following documents:

NCC 2016 Building Code of Australia - Volume One.

NCC 2016 Building Code of Australia - Volume Two.

Commission Decision 96/603/EC: Official Journal of the European Communities L 267, 19.10.1996, Annex.

3 Review of NCC Requirements

There are various requirements in the National Construction Code (NCC) Vol 2 Clause 3.7 and various clauses in National Construction Code (NCC) Vol 1 that require roof coverings to be non-combustible.

Constructions that are deemed non-combustible by the NCC clause C1.12 are steel roof sheeting. This material can be installed with combustible weather seals and the area of such seals can reach 1% of the area of the roof.

The proposed construction includes the toughened or laminated glass along with the aluminium or copper formed framing sections and weatherproofing seals of nominally 1% of the total skylight.

With reference to Commission Decision 96/603/EC: Official Journal of the European Communities L 267, 19.10.1996, Annex, the following materials are considered as class A without further testing;

- Copper and copper alloys - Not in finely divided form;
- Zinc and zinc alloys - Not in finely divided form;
- Aluminium and aluminium alloys - Not in finely divided form;
- Glass - Includes heat strengthened, chemically toughened, laminated and wired glass.

Class A materials are known as materials that are wholly inorganic and are known to not become engaged in a fire at any stage of a developed fire.

Based on the above it is considered that the proposed skylight constructions have a similar level of combustibility to steel roof sheeting with combustible weather seal washers, which is considered non-combustible.

4 Conclusion

It is confirmed by CSIRO that the construction details referenced in this report are sufficient for the determination of compliance with the construction requirements for non-combustibility. A summary of the potential for compliance is listed in Section 3, along with any qualifications or requirements.

Compliance with relevant building regulations in the use of the product within a development is subject to acceptance by the Authorities Having Jurisdiction.

5 Term of validity

The validity of the report will lapse on 30th April 2022. Should you wish us to re-examine this report with a view to the possible extension of its term of validity, would you please apply to us three to four months before the date of expiry. This Division reserves the right at any time to amend or withdraw this report in the light of new knowledge.

6 Limitations

This report is prepared for the report client listed on page 1 and applies to the nominated materials and forms of construction in the review. Any modifications, changes or amendments to the referenced standards may invalidate the findings of this report. These items should be referred to CSIRO to allow consideration to be made of the extent that these changes may have on the outcome of this report.

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