

Performance influences

No building element fits in the ‘out of sight, out of mind’ category better than roofs. Good performance with only modest maintenance requirements can be achieved with careful design, cladding selection and installation.

WHEN SELECTING a roof cladding system, a number of influences need to be considered. These include design, environment, owner and installation influences.

Design influences

- Rules and regulations – see Roof Design Fact Sheet 1 *Compliance*.
- Local planning rules and design review panel parameters.
- Roof area.
- Whether it is a new roof or reroof.
- Building height – as height increases, so does potential wind loading.
- Complexity – as complexity increases, suitable material choices decrease while the required installation skill increases, as does the risk of getting something wrong.
- Roof weight – light or heavy. Heavyweight roofs will have a greater impact on earthquake loadings. They typically require more support (likely to come at a higher cost).
- Construction accuracy – can the roof actually be constructed to meet specific design parameters and continue to meet those parameters over its life?
- Slope – as roof slope increases, drainage is more effective and uplift wind decreases (the amount depending on the height of the building and the design wind speed). A steeper roof uses more materials.
- Number and size of roof penetrations – the fewer, the better.
- Supporting structure – what are the framing materials and spans? Is it a fully supported substrate or a self-supporting



cladding? What are the cladding span limits? What is the assessed risk of sagging or deflection in the structure and/or cladding?

- Roof-mounted equipment – how much and what weight? Is it likely that more will be added over the life of the roofing?
- Compatibility with adjacent materials, fixings and so on. Aluminium can be affected by contact with or run-off from green concrete, mortar or cement plaster. Extractives from raw cedar are acidic and can corrode galvanised steel.
- Thermal bridging.
- Insulation location – warm roof or cold roof construction.
- Fire risk – what is the risk of fire from inside or outside that the roof may be exposed to?
- Thermal expansion and contraction – roofs can experience a wide range of surface temperatures, and roofing materials can exhibit a wide range of thermal expansion coefficients. The roof system must therefore be detailed to accommodate the expected movement. Unless accommodated in the design of metal components – particularly lightweight claddings and those manufactured from zinc, copper and aluminium – thermal movement can result in tearing or buckling.
- Potential for roof space moisture accumulation – has the design allowed for the moisture generated in the space below to be removed? Is roof space ventilation a requirement?
- Safety – provision of restraint, anchors or barriers.

Environment influences

- Corrosion risk to metal claddings and fixings – this factor depends on the surrounding environment and will be higher in coastal areas, industrial areas and geothermal areas.
- UV – deterioration of the coating or the underlying material.
- Rainfall – what is the design rainfall intensity, and what is the projected increase (or decrease) in intensity over the life of the building?
- Wind – what is the wind zone, design wind speed, and most common wind



Penetrations must be correctly detailed and installed to maintain weathertightness.

direction or most likely to be damaging? What is the projected increase or decrease in wind speeds over the life of the building?

- Snow – is snow likely, a rare possibility or totally unlikely to ever occur?
- Reflectance – will the selected roof finish or colour reflect light and potentially impact on occupants of neighbouring buildings?
- Noise – from rain or movement impacting the cladding or a noisy environment close to an airport, motorway or other noise source.
- Risk of damage from hail or wind-blown debris.
- Resiliency – how will the selected roof perform in an out-of-the-ordinary event? Will the selected roofing system be able to cope without loss of performance as a result of a storm, wind-blown debris or snow in an area not typically subject to snowfall?

Owner influences

- Appearance – the finished appearance of a roof is still a personal preference.
- Cost – cheapest does not necessarily equate to being the best option.
- Activities or processes being carried out

in the spaces under the roof.

- Roof access – how often will the roof be accessed for maintenance or recreation? Is impact damage from walking on the roof a risk?
- Warranty – what is offered, for how long and what are the conditions?
- Maintenance such as cleaning or recoating is required throughout the life of most roof claddings to ensure that they achieve maximum durability. Some claddings require more maintenance or more frequent maintenance than others.
- Sustainability – life cycle assessment, recyclability, green roof options

Installation influences

- Safety – can the roof be installed safely?
- Access – what is required to allow installation of the selected roofing?
- Availability – is there an assured supply of the material in the region where the building is to be erected?
- Availability of skilled installers for the specific roof cladding in the area where the building will be constructed. Some proprietary systems require a manufacturer-approved installer for a warranty to apply.

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