

Insulated Panels
Australia

Protected by



Kingspan K-Clad Commercial & Industrial Product Guide

Insulated Roof and Wall Panel System



Greater Thermal
Comfort

Reduced Heat Gain

Speed Of Build

Robust And Durable

Lower Steelwork Costs

Finished Internal Ceiling

Eilbeck

ABUS

MRC 40t

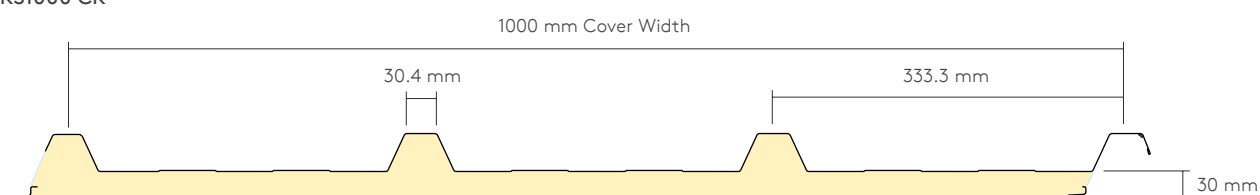
Kingspan K-Clad

Kingspan K-Clad is a viable alternative to the traditional construction methods of non-Section J buildings, out performing built-up systems in areas such as thermal comfort, temperature and heat gain control, condensation control, spanning capability, build speed and durability, while providing a metal finished internal ceiling.

K-Clad is designed for a variety of applications such as large-scale logistics facilities, distribution buildings, storage of temperature sensitive goods and agricultural construction.

Thanks to the prefabricated nature of the insulated panels, they are quicker to install than traditional roof structures, making the roof instantly wind and water-tight and significantly reducing construction risks.

KS1000 CK



Dimensions, Weight & Thermal Performance

Core Thickness (mm)	30
Overall Thickness (mm)	65
R-value (m ² K/W)	1.82
U-value (W/m ² K)	0.55
Weight (kg/m ²) 0.5 steel / 0.4 steel	9.50

Product Features

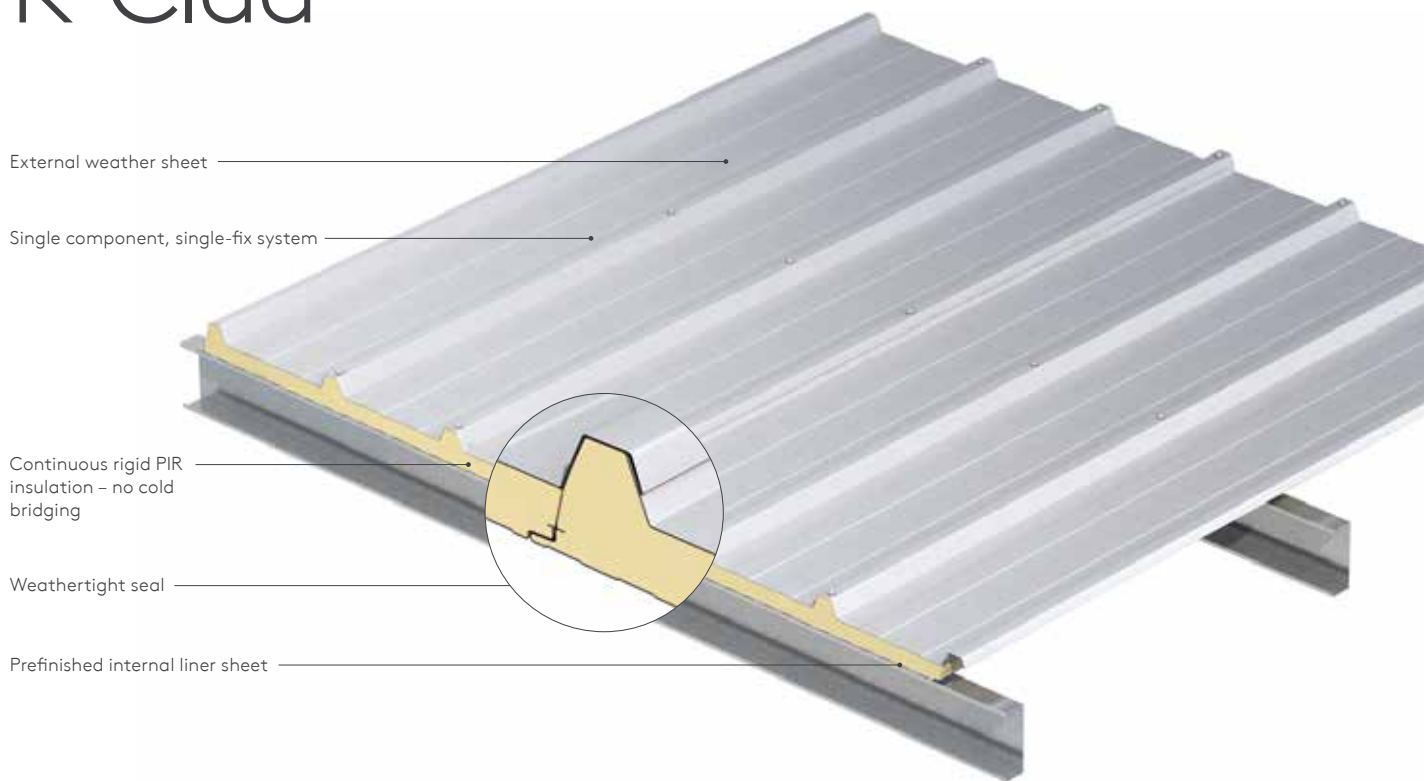
Product code:	KS1000 KC
Profile:	Trapezoidal
Fixing detail:	Through-fix
Metal type:	Steel
Application:	Pitched roofs of 3° or more after deflection*
Standard lengths:	From 2 m to 13.7 m**
Cover width:	1000 mm
Product compatibility:	Integrates with Kingspan Safety solutions and Kingspan Fabrication Systems

* For advice on using Trapezoidal Roof on lower pitch applications, please contact Kingspan Technical Services.

** Please be aware that for orders outside Australia maximum lengths are 11.8 m. Maximum length for panels transported by rail is 12 m. Lengths up to 16.1 m available in Australia with expendable trailers.

FIREsafe™ FIBREfree

Kingspan K-Clad



Kingspan insulated panel systems

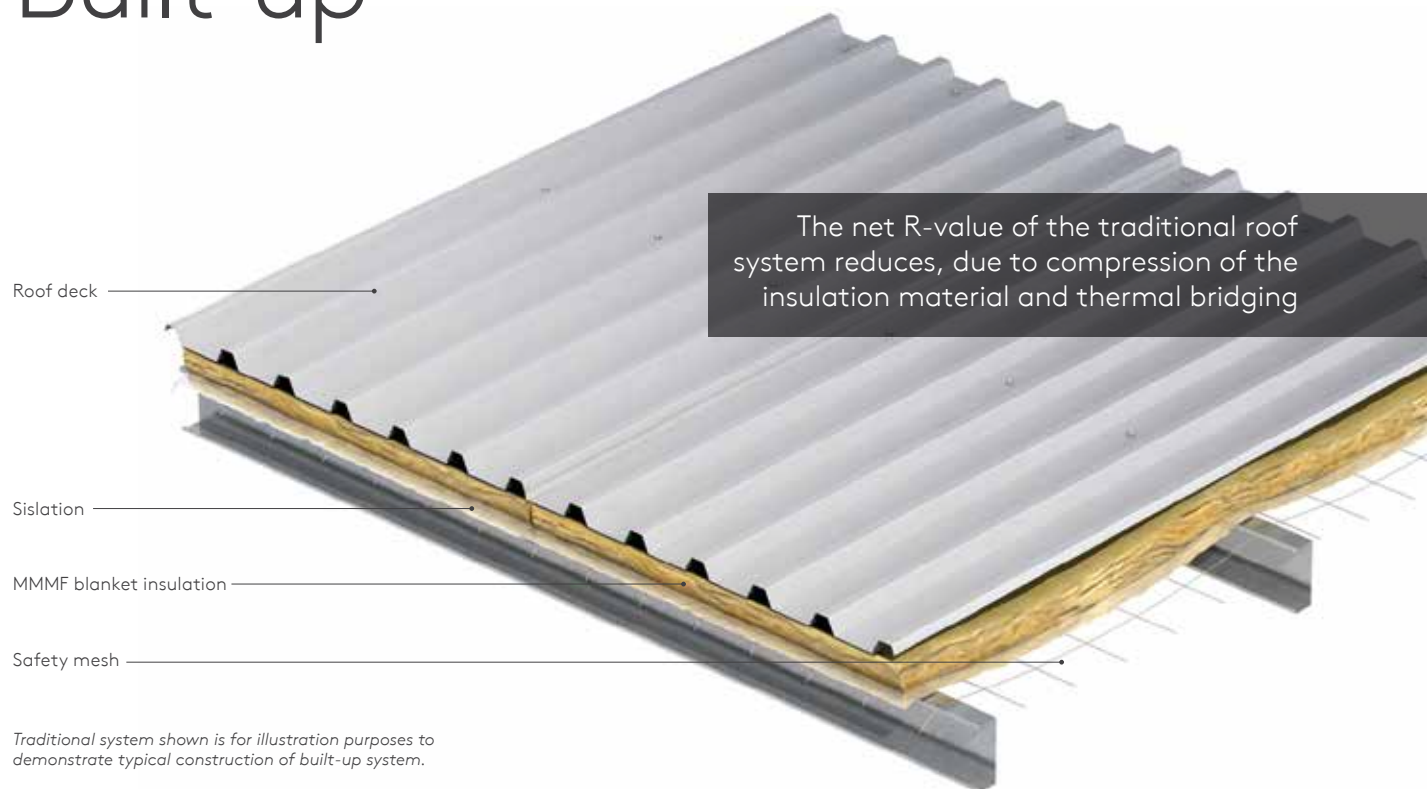
Kingspan insulated panel systems have proven high lifetime R-value performance compared to traditional building methods; the R-value reduces heating / cooling loads and controls more effectively the internal space temperature.

The building envelope performs as a barrier that helps maintain the indoor environment and can have a substantial impact on the comfort of a building.

Installed 'as-built' performance

- Fully compliant with building regulations and codes.
- Lifetime insulation continuity and thermal performance.
- Enhanced airtightness.
- Factory manufactured quality, single component system achieves 'as designed' performance.
- 25 year Kingspan Panel Warranty.

Traditional Built-up



Traditional, multi-component, site-assembled 'built-up' system

It is often difficult to achieve and maintain 'as designed' performance with traditional systems.

Any number of factors can degrade the performance and durability of traditional insulation.



Some of the reasons why blanket insulation might perform poorly in operation are:

- **Thermal bridging.** Thermal bridging occurs wherever assembly components with low R-values relative to surrounding materials span from the inside to the outside of a building assembly.
- **Humidity / condensation.** Porous / open insulation products can absorb moisture which will reduce the thermal performance.
- **Compressed insulation.** Insulation may be compressed during installation or placed in a system where the full recovered thickness cannot be achieved, such as over purlins.
- **Poor installation.** Badly fitting insulation with gaps creates areas of low thermal resistance, which contribute significantly to an overall lower thermal performance.
- **Lack of insulation continuity.** Where insulation is discontinuous, the purlins framework / structure / battens can decrease the continuous performance of insulation, since they generally have a worse performance than the surrounding insulation.
- **Air leakage.** Loose fitting insulation and gaps result in air movement that will reduce insulation effectiveness.
- **Convection.** In some cases in fibrous insulation convection can occur within the product, or where (if) it does not fit correctly against roofing sheets. Increased convection will reduce thermal resistance effectiveness.
- **Poor durability.** The internal ceiling is a foil sislation material which is easily torn.

Thermal Comfort

Kingspan has independently undertaken a thermal comfort model simulation on a typical lightweight industrial building, comparing the new Kingspan K-Clad system with a traditional insulated metal roof system.

As shown right, the Kingspan K-Clad system is able to reduce the amount of heat gain through the roof by 40 % which results in a temperature difference of greater than 4.5 °C between the two roof types.

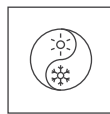
Conclusion

Based on modelling and analysis, the Kingspan K-Clad system outperforms the traditional metal roof system in terms of:



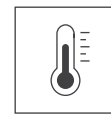
Thermal Performance (R-value)

- The Kingspan K-Clad system avoids the effects of insulation compression and thermal bridging thus providing a higher R-value.
- The Kingspan K-Clad system has a net R-value of 1.82 m²K/W while the traditional metal roof has a net R-value of 0.90 m²K/W (>50 % reduction).



Temperature and Heat Gain Control

- The Kingspan K-Clad system can reduce up to 40 % of the conduction heat gain through the roof with its higher thermal performance when compared to a traditional metal roof system.
- The Kingspan K-Clad system can be between 8 – 12 % cooler (up to 4.5 °C) than a traditional metal roof system during the winter months.



Thermal Comfort

- During the hotter periods, the Kingspan K-Clad system will provide a better thermal comfort outcome by providing a cooler indoor temperature. Based on the analysis, the floor space can achieve a 90 % acceptability limit for the entire working day (i.e. 90 % of occupants will accept and be satisfied with the indoor temperature) with the Kingspan K-Clad system, whereas with a traditional metal roof system, the acceptability limit will drop to 80 % in the afternoons.

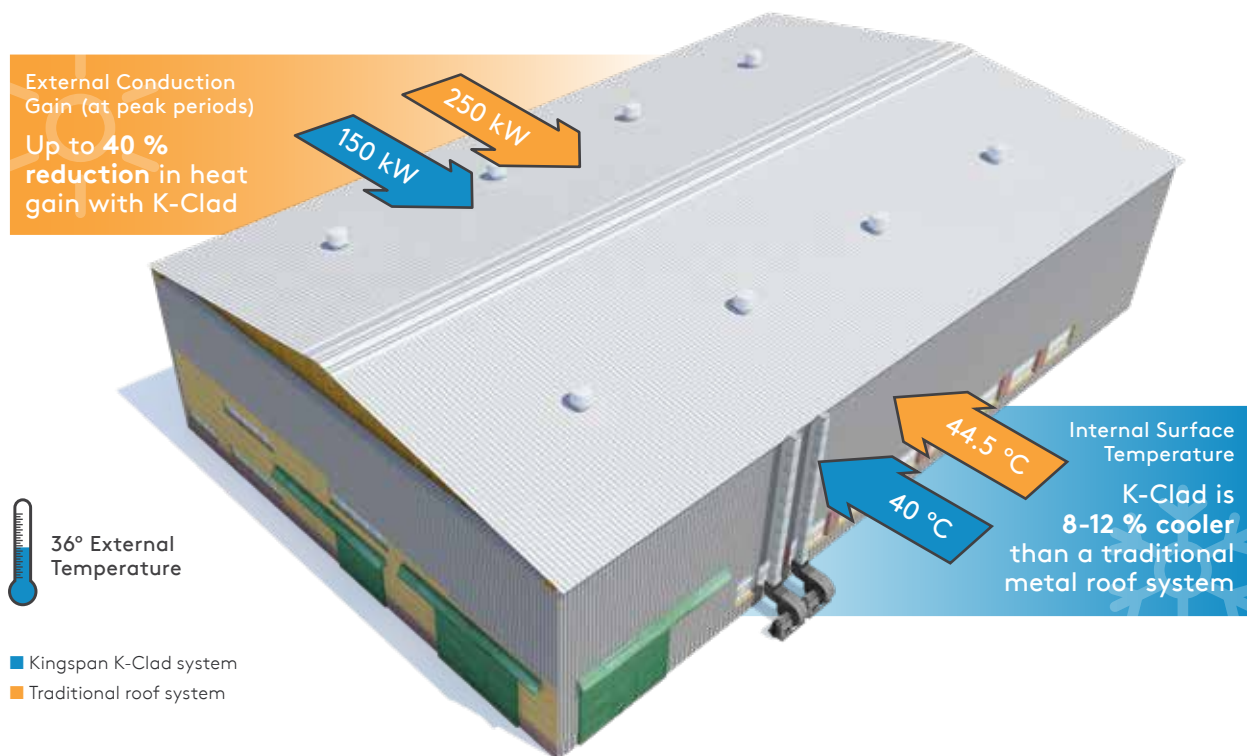
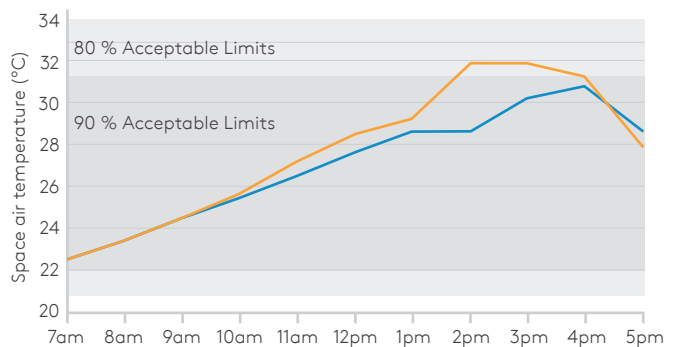


The roof is the largest surface area for a typical industrial building and it is exposed to the sun all day. As a result, choosing the right roof material and insulation is essential in achieving heat gain reduction and thermal comfort.

The acceptable indoor temperature for a naturally ventilated building is dependent on the outdoor air temperature and can range from 18 °C to 34 °C*.

The acceptable limits are the percentage of people who feel the spaces temperature is acceptable. For example, the 80 % acceptable limit is where 80 % of occupants are comfortable with the temperature.

Floor Level Space Temperature Against % Acceptable Limits (Summer)



* The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) have published a standard on Thermal Environmental Conditions for Humans, the ASHRAE 55 Standard. This standard is recognised internationally and is utilised by the Green Building Council of Australia (GBCA) for its Green Star thermal comfort studies.

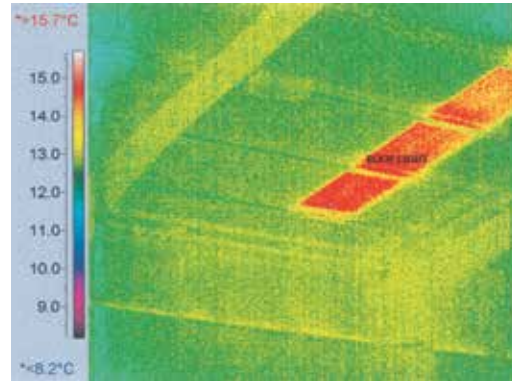
Detection of Heat Gain Through Thermal Imaging

Tools like thermal imaging cameras allow detection of differences in temperatures along the building envelope by rendering infrared radiation as visible light.

These differences can help detect flaws on a building envelope, especially regarding breaks in insulation or poor performance.

These examples show a warehouse roof in Alexandria Sydney, built with an external metal skin, insulation blankets and timber purlins and an external temperature of 22 °C. The images reflect typical issues on thermal performance when there are tears on the insulation (Example 1), most importantly, the temperature difference where the insulation is compressed above the purlins (Example 2).

These thermal breaks and thermal bridges not only represent prejudicial heat transfer into the building, but also high risks of condensation.



Internal thermographic view of a Kingspan insulated panel roof. External temperatures were high during the survey providing a good differential across the envelope. The red area is due to the solar gain through a rooflight. The insulated panels are performing well and the joints show good air seal integrity.

Example 1 – Effects of Torn Sarking



Image 2

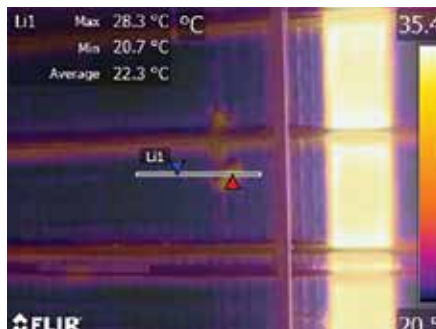


Image 2 thermal

- Torn foil under insulation exposes temperatures of up to 28.3 °C.
- Internal face of insulation in general areas shows temperatures down to 20.7 °C.

Example 2 – Effects of Thermal Bridging



Image 1

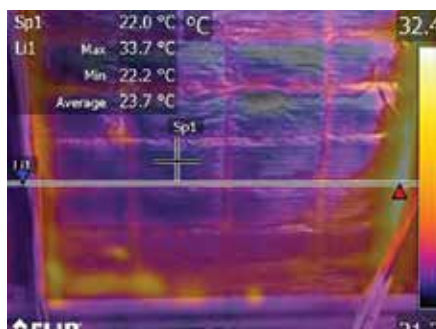


Image 1 thermal

- Temperature at top of timber purlin, where blanket insulation is compressed: up to 33.7 °C.
- Temperature at underside of timber purlin: 22.2 °C.
- Temperature at internal face of insulation, general areas: 22 °C.

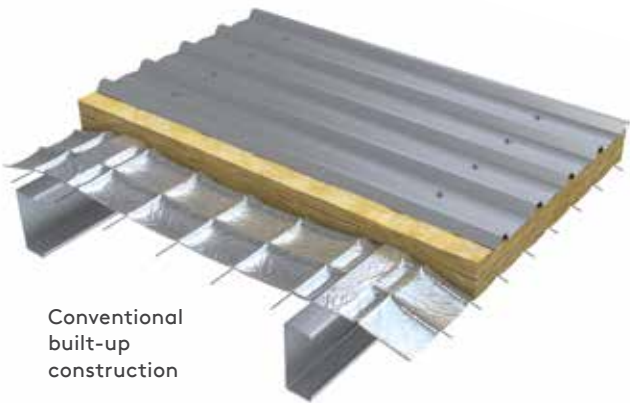


Other System Benefits

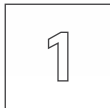
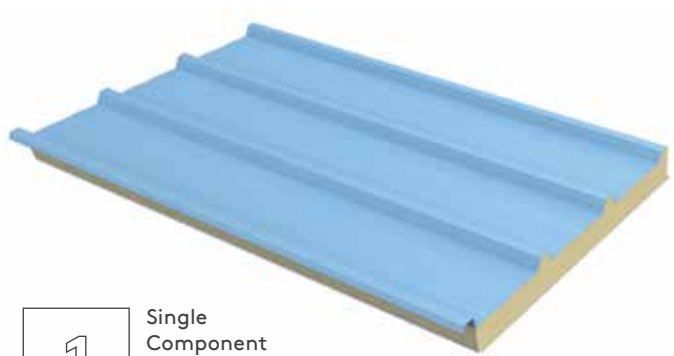
Build Speed



Insulated metal-faced panels as a single component system increase the speed of build, and minimise delays and the need for multiple trades.



Conventional built-up construction



Single Component

Building Systems Component Analysis

Assemblies with multiple components are more likely to experience delays in construction due to the scheduling of multiple trades.

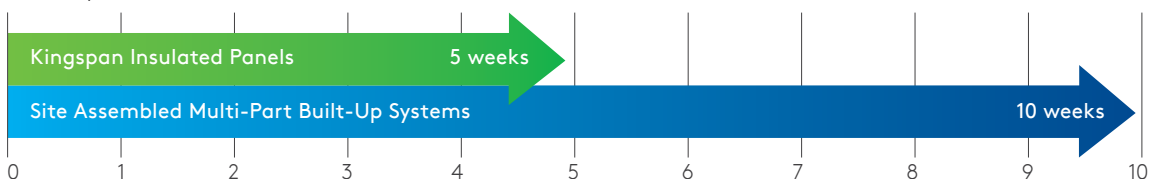
Faster Build

Consultants for a large retail chain estimate construction schedule time savings of up to five weeks were achieved in a multiple unit construction programme with insulated metal panels.

Construction Schedule



Area – 9,290m²





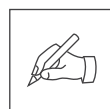
Guaranteed Airtightness, Weathertightness and Condensation Control

One of the biggest sources of building heat loss or heat gain is due to air leakage i.e. 'leaky buildings'. The superior joints on our systems ensure that they remain both air and weathertight over the life of the building.

Our factory pre-engineered systems incorporate high precision joints, which create unsurpassed airtight buildings.

We guarantee:

- Insulation continuity with no gaps or missing insulation;
- Exceptional R-value compliance and reliability;
- Low CO₂ emissions;
- 3m³/hr/m² airtightness certainty at 50Pa when installed to our standard details.



Design Flexibility and Aesthetic Appeal

Kingspan's commercial and industrial wall and roof systems offer designers a comprehensive range of building solutions for vertical and horizontal wall applications.

Available in multiple profiles, finishes, colour options, and cover widths, insulated panels provide customised building design and creative freedom. The panels are easily integrated with traditional construction methods and building systems.

Contact Detail

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For the product offering in other markets please contact your local sales representative or visit www.kingspan.com

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