

# DATA SHEET

## Sustainability



### Overview

Plantation forests cover 1.8 million hectares of New Zealand land area. They provide a healthy oxygen-filled environment for many leisure activities.

Because they are harvested on a renewable basis, they also provide vast quantities; some 20 million cubic metres of high-quality material each year.



### Mass Timber – New Zealand’s Most Sustainable Building Material

Building and construction is one of the sectors causing the most significant depletion of the earth’s natural resources. Concrete and steel have been the dominant building materials throughout the 20th Century, but manufacturing these materials contributes significantly to Green House Gas emissions.

### EPD Certification

Glulam - In 2019 TimberLab, as participants with the Wood Products and Manufacturing Association (WPMA) released an EPD for timber products made in New Zealand from Radiata Pine. This assesses environmental impact, resource use, and waste output across 27 different environmental impact criteria. The full assessment report can be downloaded on our website (<https://redstagtimberlab.co.nz/technical/fact-sheets/>).

CLT - This EPD covers the environmental impacts of Red Stag Timber softwood cross-laminated timber (CLT) for application both within and outside the building envelope subject to treatment level. The products are manufactured within the Red Stag Sawmill and processing plants located in Waipa Valley, Rotorua, New Zealand.



### FSC Certification

Red Stag TimberLab offers an environmentally responsible construction option, backed by FSC® Chain of Custody Certification. All timber is from sustainably harvested forests. It is labelled and tracked through the plants.

Red Stag TimberLab Ltd holds Chain of Custody Certification Code **NC-COC-005630** for the supply of FSC® certified timber. Material is sourced from renewable NZ Radiata plantation forests that are sustainably managed and recognised as contributing environmental benefits as opposed to steel and concrete and scarce rainforest hardwoods.

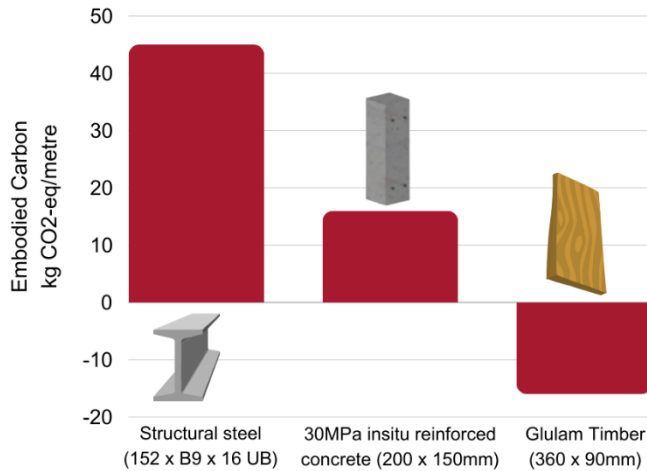
With FSC certification, we have the proof that our raw materials are obtained from sustainably managed forests, that sourcing of the raw materials is internally monitored and that conditions connected to external monitoring by third parties are fulfilled.



## Carbon Sequestration

Trees absorb carbon dioxide as they grow through the process of photosynthesis. This carbon is commonly referred to as embodied carbon. Over the long term, the embodied carbon will return to the atmosphere and complete the natural carbon cycle, but the temporary CO<sub>2</sub> wood storage can be reasonably taken as a carbon credit. Trees remove and store around 1.8kg CO<sub>2</sub> / kg wood from the atmosphere during growth. Each m<sup>3</sup> of solid Pinus Radiata glulam therefore stores approximately 900kg of CO<sub>2</sub>.

### Carbon Emissions of Equivalent Steel/Concrete/Timber Beams

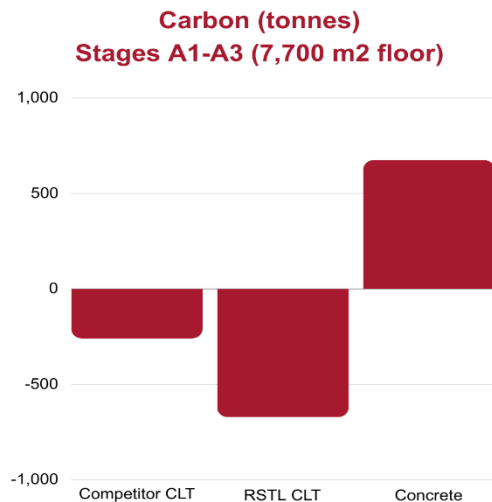


The table to the left provides an estimate of embodied carbon (kg CO<sub>2</sub>-eq) of an equivalent concrete, steel, and timber beam (data sourced from the New Zealand Wood Design Guides). For the structure assessed, the timber beam absorbs 16kg CO<sub>2</sub>-eq, whilst the equivalent steel beam emits 45kg CO<sub>2</sub>-eq.

### Carbon (CLT)

Red Stag is NZ's lowest carbon building material supplier. This is because the timber is dried and the site powered by 100% renewable energy from Red Stag's boilers and power turbines.

The graph to the right shows how our CLT EPD compares to our Australasian competitors and concrete for a project.



NB: Graph shows how Red Stag TimberLab's CLT EPD compares to our Australasian competitor's and concrete for a project.

Mass timber also has a high strength-to-weight ratio and is a light-weight alternative to concrete or steel construction. A low mass timber structure requires less bracing, and the gravity loading on the foundations is substantially reduced. The net result is reduced foundation costs (especially where soils are weak), and less truck deliveries required to site - both of which significantly reduce carbon emissions.



### Living Building Challenge

Contributing to the achievement of the high standards of the Living Building Challenge, Red Stag TimberLab's FSC Certified Glulam products form the main structural system for this first in New Zealand Living Building – Tūhoe's Te Kura Whare.

## Recyclability and Waste

Because all of Red Stag TimberLab's components are modelled in 3D, and CNC profiled to exact dimension and shape, there is no oversupply of materials to the building site. The environmental cost associated with transporting excess material to the site then carting it away again for disposal is eliminated.



In New Zealand, the most common end-of-life method is landfill. Recycling is of huge significance when considering whole-of-life carbon cost. When a timber product is recycled into a new building, the carbon sequestration can remain intact at end-of-life.

Because most of the connection details in mass timber construction are simple screw or bolted fixings, at the end of the building's life the timber elements can be simply unfixing, re-machined if necessary and used in a new building.

This can substitute alternative materials with potentially high carbon emissions. The circular economy approach to sustainable construction is becoming popular when designers choose building materials and connection details. In a circular economy, resources are kept in use for as long as possible to extract the maximum value from them.

## Health and Wellness

The biophilia hypothesis suggests that humans possess an innate tendency to seek connection with nature and other forms of life. The improvements in health and happiness that are associated with spending time outside in nature are well known. Exposure to nature has been shown to lower blood pressure, heart rate, and aggression. Nature also increases the ability to focus attention and perform concentration and creative tasks.

Mass Timber also acts as a natural humidity buffer to make for a healthy in-built environment; absorbing atmospheric moisture when it is wet and releasing it again when it is dry. You will not see interstitial condensation on timber joinery, and the same goes for glulam beams / columns and CLT panels / stairs forming part of the building envelope.



## Conclusion

Sustainability is now established as a fundamental requirement for modern construction. There is universal acceptance that conservation of the Earth's resources is essential to our survival and our regulatory framework is rapidly adapting to meet this requirement. In 2019, the New Zealand Government passed the 'Zero Carbon' Bill, committing the country to reducing net emissions of all greenhouse gases to zero by 2050. Being responsible for approximately 30% of total Greenhouse Gas emissions, the construction industry has a big part to play in achieving Government's goal.

Wood is, by far, the world's most sustainable building material. Sustainable forestry practices and certification in New Zealand means that vast quantities of timber can be used in construction materials to create a long-term carbon sinks, which continue to grow day by day. Instead of sending this material overseas as low value logs, Red Stag TimberLab is committed to producing value-added timber solutions in the way of engineered timber structures as an environmental alternative to concrete and steel.