# Mass Timber
## Performing to the Highest Standards

AMERICAN WOOD COUNCIL
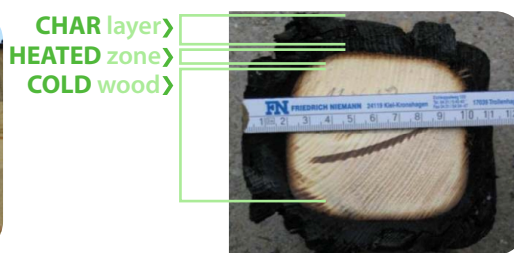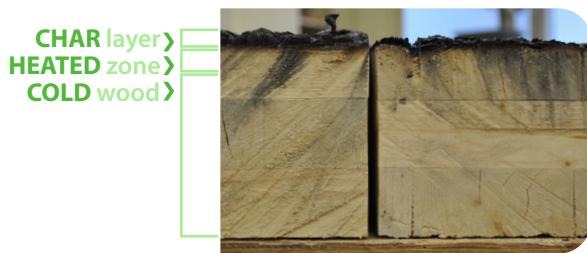
## What is Mass Timber?

Mass timber is a category of framing often using large panelized solid wood construction including cross-laminated timber (CLT), nail laminated timber (NLT), dowel-laminated timber (DLT), and glued laminated timber (glulam) panels for floor and wall framing.

## WOOD CHARRING **PROTECTS**



CHAR layer›
HEATED zone›
COLD wood›

CHAR layer›
HEATED zone›
COLD wood›

The unburnt wood, protected by the charred wood, retains up to 100 percent of its initial strength.

*Source: Fire Performance, reThink Wood*

### CASE IN POINT

A successful ASTM E119 fire endurance test of a cross-laminated timber wall was key to the decision to recognize CLT in the 2015 edition of the IBC. While only seeking a 2-hour rating as required by building code provisions, the **test specimen lasted 3 hours 6 minutes.**

## How Does Mass Timber Perform in Fires?

Mass timber enables inherent fire resistance through the insulation of inner layers.[1]

1. When mass timber is exposed to fire, the outer layer burns, creating a natural protective charred layer.
2. Char acts as insulation, delaying the onset of heating of the cold, unburned layer of wood below. Due to the solid block makeup of mass timber, with no internal void spaces, air and fire are inhibited in their travel.
3. Char forms at a predictable rate (~0.025 in/min [0.64mm/min]), slows combustion, and allows more time for evacuation.

Fire resistance requirements in the International Building Code (IBC) depend on the structural element, type of construction, use and occupancy classifications, distance from property line and other factors. Fire resistance ratings are determined by 3 criteria[2]:

- **Structural resistance:** supporting the applied load for the duration of the test.
- **Integrity:** preventing passage of flame or gases hot enough to ignite a cotton pad.
- **Insulation:** preventing temperature rise from greater than 325°F (180°C) at any location, or an average of 250°F (140°C) across many locations.

**You can find more information on mass timber performance and fire safety at**
## www.awc.org/tallwood

[1]*Fire Safety and Protection, reThink Wood; Fire Safety of Tall Wood Buildings: A Research Review, WoodWorks;* [2]*Fire Performance of cross-laminated timber assemblies, Chapter 8, CLT Handbook;* [3]*CEU: Fire Protection in Wood Buildings, reThink Wood*