



**SOUTHERN YELLOW PINE:  
A BETTER CHOICE FOR  
FURNITURE AND FLOORING**

**STRONGER DENSER HARDER**





## Summary of results

TRADA Technology's report provides conclusive evidence that Southern Yellow Pine is the strongest softwood species. The testing programme demonstrates superior impact bending and surface hardness performance to other softwoods tested under the same laboratory conditions, with Southern Yellow Pine's excellent resistance to indentation making it ideal for furniture, flooring and other domestic applications.

The test results give a clear message to furniture and flooring manufacturers who may previously have used other types of timber with a lower impact resistance.

### Background

American Softwoods, the international representative body of America's Southern Forest Products Association and Softwood Export Council, commissioned a series of independent tests to compare the performance of Southern Yellow Pine with other softwoods.

The tests were carried out by the Timber Research and Development Association (TRADA), a globally recognized authority on the specification and use of timber and wood products, based in the United Kingdom.

### Objective

Southern Yellow Pine is widely acknowledged as a reliable timber for construction use and all external structures. The project's aim was to determine its suitability for internal use in terms of hardness, impact resistance and density for furniture, flooring, staircases, skirting boards, architraves, doors and windows.



### Southern Yellow Pine

America is recognized worldwide as a sustainable source of top quality softwood timber. Southern Yellow Pine is an all-round timber, ideal for both external and internal structures. Its use in the construction industry has increased steadily throughout Europe in the last 25 years in applications such as flooring, furniture, decking, bridges, walkways, windows and doors, and roller coasters. When pressure treated and kiln-dried, it has no rival for strength and durability.



### Findings

Data analysis for the Janka hardness test showed that Southern Yellow Pine was **"significantly stronger than the other species under test."** It markedly outperformed the other softwood species' impact resistance, and was shown to be 51% denser than European Whitewood and 14% denser than New Zealand Radiata Pine, its nearest rival softwood species. Although Chilean Radiata Pine's hardness rating compared well on the tangential face, Southern Yellow Pine was found to be 80.8% harder than European Whitewood.

## Research testing programme

The mechanical testing programme was undertaken by TRADA Technology in accordance with British Standard BS 373: 1986 "Methods of testing small clear specimens." Tests determining the density and movement characteristics were carried out on the following softwoods:

- Southern Yellow Pine (*Pinus spp*): SYP
- Chilean Radiata Pine (*Pinus radiata*): CRP
- European Redwood (*Pinus sylvestris*): ER
- Brazilian Elliotis Pine (*Pinus ellioti*): BEP
- European Whitewood (*Picea spp*): EW
- New Zealand Radiata Pine (*Pinus radiata*): NZRP

## Test conditions

Stable conditions of 20 +/-2°C, 65 +/-5% relative humidity were monitored in the Test Hall with thermohygrograph and whirling hygrometer.

The samples' weights and moisture contents were carefully scrutinized. A more detailed description of the test prerequisites is available on request from American Softwoods.

## Procedures

### 1. Hardness

*Janka test (radial and tangential surfaces)*

A vice with five pieces of timber of similar type and cross-section was used. The hardness was defined as the resistance to indentation by a steel ball of 11.3mm diameter, giving a projected area of 100mm<sup>2</sup> at a depth of 5.65mm. Hardness was measured with a universal testing machine and printer, the load was calibrated and the Janka indentation jig set at a maximum movement of 5.65mm penetration. Growth rings were aligned to give radial and tangential surfaces.

*Summary of test data for radial face*

Species	Sample population (N)	Minimum Value (Newtons)	Maximum Value (Newtons)	Mean (Newtons)	Standard deviation
SYP	50	2240	5074	3160	615
NZRP	50	1720	4262	3098	473
CRP	50	1817	4789	2821	639
ER	50	1714	2964	2253	345
BEP	28	1311	2965	2007	557
EW	50	1249	2070	1613	208

*Summary of test data for tangential face*

Species	Sample population (N)	Minimum Value (Newtons)	Maximum Value (Newtons)	Mean (Newtons)	Standard deviation
SYP	50	2137	4742	3264	574
CRP	50	1942	4899	3208	700
NZRP	50	2024	4529	3173	471
ER	50	1679	3470	2549	378
BEP	28	1513	3600	2464	650
EW	50	1347	2690	1805	249

### 2. Impact bending

*Modified Hatt-Turner test*

*(radial and tangential surfaces)*

Specimens were assessed before testing to ensure they were straight-grained, free of defects and with growth rings aligned to give radial and tangential surfaces. The specimens were placed in spring-loaded yokes (radial face upwards) with the hammer dropped from increasing heights until failure. The initial drop height was 50.8mm and failure was assessed at the height where complete separation, or a deflection of 60mm or more, occurred.

*Summary of impact bending data*

Species	Sample population (N)	Minimum Value (Newtons)	Maximum Value (Newtons)	Mean (Newtons)	Standard deviation
SYP	47	0.457	1.880	0.820	0.211
CRP	51	0.457	1.422	0.719	0.185
BEP	23	0.457	1.067	0.671	0.163
ER	51	0.457	0.864	0.665	0.103
NZRP	47	0.229	0.914	0.662	0.142
EW	50	0.127	0.61	0.427	0.104

### 3. Density of samples

*(Mass and volume)*

To assess density from mass and volume, a standard balance with data acquisition was used, along with digital caliper and calibrated weight. The specimens tested were the same as those used for the hardness test. These were assessed for defects and checked to ensure they were conditioned. Mass was recorded to 0.01g and specimen dimensions to 0.01mm.

*Average density of samples*

Species	Average Density (kgm <sup>3</sup> )
Southern Yellow Pine	609
New Zealand Radiata Pine	531
European Redwood	509
Chilean Radiata Pine	505
Brazilian Elliotis Pine	433
European Whitewood	403

For more information visit  
[AmericanSoftwoods.com](http://AmericanSoftwoods.com)



Southern Forest Products Association  
6660 Riverside Drive, Suite 212  
Metairie, Louisiana 70003 USA

Tel: 001-501-443-4464  
[AmericanSoftwoods.com](http://AmericanSoftwoods.com)  
Email: [mail@sfpa.org](mailto:mail@sfpa.org)

For sources of supply, visit  
[SouthernPineGlobal.com](http://SouthernPineGlobal.com)

