

STRENGTH GRADING OF TIMBER IN THE UK AND IRELAND

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This is an addendum to:

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It is advised to view the PDF or EPUB version to see correct formatting of the tables and references

SUMMARY

This paper summarises the state-of-the-art for strength grading of construction timber grown in the United Kingdom and the Republic of Ireland. It includes the latest approvals based on recent research on spruce, larch and Douglas-fir. It lists the following information along with the primary references: visual grading grades and strength class assignments; grading machines with approved settings for machine control grading; the species, size ranges and strength class combinations covered; and grade determining properties of specific strength classes for the UK and Irish markets. This paper is useful for those grading timber, and those specifying UK and Irish grown timber.

KEYWORDS: grades, classes, machine strength grading, visual strength grading, structural timber, EN14081

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National University of Ireland Galway (NUI Galway) is now called University of Galway. All mentions of NUI Galway in the paper refer to University of Galway.

Table 1: Definition of UK and IE specific strength classes (reference moisture content is 12%). Year of approval in bold.

Class	Better than EN338	5 th percentile strength (N/mm ²)	Mean stiffness (kN/mm ²)	5 th percentile density (kg/m ³)	Reference (first report to use)
		Bending			
No new additions					

Table 2: Species codes and combinations in use with UK and Irish grown timber

Group	Common name	Botanical name	Reference
Larch (WLAD) and Douglas-fir (PSMN)	European larch LADC	<i>Larix decidua</i>	Not previously defined
	Hybrid larch LAER	<i>Larix × marschlinsii</i> (syn. <i>L. × eurolepis</i>)	
	Japanese larch LAKM	<i>Larix kaempferi</i>	
	Douglas-fir PSMN	<i>Pseudotsuga menziesii</i>	

In the paper, *Larix eurolepis* is misspelled as *eurolepis* in this table for the larch entry.

The machine control strength grading options for this new combination of larch and Douglas-fir are listed in a new *Table 11*

Table 3: Visual grading assignments for timber grown in UK and Ireland when grading with BS4978 or IS127 to EN338

Species	Source	Visual grade	Strength class	Reference
No new additions				

Table 4: Visual grading assignments when grading with BS5756

Species	Source	Visual grade	Strength class	Reference
No new additions				

Table 5. Typical average properties of UK and IE grown softwoods prior to grading (Of a batch of timber at 12% moisture content, with the EN384 k_h factor)

	Dataset size	Mean bending strength (N/mm ²)	Mean bending stiffness (kN/mm ²)	Mean density (kg/m ³)
No new additions				

Table 6: List of grading machines approved for machine control. In bold the machines with machine control settings available for UK and Ireland

Manufacturer	Name	ID*	Description
Microtec s.r.l.–GmbH	<i>Goldeneye 901</i>	40	Laser tracheid grain angle
Microtec s.r.l.–GmbH	<i>Goldeneye 902</i>	41	Laser tracheid grain angle & density
Microtec s.r.l.–GmbH	<i>Goldeneye 906</i>	42	Laser tracheid grain angle, longitudinal resonance & density

Table 7: Machine settings for British spruce WPCS (*Picea sitchensis*, *P. abies*)

Source	Size (mm) & report by	Combinations	[Machine] & table	Reference
UK IE	35-110 x 86-325 (*F) Napier Uni	[C24/C16] [C22/C14] [C20/C14] [C18] [C16]	[11]-40	TG1/202305/13rev1
UK IE	20-52 x 35-54 (*F) Napier Uni	[C14]	[14]-47	(TG1/201807/02rev
UK IE	35-110 x 86-325 (*F) Napier Uni	[C24/C16] [C22/C14] [C20/C14] [C18] [C16]	[14]-49	TG1/202305/13rev1
UK IE	20-52 x 35-54 (*F) Napier Uni	[C14]	[23]-46	(TG1/201807/02rev
UK IE	35-110 x 86-325 (*F) Napier Uni	[C24/C16] [C22/C14] [C20/C14] [C18] [C16]	[23]-48	TG1/202305/13rev1

(*F): Minimum cross-section area $\geq 3320\text{mm}^2$

Table 8: Machine settings for British pine WPNN (*Pinus sylvestris*, *P. nigra*)

Source	Size (mm) & report by	Combinations	[Machine] & table	Reference
No new additions				

Table 9: Machine settings for larch WLAD (*Larix decidua*, *L. x marschlinsii* (syn. *eurolepis*), *L. kaempferi*)

Source	Size (mm) & report by	Combinations	[Machine] & table	Reference
No new additions				

Table 10: Machine settings for Douglas-fir PSMN (*Pseudotsuga menziesii*)

Source	Size (mm) & report by	Combinations	[Machine] & table	Reference
No new additions				

Table 11: Machine settings for larch WLAD (*Larix decidua*, *L. x eurolepis*, *L. kaempferi*) and Douglas-fir PSMN (*Pseudotsuga menziesii*)

Source	Size (mm) & report by	Combinations	[Machine] & table	Reference
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[TR26/C16] [C27/C16] [C24/C16] [C24/C14] [C22/C14] [C22] [C20] [C18] [C16] [C14]	[5]-78 also [10]	TG1/202204/18
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C24/C16] [C24/C14] [C22/C14] [C20/C14] [C18/C14] [C18] [C16] [C14]	[8]-67 also [10] [20] [22]	TG1/202211/06rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C30/C16] [C30/C14] [TR26/C16] [C27/C16] [C24/C16] [C24/C14] [C22/C14] [C22] [C20] [C18] [C16] [C14]	[10]-93	TG1/202211/03rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C24/C16] [C24/C14] [C24] [C22] [C20] [C18] [C16]	[11]-39	TG1/202305/09rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C27/C16] [C27/C14] [C24/C16] [C24/C14] [TR26] [C24] [C22] [C20] [C18] [C16]	[14]-46	TG1/202305/09rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C24] [C22] [C20] [C18] [C16]	[19]-20	TG1/202305/09rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C30/C16] [C30/C14] [TR26/C16] [C27/C16] [C24/C16] [C24/C14] [C22/C14]	[20]-66 also [10]	TG1/202211/04rev1

		[C20/C14] [C18/C14] [C16] [C14]		
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C30/C16] [C30/C14] [TR26/C16] [C27/C16] [C24/C16] [C24/C14] [C22/C14] [C20/C14] [C18/C14] [C16] [C14]	[22]-69 also [10]	TG1/202211/05rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C27/C16] [C27/C14] [C24/C16] [C24/C14] [TR26] [C24] [C22] [C20] [C18] [C16]	[23]-45	TG1/202305/09rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C24/C14] [C24] [C22] [C20] [C18] [C16]	[24]-20	TG1/202305/09rev1
UK IE	32-110 x 68-303 (*G) Uni of Galway & Napier Uni	[C24/C14] [C24] [C22] [C20] [C18] [C16]	[26]-20	TG1/202305/09rev1

(*G): Minimum cross-section area $\geq 2400\text{mm}^2$

Contact machine manufacturer or a Notified/Approved Body to obtain more information about grading settings tables, their limitations and yields. As things change, an update of this supplement may be obtained from <http://blogs.napier.ac.uk/cwst/tg1/>

REFERENCES

CEN TC124 WG2 TG1 Approved grading reports (confidential):

GIL-MORENO D. and RIDLEY-ELLIS D. (2023): TG1/202204/18 Derivation of Goldeneye grading machines settings for the species combination Larch & Douglas fir (IE & GB, C classes)

GIL-MORENO D. and RIDLEY-ELLIS D. (2023): TG1/202211/03rev1 Derivation of Goldeneye grading machines settings for the species combination Larch & Douglas fir (IE & GB, C classes)

GIL-MORENO D. and RIDLEY-ELLIS D. (2023): TG1/202211/04rev1 Derivation of Viscan Plus grading machines settings for the species combination Larch & Douglas fir (IE & GB, C classes)

GIL-MORENO D. and RIDLEY-ELLIS D. (2023): TG1/202211/05rev1 Derivation of Viscan Compact grading machine settings for the species combination Larch & Douglas fir (IE & GB, C classes)

GIL-MORENO D. and RIDLEY-ELLIS D. (2023): TG1/202211/06rev1: Derivation of Viscan grading machine settings for the species combination Larch & Douglas fir (IE & GB, C classes)

Addendum to <https://doi.org/10.1080/20426445.2022.2050549>

GIL-MORENO D. and RIDLEY-ELLIS D. (2023): TG1/202305/09rev1: Derivation of MTG grading machine settings for the species combination Larch & Douglas fir (IE & GB, C classes).

RIDLEY-ELLIS D. (2023): TG1/202305/13rev1: Derivation of MTG 960 grading machine settings for British Spruce