SUORITUSTASOILMOITUS
DECLARATION OF PERFORMANCE

CE

Rakennustuotedirektiivi CPD 89/106/EEC

Tämä suoritustasoilmoitus koskee seuraavia tuotteita:

4573AG, 4573BSG, 4574AG, 4574BSG, 4576AG, 4576ASG, 4566BR, 4567BR, 4569BR, 4573BR, 4574BR, 4576BR, 4576AR, 4572BR, 4599BR, 4582BR, 4584BR, 4570BR, 4612BS, 4613BS, 4615BS, 4616BS, 4625BS, 4628BS, 4629BS, 4631BS, 4632BS, 4634BS, 4631BR, 4629BR, 4634BS

Käyttötarkoitus:

H&H konenaulat on tarkoitettu puun kiinnittämiseen puuhun.

Sovellettava standardi:

EN 14592:2008+A1:2012

Eränumero:

Eränumero on pakkauksessa.

Suoritustaso:

Tuote Ø /mm	Myötömomentti My,k/Nmm	Ulosvetolujuus fax,k/N/mm²	Ulosveto kannan läpi fhead,k/N/mm²
2,1 kampa	818	9,88	35,85
2,1 sileä	727	6,04	38,87
2,5 kampa	1979	9,02	47,62
2,5 sileä	2214	5,55	44,33
2,8 kampa	2794	8,86	31,09
2,8 sileä	2955	7,27	31,76
3,1 kampa	3919	8,25	50,97
3,1 sileä	3921	5,44	54,69

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myynti@hhtuonti.fi - www.hhtuonti.fi

SUORITUSTASOILMOITUS
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Korroosionkestävyys:

Kirkkaat ja sähkösinkityt naulat, suojausluokka 1. Kuumasinkityt ja ruostumattomat naulat, suojausluokka 1,2,3.

Valmistaja:

Valmistajan numero 21.

ITT (Initial type testing) alkutestauspaikka:

Szutest Engineering Test Institute
Hudcova 56b
62100 Brno
Czech Republic

Raporttinumerot:

J-30-20394-11, J-30-20392-11, J-30-20393-11 ja J-30-20396-11

Espoo 03.02.2014

Martti Laaksonen

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SUORITUSTASOILMOITUS

DECLARATION OF PERFORMANCE

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Tämä suoritustasoilmoitus koskee seuraavia tuotteita:

4564N, 4564L, 4564C, 4563C, 4563E, 4563D, 4563F, 4561N, 4561L, 4576BR, 4576AR, 4562C, 4562E, 4561H, 4574BR, 4561C, 4561D, 4561E, 4573BR, 4559D, 4561B, 4566EB

Käyttötarkoitus:

H&H konenaulat on tarkoitettu puun kiinnittämiseen puuhun ja 4566EB metallilevyn kiinnittämiseen puuhun.

Sovellettava standardi:

EN 14592:2008+A1:2012

Eränumero:

Eränumero on pakkauksessa.

Suoritustaso:

Myötömomentin, ulosvetolujuuden, ulosveto kannan läpi mittausarvot ja käyttöluokitukset erillisessä liitteessä. No VTT-S-00582-12.

Korroosionkestävyys:

Kirkkaat ja sähkösinkityt naulat, suojausluokka 1. Kuumasinkityt ja ruostumattomat naulat, suojausluokka 1,2,3.

Valmistaja:

Valmistajan numero 13

ITT (Initial type testing) alkutestauspaikka ja raporttinumero:

VTT Expert Services Ltd
Kemistintie 3, Espoo
P.O. BOX 1001, 02044 VTT
VTT-S-00582-12
VTT-S-03992-14

Espoo 27.11.2015

Martti Laaksonen

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Summary

Values shown in Table 21 may be given as declared values for the tested nails. Nails 4564L, 4563E, 4563F and 4561L may be classified as threaded nails ($f_{ax} \geq 4{,}5$ N/mm^2).

Table 21 Declared values.

Nail	l x d [mm]	A_h [mm^2]	l_g [mm]	$f_{u,k}$ [N/mm^2]	$M_{y,k}$ [Nmm]	$f_{ax,k}$ with ρ_k = 350 [N/mm^2]	$f_{head,k}$ with ρ_k = 350 [N/mm^2]	$f_{tens,k}$	Service class according to EN 1995-1-1
4564N	100 x 3,15	31,2	-	800	4740	2,45	11,7	NDP	3
4564L	100 x 3,15	31,2	65	800	3560	5,39	11,7	NDP	3
4564C	100 x 3,15	31,2	-	800	4740	2,45	11,7	NDP	1
4563C	90 x 3,1	31,2	-	710	4030	2,45	13,0	NDP	1
4563E	90 x 3,1	31,2	64	710	3330	4,66	14,0	NDP	1
4563D	90 x 3,1	31,2	-	710	4030	2,45	13,0	NDP	1
4563F	90 x 3,1	31,2	64	710	3330	4,66	13,0	NDP	1
4561N	90 x 3,1	31,2	-	710	4030	2,45	12,4	NDP	3
4561L	90 x 3,1	31,2	64	710	3160	5,13	12,4	NDP	3
4576BR	90 x 3,1	31,2	64	680	3800	3,34	13,0	NDP	3
4576AR	90 x 3,1	31,2	-	680	3865	2,45	13,0	NDP	3
4562C	75 x 2,9	30,2	-	740	3530	2,45	10,6	NDP	1
4562E	75 x 2,9	30,2	49	740	3000	3,75	10,6	NDP	1
4561H	75 x 2,9	30,2	49	740	2740	2,35	10,9	NDP	3
4574BR	75 x 2,9	30,2	49	690	3110	3,89	15,5	NDP	3
4561C	64 x 2,9	30,2	-	740	3530	2,45	10,6	NDP	1
4561D	64 x 2,9	30,2	38	740	3000	3,07	10,6	NDP	1
4561E	64 x 2,9	30,2	38	740	2740	2,65	10,9	NDP	3
4573BR	64 x 2,9	30,2	38	690	3110	3,84	15,5	NDP	3
4559D	50 x 2,9	30,2	24	740	3000	2,61	10,6	NDP	1
4561B	50 x 2,9	30,2	24	740	2740	3,09	10,9	NDP	3

Espoo, 23.1.2012

Ari Kevarinmäki
Senior Expert

Tero Sundström
Expert

Appendices

Appendix 1: Results of nail dimension measurements
Appendix 2: Results of zinc coating thickness tests
Appendix 3: Results of yield moment tests
Appendix 4: Withdrawal test results
Appendix 5: Pull through test results

Distribution

H&H Tuonti Oy	Original, 2 pieces
VTT Expert Services Ltd / Archive	Original

Tensile capacity

The characteristic tensile capacity derived from the tests for the anchor nail is shown in Table 29.

Table 29 The characteristic tensile capacity of the anchor nail.

Nail	$f_{tens,k}$ [kN]
40sk	11,02

Summary

Values shown in Table 30 may be given as declared values for the tested nails. All the profiled nails may be classified as threaded nails ($f_{ax} \geq 4{,}5$ N/mm^2).

Table 30 Acceptable values for the declared properties.
NPD = No Performance Determined

Nail	d [mm]	l [mm]	A_h [mm^2]	l_g [mm]	l_p [mm]	f_u [N/mm^2]	$M_{y,k}$ [Nmm]	$f_{ax,k}$ $\rho_k = 350$ [N/mm^2]	$f_{head,k}$ $\rho_k = 350$ [N/mm^2]	$f_{tens,k}$ [kN]	Service class EN 1995-1-1
50kkD	2,76	50,2	29,6	30,0	3,9	680	2730	7,35	19,8	NPD	3
50kkO	2,76	50,2	31,1	30,0	4,0	680	2730	7,35	25,4	NPD	3
64kkD	2,76	64,2	29,6	45,0	3,7	680	2730	7,35	19,8	NPD	3
64kkO	2,76	64,2	31,1	45,0	4,3	680	2730	7,35	25,4	NPD	3
64kk	2,76	64,2	36,3	45,0	4,2	680	2730	7,35	8,55	NPD	3
75kkD	2,76	75,2	29,6	55,0	3,9	680	2730	7,35	19,8	NPD	3
75kkO	2,76	75,2	31,1	55,0	4,2	680	2730	7,35	25,4	NPD	3
75kk	2,76	75,2	36,3	55,0	4,0	680	2730	7,35	8,55	NPD	3
90kkD	2,85	90,4	30,7	70,0	4,2	670	3065	9,50	21,9	NPD	3
90kkO	3,09	90,4	32,1	70,0	4,0	670	3285	9,50	24,7	NPD	3
90kk	3,09	90,4	37,0	70,0	3,8	670	3065	9,50	8,55	NPD	3
90kD	3,09	90,4	30,7	-	4,2	670	3780	2,45	21,9	NPD	3
90kO	3,09	90,4	32,1	-	4,6	670	3780	2,45	24,7	NPD	3
90k	3,09	90,4	37,0	-	4,3	670	3780	2,45	8,55	NPD	3
40sk	3,95	39,8	48,3	27,0	5,4	930	9935	8,25	NPD	11,0	1

Espoo, 2.9.2014

Ari Kevarinmäki
Leading Expert

VTT EXPERT SERVICES OY
VTT EXPERT SERVICES LTD

Appendices

Appendix 1: Dimensional drawings of the nails
Appendix 2: Results of nail dimension measurements
Appendix 3: Results of zinc coating thickness tests

SUORITUSTASOILMOITUS
DECLARATION OF PERFORMANCE

CE

Tämä suoritustasoilmoitus koskee seuraavia tuotteita:
4561UR, 4561UAR, 4561UBR, 4561UDR, 4712AS, 4713AS, 4715AS, 4561V, 4561Y, 4561Z, 4561COF, 4561EOF, 4561HOF, 4561LOF, 4561NOF, 4563COF, 4572A, 4572B, 4572BS, 4572BR, 4575BS, 4576BS, 4577BS, 4578BS, 4579BS, 4582A, 4582B, 4582BR, 4582BS, 4583A, 4583B, 4584A, 4584B, 4584BR, 4584BS, 4585A, 4585B, 4585BS, 4586B, 4592BS, 4596C, 4599AS, 4599BR, 4599BS, 4613BS, 4615BS, 4616BS, 4629BR, 4629BS, 4631BR, 4631BS, 4632BS ja 4634BS

Käyttötarkoitus:
H&H konenaulat on tarkoitettu puun kiinnittämiseen puuhun.

Sovellettava standardi:
EN 14592:2008+A1:2012

Eränumero:
Eränumero on pakkauksessa.

Suoritustaso:
Myötömomentin, ulosvetolujuuden, veto kannan läpi mittausarvot ja käyttöluokitukset erillisissä liitteissä.

Valmistaja:
Valmistajan numero 13

ITT (Initial type testing) alkutestauspaikka ja raporttinumerot:
Karlsruhe Institute of Technology
Kaiserstrasse 12
76131 Karlsruhe
Germany

Raporttinumerot: 136250/1-10, 20-32

Espoo 03.02.2014

Martti Laaksonen

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Karlsruher Institut für Technologie

Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/1
Initial Type Test (ITT)

CE

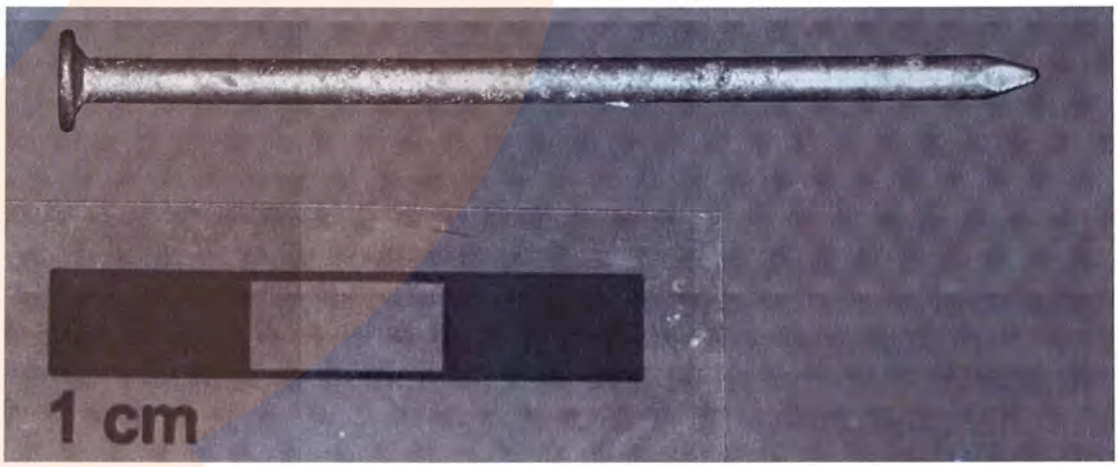
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,10 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,10 x 50 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,20	5,22	5,28	5,24	5,29	5,25	+ 0,90	- 0,91
d	2,21	2,23	2,23	2,21	2,20	2,22	+ 0,82	- 0,69
l	50,0	50,0	50,1	50,1	50,0	50,0	+ 0,17	- 0,14
h_t	1,12	1,12	1,11	1,10	1,09	1,11	+ 1,08	- 1,62
l_p	2,70	2,78	2,79	2,66	2,67	2,72	+ 2,57	- 2,21
A_h	21,2	21,4	21,9	21,6	22,0	21,6	+ 1,79	- 1,82

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
---		Ø 2,1		---			---				---			
							d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack ---	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
---		855		---		---	---		---		---		---	
---		869		---		---	---		---		---		---	
---		863		---		---	---		---		---		---	
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---		f_u > 600 N/mm²		---										

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

VERSUCHSANSTALT FÜR STAHL, HOLZ U. STEINE
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Dr.-Ing. R. Görlacher

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Karlsruher Institut für Technologie

Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/2
Initial Type Test (ITT)

CE

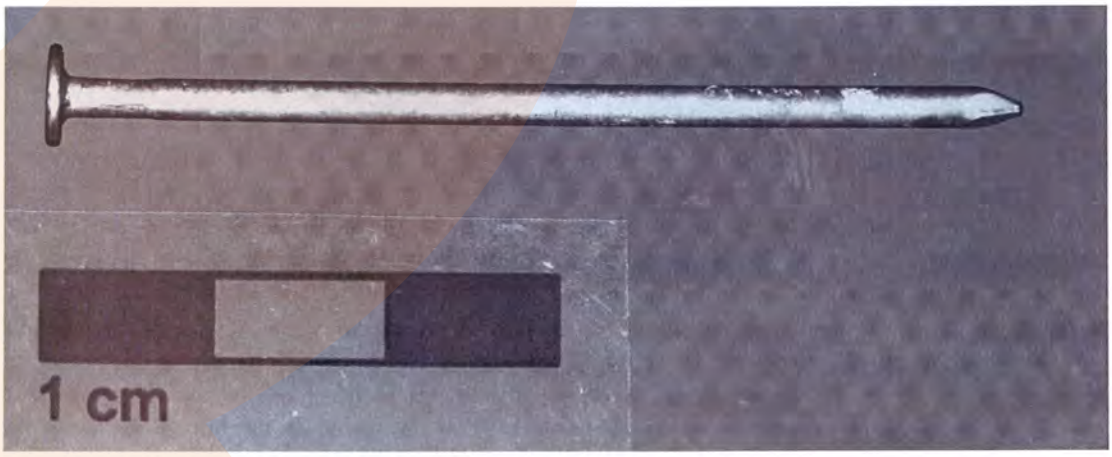
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,30 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,30 x 57 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,69	5,63	5,64	5,55	5,59	5,62	+ 1,24	- 1,24
d	2,34	2,35	2,35	2,35	2,35	2,35	+ 0,22	- 0,25
l	56,8	56,7	56,9	56,7	56,8	56,8	+ 0,23	- 0,15
h_t	1,05	1,04	1,08	1,06	1,09	1,06	+ 2,44	- 2,26
l_p	3,19	3,22	3,14	3,23	3,28	3,21	+ 2,12	- 2,24
A_h	25,4	24,9	25,0	24,2	24,5	24,8	+ 2,49	- 2,47

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
---		Ø 2,3		---			---				---			
							d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack	---	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
---		793		---		---		---		---		---		---	
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---		**f_u > 600 N/mm²**													

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

VERSUCHSANSTALT FÜR STAHL, HOLZ U. STEINE
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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/3
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,50 mm

Coating: no

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 2,50 x 65 smooth

Dimen-sions	measured values mm					mean value mm	measured values related to mean value %	
	1	2	3	4	5			
d_h	6,14	6,27	6,15	6,32	6,40	6,26	+ 2,29	- 1,81
d	2,45	2,45	2,46	2,46	2,47	2,46	+ 0,48	- 0,49
l	63,9	63,6	63,7	63,5	63,7	63,7	+ 0,38	- 0,20
h_t	1,14	1,13	1,08	1,08	1,13	1,11	+ 2,52	- 2,88
l_p	3,87	4,00	4,04	4,01	3,90	3,96	+ 1,92	- 2,37
A_h	29,6	30,9	29,7	31,3	32,1	30,7	+ 4,61	- 3,61

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
---		Ø 2,5		---			--- d = ---		--- l_{ef} = ---		--- d_h = ---			
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack ---	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
---		1023		---		---	---		---		---		---	
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---		f_u > 600 N/mm²		---										

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

VERSUCHSANSTALT FÜR STAHL, HOLZ U. STEINE
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Karlsruher Institut für Technologie

Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/4
Initial Type Test (ITT)

CE

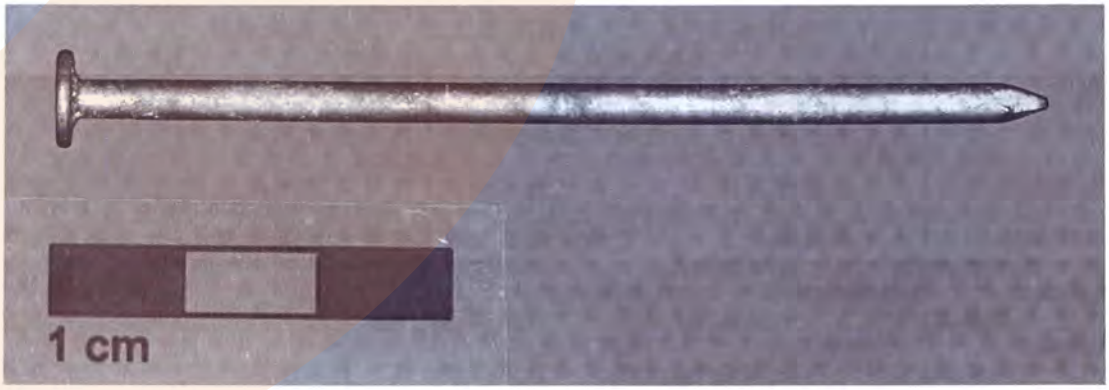
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,90 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,90 x 75 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	7,00	6,96	7,01	6,79	6,73	6,90	+ 1,60	- 2,41
d	2,95	2,92	2,93	2,93	2,93	2,93	+ 0,33	- 0,22
l	74,8	74,9	74,5	74,5	74,7	74,7	+ 0,53	- 0,35
h_t	1,77	1,69	1,76	1,76	1,68	1,73	+ 2,19	- 3,00
l_p	4,64	4,40	4,39	4,64	4,46	4,51	+ 2,97	- 2,57
A_h	38,5	38,0	38,6	36,2	35,6	37,4	+ 3,19	- 4,78

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
	---		Ø 2,9		---		---				---			
							d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack ---	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
---		984		---		---	---		---		---		---	
---		949		---		---	---		---		---		---	
---		977		---		---	---		---		---		---	
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---		f_u > 600 N/mm²		---										

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VERSUCHSANSTALT FÜR STAHL, HOLZ U. STEINE
12
Amtliche Materialprüfungsanstalt Universität Karlsruhe (TH)

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/5
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,90 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 2,90 x 65 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
$d_{h,\,max}$	7,05	7,06	7,16	7,06	7,11	7,09	+ 1,01	- 0,54
$d_{h,\,min}$	5,37	5,35	5,30	5,28	5,32	5,32	+ 0,86	- 0,83
d	2,95	2,94	2,95	2,93	2,93	2,94	+ 0,38	- 0,42
l	64,0	64,2	64,1	63,7	64,2	64,1	+ 0,27	- 0,49
h_t	2,09	2,15	2,10	2,13	2,10	2,11	+ 1,70	- 1,14
l_p	4,34	4,40	4,40	4,43	4,46	4,34	+ 1,23	- 1,50
A_h	31,7	31,8	31,9	31,4	31,8	31,7	+ 0,63	- 1,09

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head pull-through parameter	--- d_h = ---	R_{ax}^*	kN	---	---	---	---	---	---	---	---	---	---	---
		ρ	kg/m³	---	---	---	---	---	---	---	---	---	---	---
withdrawal parameter	--- l_{ef} = ---	R_{ax}	kN	---	---	---	---	---	---	---	---	---	---	---
	d = ---	ρ	kg/m³	---	---	---	---	---	---	---	---	---	---	---
yield moment	---	crack	---	---	---	---	---	---	---	---	---	---	---	---
		M_y	Nm	---	---	---	---	---	---	---	---	---	---	---
tensile strength of wire	---	f_u	N/mm²	---	---	---	---	---	---	---	---	---	---	---
tensile capacity	---	f_{tens}	kN	---	---	---	---	---	---	---	---	---	---	---

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/6
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,10 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 3,10 x 83 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	7,01	7,13	7,03	7,08	7,10	7,07	+ 0,80	- 0,86
d	3,12	3,13	3,16	3,12	3,12	3,13	+ 0,88	- 0,40
l	82,7	82,9	82,7	82,9	83,0	82,8	+ 0,16	- 0,22
h_t	1,87	1,88	1,94	1,95	1,98	1,92	+ 2,91	- 2,81
l_p	5,08	4,81	5,09	4,83	4,95	4,95	+ 2,79	- 2,87
A_h	38,6	39,9	38,8	39,4	39,6	39,2	+ 1,61	- 1,71

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
---		Ø 3,1		---			---				---			
							d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack ---	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
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---		960		---		---	---		---		---		---	
---		943		---		---	---		---		---		---	
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---		f_u > 600 N/mm²		---										

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/7
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,10 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 3,10 x 90 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
$d_{h,\,max}$	7,24	7,25	7,32	7,18	7,26	7,25	+ 0,91	- 0,97
$d_{h,\,min}$	5,28	5,26	5,23	5,25	5,26	5,26	+ 0,46	- 0,49
d	3,11	3,14	3,14	3,12	3,13	3,13	+ 0,31	- 0,42
l	88,6	88,6	88,5	88,6	88,4	88,6	+ 0,10	- 0,16
h_t	2,09	2,10	2,15	2,10	2,13	2,11	+ 1,70	- 1,14
l_p	4,36	4,37	4,41	4,38	4,44	4,39	+ 1,09	- 0,73
A_h	32,1	32,1	32,1	31,7	32,1	32,0	+ 0,38	- 0,97

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tensile capacity		tensile strength of wire	yield moment		withdrawal parameter				head pull-through parameter			
					---				---			
					d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	kN	f_u	M_y	Nm	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/8
Initial Type Test (ITT)

CE

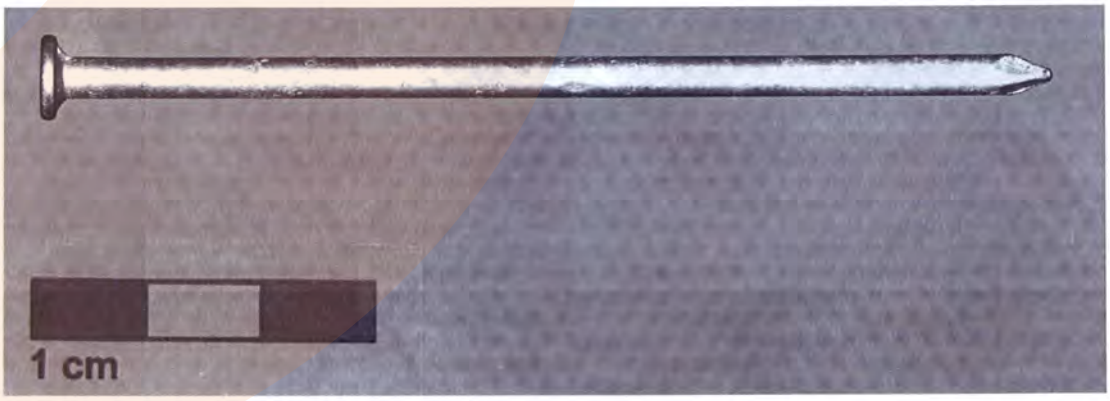
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,40 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 3,40 x 90 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	7,16	7,16	7,10	7,25	7,20	7,16	+ 1,25	- 1,72
d	3,43	3,43	3,43	3,44	3,44	3,43	+ 0,25	- 0,18
l	88,6	88,3	88,5	88,5	89,0	88,6	+ 0,43	- 0,28
h_t	1,94	1,97	1,96	2,03	2,04	1,99	+ 2,62	- 2,41
l_p	5,50	5,44	5,36	5,48	5,40	5,44	+ 1,18	- 1,40
A_h	40,3	40,3	38,9	41,3	40,7	40,3	+ 2,51	- 3,42

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
---		Ø 3,4		---			---				---			
							d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
---		931		---		---	---		---		---		---	
---		920		---		---	---		---		---		---	
---		919		---		---	---		---		---		---	
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---		f_u > 600 N/mm²		---			---							

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/9
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,80 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 3,80 x 100 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	7,40	7,43	7,34	7,40	7,57	7,43	+ 1,95	- 1,24
d	3,83	3,82	3,82	3,82	3,84	3,83	+ 0,42	- 0,31
l	99,9	99,2	99,3	99,6	99,6	99,5	+ 0,34	- 0,33
h_t	2,10	2,17	2,07	2,11	2,10	2,11	+ 2,84	- 1,90
l_p	5,71	5,93	5,87	5,85	5,81	5,83	+ 1,65	- 2,13
A_h	43,0	43,4	42,3	43,0	45,0	43,3	+ 3,92	- 2,47

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
---		Ø 3,8		---			---				---			
							d = ---		l_{ef} = ---			d_h = ---		
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack ---	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}*	kN
---		885		---		---	---		---		---		---	
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---		f_u > 600 N/mm²		---			---							

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/10
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 4,20 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 4,20 x 130 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	8,26	8,26	8,31	8,34	8,38	8,31	+ 0,83	- 0,61
d	4,26	4,27	4,28	4,25	4,25	4,26	+ 0,49	- 0,33
l	128	127	128	127	127	128	+ 0,23	- 0,16
h_t	1,99	1,96	2,07	2,04	2,01	2,01	+ 2,78	- 2,68
l_p	5,96	5,91	5,90	5,98	6,00	5,95	+ 0,84	- 0,84
A_h	53,6	53,6	54,2	54,7	55,1	54,2	+ 1,66	- 1,22

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tensile capacity		tensile strength of wire		yield moment			withdrawal parameter				head pull-through parameter			
---		Ø 4,2		---			---				---			
							d = ---		l_{ef} = ---			d_h = ---		
f_{tens}	kN	f_u	N/mm²	M_y	Nm	crack ---	ρ	kg/m³	R_{ax}	kN	ρ	kg/m³	R_{ax}^*	kN
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---		f_u > 600 N/mm²		---										

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Amtliche Materialprüfungsanstalt

Report No. 136250/11
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 4,60 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 4,60 x 145 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	9,34	9,24	9,30	9,26	9,23	9,27	+ 0,76	- 0,48
d	4,64	4,66	4,66	4,64	4,64	4,65	+ 0,36	- 0,24
l	142	143	143	142	143	143	+ 0,15	- 0,16
h_t	2,06	2,11	2,17	2,05	2,15	2,11	+ 2,94	- 2,75
l_p	6,53	6,46	6,80	6,74	6,77	6,66	+ 2,10	- 3,00
A_h	68,6	67,0	67,9	67,3	66,9	67,5	+ 1,52	- 0,96

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter				head pull-through parameter			
					---				---			
					d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	f_u	M_y	crack		ρ		R_{ax}		ρ		R_{ax}*	
kN	N/mm²	Nm	---		kg/m³		kN		kg/m³		kN	
---	823	---	---		---		---		---		---	
---	806	---	---		---		---		---		---	
---	795	---	---		---		---		---		---	
---	782	---	---		---		---		---		---	
---	800	---	---		---		---		---		---	
---	---	---	---		---		---		---		---	
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---	---	---	---		---		---		---		---	
---	**f_u > 600 N/mm²**	---			---							

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

VERSUCHSANSTALT FÜR STAHL, HOLZ U. STEINE
12
Amtliche Materialprüfungsanstalt Universität Karlsruhe (TH)

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Karlsruher Institut für Technologie

Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/12
Initial Type Test (ITT)

CE

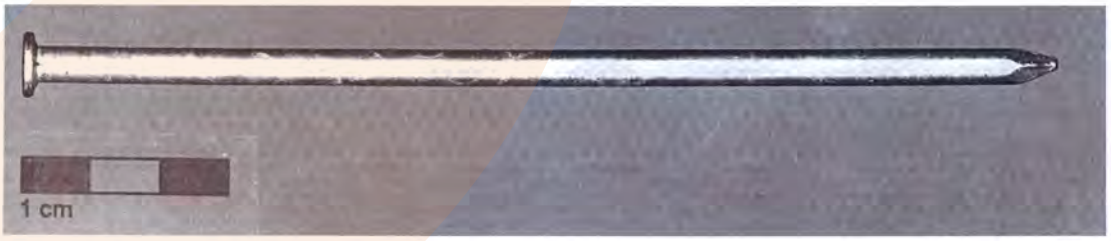
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 5,0 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 5,0 x 150 mm smooth HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	9,21	9,30	9,08	9,19	9,30	9,22	+ 0,93	- 1,48
d	5,10	5,10	5,09	5,12	5,10	5,10	+ 0,35	- 0,23
l	149	149	149	149	149	149	+ 0,03	- 0,04
h_t	2,23	2,24	2,22	2,14	2,18	2,20	+ 1,73	- 2,82
l_p	7,98	7,87	7,95	7,95	7,96	7,94	+ 0,48	- 0,91
A_h	66,6	67,8	64,7	66,4	67,9	66,7	+ 1,85	- 2,95

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter				head pull-through parameter			
---	Ø 5,0	---			---				---			
					d = ---		l_{ef} = ---		d_h = ---			
f_{tens}	f_u	M_y	crack		ρ		R_{ax}		ρ		R_{ax}^*	
kN	N/mm²	Nm	---		kg/m³		kN		kg/m³		kN	
---	772	---	---		---		---		---		---	
---	772	---	---		---		---		---		---	
---	770	---	---		---		---		---		---	
---	764	---	---		---		---		---		---	
---	760	---	---		---		---		---		---	
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---	f_u > 600 N/mm²	---			---							

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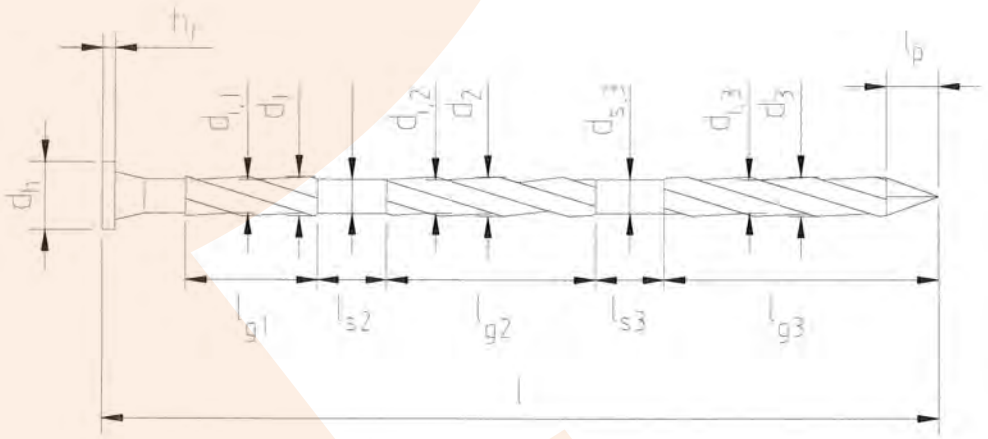
Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/13
Initial Type Test (ITT)

CE

Client:	H&H Tuonti Oy
Base:	EN 14592:2008+A1:2012 (D) nails for structural timber products
Dimensions:	diameter 2,30 mm
Coating:	type 1 – HDG ≥ 50µm or bright = 0µm
Material:	HPB 235 (Q235) in accordance to GB1499.1-2008)



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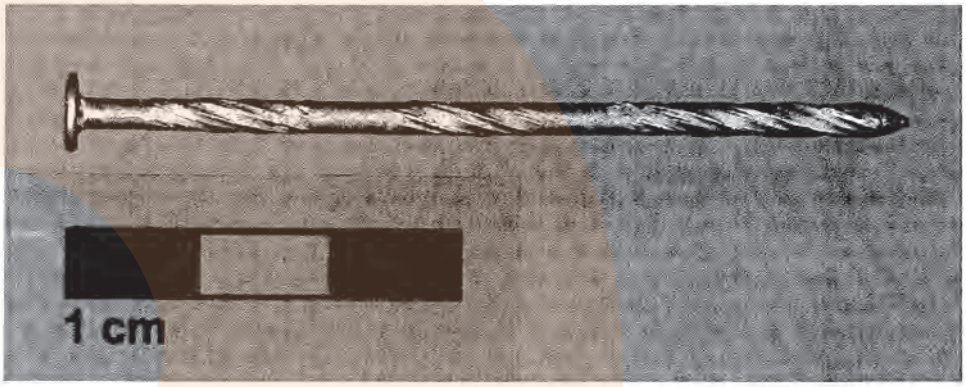
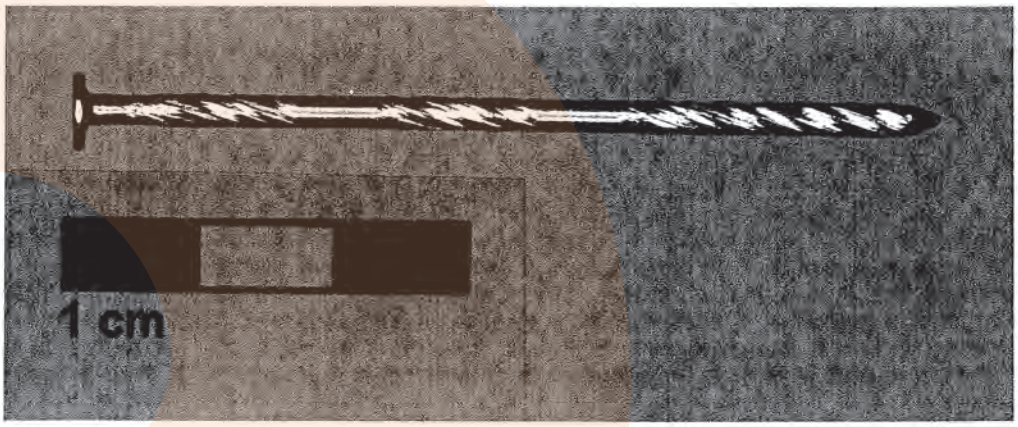


tested nail 2,30 x 65 mm spiral HDG

Dimensi-ons	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,90	5,77	5,76	5,76	5,77	5,79	+ 1,87	- 0,61
$d_{s,1}$	2,26	2,24	2,26	2,31	2,29	2,27	+ 1,67	- 1,28
$d_{s,2}$	2,36	2,36	2,39	2,36	2,37	2,37	+ 0,93	- 0,51
$d_{s,3}$	2,37	2,38	2,36	2,35	2,39	2,37	+ 0,70	- 0,85
d_1	2,38	2,47	2,45	2,41	2,43	2,43	+ 1,84	- 1,93
d_2	2,48	2,56	2,50	2,54	2,52	2,52	+ 1,42	- 1,47
d_3	2,52	2,54	2,49	2,52	2,59	2,53	+ 2,18	- 1,65
l_{g1}	12,0	11,6	11,8	11,4	11,9	11,7	+ 2,13	- 2,81
l_{g2}	11,9	12,2	12,1	11,8	11,9	12,0	+ 2,05	- 1,87
l_{g3}	22,1	22,2	21,5	21,7	22,0	21,9	+ 1,43	- 1,81
l_{s2}	6,05	6,37	6,21	6,22	6,32	6,23	+ 2,18	- 2,95
l_{s3}	6,72	6,92	6,99	6,99	6,98	6,92	+ 1,01	- 2,89
l	63,9	64,1	64,0	63,5	64,0	63,9	+ 0,29	- 0,60
h_t	1,18	1,19	1,18	1,20	1,18	1,19	+ 1,18	- 0,51
l_p	2,80	2,88	2,85	2,74	2,73	2,80	+ 2,86	- 2,50
A_h	27,3	26,2	26,0	26,1	26,1	26,3	+ 3,77	- 1,23



tested nail 2,30 x 65 mm spiral bright

Dimensi-ons	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,63	5,71	5,63	5,65	5,55	5,64	+ 1,37	- 1,50
$d_{s,1}$	2,26	2,25	2,23	2,25	2,29	2,26	+ 1,51	- 1,15
$d_{s,2}$	2,29	2,29	2,29	2,28	2,28	2,29	+ 0,17	- 0,19
$d_{s,3}$	2,28	2,28	2,28	2,28	2,28	2,28	+ 0,08	- 0,14
d_1	2,34	2,40	2,36	2,35	2,34	2,36	+ 2,01	- 0,87
d_2	2,43	2,48	2,44	2,46	2,45	2,45	+ 1,30	- 1,09
d_3	2,44	2,46	2,46	2,46	2,43	2,45	+ 0,57	- 0,71
l_{g1}	11,6	11,2	11,1	11,4	11,2	11,3	+ 2,65	- 1,77
l_{g2}	12,2	11,9	12,2	12,0	11,9	12,0	+ 1,33	- 1,16
l_{g3}	23,0	22,4	23,0	22,6	22,3	22,7	+ 1,50	- 1,59
l_{s2}	6,09	6,20	6,19	6,01	6,00	6,10	+ 1,67	- 1,61
l_{s3}	6,12	6,13	6,16	6,14	6,39	6,19	+ 3,26	- 1,10
l	63,9	63,7	64,1	64,1	63,5	63,9	+ 0,44	- 0,62
h_t	1,07	1,02	1,05	1,07	1,03	1,05	+ 2,10	- 2,67
l_p	2,66	2,62	2,70	2,60	2,60	2,64	+ 2,43	- 1,37
A_h	24,9	25,6	24,9	25,1	24,2	24,9	+ 2,74	- 2,99

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter		
2,30 x 65 HDG	---	2,30 x 65 HDG			2,30 x 65 bright d = 2,3 mm l_{ef} = 20,2 mm			2,30 x 65 HDG d_h = 5,80 mm		
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*	
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN	
1,62	---	0,921	NO		373	0,418		355	0,900	
1,61	---	0,939	NO		346	0,329		364	0,860	
1,69	---	0,958	NO		357	0,506		370	0,860	
1,67	---	0,968	NO		353	0,485		410	1,26	
1,68	---	0,949	NO		333	0,414		371	1,32	
1,69	---	0,930	NO		334	0,299		398	1,33	
1,65	---	0,968	NO		346	0,334		393	1,34	
1,70	---	0,921	NO		334	0,271		370	1,10	
1,63	---	0,930	NO		353	0,281		384	1,43	
1,65	---	0,949	NO		333	0,257		374	1,11	
$f_{tens,k}$ = 1,49 kN	---	**$M_{y,k}$ = 0,849 Nm**			**$f_{ax,k}$ = 4,50 N/mm² with ρ_k = 350 kg/m³**			**$f_{head,k}$ = 22,2 N/mm² with ρ_k = 380 kg/m³**		

penetration depth: 23 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

VERSUCHSANSTALT FÜR STAHL HOLZ U. STEINE
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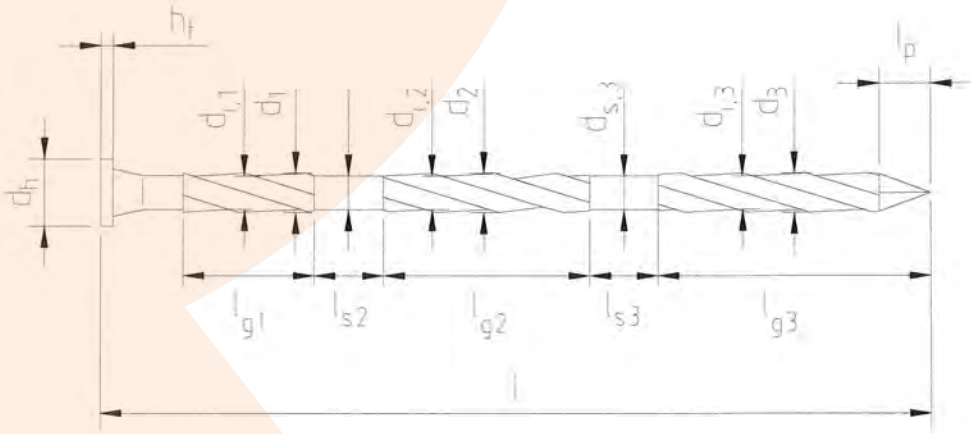
Karlsruher Institut für Technologie

Versuchsanstalt für
Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/14
Initial Type Test (ITT)

CE

Client:	H&H Tuonti Oy
Base:	EN 14592:2008+A1:2012 (D) nails for structural timber products
Dimensions:	diameter 2,50 mm
Coating:	type 1 – HDG ≥ 50µm
Material:	HPB 235 (Q235) in accordance to GB1499.1-2008



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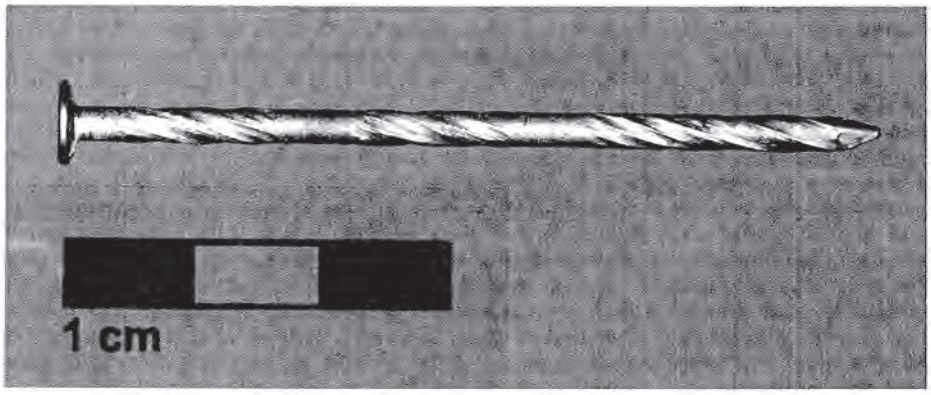

tested nail 2,50 x 65 mm spiral HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,38	6,35	6,52	6,40	6,34	6,40	+ 1,86	- 0,87
$d_{s,1}$	2,66	2,62	2,67	2,62	2,68	2,65	+ 1,16	- 1,24
$d_{s,2}$	2,55	2,58	2,58	2,58	2,57	2,57	+ 0,40	- 0,77
$d_{s,3}$	2,55	2,57	2,56	2,57	2,55	2,56	+ 0,41	- 0,47
d_1	2,79	2,64	2,68	2,70	2,76	2,71	+ 2,89	- 2,77
d_2	2,68	2,62	2,71	2,66	2,68	2,67	+ 1,41	- 1,72
d_3	2,72	2,72	2,70	2,72	2,75	2,72	+ 1,04	- 0,82
l_{g1}	12,8	12,4	12,5	12,7	12,2	12,5	+ 2,41	- 2,70
l_{g2}	11,8	12,6	12,0	12,4	12,3	12,2	+ 2,88	- 3,34
l_{g3}	23,0	22,6	23,0	22,5	22,4	22,7	+ 1,36	- 1,33
l_{s2}	7,25	7,22	7,19	6,90	6,95	7,10	+ 2,08	- 2,84
l_{s3}	6,72	7,00	6,94	6,92	6,93	6,90	+ 1,42	- 2,64
l	63,9	64,2	64,3	64,0	64,0	64,1	+ 0,30	- 0,27
h_t	1,15	1,20	1,14	1,19	1,16	1,17	+ 2,74	- 2,40
l_p	2,78	2,84	2,90	2,91	2,90	2,87	+ 1,54	- 3,00
A_h	31,9	31,7	33,3	32,2	31,6	32,1	+ 3,75	- 1,74

tensile capacity	tensile strength of wire	yield moment			withdrawal parameter		head pull-through parameter		
2,50 x 65	---	2,50 x 65			2,50 x 65** l_{ef} = 22,1 mm		2,50 x 65 d_h = 6,40 mm		
					d = 2,5 mm				
f_{tens}	f_u	M_y	crack		ρ	R_{ax}	ρ	R_{ax}*	
kN	N/mm²	Nm	-		kg/m³	kN	kg/m³	kN	
2,87	---	1,58	NO		346	0,462	355	1,18	
2,63	---	1,61	NO		369	0,371	406	1,59	
2,62	---	1,65	NO		373	0,391	384	1,19	
2,68	---	1,62	NO		366	0,404	407	1,30	
2,74	---	1,65	NO		382	0,545	364	0,850	
2,78	---	1,67	NO		346	0,252	373	1,06	
2,74	---	1,61	NO		369	0,291	384	1,46	
2,74	---	1,67	NO		373	0,203	371	1,26	
2,98	---	1,64	NO		366	0,390	347	0,910	
2,67	---	1,61	NO		382	0,404	360	1,46	
$f_{tens,k}$ = 2,47 kN	---	**$M_{y,k}$ = 1,47 Nm**			**$f_{ax,k}$ = 3,50 N/mm² with ρ_k = 350 kg/m³**		**$f_{head,k}$ = 19,1 N/mm² with ρ_k = 380 kg/m³**		

penetration depth: 25 mm

* maximal strength at a crosshead displacement of 15 mm

** withdrawal parameter < 4,50 N/mm²

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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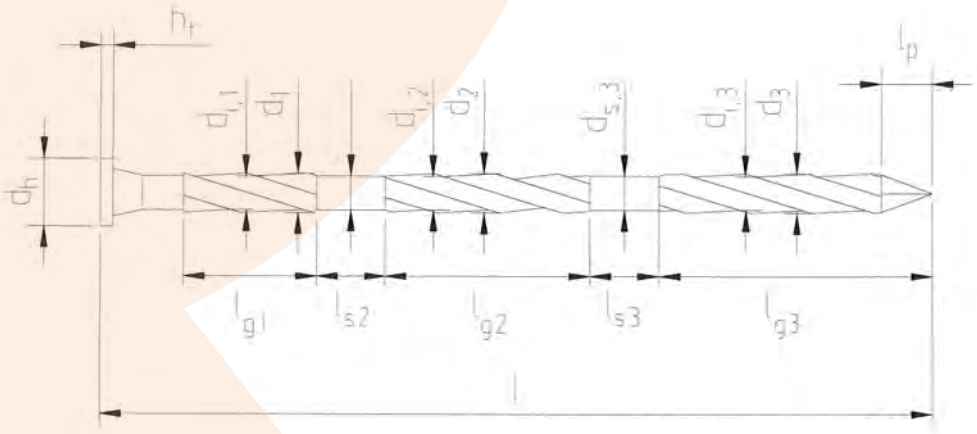
Versuchsanstalt für
Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/15
Initial Type Test (ITT)

CE

Client:	H&H Tuonti Oy
Base:	EN 14592:2008+A1:2012 (D) nails for structural timber products
Dimensions:	diameter 2,90 mm
Coating:	type 1 – HDG ≥ 50µm or bright = 0µm
Material:	HPB 235 (Q235) in accordance to GB1499.1-2008



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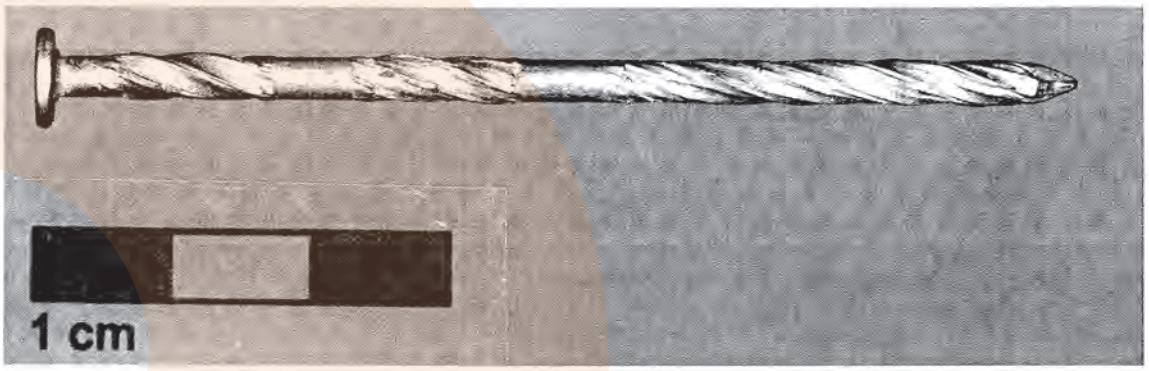

tested nail 2,90 x 75 mm spiral HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	7,06	6,96	6,90	7,07	7,05	7,01	+ 0,87	- 1,49
$d_{s,1}$	2,89	2,88	2,92	2,91	2,92	2,88	+ 1,25	- 2,22
$d_{s,2}$	2,93	2,94	2,94	2,94	2,94	2,94	+ 0,15	- 0,24
$d_{s,3}$	2,94	2,93	2,93	2,94	2,93	2,94	+ 0,16	- 0,10
d_1	3,17	3,21	3,15	3,20	3,11	3,17	+ 1,33	- 1,83
d_2	3,25	3,23	3,17	3,21	3,12	3,20	+ 1,69	- 2,38
d_3	3,22	3,19	3,13	3,26	3,19	3,20	+ 1,94	- 2,13
l_{g1}	12,4	12,4	12,2	12,2	12,7	12,4	+ 2,57	- 1,63
l_{g2}	12,8	12,7	12,8	12,7	12,9	12,8	+ 0,88	- 0,85
l_{g3}	33,7	32,6	33,2	33,0	32,5	33,0	+ 2,15	- 1,52
l_{s2}	5,24	5,30	4,99	5,09	5,13	5,15	+ 2,91	- 3,11
l_{s3}	5,29	5,30	5,32	5,34	5,50	5,35	+ 2,80	- 1,12
l	75,0	75,1	74,7	75,0	74,6	74,9	+ 0,28	- 0,37
h_t	1,72	1,82	1,79	1,72	1,81	1,77	+ 2,71	- 2,93
l_p	3,48	3,47	3,60	3,68	3,67	3,58	+ 2,79	- 3,07
A_h	39,1	38,1	37,4	39,2	39,0	38,6	+ 1,74	- 2,97

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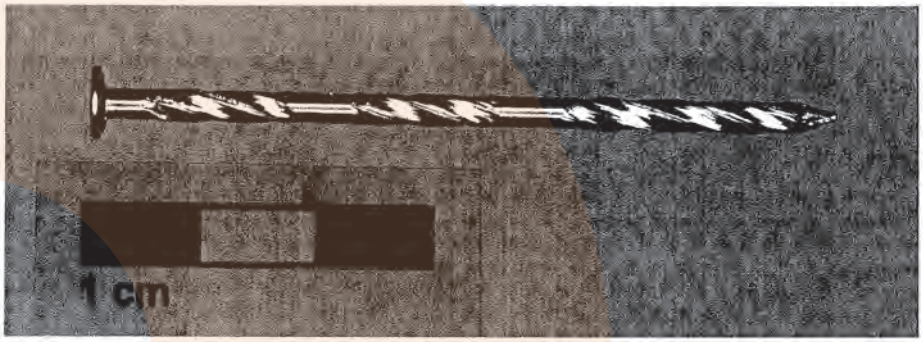

tested nail 2,90 x 75 mm spiral bright

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,87	6,95	6,73	6,78	6,76	6,82	+ 1,95	- 1,26
$d_{s,1}$	2,81	2,79	2,84	2,85	2,84	2,84	+ 0,85	- 1,27
$d_{s,2}$	2,85	2,84	2,84	2,84	2,84	2,84	+ 0,19	- 0,15
$d_{s,3}$	2,84	2,84	2,84	2,84	2,84	2,84	+ 0,10	- 0,06
d_1	2,96	3,05	3,00	2,93	2,95	2,98	+ 2,42	- 1,61
d_2	2,98	3,05	3,04	2,96	2,99	3,00	+ 1,53	- 1,46
d_3	3,05	3,06	3,05	3,00	2,99	3,03	+ 0,99	- 1,32
l_{g1}	12,9	12,6	12,3	12,5	12,1	12,5	+ 3,17	- 3,16
l_{g2}	12,6	12,4	12,8	12,1	12,0	12,4	+ 3,39	- 3,07
l_{g3}	33,3	33,2	33,2	32,7	33,8	33,3	+ 1,65	- 1,75
l_{s2}	5,92	5,96	6,30	6,42	6,24	6,17	+ 4,09	- 4,02
l_{s3}	5,83	5,79	6,32	6,17	6,14	6,05	+ 4,46	- 4,30
l	75,1	74,5	74,9	74,8	74,7	74,8	- 0,37	- 0,39
h_t	1,50	1,45	1,53	1,46	1,48	1,48	+ 3,10	- 2,29
l_p	3,54	3,50	3,72	3,72	3,64	3,62	+ 2,65	- 3,42
A_h	37,1	37,9	35,6	36,0	35,9	36,5	+ 3,92	- 2,51

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
2,90 x 75 HDG	---	2,90 x 75 HDG			2,90 x 75 bright d = 2,9 mm l_{ef} = 25,4 mm			2,90 x 75 HDG d_h = 7,00 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*
kN	N/mm²	Nm	---		kg/m³	kN		kg/m³	kN
4,72	---	2,76	NO		373	0,753		378	1,52
4,80	---	2,79	NO		346	0,648		376	2,41
4,82	---	2,76	NO		334	0,571		355	1,28
4,64	---	2,86	NO		357	0,624		370	0,990
4,67	---	2,75	NO		353	0,676		364	1,46
4,60	---	2,88	NO		373	0,469		398	2,01
4,61	---	2,85	NO		346	0,406		393	2,17
4,64	---	2,73	NO		334	0,479		370	1,81
4,61	---	2,80	NO		357	0,497		374	1,78
4,91	---	2,72	NO		353	0,604		384	2,05
$f_{tens,k}$ = 4,23 kN	---	**$M_{y,k}$ = 2,51 Nm**			**$f_{ax,k}$ = 5,10 N/mm² with ρ_k = 350 kg/m³**			**$f_{head,k}$ = 19,6 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 29 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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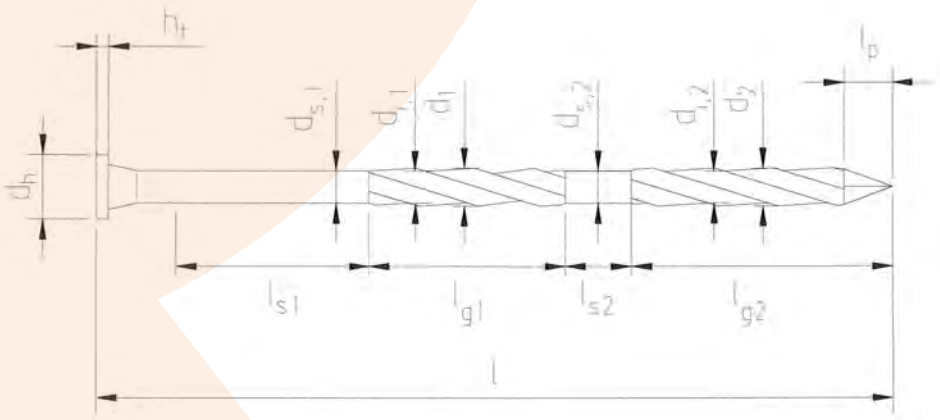
Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/16
Initial Type Test (ITT)

CE

Client:	H&H Tuonti Oy
Base:	EN 14592:2008+A1:2012 (D) nails for structural timber products
Dimensions:	diameter 3,10 mm
Coating:	type 1 – HDG ≥ 50µm
Material:	HPB 235 (Q235) in accordance to GB1499.1-2008



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tested nail 3,10 x 90 mm spiral HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	7,11	7,11	7,22	6,99	7,16	7,12	+ 1,42	- 1,82
$d_{s,1}$	3,13	3,09	3,12	3,12	3,13	3,12	+ 0,51	- 0,82
$d_{s,2}$	3,15	3,14	3,12	3,11	3,12	3,13	+ 0,64	- 0,53
d_1	3,34	3,29	3,27	3,39	3,32	3,32	+ 2,05	- 1,57
d_2	3,45	3,41	3,32	3,30	3,37	3,37	+ 2,37	- 2,08
l_{g1}	14,0	14,1	14,7	14,6	13,9	14,3	+ 3,17	- 2,51
l_{g2}	48,2	47,6	48,1	48,7	48,4	48,2	+ 1,02	- 1,26
l_{s2}	5,90	5,85	5,77	5,55	5,50	5,71	+ 3,26	- 3,75
l	89,0	89,2	88,9	89,0	88,8	89,0	+ 0,23	- 0,19
h_t	1,98	1,87	1,88	1,91	1,97	1,92	+ 3,02	- 2,71
l_p	3,20	3,22	3,24	3,40	3,40	3,29	+ 3,28	- 2,79
A_h	39,6	39,7	40,9	38,3	40,2	39,7	+ 2,86	- 3,62

tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
3,10 x 90	---	3,10 x 90			3,10 x 90 d = 3,1 mm l_{ef} = 27,7 mm			3,10 x 90 d_h = 7,20 mm	
f_{tens} kN	f_u N/mm²	M_y Nm	crack -		ρ kg/m³	R_{ax} kN		ρ kg/m³	R_{ax}* kN
5,54	---	3,52	NO		369	0,730		384	2,01
5,53	---	3,50	NO		364	0,820		374	1,83
5,54	---	3,57	NO		375	0,758		370	1,99
5,25	---	3,60	NO		346	0,869		393	1,85
5,26	---	3,56	NO		381	0,824		398	1,97
5,29	---	3,53	NO		369	0,722		364	1,32
5,44	---	3,48	NO		375	0,828		370	1,56
5,31	---	3,52	NO		358	0,448		355	1,37
5,27	---	3,56	NO		346	0,438		410	1,83
5,29	---	3,51	NO		381	0,938		371	1,31
$f_{tens,k}$ = 4,84 kN	---	**$M_{y,k}$ = 3,18 Nm**			**$f_{ax,k}$ = 4,78 N/mm² with ρ_k = 350 kg/m³**			**$f_{head,k}$ = 22,4 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 31 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

VERSUCHSANSTALT FÜR STAHL, HOLZ U. STEINE
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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/17
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,40 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 3,40 x 100 mm spiral HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	7,09	7,07	7,02	7,20	7,11	7,10	+ 1,40	- 1,10
d	3,43	3,41	3,42	3,38	3,40	3,41	+ 0,64	- 0,89
d_a	3,54	3,55	3,59	3,58	3,62	3,58	+ 1,23	- 1,01
l_g	72,6	74,8	73,9	72,8	72,6	73,3	+ 1,99	- 1,01
l	99,6	99,9	99,2	100	99,9	99,7	+ 0,39	- 0,54
h_t	1,97	1,94	2,05	2,04	1,97	1,99	+ 2,81	- 2,71
l_p	4,21	4,26	4,27	4,13	4,35	4,24	+ 2,50	- 2,69
A_h	39,5	39,2	38,7	40,7	39,7	39,6	+ 2,80	- 2,19

d_a = outer diameter

tensile capacity	tensile strength of wire	yield moment			withdrawal parameter		head pull-through parameter	
3,40 x 100	---	3,40 x 100			3,40 x 100 l_{ef} = 30 mm		3,40 x 100 d_h = 7,10 mm	
					d = 3,4 mm			
f_{tens}	f_u	M_y	crack		ρ	R_{ax}	ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN	kg/m³	kN
6,44	---	4,42	NO		381	0,801	398	1,90
6,56	---	4,46	NO		346	0,653	370	1,61
6,47	---	4,44	NO		365	0,978	393	1,55
6,24	---	4,53	NO		369	0,677	374	1,44
6,62	---	4,50	NO		358	0,755	384	1,62
6,32	---	4,62	NO		381	1,140	370	1,33
6,18	---	4,55	NO		346	0,731	355	0,970
6,16	---	4,55	NO		369	0,630	364	1,11
6,14	---	4,60	NO		358	0,834	410	1,43
6,24	---	4,53	NO		375	0,750	393	1,47
$f_{tens,k}$ = 5,70 kN	---	**$M_{y,k}$ = 4,07 Nm**			**$f_{ax,k}$ = 5,25 N/mm² with ρ_k = 350 kg/m³**		**$f_{head,k}$ = 18,8 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 34 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/18
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,80 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 3,80 x 110 mm spiral HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	8,14	8,12	8,15	8,24	8,23	8,18	+ 0,75	- 0,68
d	3,86	3,86	3,85	3,79	3,79	3,83	+ 0,78	- 1,00
d_a	4,09	4,06	4,12	4,04	4,17	4,10	+ 1,86	- 1,44
l_g	74,5	76,7	76,4	75,3	75,0	75,6	+ 1,44	- 1,41
l	108	108	108	108	108	108	+ 0,24	- 0,16
h_t	2,09	2,09	2,01	1,98	1,98	2,03	+2,96	-2,46
l_p	4,30	4,28	4,24	4,42	4,38	4,32	+2,22	-1,94
A_h	52,0	51,8	52,1	53,3	53,2	52,5	+ 1,50	- 1,35

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
3,80 x 110	---	3,80 x 110			3,80 x 110 $d = 3,8$ mm $l_{ef} = 33,7$ mm			3,80 x 110 $d_h = 8,20$ mm	
f_{tens} kN	f_u N/mm²	M_y Nm	crack -		ρ kg/m³	R_{ax} kN		ρ kg/m³	R_{ax}* kN
8,22	---	6,68	NO		375	0,970		355	2,55
8,16	---	6,63	NO		364	1,20		389	2,86
8,21	---	6,30	NO		365	1,01		407	3,43
8,22	---	6,66	NO		369	0,749		399	2,69
8,26	---	6,54	NO		346	0,809		384	2,47
8,27	---	6,39	NO		375	0,796		373	2,15
8,23	---	6,39	NO		364	1,28		384	2,46
8,10	---	6,53	NO		381	1,237		371	2,13
8,10	---	6,52	NO		369	0,835		360	4,51
8,22	---	6,46	NO		346	0,744		360	2,99
$f_{tens,k}$ = 7,38 kN	---	**$M_{y,k}$ = 5,86 Nm**			**$f_{ax,k}$ = 4,72 N/mm² with ρ_k = 350 kg/m³**			**$f_{head,k}$ = 25,5 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 38 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/19
Initial Type Test (ITT)

CE

Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 4,60 mm

Coating: type 1 – HDG ≥ 50µm or bright = 0µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008

tested nail 4,60 x 145 mm spiral HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	9,09	9,10	9,09	9,14	9,10	9,11	+ 0,38	- 0,14
d	4,64	4,60	4,62	4,64	4,64	4,63	+ 0,23	- 0,48
d_a	4,89	4,82	4,72	4,73	4,82	4,80	+ 1,93	- 1,49
l_g	75,3	76,1	74,1	77,2	74,6	75,0	+ 1,43	- 1,23
l	142	143	143	143	143	143	+ 0,14	- 0,25
h_t	2,05	2,10	2,11	2,08	2,07	2,08	+ 1,34	- 1,54
l_p	7,12	7,05	7,04	6,93	6,96	7,02	+ 1,42	- 1,28
A_h	64,9	65,0	64,9	65,9	65,0	65,1	+ 0,76	- 0,29

d_a = outer diameter

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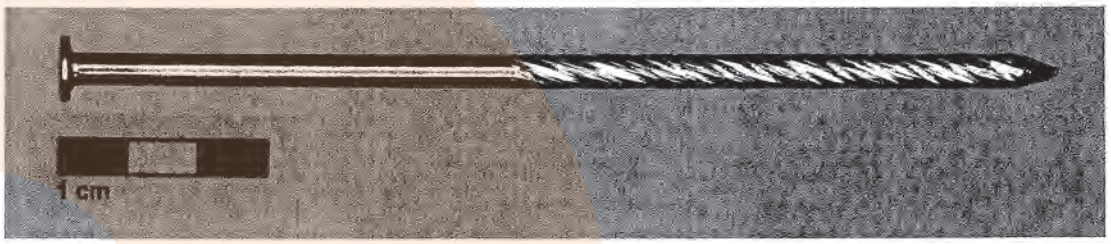

tested nail 4,60 x 145 mm spiral bright

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	9,34	9,20	9,29	9,20	9,2	9,26	+ 0,92	- 0,68
d	4,53	4,54	4,54	4,55	4,53	4,54	+ 0,32	- 0,17
d_a	4,73	4,68	4,74	4,76	4,73	4,73	+ 0,74	- 1,07
l_g	78,7	78,7	77,9	77,1	78,6	78,2	+ 0,69	- 1,41
l	142	142	143	142	143	143	+ 0,22	- 0,17
h_t	1,64	1,64	1,75	1,79	1,78	1,72	+ 4,07	- 4,65
l_p	6,96	6,80	7,12	7,20	7,31	7,08	+ 3,28	- 3,93
A_h	68,5	66,4	67,7	66,4	67,4	67,3	+ 1,84	- 1,37

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
4,60 x 145 HDG	---	4,60 x 145 HDG			4,60 x 145 bright d = 4,6 mm l_{ef} = 39,0 mm			4,60 x 145 HDG d_h = 9,20 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN
12,0	---	11,6	NO		373	0,957		361	2,37
12,1	---	11,8	NO		334	1,16		399	3,23
11,8	---	11,6	NO		357	1,28		389	3,48
12,1	---	11,5	NO		353	1,43		384	2,82
12,1	---	11,7	NO		333	1,269		407	3,88
12,2	---	11,9	NO		373	1,074		384	3,13
12,2	---	11,6	NO		334	1,117		355	2,46
12,1	---	11,5	NO		357	1,66		360	3,00
11,9	---	11,6	NO		353	1,75		371	2,99
12,2	---	11,4	NO		333	1,35		347	2,41
$f_{tens,k}$ = 10,9 kN	---	**$M_{y,k}$ = 10,5 Nm**			**$f_{ax,k}$ = 4,81 N/mm² with ρ_k = 350 kg/m³**			**$f_{head,k}$ = 24,7 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 46 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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VERSUCHSANSTALT FÜR STAHL, HOLZ U. STEINE
12
Amtliche Materialprüfungsanstalt Universität Karlsruhe (TH)

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Karlsruher Institut für Technologie

Versuchsanstalt für
Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/20
Initial Type Test (ITT)

CE

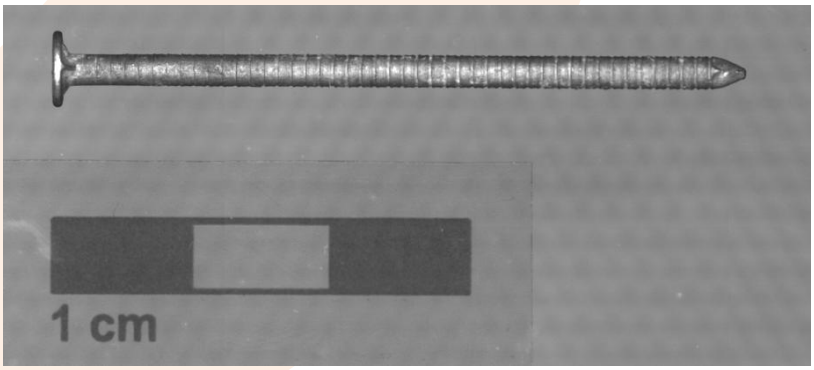
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,10 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,10 x 50 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,21	5,26	5,24	5,25	5,29	5,25	+ 0,75	- 0,77
d_1	1,95	1,97	2,03	2,03	2,01	2,00	+ 1,72	- 2,49
d_a	2,36	2,36	2,37	2,31	2,42	2,36	+ 2,42	- 2,13
l	50,0	49,7	49,4	49,8	50,0	49,8	+ 0,48	- 0,75
h	1,00	1,03	1,01	1,01	1,00	1,01	+ 1,85	- 1,05
h_t	1,24	1,19	1,27	1,20	1,27	1,23	+ 2,95	- 3,57
l_p	2,19	2,31	2,23	2,31	2,21	2,25	+ 2,67	- 2,67
A_h	21,3	21,7	21,6	21,6	22,0	21,6	+ 1,50	- 1,53

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter		
2,10 x 50	---	2,10 x 50			2,10 x 50 d = 2,10 mm l_{ef} = 18,8 mm			2,10 x 50 d_h = 5,30 mm		
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*	
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN	
1,33	---	0,699	NO		365	0,438		384	1,01	
1,31	---	0,727	NO		346	0,421		398	0,890	
1,25	---	0,803	NO		369	0,393		374	0,800	
1,27	---	0,737	NO		381	0,391		347	0,840	
1,30	---	0,727	NO		375	0,431		335	0,800	
1,24	---	0,671	NO		364	0,520		371	0,690	
1,32	---	0,690	NO		365	0,252		347	0,480	
1,28	---	0,690	NO		346	0,213		384	0,970	
1,23	---	0,708	NO		369	0,369		343	0,630	
1,25	---	0,708	NO		381	0,323		338	0,730	
$f_{tens,k}$ = 1,15 kN	---	**$M_{y,k}$ = 0,644 Nm**			**$f_{ax,k}$ = 5,22 N/mm² with ρ_k = 350 kg/m³**					**$f_{head,k}$ = 17,2 N/mm² with ρ_k = 360 kg/m³**

penetration depth: 21 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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Versuchsanstalt für
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Amtliche Materialprüfungsanstalt

Report No. 136250/21
Initial Type Test (ITT)

CE

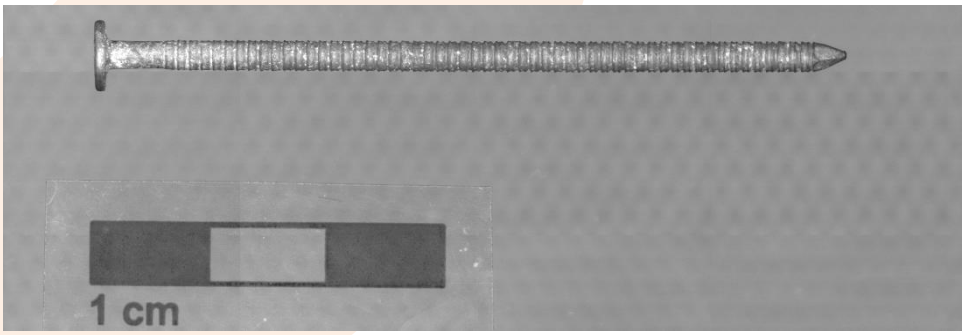
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,30 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,30 x 65 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,79	5,90	5,85	5,78	5,79	5,82	+ 1,35	- 0,72
d	2,31	2,30	2,32	2,27	2,29	2,30	+ 0,89	- 1,34
d_1	2,25	2,24	2,23	2,18	2,22	2,22	+ 1,22	- 1,92
d_a	2,49	2,44	2,50	2,52	2,43	2,48	+ 1,83	- 1,80
l_g	57,9	58,4	58,0	57,8	58,3	58,1	+ 0,62	- 0,50
l	64,1	64,1	64,1	64,1	64,1	64,1	+ 0,08	- 0,07
h	1,03	1,00	1,04	1,01	1,00	1,01	+ 2,60	- 1,81
h_t	1,22	1,18	1,19	1,21	1,20	1,20	+ 1,67	- 1,67
l_p	2,89	2,80	2,91	2,50	2,83	2,88	+ 2,57	- 2,64
A_h	26,4	27,4	26,9	26,2	26,3	26,6	+ 2,71	- 1,45

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter		head pull-through parameter	
2,30 x 65	---	2,30 x 65			2,30 x 65 d = 2,3 mm l_{ef} = 20,1 mm		2,30 x 65 d_h = 5,80 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}	ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN	kg/m³	kN
1,55	---	0,808	NO		375	0,491	378	1,20
1,52	---	0,827	NO		381	0,488	355	0,760
1,53	---	0,864	NO		369	0,528	370	1,08
1,50	---	0,780	NO		346	0,566	364	0,900
1,56	---	0,827	NO		364	0,601	376	0,770
1,53	---	0,827	NO		375	0,422	398	1,38
1,55	---	0,845	NO		381	0,562	393	1,22
1,54	---	0,827	NO		369	0,549	370	1,29
1,53	---	0,845	NO		346	0,281	384	1,29
1,51	---	0,874	NO		364	0,585	374	1,18
$f_{tens,k}$ = 1,38 kN	---	**$M_{y,k}$ = 0,749 Nm**			**$f_{ax,k}$ = 6,69 N/mm² with ρ_k = 350 kg/m³**		**$f_{head,k}$ = 20,4 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 23 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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Versuchsanstalt für
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Amtliche Materialprüfungsanstalt

Report No. 136250/22
Initial Type Test (ITT)

CE

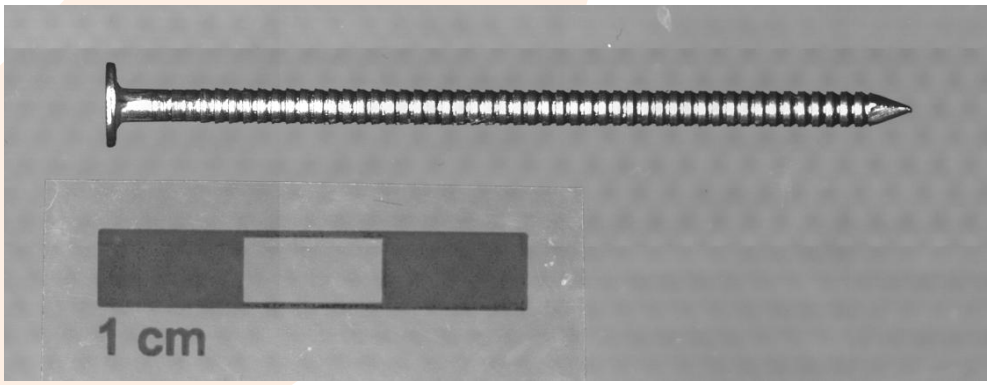
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,30 mm

Coating: no

Material: SS304 in accordance to GB1499.1-2008



tested nail 2,30 x 57 ring

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,82	5,84	5,84	5,77	5,83	5,82	+ 0,34	- 0,89
d	2,27	2,27	2,27	2,25	2,27	2,26	+ 0,19	- 0,49
d_1	2,09	2,10	2,11	2,09	2,09	2,10	+ 0,76	- 0,58
d_a	2,38	2,40	2,37	2,38	2,40	2,39	+ 0,69	- 0,82
l	56,8	57,1	56,6	56,8	56,9	56,8	+ 0,43	- 0,46
h	1,00	1,01	1,01	1,00	1,02	1,01	+ 0,84	- 0,52
h_t	1,04	1,05	1,09	1,07	1,05	1,06	+ 2,83	- 1,89
l_p	3,19	3,14	3,13	3,11	3,10	3,13	+ 1,79	- 1,08
A_h	26,6	26,8	26,8	26,1	26,7	26,6	+ 0,68	- 1,78

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter		
					d = --- l_{ef} = ---			--- d_h = ---		
2,30 x 57	Ø 2,3	2,30 x 57			---			---		
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*	
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN	
3,93	921	2,10	NO		---	---		---	---	
3,86	935	2,09	NO		---	---		---	---	
3,92	954	2,06	NO		---	---		---	---	
3,83	943	2,03	NO		---	---		---	---	
3,84	948	2,04	NO		---	---		---	---	
3,89	---	2,04	NO		---	---		---	---	
3,86	---	1,97	NO		---	---		---	---	
3,82	---	2,01	NO		---	---		---	---	
3,80	---	1,99	NO		---	---		---	---	
3,82	---	2,03	NO		---	---		---	---	
$f_{tens,k}$ = 3,47 kN	**f_u > 600 N/mm²**	**$M_{y,k}$ = 1,83 Nm**			---					

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Amtliche Materialprüfungsanstalt

Report No. 136250/23
Initial Type Test (ITT)

CE

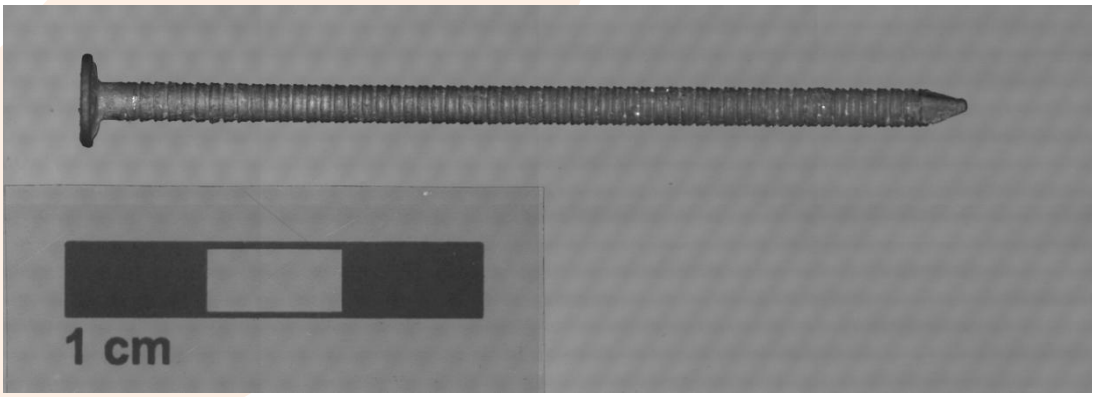
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,50 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,50 x 70 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,72	5,58	5,68	5,75	5,67	5,68	+ 1,14	- 1,73
d_1	2,61	2,62	2,59	2,62	2,62	2,61	+ 0,48	- 0,85
d_a	2,72	2,74	2,75	2,72	2,69	2,72	+ 0,95	- 1,36
l	70,0	69,5	69,7	69,8	69,7	69,7	+ 0,40	- 0,38
h	1,00	1,00	1,00	1,00	1,00	1,00	+ 0,21	- 0,18
h_t	1,23	1,29	1,25	1,23	1,30	1,26	+3,17	-2,38
l_p	3,40	3,34	3,33	3,38	3,36	3,36	+1,13	-0,95
A_h	25,7	24,5	25,3	25,9	25,3	25,3	+ 2,29	- 3,44

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
2,50 x 70	---	2,50 x 70			2,50 x 70 $d = 2,5$ mm $l_{ef} = 21,6$ mm			2,50 x 70 $d_h = 5,70$ mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN
3,26	---	1,79	NO		346	0,744		406	1,45
3,30	---	1,93	NO		366	0,598		407	1,46
3,18	---	1,94	NO		388	0,614		384	1,16
3,31	---	1,94	NO		373	0,615		399	1,04
3,29	---	1,90	NO		369	0,605		355	0,900
3,35	---	1,92	NO		346	0,449		376	1,03
3,42	---	1,95	NO		366	0,453		384	1,24
3,22	---	1,90	NO		388	0,655		371	0,970
3,17	---	1,90	NO		373	0,440		347	0,570
3,38	---	1,88	NO		369	0,615		360	0,950
$f_{tens,k}$ = 2,96 kN	**f_u > 600 N/mm²**	**$M_{y,k}$ = 1,71 Nm**			**$f_{ax,k}$ = 7,25 N/mm² with ρ_k = 350 kg/m³**			**$f_{head,k}$ = 18,2 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 25 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/24
Initial Type Test (ITT)

CE

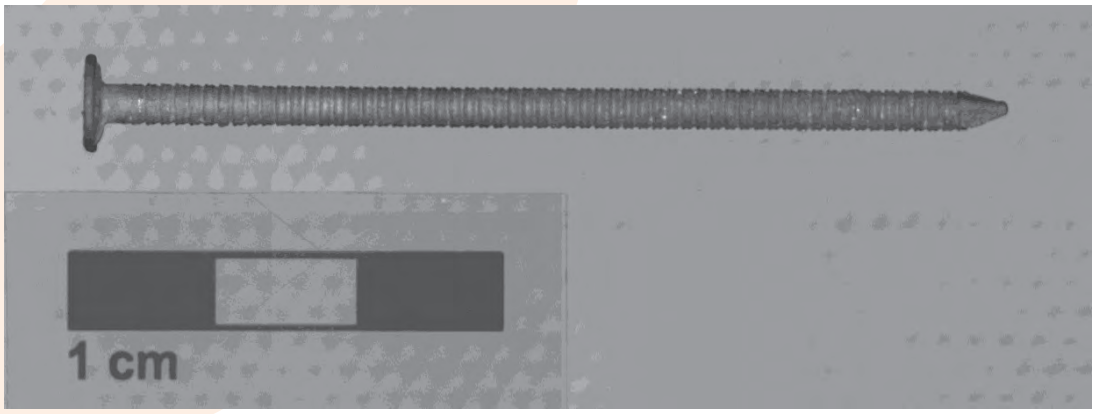
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,50 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,50 x 65 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,54	6,54	6,35	6,30	6,46	6,44	+ 1,61	- 2,22
d	2,56	2,57	2,58	2,57	2,57	2,57	+ 0,39	- 0,39
d_1	2,43	2,42	2,35	2,35	2,42	2,39	+ 1,67	- 1,99
d_a	2,67	2,68	2,68	2,75	2,68	2,69	+ 2,09	- 0,83
l	64,0	63,8	63,9	64,1	64,1	64,0	+ 0,24	- 0,26
h_t	1,16	1,22	1,21	1,16	1,15	1,18	+ 3,39	- 2,54
l_p	3,10	3,20	3,21	3,19	3,17	3,17	+ 1,13	- 2,33
A_h	33,6	33,6	31,7	31,1	32,8	32,6	+ 3,23	- 4,42

d_a = outer diameter

tensile capacity	tensile strength of wire	yield moment			withdrawal parameter		head pull-through parameter	
2,50 x 65	---	---			---		2,50 x 65	
					d = --- l_{ef} = ---		d_h = 6,40 mm	
f_{tens}	f_u	M_y	crack	ρ	R_{ax}	ρ	R_{ax}*	
kN	N/mm²	Nm	-	kg/m³	kN	kg/m³	kN	
2,49	---	---	---	---	---	374	1,46	
2,43	---	---	---	---	---	384	1,84	
2,35	---	---	---	---	---	370	1,43	
2,42	---	---	---	---	---	393	1,57	
2,42	---	---	---	---	---	398	1,49	
2,48	---	---	---	---	---	370	1,23	
2,39	---	---	---	---	---	364	1,46	
2,41	---	---	---	---	---	378	1,05	
2,48	---	---	---	---	---	376	1,23	
2,45	---	---	---	---	---	355	0,930	
$f_{tens,k}$ = 3,20 kN		---					**$f_{head,k}$ = 21,5 N/mm² with ρ_k = 380 kg/m³**	

* maximal strength at a crosshead displacement of 15 mm

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Amtliche Materialprüfungsanstalt

Report No. 136250/25
Initial Type Test (ITT)

CE

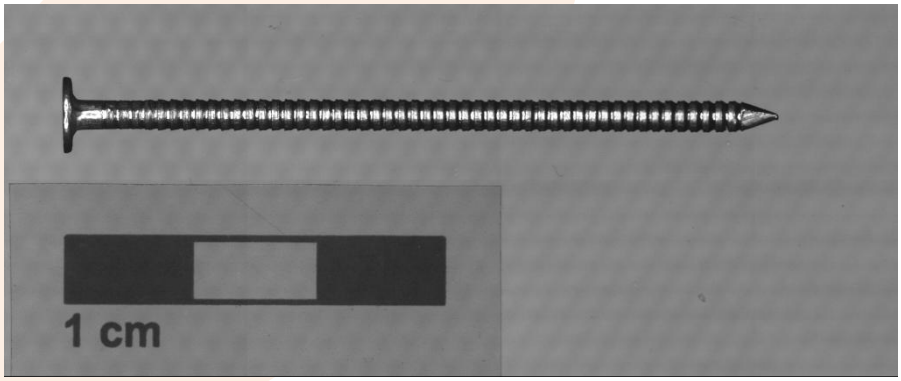
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,50 mm

Coating: no

Material: SS304 in accordance to GB1499.1-2008



tested nail 2,50 x 75 ring

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	5,91	5,89	5,78	5,83	5,84	5,85	+ 1,04	- 1,17
d	2,43	2,42	2,45	2,42	2,43	2,43	+ 0,88	- 0,49
d_1	2,26	2,32	2,28	2,26	2,28	2,28	+ 1,66	- 0,89
d_a	2,68	2,65	2,74	2,71	2,71	2,70	+ 1,54	- 1,78
l	75,0	74,8	74,2	74,9	75,2	74,8	+ 0,55	- 0,87
h	1,01	1,00	1,00	1,00	1,00	1,00	+ 0,70	- 0,53
h_t	1,19	1,19	1,25	1,26	1,25	1,23	+ 2,61	- 3,09
l_p	3,29	3,30	3,34	3,34	3,26	3,31	+ 1,03	- 1,39
A_h	27,4	27,2	26,2	26,7	26,8	26,9	+ 2,08	- 2,33

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter		
2,50 x 75	Ø 2,5	2,50 x 75			d = --- l$_{ef}$ = ---			--- d$_h$ = ---		
f$_{tens}$	f$_u$	M$_y$	crack		ρ	R$_{ax}$		ρ	R$_{ax}$*	
kN	N/mm²	Nm	---		kg/m³	kN		kg/m³	kN	
4,47	972	2,73	NO		---	---		---	---	
4,49	968	2,80	NO		---	---		---	---	
4,53	967	2,79	NO		---	---		---	---	
4,48	982	2,74	NO		---	---		---	---	
4,56	966	2,78	NO		---	---		---	---	
4,46	---	2,78	NO		---	---		---	---	
4,56	---	2,70	NO		---	---		---	---	
4,51	---	2,75	NO		---	---		---	---	
4,55	---	2,70	NO		---	---		---	---	
4,59	---	2,74	NO		---	---		---	---	
f$_{tens,k}$ = 4,07 kN	**f$_u$ > 600 N/mm²**	**M$_{y,k}$ = 2,48 Nm**			---					

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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Karlsruher Institut für Technologie

Versuchsanstalt für
Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/26
Initial Type Test (ITT)

CE

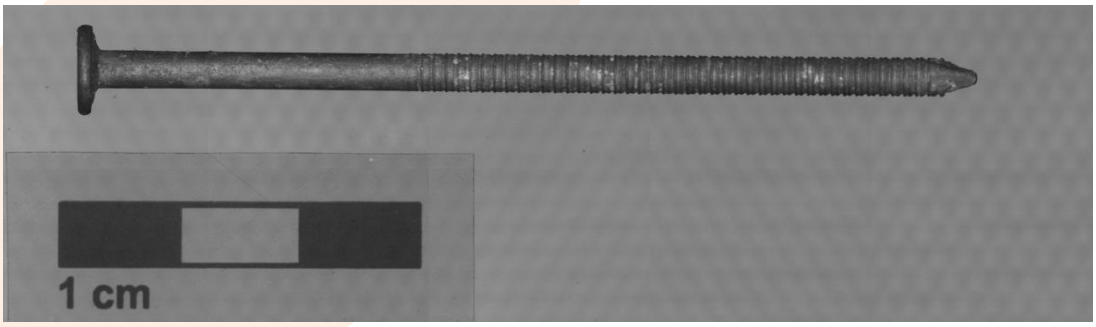
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,90 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,90 x 75 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,90	7,03	7,01	7,22	6,80	6,99	+ 3,24	- 2,70
d	2,95	2,93	2,95	2,97	2,94	2,95	+ 0,70	- 0,51
d_1	2,78	2,82	2,81	2,84	2,82	2,81	+ 0,92	- 1,21
d_a	3,09	3,12	3,09	3,08	3,06	3,09	+ 1,05	- 0,83
l_g	49,5	49,2	49,3	49,8	49,4	49,5	+ 0,78	- 0,60
l	74,7	75,1	74,4	74,8	74,9	74,8	+ 0,45	- 0,57
h	1,01	1,02	1,00	1,02	1,00	1,01	+ 1,01	- 0,99
h_t	1,81	1,83	1,79	1,77	1,80	1,80	+1,67	-1,67
l_p	3,05	3,08	3,11	3,10	3,15	3,10	+1,68	-1,55
A_h	37,4	38,7	38,6	40,9	36,3	38,4	+ 6,54	- 5,37

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter		head pull-through parameter	
2,90 x 75	Ø 2,90	2,90 x 75			2,90 x 75 d = 2,9 mm l_{ef} = 25,9 mm		2,90 x 75 d_h = 7,00 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}	ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN	kg/m³	kN
4,20	---	2,60	NO		388	0,853	370	1,74
4,19	---	2,70	NO		366	0,791	374	1,89
4,22	---	2,66	NO		369	0,670	398	2,01
4,16	---	2,57	NO		346	0,831	393	2,04
4,23	---	2,70	NO		373	0,743	384	1,78
4,25	---	2,75	NO		382	0,678	370	1,67
4,29	---	2,70	NO		388	0,718	371	1,36
4,09	---	2,73	NO		366	0,607	355	1,49
4,08	---	2,71	NO		369	0,606	410	1,51
4,29	---	2,69	NO		346	0,725	393	1,92
$f_{tens,k}$ = 3,78 kN	---	**$M_{y,k}$ = 2,41 Nm**			**$f_{ax,k}$ = 7,45 N/mm² with ρ_k = 350 kg/m³**		**$f_{head,k}$ = 26,4 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 29 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/27
Initial Type Test (ITT)

CE

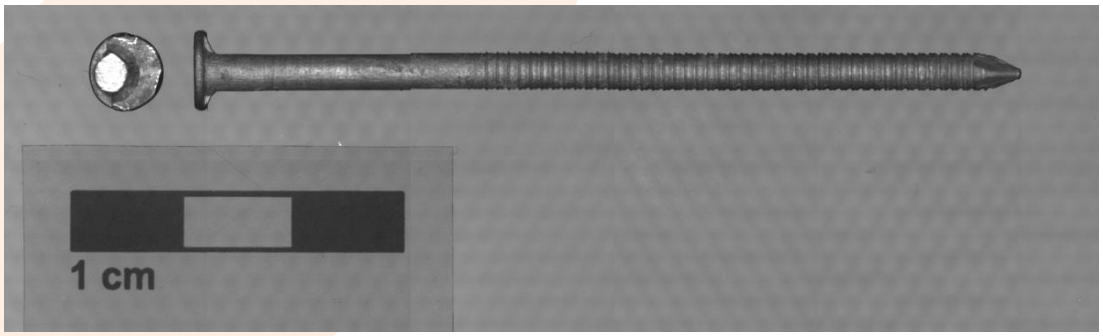
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,90 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,90 x 76 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,71	6,95	6,81	6,95	6,97	6,88	+ 1,39	- 2,47
d	2,96	2,95	2,93	2,94	2,96	2,95	+ 0,33	- 0,57
d_1	2,90	2,88	2,89	2,86	2,91	2,89	+ 0,76	- 1,02
d_a	3,07	3,09	3,07	3,10	3,11	3,09	+ 0,71	- 0,58
l_g	49,0	49,9	49,6	48,3	49,9	49,3	+ 1,14	- 2,02
l	74,7	74,9	74,9	75,3	75,0	75,0	+ 0,49	- 0,38
h	1,00	0,99	1,01	1,00	1,01	1,00	+ 0,90	- 1,39
h_t	1,57	1,63	1,62	1,56	1,54	1,58	+ 2,90	- 2,78
l_p	3,71	3,72	3,78	3,80	3,85	3,77	+ 2,07	- 1,67
A_h	35,3	37,9	36,4	37,9	38,2	37,1	+ 2,77	- 4,90

d_a = outer diameter

tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
2,90 x 76	---	---			---			2,90 x 76	
					d = ---		l_{ef} = ---	d_h = 6,90 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN
4,67	---	---	---		---	---		393	1,68
4,66	---	---	---		---	---		410	1,33
4,57	---	---	---		---	---		364	1,10
4,69	---	---	---		---	---		371	0,90
4,49	---	---	---		---	---		370	1,60
4,46	---	---	---		---	---		384	1,65
4,32	---	---	---		---	---		393	2,11
4,68	---	---	---		---	---		398	1,97
4,68	---	---	---		---	---		370	1,70
4,54	---	---	---		---	---		374	1,51
$f_{tens,k}$ = 4,12 kN		---						**$f_{head,k}$ = 18,4 N/mm² with ρ_k = 380 kg/m³**	

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/28
Initial Type Test (ITT)

CE

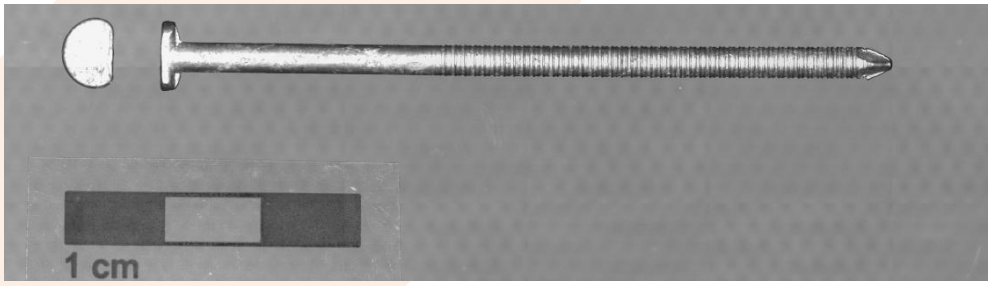
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,90 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 2,90 x 75 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h, max	7,05	6,95	6,95	6,88	6,99	6,96	+ 1,24	- 1,24
d_h, min	5,30	5,30	5,26	5,25	5,32	5,29	+ 0,64	- 0,68
d	2,97	2,97	2,95	2,99	2,97	2,97	+ 0,60	- 0,67
d_1	2,86	2,84	2,85	2,93	2,88	2,87	+ 2,09	- 0,97
d_a	3,07	3,14	3,09	3,03	3,08	3,08	+ 1,78	- 1,53
l_g	50,0	47,7	50,3	50,4	48,3	49,3	+ 2,14	- 3,25
l	74,8	74,9	74,9	74,8	74,9	74,9	+ 0,07	- 0,09
h	1,01	0,96	1,00	1,00	0,98	0,99	+ 1,91	- 2,90
h_t	1,73	1,74	1,76	1,66	1,67	1,71	+ 2,80	- 3,04
l_p	3,08	3,19	3,18	3,21	3,22	3,18	+ 1,39	- 3,02
A_h	31,5	31,0	30,8	30,4	31,3	31,0	+ 1,49	- 1,91

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
2,90 x 75	---	---			d = --- l_{ef} = ---			2,90 x 75 d_h = 7,00 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN
4,56	---	---	---		---	---		384	1,21
4,48	---	---	---		---	---		371	0,74
4,50	---	---	---		---	---		347	0,80
4,62	---	---	---		---	---		360	1,08
4,46	---	---	---		---	---		355	1,17
4,42	---	---	---		---	---		399	1,38
4,53	---	---	---		---	---		384	1,28
4,43	---	---	---		---	---		406	1,41
4,65	---	---	---		---	---		407	1,52
4,45	---	---	---		---	---		373	1,25
$f_{tens,k}$ = 4,06 kN		---						**$f_{head,k}$ = 14,4 N/mm² with ρ_k = 380 kg/m³**	

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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Karlsruher Institut für Technologie

Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/29
Initial Type Test (ITT)

CE

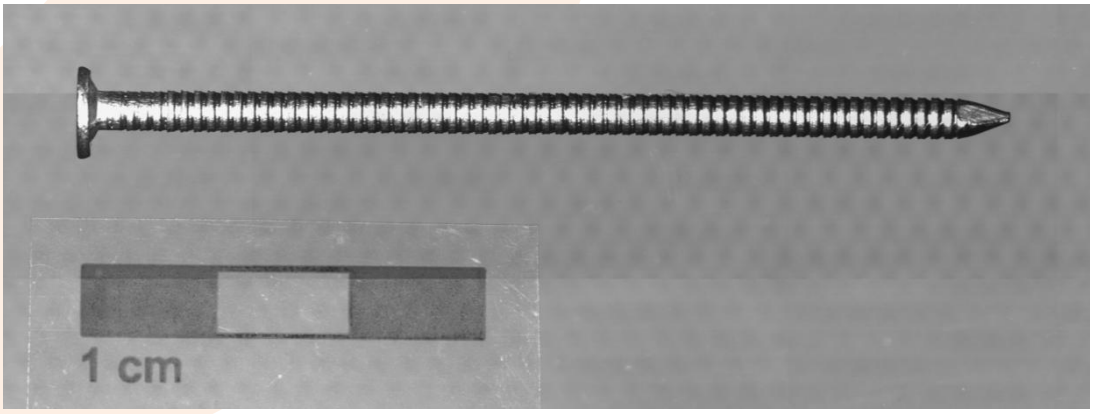
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 2,90 mm

Coating: no

Material: SS304 in accordance to GB1499.1-2008



tested nail 2,90 x 70 ring

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,76	6,72	6,67	6,64	6,70	6,70	+ 0,97	- 0,83
d	2,88	2,88	2,87	2,88	2,89	2,88	+ 0,21	- 0,40
d_1	2,65	2,64	2,64	2,70	2,64	2,65	+ 1,72	- 0,61
d_a	3,01	3,03	3,01	2,99	3,05	3,02	+ 0,90	- 0,83
l	70,0	69,6	69,8	70,1	69,9	69,9	+ 0,23	- 0,20
h_t	1,57	1,58	1,59	1,49	1,50	1,55	+ 2,85	- 3,62
l_p	4,14	4,18	4,19	4,20	4,20	4,18	+ 0,43	- 1,00
A_h	35,9	35,4	34,9	34,7	35,2	35,2	+ 1,94	- 1,66

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter		head pull-through parameter	
2,90 x 70	Ø 2,9	2,90 x 70			---		2,90 x 70	
					d = --- l_{ef} = ---		d_h = 6,70 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}	ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN	kg/m³	kN
5,65	861	3,49	NO		---	---	373	1,21
5,55	834	3,51	NO		---	---	384	1,37
5,69	846	3,53	NO		---	---	371	1,39
5,54	847	3,48	NO		---	---	347	0,940
5,58	835	3,53	NO		---	---	360	1,30
5,59	---	3,47	NO		---	---	355	1,70
5,60	---	3,40	NO		---	---	399	1,47
5,59	---	3,42	NO		---	---	384	1,25
5,58	---	3,47	NO		---	---	406	2,03
5,66	---	3,49	NO		---	---	407	1,66
$f_{tens,k}$ = 5,04 kN	**f_u > 600 N/mm²**	**$M_{y,k}$ = 3,13 Nm**			---		**$f_{head,k}$ = 20,0 N/mm² with ρ_k = 380 kg/m³**	

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 262.04.2013

Head of Notified Body NB 0769

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Karlsruher Institut für Technologie

Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/30
Initial Type Test (ITT)

CE

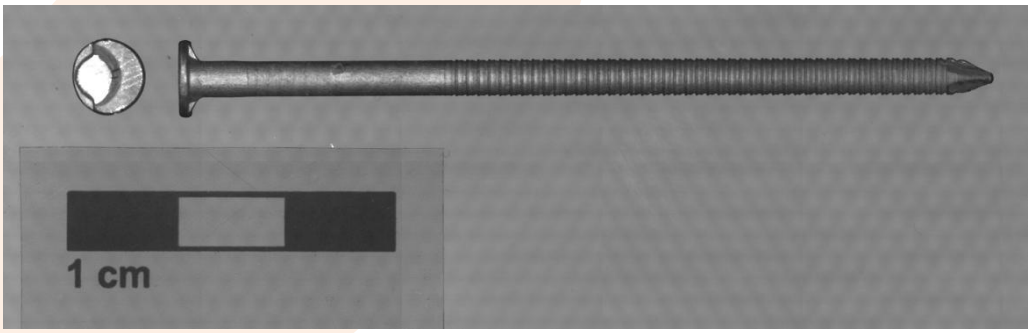
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,10 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 3,10 x 76 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,93	6,82	6,87	6,85	6,86	6,86	+ 0,88	- 0,65
d	3,20	3,16	3,16	3,16	3,16	3,17	+ 0,96	- 0,40
d_1	3,01	2,97	3,05	2,98	3,03	3,01	+ 1,54	- 1,38
d_a	3,33	3,28	3,22	3,26	3,26	3,27	+ 1,79	- 1,62
l_g	50,0	50,3	49,1	49,0	48,9	49,4	+ 1,65	- 1,02
l	74,9	74,9	74,3	74,7	74,8	74,7	+ 0,22	- 0,52
h	1,02	1,01	1,02	1,02	1,05	1,02	+ 2,56	- 1,58
h_t	1,50	1,51	1,58	1,55	1,57	1,54	+ 2,46	- 2,72
l_p	4,17	4,07	4,17	4,19	4,20	4,16	+ 0,96	- 2,16
A_h	37,7	36,5	37,1	36,8	37,0	37,0	+ 1,77	- 1,29

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter	
3,10 x 76	---	3,10 x 76			3,10 x 76			3,10 x 76	
					d = 3,1 mm	l_{ef} = 25,8 mm		d_h = 6,90 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN
4,68	---	3,01	NO		373	0,741		407	1,80
4,51	---	2,94	NO		346	1,09		406	1,71
4,84	---	2,82	NO		388	0,932		384	1,29
4,60	---	2,91	NO		369	0,944		399	1,47
4,76	---	2,86	NO		366	0,971		355	1,25
4,69	---	2,94	NO		373	0,538		360	1,63
4,76	---	3,05	NO		346	0,779		347	1,11
4,52	---	3,05	NO		388	0,775		371	1,22
4,77	---	2,87	NO		369	0,846		384	1,29
4,84	---	2,81	NO		366	0,644		376	1,08
$f_{tens,k}$ = 4,23 kN	---	**$M_{y,k}$ = 2,63 Nm**			**$f_{ax,k}$ = 6,52 N/mm² with ρ_k = 350 kg/m³**			**$f_{head,k}$ = 19,7 N/mm² with ρ_k = 380 kg/m³**	

penetration depth: 31 mm

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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Versuchsanstalt für
Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/31
Initial Type Test (ITT)

CE

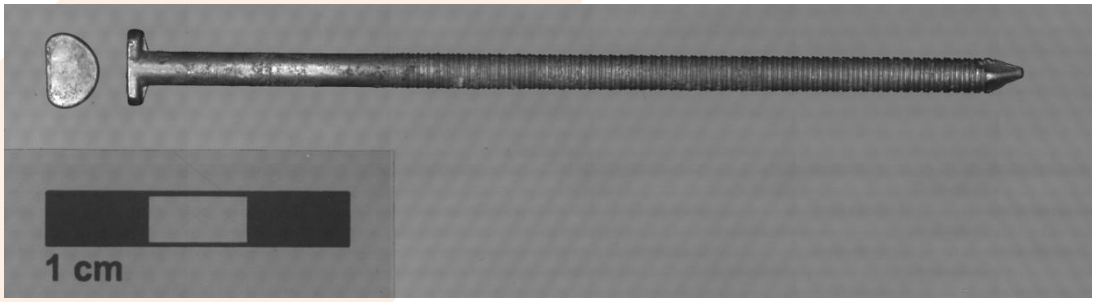
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,10 mm

Coating: type 1 – HDG ≥ 50µm

Material: HPB 235 (Q235) in accordance to GB1499.1-2008



tested nail 3,10 x 89 mm ring HDG

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h, max	7,24	7,16	7,16	7,23	7,27	7,21	+ 0,75	- 0,76
d_h, min	5,30	5,34	5,32	5,38	5,33	5,33	+ 0,86	- 0,64
d	3,13	3,13	3,15	3,14	3,19	3,15	+ 1,18	- 0,55
d_1	3,01	3,02	2,99	2,99	3,12	3,03	+ 3,20	- 1,31
d_a	3,31	3,33	3,32	3,26	3,35	3,31	+ 1,04	- 1,73
l_g	63,3	62,3	64,4	63,7	62,2	63,1	+ 1,95	- 1,56
l	88,7	88,5	89,2	88,9	88,8	88,8	+ 0,45	- 0,38
h	0,99	1,01	1,01	1,01	1,00	1,00	+ 0,48	- 1,40
h_t	1,99	2,06	2,05	2,03	2,05	2,04	+ 1,18	- 2,26
l_p	4,46	4,40	4,39	4,52	4,51	4,46	+ 1,44	- 1,48
A_h	32,3	32,2	32,0	32,7	32,6	32,4	+ 1,20	- 0,99

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter		head pull-through parameter	
3,10 x 89	---	---			---		3,10 x 89	
					d = ---	l_{ef} = ---	d_h = 7,20 mm	
f_{tens}	f_u	M_y	crack		ρ	R_{ax}	ρ	R_{ax}*
kN	N/mm²	Nm	-		kg/m³	kN	kg/m³	kN
5,29	---	---	---		---	---	378	1,66
5,16	---	---	---		---	---	371	0,800
5,20	---	---	---		---	---	364	1,10
5,19	---	---	---		---	---	355	1,10
5,34	---	---	---		---	---	370	1,03
5,22	---	---	---		---	---	398	1,59
5,22	---	---	---		---	---	370	1,34
5,27	---	---	---		---	---	393	1,24
5,27	---	---	---		---	---	374	1,20
5,14	---	---	---		---	---	384	1,30
$f_{tens,k}$ = 4,71 kN		---					**$f_{head,k}$ = 15,0 N/mm² with ρ_k = 380 kg/m³**	

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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Karlsruher Institut für Technologie

Versuchsanstalt für Stahl, Holz und Steine
Amtliche Materialprüfungsanstalt

Report No. 136250/32
Initial Type Test (ITT)

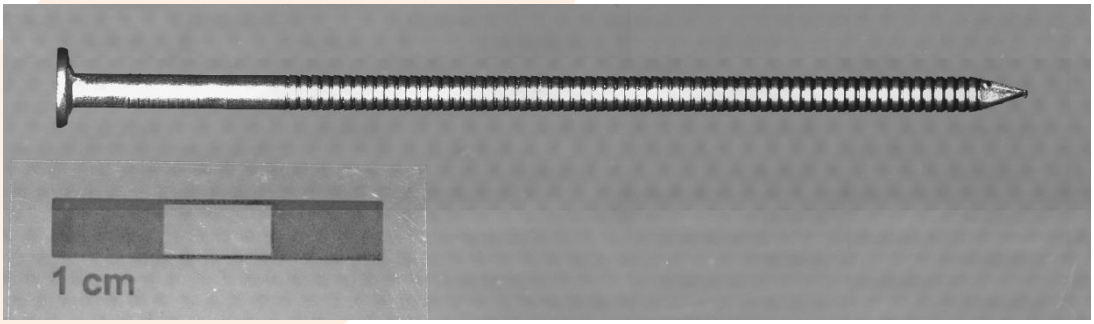
Client: H&H Tuonti Oy

Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products

Dimensions: diameter 3,10 mm

Coating: no

Material: SS304 in accordance to GB1499.1-2008



tested nail 3,10 x 90 / 7,0 ring

Dimen-sions	measured values in mm					mean value in mm	measured values related to mean value in %	
	1	2	3	4	5			
d_h	6,90	6,67	6,91	6,67	6,88	6,81	+ 1,52	- 2,04
d	3,02	2,99	3,00	3,00	3,01	3,00	+ 0,56	- 0,50
d_1	2,77	2,64	2,77	2,65	2,72	2,71	+ 2,21	- 2,58
d_a	3,18	3,16	3,20	3,14	3,17	3,17	+ 0,79	- 0,96
l_g	68,2	68,1	68,4	68,5	68,5	68,3	+ 0,24	- 0,38
l	88,7	89,0	88,8	89,0	88,7	88,8	+ 0,19	- 0,14
h	1,01	1,00	0,99	1,00	1,01	1,00	+ 0,78	- 1,17
h_t	1,41	1,48	1,47	1,41	1,49	1,45	+ 2,62	- 2,89
l_p	5,25	5,00	5,10	5,04	5,10	5,10	+ 2,98	- 1,92
A_h	37,4	34,9	39,8	34,9	37,2	36,4	+ 3,04	- 4,07

d_a = outer diameter

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tensile capacity	tensile strength of wire	yield moment			withdrawal parameter			head pull-through parameter		
3,10 x 90	Ø 3,1	3,10 x 90			---			3,10 x 90		
					d = ---		l_{ef} = ---	d_h = 6,90 mm		
f_{tens}	f_u	M_y	crack		ρ	R_{ax}		ρ	R_{ax}*	
kN	N/mm²	Nm	-		kg/m³	kN		kg/m³	kN	
6,16	855	4,01	NO		---	---		360	1,22	
6,12	878	4,08	NO		---	---		347	1,10	
5,98	866	4,02	NO		---	---		371	1,04	
5,99	881	3,86	NO		---	---		384	1,39	
6,12	872	4,03	NO		---	---		373	1,10	
6,07	---	3,92	NO		---	---		364	1,13	
6,20	---	3,97	NO		---	---		407	1,67	
6,05	---	4,09	NO		---	---		384	1,06	
6,13	---	4,03	NO		---	---		406	1,88	
6,08	---	3,92	NO		---	---		355	1,27	
$f_{tens,k}$ = 5,48 kN	**f_u > 600 N/mm²**	**$M_{y,k}$ = 3,59 Nm**			---			**$f_{head,k}$ = 17,3 N/mm² with ρ_k = 380 kg/m³**		

* maximal strength at a crosshead displacement of 15 mm

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