

SUORITUSTASOILMOITUS

DECLARATION OF PERFORMANCE



Rakennustuotedirektiivi CPD 89/106/EEC

Tämä suoritusasoilmoitus 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/mm ² | Ulosveto kannan läpi fhead,k/N/mm ² |
|----------------|---------------------------|---|---|
| 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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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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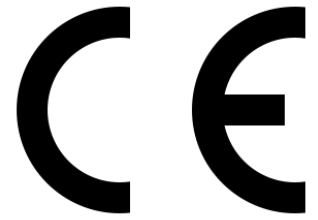
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SUORITUSTASOILMOITUS

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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 ($f_{ax} \geq 4,5 \text{ N/mm}^2$).


Table 21 Declared values.

| Nail | $l \times d$ [mm] | A_h [mm ²] | l_g [mm] | $f_{u,k}$ [N/mm ²] | $M_{y,k}$ [Nmm] | $f_{ax,k}$ With $\rho_k = 350$ [N/mm ²] | $f_{head,k}$ With $\rho_k = 350$ [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

The test results relate only to the sample tested.

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 | $f_{\text{tens,k}}$ [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 ($f_{\text{ax}} \geq 4,5 \text{ N/mm}^2$).

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

| Nail | d [mm] | l [mm] | A_n [mm ²] | l_g [mm] | l_p [mm] | f_u [N/mm ²] | $M_{y,k}$ [Nmm] | $f_{\text{ax,k}}$ $\rho_k = 350$ [N/mm ²] | $f_{\text{head,k}}$ $\rho_k = 350$ [N/mm ²] | $f_{\text{tens,k}}$ [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



Appendices

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

The test results relate only to the sample tested.

SUORITUSTASOILMOITUS

DECLARATION OF PERFORMANCE



Tämä suoritusasoilmoitus koskee seuraavia tuotteita:

4561UR, 4561UAR, 4561UBR, 4561UDR, 4712AS, 4713AS, 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, 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 raporttinerot:

Karlsruhe Institute of Technology
Kaiserstrasse 12
76131 Karlsruhe
Germany

Raporttinerot: 136250/1-10, 20-32

Espoo 03.02.2014

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



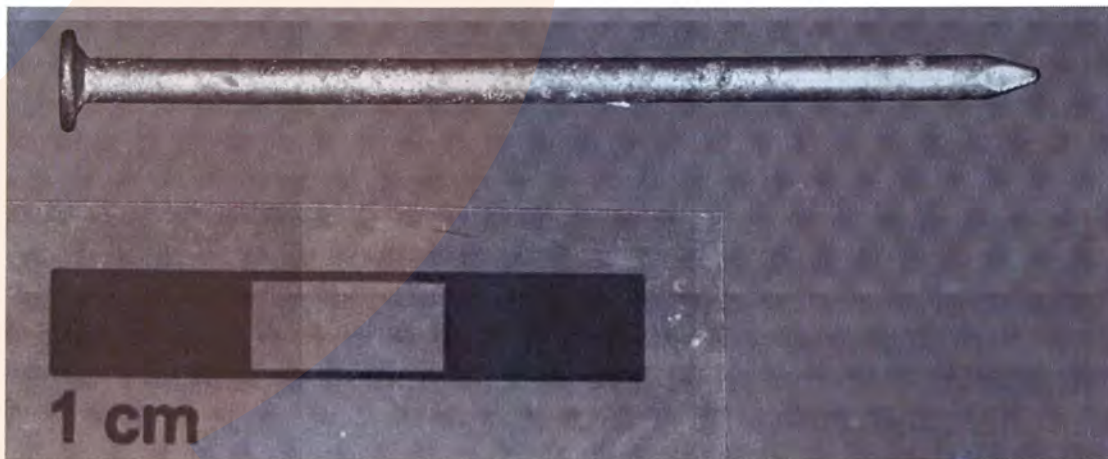
Client: H&H Tuonti Oy

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

Dimensions: diameter 2,10 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$

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 |

| tensile capacity | tensile strength of wire | yield moment | | withdrawal parameter | | head pull-through parameter | |
|------------------|-------------------------------|--------------|--------------|--|----------------------------------|--|------------------|
| | | M_y Nm | crack --- | d = --- ρ kg/m ³ | l_{ef} = --- R_{ax} kN | d_H = --- ρ kg/m ³ | R_{ax}^* kN |
| --- | $\varnothing 2,1$ | --- | --- | --- | --- | --- | --- |
| f_{tens} kN | f_u N/mm ² | --- | --- | --- | --- | --- | --- |
| --- | 855 | --- | --- | --- | --- | --- | --- |
| --- | 869 | --- | --- | --- | --- | --- | --- |
| --- | 863 | --- | --- | --- | --- | --- | --- |
| --- | 854 | --- | --- | --- | --- | --- | --- |
| --- | 855 | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | $f_u > 600$ N/mm ² | --- | --- | --- | --- | --- | --- |

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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



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 $\geq 50\mu\text{m}$

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



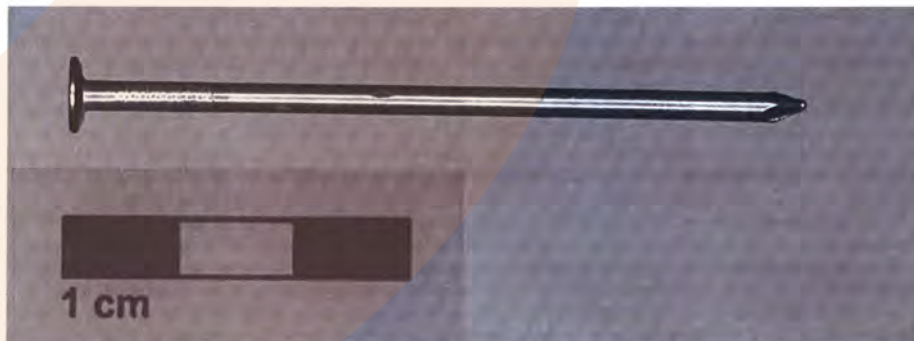
Client: H&H Tuonti Oy

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 | |
|------------------|-------------------------------|--------------|-------|----------------------|----------------|-----------------------------|------------------|
| | | M_y Nm | crack | d | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| | \varnothing 2,5 | | | $d_h = \dots$ | | | |
| f_{tens} kN | f_u N/mm ² | | | | | | |
| | 1023 | | | | | | |
| | 1043 | | | | | | |
| | 1037 | | | | | | |
| | 1036 | | | | | | |
| | 1041 | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | $f_u > 600$ N/mm ² | | | | | | |

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Karlsruhe 26.04.2013

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



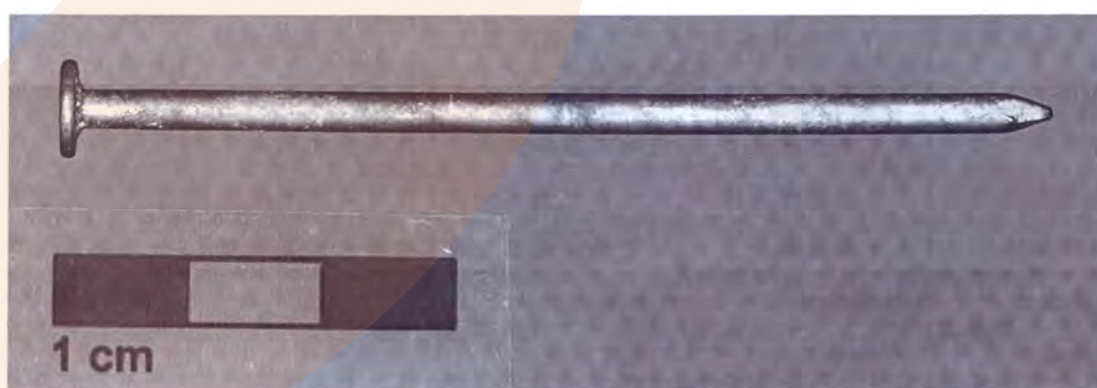
Client: H&H Tuonti Oy

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

Dimensions: diameter 2,90 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$

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



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 $\geq 50\mu\text{m}$

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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| tensile capacity | tensile strength of wire | yield moment | withdrawal parameter | | head pull-through parameter | | | | | | | | | | | | | | | | | |
|------------------|--------------------------|--------------|-------------------------|----------------------------|-----------------------------|-------|-----------------------------|-----------------------|-------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | f_{tens} kN | f_u N/mm ² | M_y Nm | crack | ρ kg/m ³ | R_{ax} kN | R_{ax}^* kN | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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Report No. 136250/6
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: type 1 – HDG $\geq 50\mu\text{m}$

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 |

Report No. 136250/7
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: type 1 – HDG $\geq 50\mu\text{m}$

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



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 $\geq 50\mu\text{m}$

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 | |
|------------------|-------------------------------|--------------|----------------------|-----------------------------|-----------------------------|------------------|
| | | | $d = \dots$ | $l_{ef} = \dots$ | $d_h = \dots$ | |
| f_{tens} kN | f_u N/mm ² | M_y Nm | crack — | ρ kg/m ³ | R_{ax} kN | R_{ax}^* kN |
| | Ø 3,4 | | | | | |
| — | 931 | — | — | — | — | — |
| — | 920 | — | — | — | — | — |
| — | 919 | — | — | — | — | — |
| — | 919 | — | — | — | — | — |
| — | 925 | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | — | — | — | — | — | — |
| — | $f_u > 600$ N/mm ² | — | — | — | — | — |

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



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 $\geq 50\mu\text{m}$

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 |

| tensile capacity | tensile strength of wire | yield moment | | withdrawal parameter | | head pull-through parameter | |
|------------------|-------------------------------|--------------|-------|-----------------------------|----------------|-----------------------------|------------------|
| | | M_y Nm | crack | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| --- | Ø 3,8 | --- | --- | --- | --- | --- | --- |
| f_{tens} kN | f_u N/mm ² | | | | | | |
| --- | 885 | --- | --- | --- | --- | --- | --- |
| --- | 880 | --- | --- | --- | --- | --- | --- |
| --- | 881 | --- | --- | --- | --- | --- | --- |
| --- | 889 | --- | --- | --- | --- | --- | --- |
| --- | 899 | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | --- | --- | --- | --- | --- | --- | --- |
| --- | $f_u > 600$ N/mm ² | --- | --- | --- | --- | --- | --- |

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



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 $\geq 50\mu\text{m}$

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 | |
|-------------------------|---|----------------------|-----------------------------|-----------------------|-----------------------------|-------------------------|
| | | | d | l_{eff} | ρ | R_{ax}^* |
| f_{tens} kN | $\varnothing 4,2$ f_u N/mm ² | M_y Nm crack | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| --- | 827 844 847 844 822 --- --- --- --- | --- | --- | --- | --- | --- |
| --- | $f_u > 600$ N/mm ² | --- | --- | --- | --- | --- |

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



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 $\geq 50\mu\text{m}$

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 |

| tensile capacity | tensile strength of wire | yield moment | | withdrawal parameter | | head pull-through parameter | | | |
|------------------|--------------------------|------------------|----------------------------|----------------------|-------|--|------------------------------------|--|------------------|
| | | f_{tens} kN | f_u N/mm ² | M_y Nm | crack | $d = \dots$ ρ kg/m ³ | $l_{ef} = \dots$ R_{ax} kN | $d_h = \dots$ ρ kg/m ³ | R_{ax}^* kN |
| --- | Ø 4,60 | | | | | | | | |
| | | | 823 | | | | | | |
| | | | 806 | | | | | | |
| | | | 795 | | | | | | |
| | | | 782 | | | | | | |
| | | | 800 | | | | | | |
| | | | --- | | | | | | |
| | | | --- | | | | | | |
| | | | --- | | | | | | |
| | | | --- | | | | | | |
| | | | --- | | | | | | |
| | | | --- | | | | | | |
| | | | --- | | | | | | |
| | | | --- | | | | | | |
| | | | $f_u > 600 \text{ N/mm}^2$ | | | | | | |

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



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 $\geq 50\mu\text{m}$
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 |

| tensile capacity | tensile strength of wire | yield moment | | withdrawal parameter | | head pull-through parameter | |
|------------------|----------------------------|--------------|-------|--------------------------|----------------|-----------------------------|------------------|
| | | M_y Nm | crack | d kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| | $\emptyset 5,0$ | | | | | | |
| f_{tens} kN | f_u N/mm ² | | | | | | |
| | 772 | | | | | | |
| | 772 | | | | | | |
| | 770 | | | | | | |
| | 764 | | | | | | |
| | 760 | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | $f_u > 600 \text{ N/mm}^2$ | | | | | | |

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



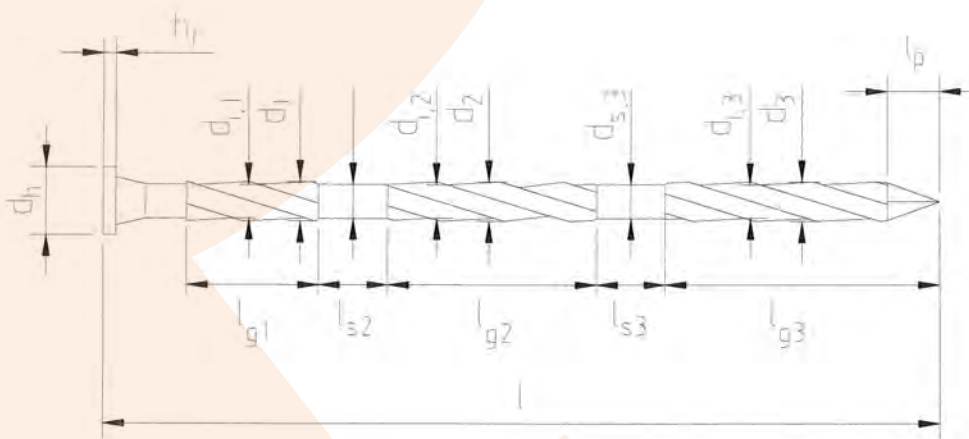
Client: H&H Tuonti Oy

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

Dimensions: diameter 2,30 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$ or bright = $0\mu\text{m}$

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



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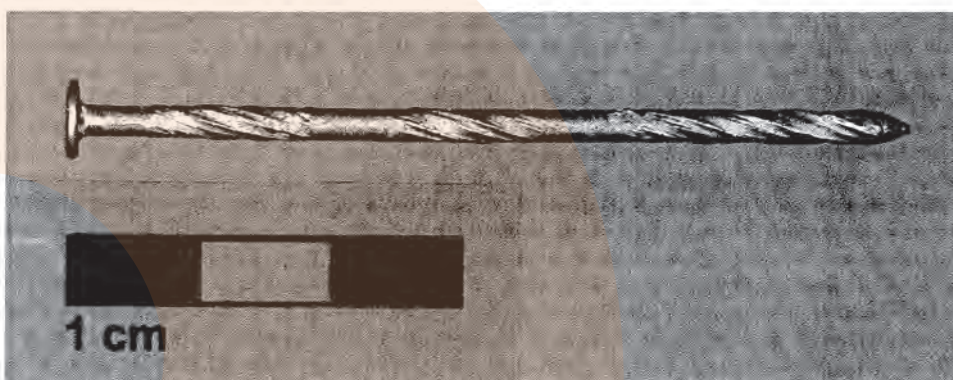
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tested nail 2,30 x 65 mm spiral HDG

| 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_n | 27,3 | 26,2 | 26,0 | 26,1 | 26,1 | 26,3 | + 3,77 | - 1,23 |

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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 |

| 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 | 2,30 x 65 HDG |
| f_{tens} kN | f_u N/mm ² | M_y Nm | ρ kg/m ³ | ρ kg/m ³ |
| 1,62 | --- | crack | R_{ax} kN | R_{ax}^* kN |
| 1,61 | --- | - | | |
| 1,69 | --- | NO | | |
| 1,67 | --- | NO | | |
| 1,68 | --- | NO | | |
| 1,69 | --- | NO | | |
| 1,65 | --- | NO | | |
| 1,70 | --- | NO | | |
| 1,63 | --- | NO | | |
| 1,65 | --- | NO | | |
| $f_{tens,k} = 1,49$ kN | --- | $M_{y,k} = 0,849$ Nm | $f_{ax,k} = 4,50$ N/mm ² with $\rho_k = 350$ kg/m ³ | $f_{head,k} = 22,2$ N/mm ² with $\rho_k = 380$ kg/m ³ |

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 23 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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



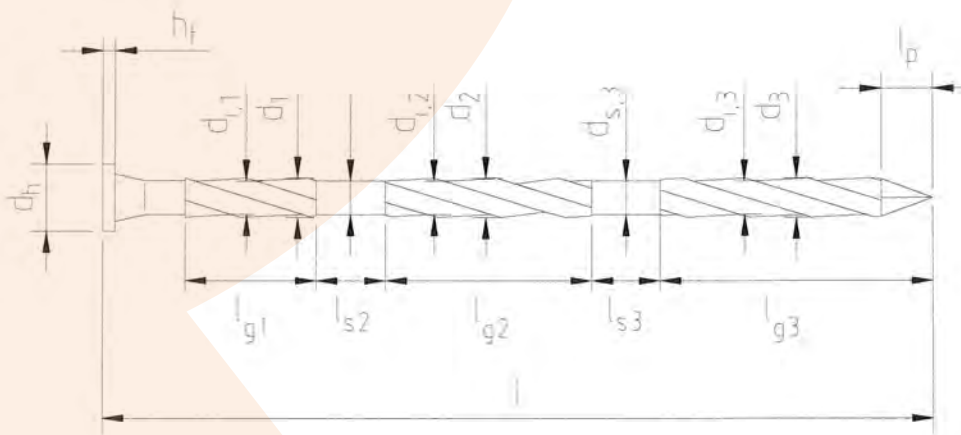
Client: H&H Tuonti Oy

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

Dimensions: diameter 2,50 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$

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



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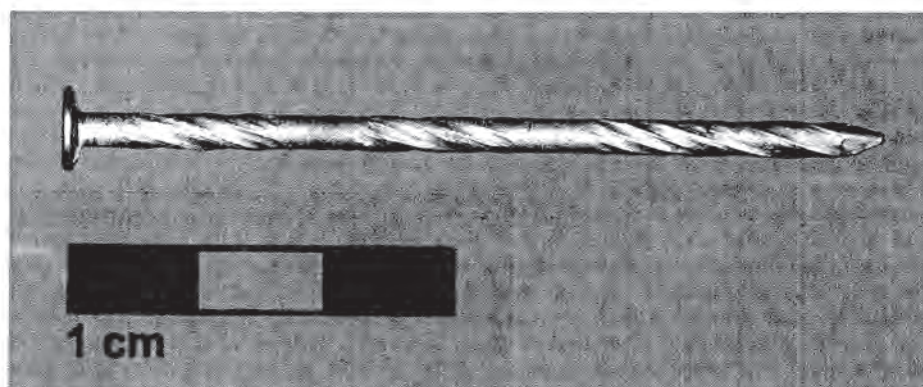
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tested nail 2,50 x 65 mm spiral HDG

| 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 | |
|------------------------|----------------------------|---------------------|-------|---|----------------|---|------------------|
| | | M_y Nm | crack | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 2,50 x 65 | --- | 2,50 x 65 | | 2,50 x 65** | | 2,50 x 65 | |
| f_{tens} kN | f_u N/mm ² | | | $d = 2,5$ mm $l_{ef} = 22,1$ mm | | $d_h = 6,40$ mm | |
| 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/mm ² with $P_k = 350$ kg/m ³ | | $f_{head,k} = 19,1$ N/mm ² with $P_k = 380$ kg/m ³ | |

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 25 mm

** withdrawal parameter < 4,50 N/mm²

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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



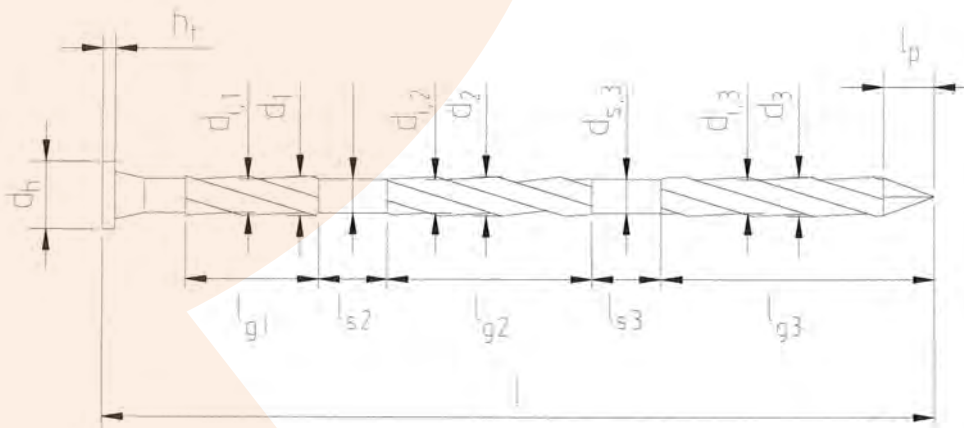
Client: H&H Tuonti Oy

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

Dimensions: diameter 2,90 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$ or bright = $0\mu\text{m}$

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



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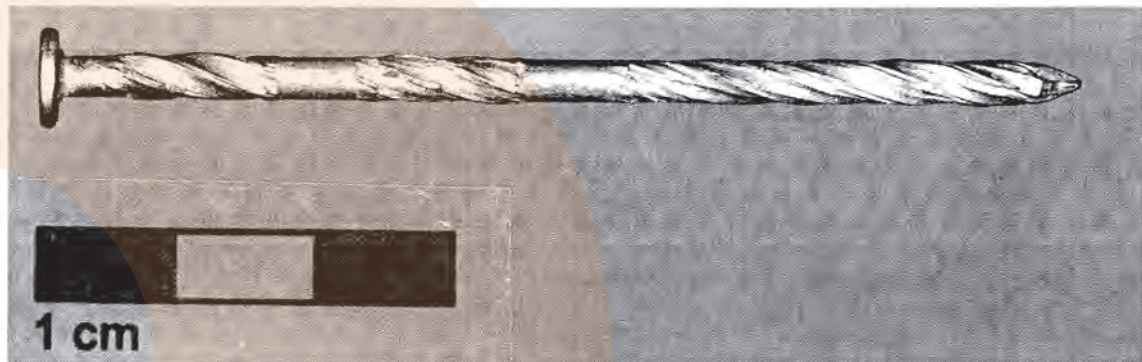
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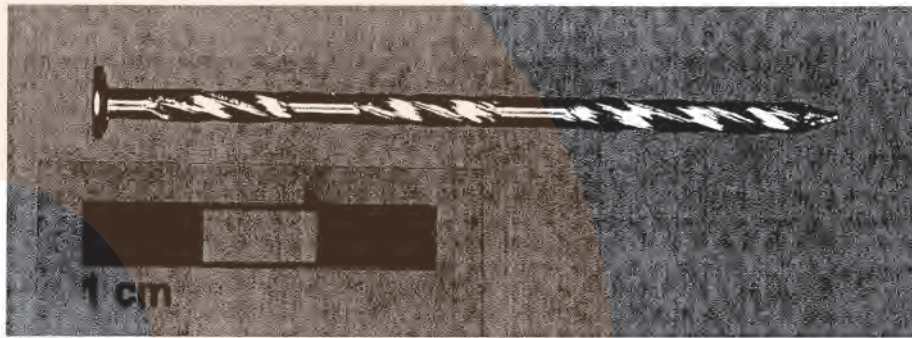
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tested nail 2,90 x 75 mm spiral HDG

| 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 |



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 |

| tensile capacity | tensile strength of wire | yield moment | | withdrawal parameter | | head pull-through parameter | | | |
|--|--------------------------|---------------------------------------|----------------------------|--|-------|--|---|-----------------------------|------------------|
| | | f_{tens} kN | f_u N/mm ² | $M_{y,k}$ Nm | crack | $d = 2,9$ mm $l_{ef} = 25,4$ mm | $2,90 \times 75$ HDG $d_h = 7,00$ mm | ρ kg/m ³ | R_{ax}^* kN |
| 2,90 x 75 HDG | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4,72 | --- | 2,76 | NO | 0,753 | 1,52 | 378 | 1,52 | 378 | 1,52 |
| 4,80 | --- | 2,79 | NO | 0,648 | 2,41 | 346 | 2,41 | 376 | 2,41 |
| 4,82 | --- | 2,76 | NO | 0,571 | 1,28 | 334 | 1,28 | 355 | 1,28 |
| 4,64 | --- | 2,86 | NO | 0,624 | 0,990 | 357 | 0,990 | 370 | 0,990 |
| 4,67 | --- | 2,75 | NO | 0,676 | 1,46 | 353 | 1,46 | 364 | 1,46 |
| 4,60 | --- | 2,88 | NO | 0,469 | 2,01 | 373 | 2,01 | 398 | 2,01 |
| 4,61 | --- | 2,85 | NO | 0,406 | 2,17 | 346 | 2,17 | 393 | 2,17 |
| 4,64 | --- | 2,73 | NO | 0,479 | 1,81 | 334 | 1,81 | 370 | 1,81 |
| 4,61 | --- | 2,80 | NO | 0,497 | 1,78 | 357 | 1,78 | 374 | 1,78 |
| 4,91 | --- | 2,72 | NO | 0,604 | 2,05 | 353 | 2,05 | 384 | 2,05 |
| $f_{tens,k} = 4,23$ kN | --- | $M_{y,k} = 2,51$ Nm | | $f_{ax,k} = 5,10$ N/mm² with $\rho_k = 350$ kg/m³ | | $f_{head,k} = 19,6$ N/mm² with $\rho_k = 380$ kg/m³ | | | |

* maximal strength at a crosshead displacement of 15 mm
penetration depth: 29 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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



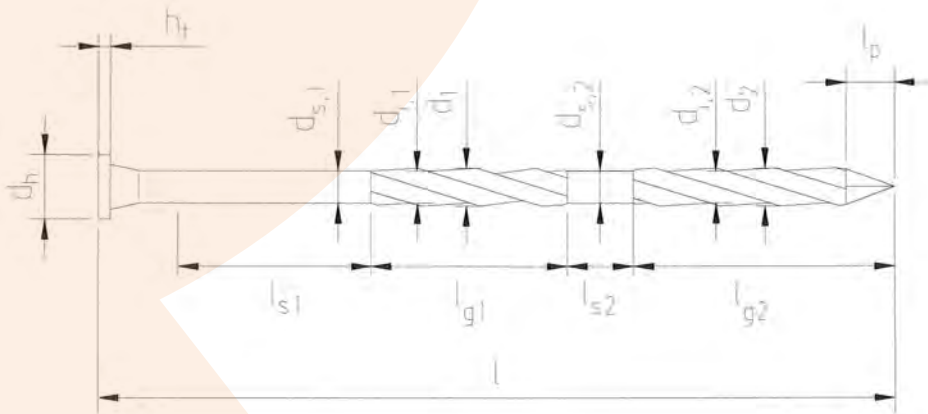
Client: H&H Tuonti Oy

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

Dimensions: diameter 3,10 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$

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 | | | | |
|--|--------------------------|---------------------------------------|----------------------------|--|--|------------------------------------|-----------------------------|----------------|-----------------------------|------------------|
| | | f_{tens} kN | f_u N/mm ² | $M_{y,k}$ Nm | crack | $d = 3,1$ mm $l_{ef} = 27,7$ mm | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 3,10 x 90 | --- | --- | --- | 3,10 x 90 | --- | 3,10 x 90 | --- | 3,10 x 90 | --- | --- |
| 5,54 | --- | 3,52 | NO | 0,730 | 384 | 2,01 | | | | |
| 5,53 | --- | 3,50 | NO | 0,820 | 374 | 1,83 | | | | |
| 5,54 | --- | 3,57 | NO | 0,758 | 370 | 1,99 | | | | |
| 5,25 | --- | 3,60 | NO | 0,869 | 393 | 1,85 | | | | |
| 5,26 | --- | 3,56 | NO | 0,824 | 398 | 1,97 | | | | |
| 5,29 | --- | 3,53 | NO | 0,722 | 364 | 1,32 | | | | |
| 5,44 | --- | 3,48 | NO | 0,828 | 370 | 1,56 | | | | |
| 5,31 | --- | 3,52 | NO | 0,448 | 355 | 1,37 | | | | |
| 5,27 | --- | 3,56 | NO | 0,438 | 410 | 1,83 | | | | |
| 5,29 | --- | 3,51 | NO | 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 $\rho_k = 350$ kg/m³ | $f_{head,k} = 22,4$ N/mm² with $\rho_k = 380$ kg/m³ | | | | | |

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 31 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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



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 $\geq 50\mu\text{m}$

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 d = 3,4 mm l _{ef} = 30 mm | 3,40 x 100 d _h = 7,10 mm |
| f _{tens} kN | f _u N/mm ² | M _y Nm crack | ρ kg/m ³ R _{ax} kN | ρ kg/m ³ R _{ax} 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/mm ² with p _k = 350 kg/m ³ | f _{head,k} = 18,8 N/mm ² with p _k = 380 kg/m ³ |

* maximal strength at a crosshead displacement of 15 mm
 penetration depth: 34 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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



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 $\geq 50\mu\text{m}$

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 | |
|--------------------------------|----------------------------|-----------------------------|-------|---|-------------------------|---|------------------|
| | | M_y Nm | crack | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 3,80 x 110 | --- | 3,80 x 110 | | 3,80 x 110 | | 3,80 x 110 | |
| f_{tens} kN | f_u N/mm ² | | | $d = 3,8 \text{ mm}$ $l_{ef} = 33,7 \text{ mm}$ | $d_h = 8,20 \text{ mm}$ | | |
| 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 |
| $f_{tens,k} = 7,38 \text{ kN}$ | --- | $M_{y,k} = 5,86 \text{ Nm}$ | | $f_{ax,k} = 4,72 \text{ N/mm}^2$ with $P_k = 350 \text{ kg/m}^3$ | | $f_{head,k} = 25,5 \text{ N/mm}^2$ with $P_k = 380 \text{ kg/m}^3$ | |

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 38 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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



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 $\geq 50\mu\text{m}$ or bright = $0\mu\text{m}$

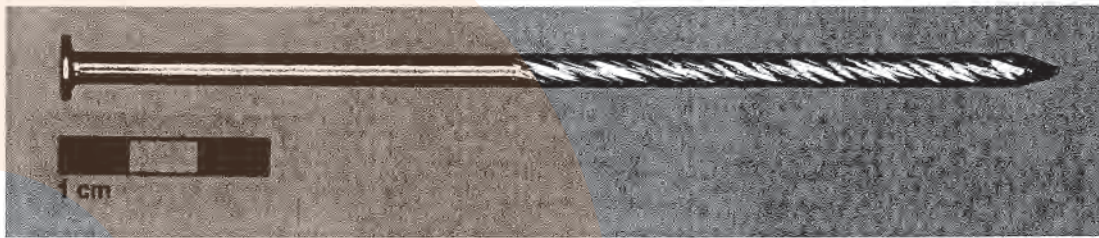
Material: HPB 235 (Q235) in accordance to GB1499.1-2008



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



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

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

* maximal strength at a crosshead displacement of 15 mm
 penetration depth: 46 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769



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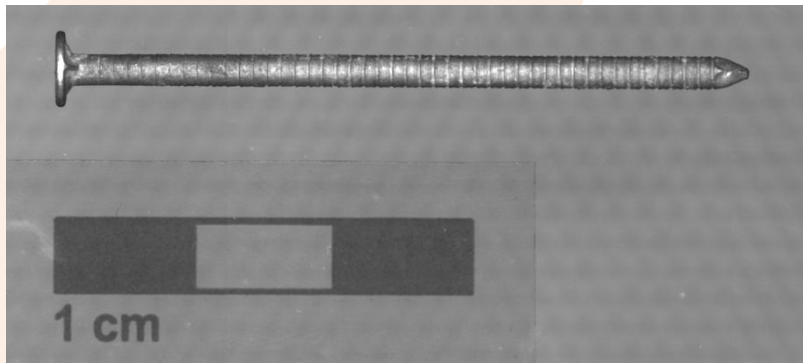
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Report No. 136250/20
Initial Type Test (ITT)



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 $\geq 50\mu\text{m}$
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

| tensile capacity | tensile strength of wire | yield moment | | withdrawal parameter | | head pull-through parameter | |
|--------------------------------|----------------------------|------------------------------|-------|--|-------------------------|--|------------------|
| | | M_y Nm | crack | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 2,10 x 50 | --- | 2,10 x 50 | | 2,10 x 50 | | 2,10 x 50 | |
| f_{tens} kN | f_u N/mm ² | | | $d = 2,10 \text{ mm}$ $l_{ef} = 18,8 \text{ mm}$ | $d_h = 5,30 \text{ mm}$ | | |
| 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 |
| $f_{tens,k} = 1,15 \text{ kN}$ | --- | $M_{y,k} = 0,644 \text{ Nm}$ | | $f_{ax,k} = 5,22 \text{ N/mm}^2$ with $\rho_k = 350 \text{ kg/m}^3$ | | $f_{head,k} = 17,2 \text{ N/mm}^2$ with $\rho_k = 360 \text{ kg/m}^3$ | |

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 2.1 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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



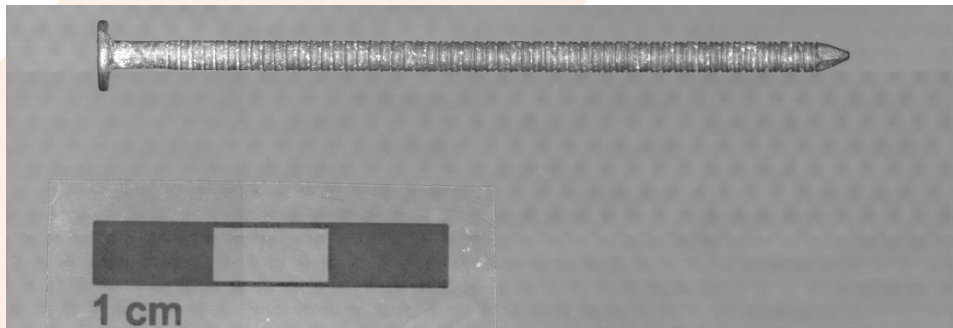
Client: H&H Tuonti Oy

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

Dimensions: diameter 2,30 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$

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 | 2,30 x 65 |
| f_{tens} kN | f_u N/mm ² | M_y Nm | ρ kg/m ³ | ρ kg/m ³ |
| 1,55 | --- | crack | R_{ax} kN | R_{ax}^* kN |
| 1,52 | --- | - | | |
| 1,53 | --- | NO | | |
| 1,50 | --- | NO | | |
| 1,56 | --- | NO | | |
| 1,53 | --- | NO | | |
| 1,55 | --- | NO | | |
| 1,54 | --- | NO | | |
| 1,53 | --- | NO | | |
| 1,51 | --- | NO | | |
| $f_{tens,k} = 1,38$ kN | --- | $M_{y,k} = 0,749$ Nm | $f_{ax,k} = 6,69$ N/mm ² with $\rho_k = 350$ kg/m ³ | $f_{head,k} = 20,4$ N/mm ² with $\rho_k = 380$ kg/m ³ |

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 23 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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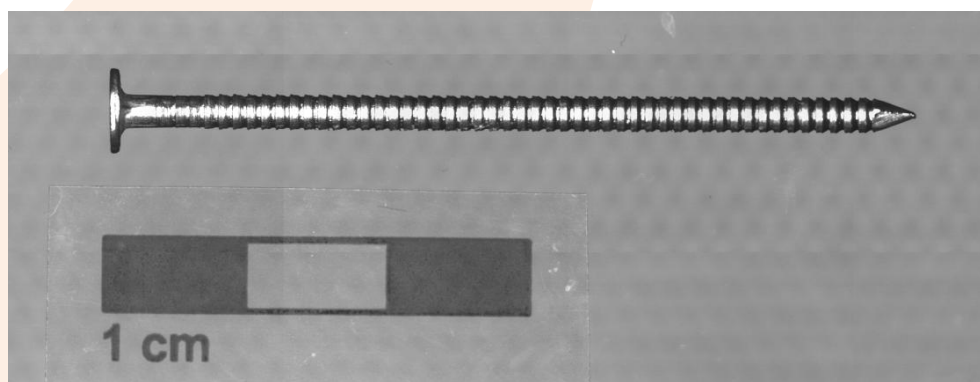
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Report No. 136250/22
Initial Type Test (ITT)



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 |
|------------------------|-------------------------------|---------------------|-----------------------------|-----------------------------|
| 2,30 x 57 | Ø 2,3 | 2,30 x 57 | --- | --- |
| f_{tens} kN | f_u N/mm ² | M_y Nm | ρ kg/m ³ | ρ kg/m ³ |
| 3,93 | 921 | crack - | R_{ax} kN | R_{ax}^* kN |
| 3,86 | 935 | NO | --- | --- |
| 3,92 | 954 | NO | --- | --- |
| 3,83 | 943 | NO | --- | --- |
| 3,84 | 948 | NO | --- | --- |
| 3,89 | --- | NO | --- | --- |
| 3,86 | --- | NO | --- | --- |
| 3,82 | --- | NO | --- | --- |
| 3,80 | --- | NO | --- | --- |
| 3,82 | --- | NO | --- | --- |
| $f_{tens,k} = 3,47$ kN | $f_u > 600$ N/mm ² | $M_{y,k} = 1,83$ Nm | --- | --- |

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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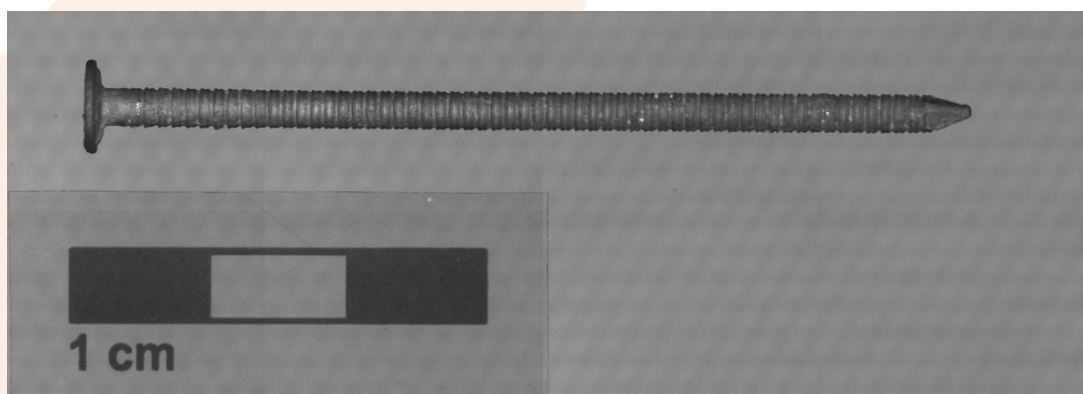
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Report No. 136250/23
Initial Type Test (ITT)



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 $\geq 50\mu\text{m}$
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

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

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 25 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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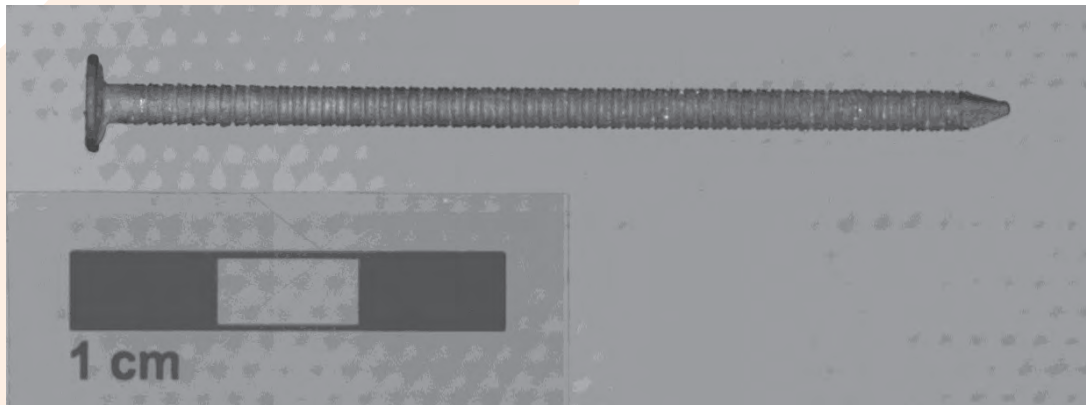
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Report No. 136250/24
Initial Type Test (ITT)



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 $\geq 50\mu\text{m}$
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

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| tensile capacity | tensile strength of wire | yield moment | withdrawal parameter | head pull-through parameter |
|------------------------|----------------------------|---------------------------|---|--|
| 2,50 x 65 | --- | --- | --- | 2,50 x 65 $d_h = 6,40$ mm |
| f_{tens} kN | f_u N/mm ² | M_y Nm crack - | ρ kg/m ³ R_{ax} kN | ρ kg/m ³ R_{ax}^* kN |
| 2,49 | --- | --- | --- | 374 |
| 2,43 | --- | --- | --- | 384 |
| 2,35 | --- | --- | --- | 370 |
| 2,42 | --- | --- | --- | 393 |
| 2,42 | --- | --- | --- | 398 |
| 2,48 | --- | --- | --- | 370 |
| 2,39 | --- | --- | --- | 364 |
| 2,41 | --- | --- | --- | 378 |
| 2,48 | --- | --- | --- | 376 |
| 2,45 | --- | --- | --- | 355 |
| $f_{tens,k} = 3,20$ kN | --- | --- | --- | $f_{head,k} = 21,5$ N/mm ² with $\rho_k = 380$ kg/m ³ |

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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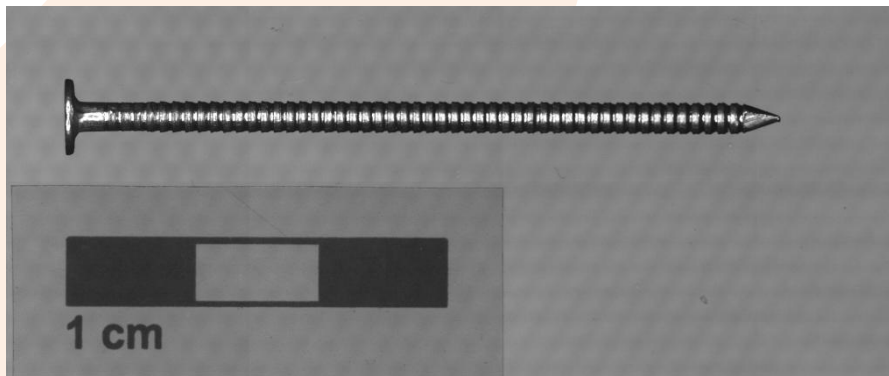
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Report No. 136250/25
Initial Type Test (ITT)



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 | | | | |
|--|---|---------------------------------------|----------------------------|----------------------|-------|---------------------------------|-----------------------------|----------------|-----------------------------|------------------|
| | | f_{tens} kN | f_u N/mm ² | M_y Nm | crack | $d = \dots$ $l_{ef} = \dots$ | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 2,50 x 75 | Ø 2,5 | 2,50 x 75 | --- | --- | --- | --- | --- | --- | --- | --- |
| 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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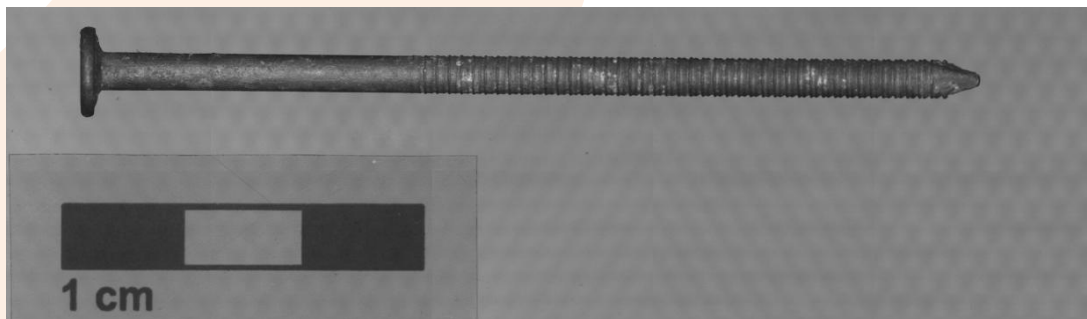
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Report No. 136250/26
Initial Type Test (ITT)



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 $\geq 50\mu\text{m}$
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 | |
|--------------------------------|----------------------------|-----------------------------|------------|--|----------------------------|--|------------------|
| | | M_y Nm | crack - | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 2,90 x 75 | Ø 2,90 | 2,90 x 75 | | 2,90 x 75 | | 2,90 x 75 | |
| f_{tens} kN | f_u N/mm ² | | | $d = 2,9 \text{ mm}$ $l_{ef} = 25,9 \text{ mm}$ | $d_{ht} = 7,00 \text{ mm}$ | | |
| 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 |
| $f_{tens,k} = 3,78 \text{ kN}$ | --- | $M_{y,k} = 2,41 \text{ Nm}$ | | $f_{ax,k} = 7,45 \text{ N/mm}^2$ with $\rho_k = 350 \text{ kg/m}^3$ | | $f_{head,k} = 26,4 \text{ N/mm}^2$ with $\rho_k = 380 \text{ kg/m}^3$ | |

* maximal strength at a crosshead displacement of 15 mm

penetration depth: 29 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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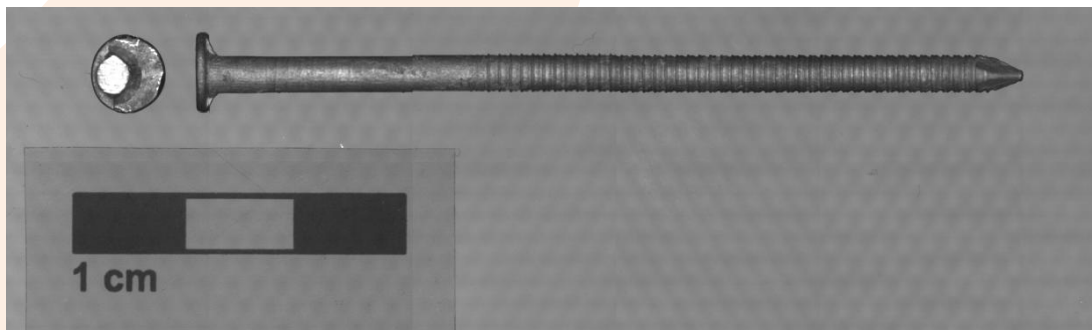
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Report No. 136250/27
Initial Type Test (ITT)



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 $\geq 50\mu\text{m}$
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

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| tensile capacity | tensile strength of wire | yield moment | | withdrawal parameter | | head pull-through parameter | |
|--------------------------------|----------------------------|--------------|------------|-----------------------------|-----------------------|--|-------------------------|
| | | M_y Nm | crack - | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 2,90 x 76 | --- | --- | --- | $d = \text{---}$ | $l_{ef} = \text{---}$ | 2,90 x 76 | $d_h = 6,90 \text{ mm}$ |
| f_{tens} kN | f_u N/mm ² | | | | | | |
| 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 |
| $f_{tens,k} = 4,12 \text{ kN}$ | | | --- | | | $f_{head,k} = 18,4 \text{ N/mm}^2$ with $\rho_k = 380 \text{ kg/m}^3$ | |

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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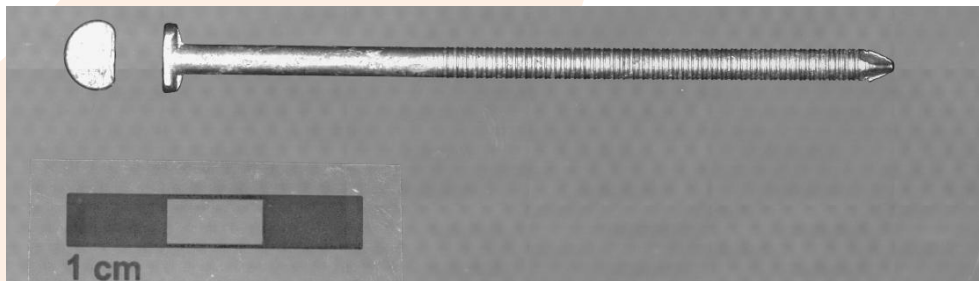
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Report No. 136250/28
Initial Type Test (ITT)



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 $\geq 50\mu\text{m}$
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 | --- | --- | --- | 2,90 x 75 |
| f_{tens} kN | f_u N/mm ² | M_y Nm | ρ kg/m ³ | ρ kg/m ³ |
| 4,56 | --- | --- | --- | 384 |
| 4,48 | --- | --- | --- | 371 |
| 4,50 | --- | --- | --- | 347 |
| 4,62 | --- | --- | --- | 360 |
| 4,46 | --- | --- | --- | 355 |
| 4,42 | --- | --- | --- | 399 |
| 4,53 | --- | --- | --- | 384 |
| 4,43 | --- | --- | --- | 406 |
| 4,65 | --- | --- | --- | 407 |
| 4,45 | --- | --- | --- | 373 |
| $f_{tens,k} = 4,06$ kN | --- | --- | --- | $f_{head,k} = 14,4$ N/mm ² with $\rho_k = 380$ kg/m ³ |

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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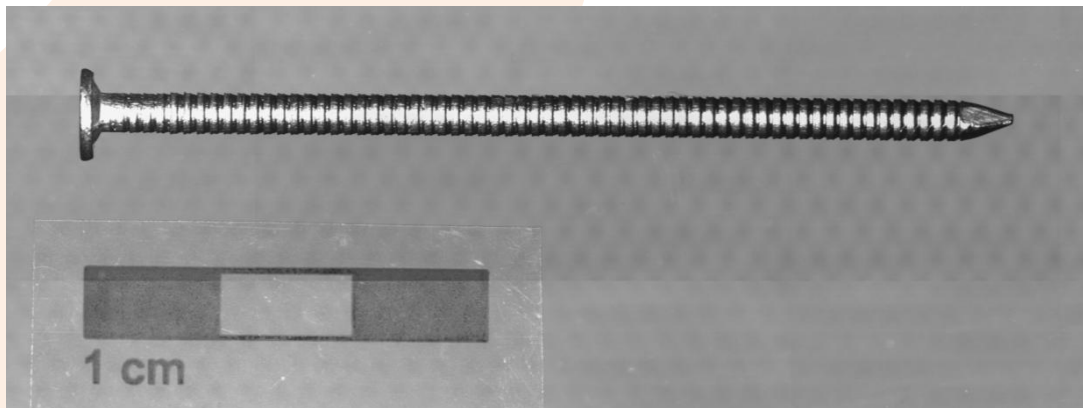
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Report No. 136250/29
Initial Type Test (ITT)



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 | | | |
|------------------------|-------------------------------|---------------------|----------------------------|--|-------|-----------------------------|------------------|-----------------------------|------------------|
| | | f_{tens} kN | f_u N/mm ² | M_y Nm | crack | $d = \dots$ | $l_{ef} = \dots$ | ρ kg/m ³ | R_{ax}^* kN |
| 2,90 x 70 | \emptyset 2,9 | 2,90 x 70 | 2,90 x 70 | --- | --- | 2,90 x 70 | $d_h = 6,70$ mm | --- | --- |
| 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/mm ² | $M_{y,k} = 3,13$ Nm | --- | $f_{head,k} = 20,0$ N/mm ² with $\rho_k = 380$ kg/m ³ | --- | --- | --- | --- | |

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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



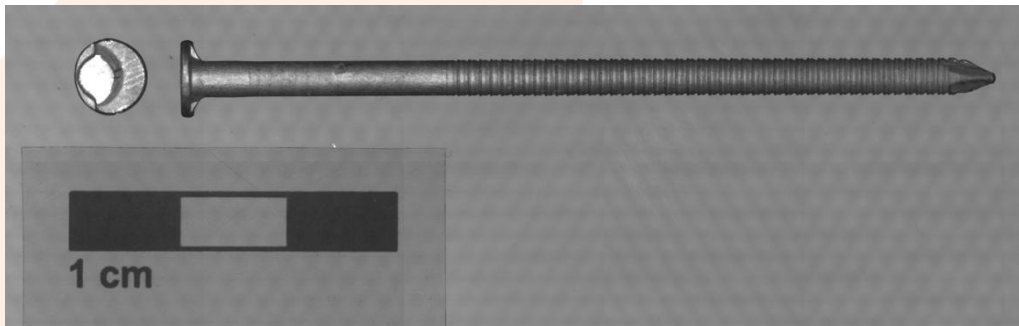
Client: H&H Tuonti Oy

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

Dimensions: diameter 3,10 mm

Coating: type 1 – HDG $\geq 50\mu\text{m}$

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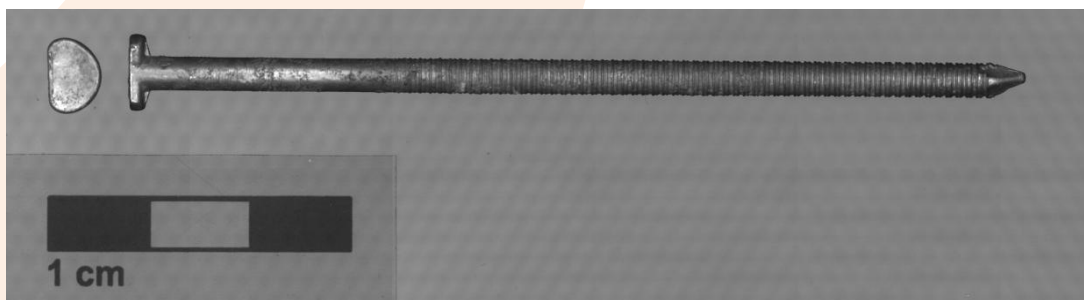
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Report No. 136250/31
Initial Type Test (ITT)



Client: H&H Tuonti Oy
Base: EN 14592:2008+A1:2012 (D)
nails for structural timber products
Dimensions: diameter 3,10 mm
Coating: type 1 – HDG $\geq 50\mu\text{m}$
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 |
| f_{tens} kN | f_u N/mm ² | M_y Nm crack - | d = --- ρ kg/m ³ R_{ax} kN l_{ef} = --- | ρ kg/m ³ R_{ax}^* kN |
| 5,29 5,16 5,20 5,19 5,34 5,22 5,22 5,27 5,27 5,14 | --- | --- | --- | 378 371 364 355 370 398 370 393 374 384 |
| $f_{tens,k} = 4,71$ kN | --- | --- | --- | $f_{head,k} = 15,0$ N/mm ² with $\rho_k = 380$ kg/m ³ |

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

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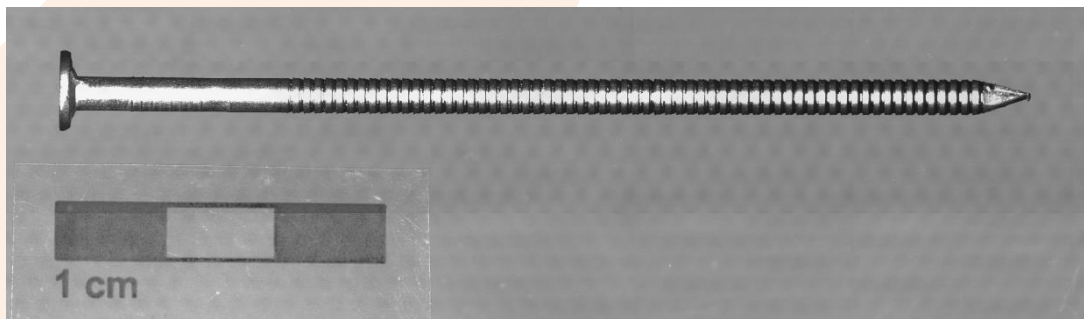
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Report No. 136250/32
Initial Type Test (ITT)



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 | | | | |
|------------------------|-------------------------------|---------------------|----------------------------|----------------------|-------|---------------------------------|-----------------------------|----------------|-----------------------------|--|
| | | f_{tens} kN | f_u N/mm ² | M_y Nm | crack | $d = \dots$ $l_{ef} = \dots$ | ρ kg/m ³ | R_{ax} kN | ρ kg/m ³ | R_{ax}^* kN |
| 3,10 x 90 | Ø 3,1 | 3,10 x 90 | 3,10 x 90 | --- | --- | --- | --- | --- | --- | --- |
| 6,16 | 855 | 4,01 | NO | --- | --- | --- | --- | --- | --- | 1,22 |
| 6,12 | 878 | 4,08 | NO | --- | --- | --- | --- | --- | --- | 1,10 |
| 5,98 | 866 | 4,02 | NO | --- | --- | --- | --- | --- | --- | 1,04 |
| 5,99 | 881 | 3,86 | NO | --- | --- | --- | --- | --- | --- | 1,39 |
| 6,12 | 872 | 4,03 | NO | --- | --- | --- | --- | --- | --- | 1,10 |
| 6,07 | --- | 3,92 | NO | --- | --- | --- | --- | --- | --- | 1,13 |
| 6,20 | --- | 3,97 | NO | --- | --- | --- | --- | --- | --- | 1,67 |
| 6,05 | --- | 4,09 | NO | --- | --- | --- | --- | --- | --- | 1,06 |
| 6,13 | --- | 4,03 | NO | --- | --- | --- | --- | --- | --- | 1,88 |
| 6,08 | --- | 3,92 | NO | --- | --- | --- | --- | --- | --- | 1,27 |
| $f_{tens,k} = 5,48$ kN | $f_u > 600$ N/mm ² | $M_{y,k} = 3,59$ Nm | | --- | | | | | | $f_{head,k} = 17,3$ N/mm ² with $\rho_k = 380$ kg/m ³ |

* maximal strength at a crosshead displacement of 15 mm

Karlsruhe 26.04.2013

Head of Notified Body NB 0769

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