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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA-26/0397
of 01/08/2026

General Part

Technical Assessment Body issuing the European Technical Assessment Technický a zkušební ústav stavební Praha, s.p.	
Trade name of the construction product	Evolution® WoodMaster® timber construction screws
Product family to which the construction product belongs	Product area code: 13 Screws for use in timber constructions
Manufacturer	Evolution Fasteners (UK) Ltd. Suite 1b, 1 Oaks Court, Warwick Road, Borehamwood WD6 1GS, Hertfordshire, England
Manufacturing plant	Plant 1
This European Technical Assessment contains	24 pages including 3 Annexes, which form an integral part of this European Technical Assessment
This European Technical Assessment is issued in accordance with Article 95(4) of Regulation (EU) 2024/3110, on the basis of	EAD 130118-01-0603 Screws and threaded rods for use in timber constructions

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1 Technical description of the product

Evolution® WoodMaster® timber construction screws are made from carbon steel 10B21. Surface of the screws is zinc plated/yellow zinc plated/Ruspert/Mechanical zinc plated or Geomet. Type of head is Countersunk or Wafer. The screws are with full thread or partial thread. Dimensions, tolerances and shapes are shown in Annex 1. All screws fulfill the requirement for a minimum bending angle $\alpha = (45/d^{0.7} + 20)$. The screws are used for connections in load bearing timber structures between wood-based members.

1.1 Shape and dimensions

The outer thread diameter is ranging from 3.0 mm to 10.0 mm. The overall length of the screws is ranging from 16 mm to 400 mm. Further dimensions are shown in Annex 1.

The ratio of inner thread diameter to outer thread diameter d_1/d for tested screws is ranging from 0.58 to 0.67.

The screws are threaded over a minimum length $l_g \geq 4 \cdot d$.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The screws are used for connections in timber constructions.

The screws are intended to be used for connecting wood-based members where requirements for mechanical resistance and stability and safety in use shall be fulfilled. The screws are used for connections in load bearing timber structures between steel plates or wood-based members:

- Solid timber (softwood) of strength classes C14 - C 40 according to EN 338[1] / EN 14081-1+A1[2]
- Glued laminated timber (softwood) of at least strength class GL24c/GL24h according to EN 14080[3]
- Laminated veneer lumber LVL according to EN 14374[4], arrangement of the screws only perpendicular to the plane of the veneers
- Glued laminated solid timber according to EN 14080[3]
- Cross laminated timber according to European Technical Assessments or national provisions that apply at the installation site

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

- Plywood according to EN 636+A1[5] and EN 13986+A1[6]
- Oriented Strand Board, OSB according to EN 300[7] and EN 13986+A1[6]
- Particleboard according to EN 312[8] and EN 13986+A1[6]

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1 EN 338 Timber structures - Strength classes
2 EN 14081-1+A1 Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements
3 EN 14080 Timber structures - Glued laminated timber and glued solid timber - Requirements
4 EN 14374 Timber structures - Structural laminated veneer lumber - Requirements
5 EN 636+A1 Plywood - Specification
6 EN 13986+A1 Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking
7 EN 300 Oriented strand boards (OSB) - Definition, classification and specifications
8 EN 312 Particleboards - Specifications

- Fibreboards according to EN 622-2[9], EN 622-3[10] and EN 13986+A1[6]
- Cement-bonded particle boards according to national provisions that apply at the building site
- Solid-wood panels according to national provisions that apply at the building site

Wood-based panels shall only be arranged on the side of the screw head.
According to EN 1995-1-1[11] the screws made from special stainless or carbon steel with $d > 4$ mm may be used in timber structures subject to climate conditions defined by service classes 1 and 2. According to EN 1995-1-1 the screws made from special stainless or carbon steel with $d \leq 4$ mm may be used in timber structures subject to climate conditions defined by service class 1. Regarding environmental conditions national provisions shall apply at the building site.

Corrosive categories according to EN ISO 12944-2 shall be taken into account.
The use of the screws shall be limited to static and quasi/static actions.

The provisions made in this European Technical Assessment are based on an assumed minimum working life of 50 years, provided that the screws are subject to appropriate use and maintenance.

The indications given as to the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body but are regarded only as a mean for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

The assessment of the fitness for use of the Evolution® WoodMaster® timber construction screws according to the basic work requirements (BWR) were carried out in compliance with EAD 130118-01-0603. The European Technical Assessment is issued for the screws on the basis of agreed data and information, deposited at Technický a zkušební ústav stavební Praha, s.p., which identifies screws that has been assessed and judged. Changes to the screws or production process which could result in this deposited data and information being incorrect should be notified to Technický a zkušební ústav stavební Praha, s.p. before the changes are introduced. Technický a zkušební ústav stavební Praha, s.p. will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alternations to the ETA shall be necessary.

Table 1 Essential characteristics of the product

	Essential characteristic	Performance
3.1 BWR 1: Mechanical resistance and stability		
3.1.1	Dimensions	See Annex 1 and Annex 2
3.1.2	Characteristic yield moment	See Annex 2
3.1.3	Characteristic withdrawal parameter	See Annex 2
3.1.4	Characteristic head pull-through parameter	See Annex 2
3.1.5	Characteristic tensile strength	See Annex 2
3.1.6	Characteristic yield strength	See Annex 2
3.1.7	Characteristic torsional strength	See Annex 2
3.1.8	Insertion moment	See Annex 2
3.1.9	Bending angle	See Annex 2
3.1.10	Durability against corrosion	See Annex 2 Surface of the screws is zinc plated/yellow zinc

9 EN 622-2 Fibreboards - Specifications - Part 2: Requirements for hardboards
10 EN 622-3 Fibreboards - Specifications - Part 3: Requirements for medium boards
11 EN 1995-1-1 Design of timber structures - Part 1-1: General - Common rules and rules for buildings

	Essential characteristic	Performance
		plated/Ruspert/Mechanical zinc plated or Geomet
3.1.11	Spacing, end and edge distances of the screws and minimum thickness of the timber material	No performance assessed Point 3.1.11
3.1.12	Slip modulus for mainly axially loaded screws	No performance assessed Point 3.1.12
3.2 BWR 2: Safety in case of fire		
3.2.1	Reaction to fire	All screws are made from carbon steel 10B21 classified as Euroclass A in accordance with EC Decision 1996/603/EC, as amended by EC
BWR 4: Safety and accessibility in use		
Same as BWR 1		

3.1 Mechanical resistance and stability (BWR 1)

Annex 2 contains essential characteristics for all screws. The design and construction shall be carried out according to national provisions that apply at the installation site in line with the partial safety factor format, e.g. in accordance with EN 1995-1-1.

3.1.1 Dimensions

The dimensions have been measured according to provisions in EN 14592+A1. The dimensions are stated in tables at Annex 1 and measured values in tables at Annex 2.

3.1.2 Characteristic yield moment

The characteristic yield moment $M_{y,k}$ has been determined by tests according to EN 409. The test results are stated in tables at Annex 2.

3.1.3 Characteristic withdrawal parameter

The characteristic withdrawal parameter $f_{ax,90,k}$ has been determined by tests according to EN 1382. Density of used timber is stated below the tables at Annex 2. The test results are stated in tables at Annex 2.

For angles α between screw axis and grain direction $15° \le \alpha < 45°$ the characteristic withdrawal capacity $F_{ax,\alpha,Rk}$ shall be determined according to equation:

$$F_{ax,\alpha,Rk} = k_{ax} \cdot f_{ax,90,k} \cdot d \cdot l_{ef} \cdot (\rho_k/350)^{0,8}$$

where

k_{ax} factor to consider the influence of the angle between screw axis and grain direction and the long term behaviour
$k_{ax} = 0,3+(0,7 \cdot \alpha)/45°$

$f_{ax,90,k}$ short-term characteristic withdrawal parameter for an angle α between screw axis and grain direction of 90° in N/mm²

d outer thread diameter of the screw in mm

l_{ef} penetration length of the threaded part of the screw in the timber member in mm

ρ_k characteristic density of the wood-based member in kg/m³

For angle α between screw axis and grain direction $0° \le \alpha < 15°$ the following requirements were fulfilled and relevant equations can be used:

1. $f_{ax,0,k} / f_{ax,90,k} \ge 0.6$
2. The penetration length of the screws in the timber member shall be

$$l_{pen,req} = \min \begin{cases} \dfrac{4 \cdot d}{\sin \alpha} \\ 20 \cdot d \end{cases}$$

3. At least four screws shall be used in a connection with screws inserted in the timber member with an angle between screw axis and grain direction of less than 15°.

3.1.4 Characteristic head pull-through parameter

The characteristic head pull-through parameter $f_{head,k}$ has been determined by tests according to EN 1383. Density of used timber is stated below the tables at Annex 2. The test results are stated in tables at Annex 2.

3.1.5 Characteristic tensile strength

The characteristic tensile strength $f_{tens,k}$ has been determined by tests according to EN 1383. The test results are stated in tables at Annex 2.

3.1.6 Characteristic yield strength

The characteristic yield strength has been determined by tests according to EN 1383. The test results are stated in tables at Annex 2.

3.1.7 Characteristic torsional strength

The characteristic torsional strength $f_{tor,k}$ has been determined by tests according to EN ISO 10666. The test results are stated in tables at Annex 2.

3.1.8 Insertion moment

The insertion moment $R_{tor,mean}$ has been determined by tests according to EN 15737. The torsional ratio $f_{tor,k}/R_{tor,mean} \geq 1.5$ has been fulfilled for all types of screws. The test results are stated in tables at Annex 2.

3.1.9 Bending angle

The bending angle α has been determined for each diameter of the screw. The test results are stated in tables at Annex 2. All screws fulfill the requirement for a minimum bending angle of $\alpha = (45/d^{0.7} + 20)$.

3.1.10 Durability against corrosion

The screws are made from carbon steel 10B21. Surface of the screws is zinc plated/yellow zinc plated/Ruspert/Mechanical zinc plated or Geomet.

3.1.11 Spacing, end and edge distances of the screws and minimum thickness of the timber material

No performance assessed.

Laterally loaded screws
For screws the minimum spacing, end and edge distances are given in EN 1995-1-1, clause 8.7.1.

Axially loaded screws
For screws the minimum spacing, end and edge distances are given in EN 1995-1-1, clause 8.7.2 and Table 8.6.

3.1.12 Slip modulus for mainly axially loaded screws

No performance assessed.

The axial slip modulus K_{ser} of the threaded part of a screw for the serviceability limit state should be taken independent of angle α to the grain as:

$K_{ser} = 25 \cdot d \cdot l_{ef}$ [N/mm] for screws in members made from softwood
$K_{ser} = 30 \cdot d \cdot l_{ef}$ [N/mm] for screws in members made from hardwood,

where

d outer thread diameter [mm]
l_{ef} penetration length in the timber member [mm]

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to fire

All screws are made from carbon steel 10B21 classified as Euroclass A in accordance with EC Decision 1996/603/EC, as amended by EC.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to the Decision 1997/0176/EC [12], of the European Commission the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011 and Commission delegated Regulation (EU) No 568/2014) given in the following table applies:

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
Fasteners for structural timber products	Structural timber products		3

[12] 1997/0176/EC - European Commission decision of 17/2/1997, published in the Official Journal of the European Communities No L 73/19

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at the Technický a zkušební ústav stavební Praha, s.p.

Issued in Prague on 01/08/2026

By

Jiří Studnička, Ph.D.
Head of the TAB

Annexes:

Annex 1 Dimensions and tolerances of Evolution® WoodMaster® timber construction screws

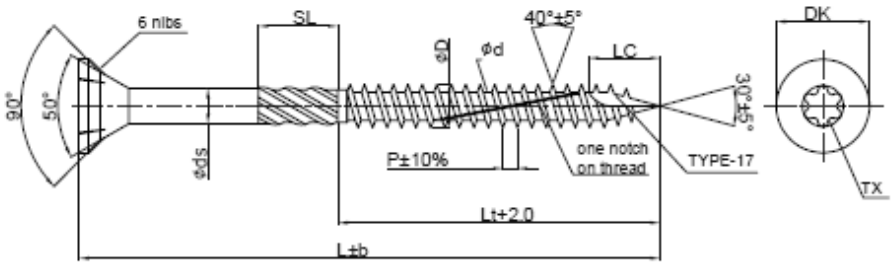
Annex 2 Essential characteristics of Evolution® WoodMaster® timber construction screws

Annex 3 Reference documents

Annex 1 Dimensions and tolerances of Evolution® WoodMaster® timber construction screws

名 称 Description	Construction Screw.Countersunk Head Torx Drive 平头草绳钉		
客 户 Customer		图 号 PART NO.	YS01-WFDRT0-02

Unit:mm



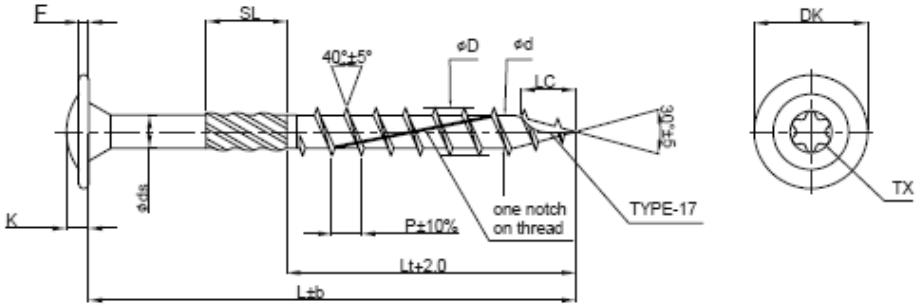
Technical Information:

1.Surface: Zinc plated/Yellow zinc plated/Ruspert /Mechanical zinc plated/Geomet ;
2.Material : Carbon steel .

SIZE	Dk	TX	ds	SL	D	d	P	LC
3.0	5.6-6.0	T10	2.15±0.12	3-6	2.8-3.1	1.7-2.0	1.80	4-7
3.5	6.6-7.0	T15	2.45±0.12	5-7	3.3-3.6	1.9-2.2	2.20	4-8
4.0	7.5-8.0	T20	2.72±0.12	5-7	3.7-4.1	2.2-2.5	2.60	7-12
4.5	8.5-9.2	T25	3.00±0.12	5-8	4.2-4.6	2.6-3.0	2.80	7-12
5.0	9.5-10.0	T25	3.47±0.12	7-10	4.7-5.1	2.7-3.2	3.20	9-14
6.0	11.5-12.0	T30	4.20±0.12	11-14	5.8-6.2	3.6-4.0	4.50	11-15
8.0	14.3-15.2	T40	5.78±0.12	12-14	7.8-8.3	5.1-5.5	5.50	14-21
10.0	17.4-18.2	T40	7.00±0.12	12-14	9.7-10.3	6.0-6.5	6.60	15-21

3.0		3.5		4.0		4.5		5.0		6.0		8.0		10.0	
L	Lt	L	Lt	L	Lt	L	Lt	L	Lt	L	Lt	L	Lt	L	Lt
16	Fully	16	Fully	16	Fully	25	Fully	25	Fully	40	Fully	80	50	80	50
20	Fully	20	Fully	20	Fully	30	18	30	20	50	25	90	50	90	50
25	Fully	25	Fully	25	Fully	35	20	35	20	60	35	100	50	100	50
30	15	30	15	30	16	40	25	40	25	70	35	110	50	110	50
35	15	35	15	35	16	45	25	45	25	80	50	120	50	120	50
40	25	40	25	40	25	50	25	50	25	90	50	140	80	140	80
45	25	45	25	45	25	60	35	60	35	100	50	160	80	160	80
50	25	50	25	50	25	70	35	70	35	110	50	180	80	180	80
				55	35	80	35	80	50	120	50	200	80	200	80
				60	35			90	50	130	70	220	80	220	80
				70	35			100	50	140	70	240	80	240	80
L≤25 b=1.25;25<L≤80 b=1.75; L>80 b=2.8 L≤25 NO SERRATION （L≤25 牙纹无需带肋）								120	60	150 | 300	70	260 | 400	80	260 | 400	80

名 称 Description	Construction Screw,Wafer Head Torx Drive 华司头草绳钉			Unit:mm
订单号 ORDER NO.		图 号 PART NO.	YS01-WFDRT0-01	



SIZE	Dk	K	F	TX	ds	SL	D	d	P	LC
4.0	9.00-9.80	1.80-2.25	Ref 0.9	T20	2.72±0.12	5-7	3.7-4.1	2.2-2.5	2.60	7-12
5.0	11.20-12.00	2.25-2.65	Ref 1.3	T25	3.47±0.12	7-10	4.7-5.1	2.7-3.2	3.20	9-14
6.0	14.70-16.50	2.60-3.25	Ref 1.5	T30	4.20±0.12	11-14	5.8-6.2	3.6-4.0	4.50	11-15
8.0	20.20-23.50	3.00-3.75	Ref 1.6	T40	5.78±0.12	12-14	7.8-8.3	5.1-5.5	5.50	14-21
10.0	24.00-27.50	3.70-4.20	Ref 2.2	T40	7.00±0.12	12-14	9.7-10.3	6.0-6.5	6.60	15-21

4.0		5.0		6.0		8.0		10.0	
L	Lt	L	Lt	L	Lt	L	Lt	L	Lt
16	Fully	25	Fully	40	25	80	50	80	50
20	Fully	30	20	50	25	90	50	90	50
25	Fully	35	20	60	35	100	50	100	50
30	16	40	25	70	35	110	50	110	50
35	16	45	25	80	50	120	50	120	50
40	25	50	25	90	50	140	80	140	80
45	25	60	35	100	50	160	80	160	80
50	25	70	35	110	50	180	80	180	80
55	35	80	50	120	50	200	80	200	80
60	35	90	50	130	70	220	80	220	80
70	35	100	50	140	70	240	80	240	80
		120	50-60	150		260	80	260	80
				|	70	280	80	280	80
				300		300	80	300	80

L≤25 b=1.25;25<L≤80 b=1.75;L>80 b=2.8
L≤25 NO SERRATION （L≤25 牙纹无需带肋）

Technical Information:

1.Surface: Zinc plated/Yellow zinc plated/Ruspert /Mechanical zinc plated/Geomet ；
2.Material : Carbon steel 。

Annex 2 Essential characteristics of Evolution® WoodMaster® timber construction screws

Mechanical resistance and stability (BWR 1)

Table 2 Evolution® WoodMaster® timber construction screw M3.0, Countersunk Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	3.0	2.92		
d_1 (mm)	3.0	1.94		
d_h (mm)	3.0	5.86		
d_s (mm)	3.0	2.16		
p pitch thread (mm)	3.0	1.86		
l_g (mm)	3.0	24.59		
l (mm)	3.0	39.77		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	3.0	1614		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm²)	3.0	12.52 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm²)	ø [mm]	Partial thread		
	3.0	20.10 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	3.0	3.36		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	3.0	1219.2		
$R_{p0.2}$ (MPa)	3.0	1213.2		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	3.0	480 kg/m³	1.53 / 0.71 = 2.17 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	3.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	3.0	Yellow zinc plated	14.7**	

* density of timber 380 kg/m³
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 3 Evolution® WoodMaster® timber construction screw M3.5, Countersunk Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	3.5	3.46		
d_1 (mm)	3.5	2.18		
d_h (mm)	3.5	6.75		
d_s (mm)	3.5	2.44		
p pitch thread (mm)	3.5	2.25		
l_g (mm)	3.5	24.54		
l (mm)	3.5	38.83		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	3.5	2086		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm^2)	3.5	11.70 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm^2)	ø [mm]	Partial thread		
	3.5	18.37 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	3.5	4.23		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	3.5	1149.9		
$R_{p0.2}$ (MPa)	3.5	1079.1		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	3.5	480 kg/m^3	2.31 / 0.93 = 2.47 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	3.5	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	3.5	Yellow zinc plated	12.8**	

* density of timber 380 kg/m^3
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 4 Evolution® WoodMaster® timber construction screw M4.0, Countersunk Head, Torx drive, partial thread, Carbon Steel, Zinc plated, Yellow zinc plated, Ruspert, Mechanical zinc plated and Geomet coating

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d (mm)	4.0	3.93		
d_1 (mm)	4.0	2.45		
d_h (mm)	4.0	8.02		
d_s (mm)	4.0	2.71		
p pitch thread (mm)	4.0	2.60		
l_g (mm)	4.0	23.32		
l (mm)	4.0	38.57		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	4.0	2367		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm²)	4.0	11.68 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm²)	ø [mm]	Partial thread		
	4.0	18.35 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	4.0	5.36		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	4.0	1014.8		
$R_{p0.2}$ (MPa)	4.0	1011.4		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	4.0	480 kg/m³	3.13 / 1.13 = 2.77 (****)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	4.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	4.0	Yellow zinc plated	13.9**	
		Zinc plated	14.5***	
		Mechanical zinc plated	33.4***	
		Geomet	21.2***	
		Ruspert	23.7***	

* density of timber 380 kg/m³
**coating thickness was measured on shank
***coating thickness was measured on head
**** longest screw with longest threaded part were used

Table 5 Evolution® WoodMaster® timber construction screw M4.5, Countersunk Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	4.5	4.40		
d_1 (mm)	4.5	2.74		
d_h (mm)	4.5	8.92		
d_s (mm)	4.5	3.05		
p pitch thread (mm)	4.5	2.87		
l_g (mm)	4.5	24.39		
l (mm)	4.5	49.39		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	4.5	4329		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm^2)	4.5	13.65 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm^2)	ø [mm]	Partial thread		
	4.5	17.79 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	4.5	7.33		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	4.5	1391.8		
$R_{p0.2}$ (MPa)	4.5	1300.7		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	4.5	480 kg/m^3	4.69 / 1.32 = 3.57 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	4.5	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	4.5	Yellow zinc plated	16.3**	

* density of timber 380 kg/m^3
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 6 Evolution® WoodMaster® timber construction screw M5.0, Countersunk Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry				
	ø [mm]	Partial thread			
d_1 (mm)	5.0	4.97			
d_1 (mm)	5.0	3.16			
d_h (mm)	5.0	9.71			
d_s (mm)	5.0	3.52			
p pitch thread (mm)	5.0	3.25			
l_g (mm)	5.0	33.96			
l (mm)	5.0	69.37			
3.1.2	Characteristic yield moment				
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread			
	5.0	6113			
3.1.3	Characteristic withdrawal parameter				
	ø [mm]	Partial thread			
$f_{ax,90,k}$ (N/mm^2)	5.0	12.46 (*)			
3.1.4	Characteristic head pull-through parameter				
$f_{head,k}$ (N/mm^2)	ø [mm]	Partial thread			
	5.0	20.91 (*)			
3.1.5	Characteristic tensile capacity				
$f_{tens,k}$ (kN)	ø [mm]	Partial thread			
	5.0	8.22			
3.1.6	Characteristic yield strength				
	ø [mm]	Partial thread			
R_m (MPa)	5.0	1163.5			
$R_{p0.2}$ (MPa)	5.0	1152.2			
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)				
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread		
	5.0	480 kg/m^3	5.03 / 1.91 = 2.63 (***)		
3.1.9	Bending angle				
Bending angle (°)	ø [mm]	Partial thread			
	5.0	> (45/d$^{0.7}$ + 20)			
3.1.10	Average value of durability against corrosion (protective layer thickness)				
Protective layer thickness (µm)	ø [mm]	Partial thread			
	5.0	Yellow zinc plated	20.3**		

* density of timber 380 kg/m^3
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 7 Evolution® WoodMaster® timber construction screw M6.0, Countersunk Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	6.0	5.81		
d_1 (mm)	6.0	3.85		
d_h (mm)	6.0	11.78		
d_s (mm)	6.0	4.18		
p pitch thread (mm)	6.0	4.57		
l_g (mm)	6.0	31.06		
l (mm)	6.0	89.70		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	6.0	11062		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm²)	6.0	12.89 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm²)	ø [mm]	Partial thread		
	6.0	16.97 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	6.0	13.88		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	6.0	1228.5		
$R_{p0.2}$ (MPa)	6.0	1222.8		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	6.0	480 kg/m³	12.78 / 4.39 = 2.92 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	6.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	6.0	Yellow zinc plated	20.5**	

* density of timber 380 kg/m³
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 8 Evolution® WoodMaster® timber construction screw M8.0, Countersunk Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry				
	ø [mm]	Partial thread			
d_1 (mm)	8.0	8.01			
d_1 (mm)	8.0	5.36			
d_h (mm)	8.0	14.92			
d_s (mm)	8.0	5.72			
p pitch thread (mm)	8.0	5.52			
l_g (mm)	8.0	50.39			
l (mm)	8.0	119.46			
3.1.2	Characteristic yield moment				
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread			
	8.0	22022			
3.1.3	Characteristic withdrawal parameter				
	ø [mm]	Partial thread			
$f_{ax,90,k}$ (N/mm^2)	8.0	11.71 (*)			
3.1.4	Characteristic head pull-through parameter				
$f_{head,k}$ (N/mm^2)	ø [mm]	Partial thread			
	8.0	17.28 (*)			
3.1.5	Characteristic tensile capacity				
$f_{tens,k}$ (kN)	ø [mm]	Partial thread			
	8.0	28.07			
3.1.6	Characteristic yield strength				
	ø [mm]	Partial thread			
R_m (MPa)	8.0	1272.4			
$R_{p0.2}$ (MPa)	8.0	879.0			
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)				
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread		
	8.0	480 kg/m^3	30.04 / 8.82 = 3.41 (***)		
3.1.9	Bending angle				
Bending angle (°)	ø [mm]	Partial thread			
	8.0	> (45/d$^{0.7}$ + 20)			
3.1.10	Average value of durability against corrosion (protective layer thickness)				
Protective layer thickness (µm)	ø [mm]	Partial thread			
	8.0	Yellow zinc plated	23.6**		

* density of timber 380 kg/m^3
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 9 Evolution® WoodMaster® timber construction screw M10.0, Countersunk Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry				
	ø [mm]	Partial thread			
d_1 (mm)	10.0	9.81			
d_1 (mm)	10.0	6.48			
d_h (mm)	10.0	17.58			
d_s (mm)	10.0	6.90			
p pitch thread (mm)	10.0	6.79			
l_g (mm)	10.0	80.06			
l (mm)	10.0	239.01			
3.1.2	Characteristic yield moment				
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread			
	10.0	38251			
3.1.3	Characteristic withdrawal parameter				
	ø [mm]	Partial thread			
$f_{ax,90,k}$ (N/mm^2)	10.0	12.13 (*)			
3.1.4	Characteristic head pull-through parameter				
$f_{head,k}$ (N/mm^2)	ø [mm]	Partial thread			
	10.0	15.84 (*)			
3.1.5	Characteristic tensile capacity				
$f_{tens,k}$ (kN)	ø [mm]	Partial thread			
	10.0	38.81			
3.1.6	Characteristic yield strength				
	ø [mm]	Partial thread			
R_m (MPa)	10.0	1272.4			
$R_{p0.2}$ (MPa)	10.0	879.0			
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)				
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread		
	10.0	480 kg/m^3	52.29 / 16.96 = 3.05 (***)		
3.1.9	Bending angle				
Bending angle (°)	ø [mm]	Partial thread			
	10.0	> (45/d$^{0.7}$ + 20)			
3.1.10	Average value of durability against corrosion (protective layer thickness)				
Protective layer thickness (µm)	ø [mm]	Partial thread			
	10.0	Yellow zinc plated	22.9**		

* density of timber 380 kg/m^3
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 10 Evolution® WoodMaster® timber construction screw M4.0, Wafer Head, Torx drive, partial thread, Carbon Steel, Zinc plated, Yellow zinc plated, Ruspert, Mechanical zinc plated and Geomet coating

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	4.0	4.07		
d_1 (mm)	4.0	2.38		
d_h (mm)	4.0	9.45		
d_s (mm)	4.0	2.68		
p pitch thread (mm)	4.0	2.65		
l_g (mm)	4.0	23.70		
l (mm)	4.0	51.90		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	4.0	2629		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm^2)	4.0	10.75 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm^2)	ø [mm]	Partial thread		
	4.0	18.51 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	4.0	4.31		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	4.0	983.5		
$R_{p0.2}$ (MPa)	4.0	941.8		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	4.0	480 kg/m^3	2.83 / 1.00 = 2.83 (****)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	4.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	4.0	Yellow zinc plated	15.3**	
		Zinc plated	16.2***	
		Mechanical zinc plated	29.6***	
		Geomet	29.3***	
		Ruspert	26.0***	

* density of timber 380 kg/m^3
**coating thickness was measured on shank
***coating thickness was measured on head
**** longest screw with longest threaded part were used

Table 11 Evolution® WoodMaster® timber construction screw M5.0, Wafer Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	5.0	4.80		
d_1 (mm)	5.0	3.06		
d_h (mm)	5.0	11.51		
d_s (mm)	5.0	3.44		
p pitch thread (mm)	5.0	3.23		
l_g (mm)	5.0	34.82		
l (mm)	5.0	62.52		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	5.0	4611		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm²)	5.0	11.96 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm²)	ø [mm]	Partial thread		
	5.0	20.10 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	5.0	6.71		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	5.0	855.4		
$R_{p0.2}$ (MPa)	5.0	821.0		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	5.0	480 kg/m³	5.43 / 1.99 = 2.72 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	5.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	5.0	Yellow zinc plated	22.6**	

* density of timber 380 kg/m³
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 12 Evolution® WoodMaster® timber construction screw M6.0, Wafer Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	6.0	6.07		
d_1 (mm)	6.0	3.93		
d_h (mm)	6.0	15.47		
d_s (mm)	6.0	4.26		
p pitch thread (mm)	6.0	4.56		
l_g (mm)	6.0	34.96		
l (mm)	6.0	61.74		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	6.0	11583		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm²)	6.0	12.23 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm²)	ø [mm]	Partial thread		
	6.0	19.20 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	6.0	13.19		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	6.0	1201.0		
$R_{p0.2}$ (MPa)	6.0	1125.5		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	6.0	480 kg/m³	11.32 / 3.59 = 3.15 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	6.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	6.0	Yellow zinc plated	21.1**	

* density of timber 380 kg/m³
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 13 Evolution® WoodMaster® timber construction screw M8.0, Wafer Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	8.0	7.97		
d_1 (mm)	8.0	5.25		
d_h (mm)	8.0	21.51		
d_s (mm)	8.0	5.70		
p pitch thread (mm)	8.0	5.52		
l_g (mm)	8.0	50.63		
l (mm)	8.0	103.54		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	8.0	21377		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm²)	8.0	13.49 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm²)	ø [mm]	Partial thread		
	8.0	16.83 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	8.0	27.85		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	8.0	1313.2		
$R_{p0.2}$ (MPa)	8.0	1111.2		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	8.0	480 kg/m³	30.11 / 8.45 = 3.56 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	8.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	8.0	Yellow zinc plated	20.8**	

* density of timber 380 kg/m³
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Table 14 Evolution® WoodMaster® timber construction screw M10.0, Wafer Head, Torx drive, partial thread, Carbon Steel, Yellow zinc plated (Zinc plated, Ruspert, Mechanical zinc plated and Geomet coating)

3.1.1	Average value of geometry			
	ø [mm]	Partial thread		
d_1 (mm)	10.0	10.17		
d_1 (mm)	10.0	6.38		
d_h (mm)	10.0	26.67		
d_s (mm)	10.0	6.92		
p pitch thread (mm)	10.0	6.60		
l_g (mm)	10.0	50.50		
l (mm)	10.0	105.87		
3.1.2	Characteristic yield moment			
$M_{y,k}$ (Nmm)	ø [mm]	Partial thread		
	10.0	35226		
3.1.3	Characteristic withdrawal parameter			
	ø [mm]	Partial thread		
$f_{ax,90,k}$ (N/mm²)	10.0	11.38 (*)		
3.1.4	Characteristic head pull-through parameter			
$f_{head,k}$ (N/mm²)	ø [mm]	Partial thread		
	10.0	14.39 (*)		
3.1.5	Characteristic tensile capacity			
$f_{tens,k}$ (kN)	ø [mm]	Partial thread		
	10.0	34.79		
3.1.6	Characteristic yield strength			
	ø [mm]	Partial thread		
R_m (MPa)	10.0	1147.4		
$R_{p0.2}$ (MPa)	10.0	913.5		
3.1.7 3.1.8	Torsional ratio (Characteristic torsional strength/Mean insertion moment)			
$f_{tor,k}$ / $R_{tor,mean}$ (Nm) / (Nm)	ø [mm]	Material	Partial thread	
	10.0	480 kg/m³	50.69 / 15.28 = 3.32 (***)	
3.1.9	Bending angle			
Bending angle (°)	ø [mm]	Partial thread		
	10.0	> (45/d$^{0.7}$ + 20)		
3.1.10	Average value of durability against corrosion (protective layer thickness)			
Protective layer thickness (µm)	ø [mm]	Partial thread		
	10.0	Yellow zinc plated	16.3**	

* density of timber 380 kg/m³
**coating thickness was measured on shank
*** longest screw with longest threaded part were used

Annex 3 Reference documents

[1] European Assessment Document EAD 130118-01-0603 Screws and threaded rods for use in timber constructions (edition February 2019)