



ENGINEERING SPECIFICATION: ETKR Range

0.0 – Contents:

Sec.	Title	Page(s)
1.0	Dimensional and metrological properties	02
2.0	Standard product details	03
3.0	Installation instructions	03
4.0	General mechanical properties of the screws	04
5.0	Mechanical performance of the screws in various substrate types	05 to
5.1	Hot-rolled mild structural steel (as per BS EN 10025-1)	06 & 07
5.2	Cold-rolled mild structural steel (as per BS EN 10346)	08
5.3	Withdrawal and pull-through in various timber substrates	9 & 10
6.0	Fixing finder: screws and washers by insulation thicknesses	11
7.0	Fixing suitability in various timber types and treatments	12
8.0	Normative references, notes and disclaimer	13 to 15

NOTE: Readers should always check the Evolution Fasteners (UK) Ltd website¹ for the latest version of this document.

[INTENTIONALLY BLANK]

¹ Latest versions can be found at <http://www.evolutionfasteners.co.uk>,

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

1.0 – Dimensional and metrological properties:

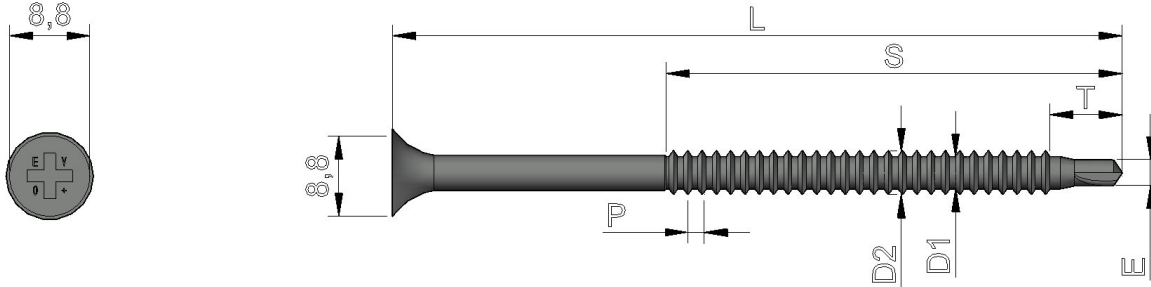


Table 01: Dimensional properties inc. tolerances (in mm)

SKU ²	L	S	T	P	D1	D2	E
ETKR60	60.0 ± 1.0	55.0 ± 1.5	4.96 (REF.)	1.81 (14 TPI)	3.48 – 3.64	4.63 – 4.79	2.90 – 3.05
ETKR80	80.0 ± 1.0						
ETKR100	100.0 ± 1.0						
ETKR120	120.0 ± 1.5						
ETKR140	140.0 ± 1.5						
ETKR160	160.0 ± 1.5						
ETKR180	180.0 ± 1.5						
ETKR200	200.0 ± 2.0						
ETKR220	220.0 ± 2.0						
ETKR240	240.0 ± 2.0						
ETKR260	260.0 ± 2.0						
ETKR280	280.0 ± 2.0						
ETKR300	300.0 ± 3.0						

² SKU = Stock Keeping Unit (synonymous with “part number”).

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “^{NC}” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

2.0 – Standard product details:

Table 02: Product Details	
Designed for/ purpose:	Fastening insulation (such as Rockwool Ltd or Celotex Ltd product) to steel or (untreated) timber structural sections in internal applications.
Head style and drive:	Bugle countersunk head w/ Phillips No. 2 female recess.
Thread form:	TEK® 2 SKUs = Coarse (1.80mm pitch),
Material type and grade:	SAE C1022 carbon steel.
Coating and corrosion resistance:	<ol style="list-style-type: none"> ≥ 500 Hour corrosion resistance (when tested in 5% NaCl accelerated corrosion test as per BS EN ISO 9227). For use in atmospheric corrosivity categories of C2 and C1 as per BS EN ISO 12944-2 and BS EN ISO 9223.
Washer details:	None provided, but compatible w/ Evolution RW, ECW, SPR and SPO parts.

3.0 - Installation instructions³:

NOTE: Failure to abide by these instructions may void any warranty provided by Evolution Fasteners (UK) Ltd. This document does not alleviate the user, designer or any other party from their respective obligations under the terms of the Warranty⁴. **The use of impact tooling voids the Warranty.**

1. Clear installation area of dirt and debris and ensure that there are no other contaminating substances (i.e. oil, grease, etc),
2. Using a non-impacting TEK screwdriver (such as Makita FS2500), insert the screw into the fixture and substrate material perpendicularly ($\pm 5^\circ$ from the normal) using not greater than 1,500 RPM and a steady pressure on the tooling only (do not force the tool, allow the screw to cut),
3. Stop inserting the screw once the underside of the flange makes contact with the topside of the fixture material for non-washed screws. For washed screws continue inserting until the compression disc of the washer changes from convex to flat. There should be no torque applied to the fasteners post-installation.

³ Video instructions available on our YouTube™ channel ([Evolution Technical Services and Laboratory](#)),

⁴ For further information, refer to the Evolution Product Warranty document hosted on our website.

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

4.0 – General mechanical properties of the screws:

Mechanical Properties of Screws		
Tensile Capacity	Shear Capacity	Torque Capacity

Table 03: Mechanical Properties for C1022 Carbon Steel Screws ⁵			
Parameter	Symbol	Unit	Nominal Diameter & TEK® Point
			4.8 TEK® 2
Material yield strength ⁶	f_y	N/mm ²	970
Ultimate tensile strength ⁷	R_m	N/mm ²	1,220
Maximum force at elastic limit ⁷	F_{eH}	N	9,220
Ultimate force at plastic limit ⁷	F_m	N	11,600
Cross-sectional area	S_0	mm ²	9.51
Young's modulus of elasticity	E	N/mm ²	193,000
Elastic section modulus	W_{eL}	mm ³	4.14
Bending moment capacity	$M_{c,Rd}$	Nm	2.97
Lateral-torsional buckling resistance	$M_{b,Rd}$	Nm	1.38
Polar moment of inertia	J	mm ⁴	14.40
Modulus of rigidity/ Shear modulus ⁸	G	N/mm ²	74,000
Ultimate force at shear failure ⁹	V_m	N	5,530
Ultimate torsional strength ¹⁰	τ_m	Nm	14.56

$$^5 X_{st,m} = \left(\left(\frac{\sum X_{st,m}}{X_n} \right) - 2 \cdot \sigma \right), \text{ rounded down to nearest 10 N,}$$

⁶ Derived from empirical testing performed to BS EN ISO 6892-1 (for the purposes of this document, $f_y = R_{eH}$),

⁷ Derived from empirical testing performed to BS EN ISO 6892-1,

⁸ As specified in ASTM A240/ A240M,

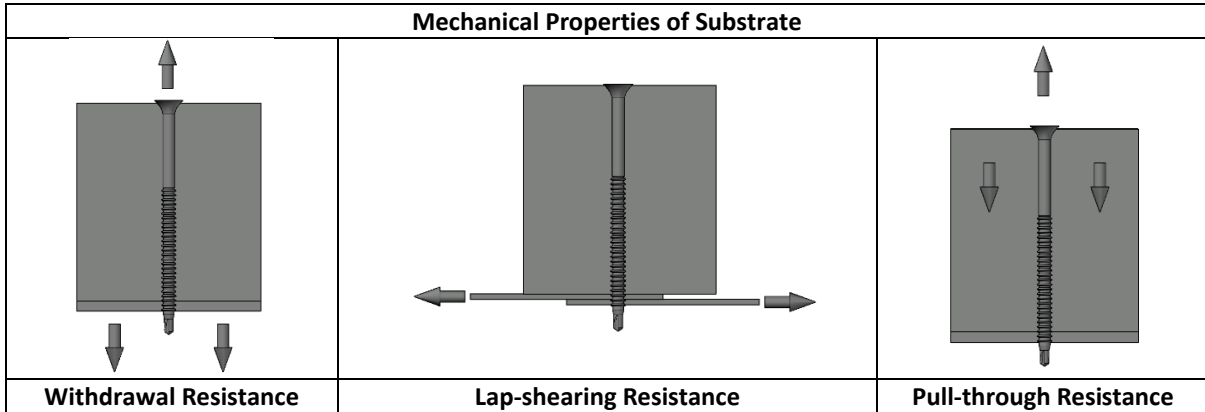
⁹ Derived from empirical testing performed to MIL-STD-1312,

¹⁰ Derived from empirical testing performed to BS EN ISO 10666.

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked "NC" in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

5.0 – Mechanical performance of the screws in various substrates:



IMPORTANT NOTICE:

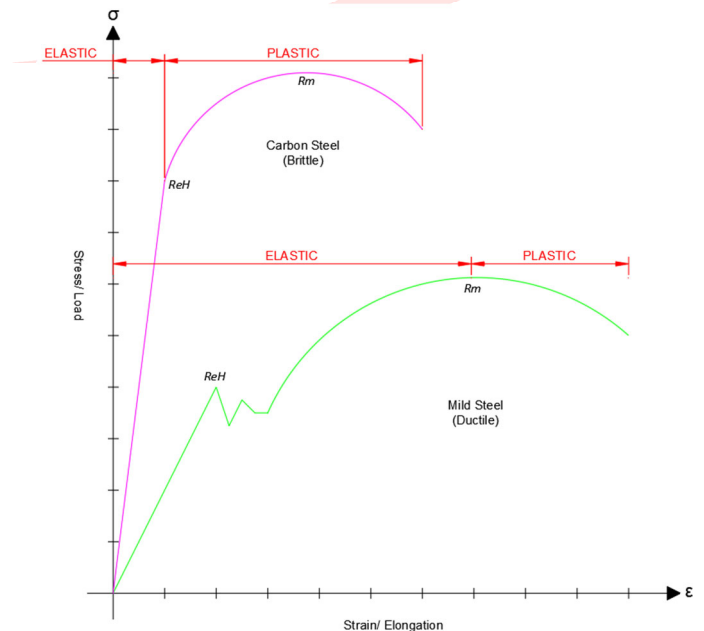
In the following tables, there are two values supplied for each grade of steel at a given thickness, *t*, these values refer to:

- Non-bracketed values = Load where the substrate reaches upper yield strength,
- [Square-bracketed] values = Load where the substrate reaches ultimate tensile strength,
- “Yield” = Load where the fastener reaches upper yield strength (see table 03),
- “Ultimate” = Load where the fastener reaches ultimate tensile strength (see table 03).

It is recommended by Evolution Fasteners (UK) Ltd that designers ensure that the screws remain in their elastic phase and as such limit themselves to F_{eH} as per Table 03.

Users of this document should be aware that they have to consider the fact that the mechanical properties of the screws and the substrate they are being used in are very different. An example stress/ strain graph is included to the side (indicative use only) to illustrate typical stress/ strain patterns in various steel types.

Carbon steel is generally more brittle and higher tensile strength than either mild or austenitic stainless steels: which are more ductile and lower tensile strength.

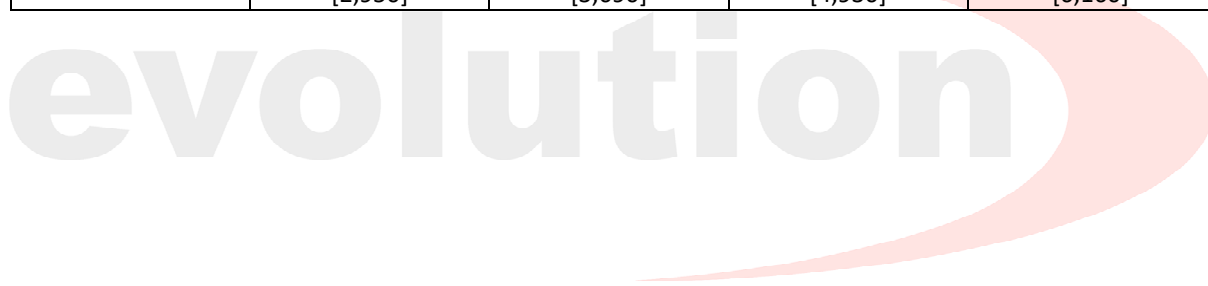


Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

5.1 - Hot-rolled mild structural steel (as per BS EN 10025-1):

Table 04: Characteristic withdrawal resistance ^{11,12} of TEK® 2 products from hot-rolled mild structural steels ¹³ (in Newtons)				
Grade	Substrate thickness, t			
	1.2mm	1.5mm	2.0mm	2.5mm
S235JR	1,000 [1,540]	1,250 [1,920]	1,670 [2,570]	2,090 [3,210]
S275JR	1,170 [1,750]	1,470 [2,190]	1,960 [2,920]	2,450 [3,660]
S355JR	1,520 [2,010]	1,900 [2,510]	2,530 [3,350]	3,170 [4,190]
S450J0	1,840 [2,350]	2,300 [2,940]	3,070 [3,920]	3,840 [4,910]
E295	1,260 [2,100]	1,580 [2,620]	2,100 [3,500]	2,630 [4,370]
E335	1,430 [2,520]	1,790 [3,160]	2,390 [4,210]	2,990 [5,260]
E360	1,540 [2,950]	1,920 [3,690]	2,570 [4,930]	3,210 [6,160]



[CONTINUED ON NEXT PAGE]

¹¹ Values without brackets refer to characteristic value at R_{eH} of substrate and values in [brackets] refer to characteristic value at R_m of substrate (tested in accordance with BS EN ISO 6892-1), rounded down to nearest 10 N,

¹² Derived from empirical tests as per BS EN 14566: 2008 & A1: 2012,

¹³ Conforming to BS EN 10025-1,

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

Table 05: Characteristic lap-shearing resistance^{14,15} of TEK® 2 products from hot-rolled mild structural steels¹³ (in Newtons)

Grade	Substrate thickness, t			
	1.2mm	1.5mm	2.0mm	2.5mm
S235JR	600 [920]	750 [1,150]	1,000 [1,540]	1,250 [1,920]
S275JR	700 [1,050]	880 [1,310]	1,170 [1,750]	1,470 [2,190]
S355JR	900 [1,200]	1,140 [1,510]	1,520 [2,010]	1,900 [2,510]
S450J0	1,100 [1,410]	1,380 [1,760]	1,840 [2,350]	2,300 [2,940]
E295	750 [1,260]	940 [1,570]	1,260 [2,100]	1,580 [2,620]
E335	860 [1,510]	1,070 [1,890]	1,430 [2,520]	1,790 [3,160]
E360	920 [1,770]	1,150 [2,210]	1,540 [2,950]	1,920 [3,690]

¹⁴ Values without brackets refer to characteristic value at R_{eH} of substrate and values in [brackets] refer to characteristic value at R_m of substrate (tested in accordance with BS EN ISO 6892-1), rounded down to nearest 10 N,

¹⁵ Derived from empirical tests as per EAD No. 330046-01-0602 (as published by EOTA – European Organisation for Technical Approvals),

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

5.2 - Cold-rolled mild structural steel (as per BS EN 10346):

Grade	Substrate thickness, t			
	1.2mm	1.5mm	2.0mm	2.5mm
DX52D	940 [1,470]	1,170 [1,840]	1,570 [2,460]	1,960 [3,080]
DX54D	720 [1,300]	910 [1,630]	1,210 [2,170]	1,510 [2,720]
DX56D	640 [1,280]	800 [1,600]	1,070 [2,140]	1,340 [2,670]
S220GD	940 [1,290]	1,170 [1,610]	1,570 [2,150]	1,960 [2,680]
S280GD	1,200 [1,540]	1,500 [1,920]	2,000 [2,570]	2,500 [3,210]
S320GD	1,370 [1,670]	1,710 [2,090]	2,280 [2,780]	2,850 [3,480]
S350GD	1,500 [1,800]	1,870 [2,250]	2,500 [3,000]	3,120 [3,750]

Grade	Substrate thickness, t			
	1.2mm	1.5mm	2.0mm	2.5mm
DX52D	560 [880]	700 [1,100]	940 [1,470]	1,170 [1,840]
DX54D	430 [780]	540 [980]	720 [1,300]	910 [1,630]
DX56D	380 [770]	480 [960]	640 [1,280]	800 [1,600]
S220GD	560 [780]	700 [970]	940 [1,290]	1,170 [1,610]
S280GD	720 [920]	900 [1,150]	1,200 [1,540]	1,500 [1,920]
S320GD	820 [1,000]	1,020 [1,250]	1,370 [1,670]	1,710 [2,090]
S350GD	900 [1,080]	1,120 [1,350]	1,500 [1,800]	1,870 [2,250]

¹⁶ Conforming to BS EN 10346.

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked "NC" in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

5.3 – Withdrawal and Pull-Through Resistances in Various Timber Substrates:

Plywood Thickness, t_{ply} (mm)	Withdrawal Resistance, $f_{ax,k}$ (N)	Pull-through Resistance, $f_{head,k}$ (N)
9	470	1,100
12	600	1,460
15	740	1,830
18	870	2,200
22	1,050	2,688
25	1,180	3,050

Plywood Thickness, t_{ply} (mm)	Withdrawal Resistance, $f_{ax,k}$ (N)	Pull-through Resistance, $f_{head,k}$ (N)
9	650	1,650
12	840	2,190
15	1,030	2,740
18	1,210	3,300
22	1,450	4,030
25	1,630	4,570

¹⁷ Tested in accordance with BS EN 14592: 2008 & A1: 2012,

¹⁸ Pursuant to specifications in BS EN 636: 2012 & A1: 2015,

¹⁹ Pursuant to specifications in BS EN 300: 2006,

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

Table 10: Characteristic Withdrawal Resistance¹⁷, $f_{ax,k}$, in Structural Timber²⁰ Substrates (in Newtons)

Timber Strength Class	Effective Embedment in Timber, l_{ef}			
	25 mm	35 mm	45 mm	55 mm
C14	910	1,230	1,540	1,850
C16	960	1,300	1,630	1,950
C18	980	1,330	1,670	2,000
C22	1,030	1,400	1,750	2,100
C24	1,060	1,430	1,790	2,150
C27	1,100	1,500	1,880	2,250
C30	1,130	1,530	1,920	2,300
C35	1,180	1,590	2,000	2,390
C40	1,220	1,660	2,080	2,490
D30	1,470	2,000	2,500	3,010
D35	1,540	2,090	2,620	3,140
D40	1,610	2,170	2,730	3,270
D50	1,740	2,350	2,950	3,530
D60	1,840	2,500	3,130	3,750
D70	2,250	3,050	3,830	4,590

²⁰ Pursuant to specifications in BS EN 1995-1-1: 2004 & A2: 2014,

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

6.0 – Fixing fender: screw and washers for insulation thicknesses:

Table 11: Fixing fender: PIR/ PUR applications with either non-encapsulated or encapsulated washers

Overall Insulation Thickness (mm)	Non-Encapsulated Washers (RW Range)			Encapsulated Washers (ECW Range)		
	Washer SKU	Substrate Type		Washer SKU	Substrate Type	
		Mild Steel ($\geq 0.6 \leq 2.5$ mm)	Timber ($\geq C16$ & Dry)		Mild Steel ($\geq 0.6 \leq 2.5$ mm)	Timber ($\geq C16$ & Dry)
≥ 50	RW5	ETKR60	ETKR100	ECW60	ETKR60	ETKR100
51 – 60		ETKR80	ETKR120		ETKR80	ETKR120
61 – 70		ETKR100	ETKR140		ETKR100	ETKR140
71 – 80					ETKR120	ETKR160
81 – 90	RW18	ETKR120	ETKR140		ETKR120	ETKR180
91 – 100	RW35				ETKR140	ETKR200
101 – 110	RW65	ETKR180	ETKR220		ETKR140	ETKR220
111 – 120					ETKR160	ETKR240
121 – 130					ETKR180	ETKR260
131 – 140					ETKR200	ETKR280
141 – 150	RW18	ETKR240	ETKR280		ETKR160	ETKR300
151 – 160					ETKR180	N/A
161 – 170					ETKR200	
171 – 180					ETKR220	
181 – 190	RW35	ETKR280	ETKR300		ETKR180	N/A
191 – 200					ETKR240	
201 – 210	RW65	ETKR300	N/A		ETKR220	
211 – 220					ETKR260	
221 – 230	RW18	ETKR300	N/A		ETKR240	
231 – 240					ETKR280	
241 – 250	RW35	ETKR300	N/A	ETKR260		
251 – 260				ETKR280		
261 – 270	RW65	ETKR300	N/A	ETKR280		
271 – 280				ETKR300		
281 – 290	RW35	ETKR300	N/A	ETKR300		
291 – 300				ETKR300		
301 – 310	RW65	ETKR300	N/A	N/A	N/A	
311 – 320						
321 – 330						
331 – 340						

NOTE: For information on pull-through or the use of stress plates with the product, please contact the Evolution Technical Department.

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “*NC*” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

7.0 – Fixing Suitability in Different Timber Types and Treatments:

Table 12: Screw Suitability in Various Timber Grades (Limitations by Tannin content, etc)			
Timber Substrate		Fastener Type Required	
Grade	Typical Species to Meet Grading (Construction Use Timbers)²¹	ETKR	A4IS
C14	Western Red Cedar.	Yes	Yes
C16	Hem Fir.		
C18	Hem Fir.		
C22	British Pine, Spruce.		
C24	Spruce, Poplar, Larch.		
C27	Spruce, Poplar, Larch, Pine (Redwood).		
C30	Spruce, Poplar, Larch, Pine (Redwood).		
C35	Douglas Fir.		
C40	Douglas Fir.	No	
D30	Oak		
D35	Beech		
D40	Beech, Teak, Eucalyptus.		
D50	Keruing, Karri, Opepe.		
D60	Kapur.		
D70	Balau, Greenheard, Ekki.		

Table 13: Screw Suitability with Typical Timber Preservatives in Construction Industry		
Timber Treatment	Fastener Suitability	
	ETKR	A4IS
Micronised Copper Quat (MCQ)	No	Yes
Alkaline Copper Quaternary (ACQ)		
Copper Azole (CA-A or (CA-B)		
Copper Naphthenate		
Chromated Copper Arsenate (CCA)		
Copper Cyclohexyldiazoniumdioxy (Cu HDO)		
Disodium Octaborate Tetrahydrate (DOT)		
Propiconazole Tebuconazole Imidacloprid (PTI)		
Sodium Silicate	Yes	
Potassium Silicate		
Bifenthrin		
Pentachlorophenol	No	
Creosote		
Emulsions/ Light Organic Solvent Preservatives (LOSP)		
Epoxy/ Resins/ Methyl Ethyl Ketone (MEK)	Yes	

NOTE: Please contact Evolution Fasteners Technical Department regarding compatibility with fire retardants.

²¹ Exotic species were purposely excluded due to cost prohibition of using such species for construction purposes,

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

8.0 – Normative references and notes:

IMPORTANT NOTICE 01:

All values provided in this document are **characteristic values**, specifically meaning that they are expressed as the mean ultimate value (from a dataset generated from the results of empirical testing in our UKAS accredited testing laboratory) minus two standard deviations. This is in-line with standard practice using Central Limit Theorem in accordance with UKAS Document M3003 “*The Expression of Uncertainty and Confidence in Measurement*” (3rd Edition).

Individual test results are validated using the Z-score method in ISO/IEC Guide No. 43-1 “Proficiency testing by interlaboratory comparisons” and the EN ratio method in UKAS Document LAB 46 “*UKAS Policy for Participation in Measurement Audits and Interlaboratory Comparisons*” (3rd Edition).

As such **no values provided in this datasheet have been treated with a factor of safety**. It is the responsibility of the user of this document to use a factor of safety appropriate to their designs.

From our experience²², designers have their own favoured approach. Some prefer to use a conservative approach as (1) below, others prefer a method used in Eurocodes²³ as per (2) below:

$$(1) \quad y_m = 3.0$$

$$(2) \quad \gamma_m = (\gamma_{gk} \cdot \gamma_{qk}) = (1.35 \times 1.50) = 2.025$$

IMPORTANT NOTICE 02:

Applicable DoPs (Declaration of Performance) and ETAs (European Technical Assessments) for Evolution Fasteners products can be found on our website (www.evolutionfasteners.co.uk). Please note that not all products fall under the mandatory CE marking requirements pursuant to European Regulation No. 305/2011 (commonly referred to as the Construction Products Regulations).

Certificates of Conformance are available upon request from the Evolution Technical Department and follow the form of F2.1 “Fastener Inspection Documents” pursuant to the requirements of BS EN ISO 16228: 2018 (and subsequently BS EN ISO 3269: 2001).

For further information or to discuss details relating to the information published in this document, please contact the Evolution Technical Department.

²² This is not an instruction nor does it alleviate the responsibilities of the reader, designer or any other third party,

²³ BS EN 1993-1-1 (Eurocode 3).

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.

NORMATIVE REFERENCES:

BS EN ISO 9001: 2015	<i>"Quality management systems. Requirements."</i>
BS EN ISO/IEC 17025: 2017	<i>"General requirements for the competence of testing and calibration laboratories."</i>
BS EN ISO 9227: 2017	<i>"Corrosion tests in artificial atmospheres. Salt spray tests."</i>
BS EN ISO 12944-2: 2017	<i>"Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Classification of environments."</i>
BS EN ISO 9223: 2012	<i>"Corrosion of metals and alloys. Corrosivity of atmospheres. Classification, determination and estimation."</i>
BS EN 3506-1: 2009	<i>"Mechanical properties of corrosion-resistant stainless-steel fasteners. Bolts, screws and studs."</i>
BS EN 10088-3: 2014	<i>"Stainless steels. Technical delivery conditions for semi-finished products, bars, rods, wires, sections and bright products of corrosion resisting steels for general purposes."</i>
BS EN ISO 6892-1: 2016^{NC}	<i>"Metallic materials. Tensile testing. Method of test at room temperature."</i>
BS ISO/IEC Guide 43-1: 1997	<i>"Proficiency testing by interlaboratory comparisons. Part 1: Development and operation of proficiency testing schemes."</i>
UKAS Document M3003	<i>"The expression of uncertainty and confidence in measurement. 3rd Edition." Published by the United Kingdom Accreditation Service on behalf of HM Government's Department for Business, Innovation and Skills,</i>
MIL-STD-1312-13^{NC}	<i>"Military Standard: Fastener test methods (method 13), double shear test." Published by the United States Department of Defence,</i>
BS EN ISO 10666: 1999^{NC}	<i>"Drilling screws with tapping screw threads. Mechanical and functional properties."</i>
BS EN 10025-1: 2004	<i>"Hot rolled products of structural steels. General technical delivery conditions."</i>
BS EN 14566: 2008 & A1: 2009	<i>"Mechanical fasteners for gypsum plasterboard systems. Definitions, requirements and test methods."</i>
EAD 330046-01-0602	<i>"European Assessment Document: Fastening screws for metal members and sheeting." Published by the European Organisation for Technical Assessments,</i>

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)



BS EN 10346: 2015	<i>“Continuously hot-dip coated steel flat products for cold forming. Technical delivery conditions.”,</i>
BS EN 636: 2012 & A1: 2015	<i>“Plywood. Specifications.”,</i>
BS EN 14592: 2008 & A1: 2012	<i>“Timber structures. Dowel type fasteners. Requirements.”,</i>
BS EN 300: 2006	<i>“Orientated strand boards (OSB). Definitions, classification and specifications.”,</i>
BS EN 1993-1-1: 2005 & A1: 2014	<i>“Eurocode 3: Design of steel structures. General rules and rules for buildings.”,</i>
UKAS Document LAB 46	<i>“UKAS policy for participation in measurement audits and interlaboratory comparisons. 3rd Edition.”. Published by the United Kingdom Accreditation Service on behalf of HM Government’s Department for Business, Innovation and Skills,</i>
BS EN ISO 16228: 2018	<i>“Fasteners. Types of inspection documents.”,</i>
BS EN ISO 3269: 2001	<i>“Fasteners. Acceptance inspection.”.</i>

DISCLAIMER:

This document is provided for educational purposes only and remains the intellectual property of Evolution Fasteners (UK) Ltd. The information provided in this document does not alleviate any responsibility on the part of any third party, nor does Evolution Fasteners (UK) Ltd accept any liability for any failures in practice, design or otherwise by any third parties using this document.

Evolution Fasteners (UK) Ltd retain all rights in relation to this document. This document shall not be reproduced except in full, without written approval from Evolution Fasteners (UK) Ltd.

Whilst every effort was made to ensure that all information in this document is accurate, it is provided strictly on the basis errors and omissions excepted.

It is the recommendation of Evolution Fasteners (UK) Ltd that any third party seeking to use our products should enquire directly with the Evolution Technical Department either by e-mail to technical@evolutionfasteners.co.uk or phone call to +44 (0) 141 647 7100. Written enquires can be made to:

Technical Department and Laboratory Services
Evolution Fasteners (UK) Ltd
Clyde Gateway Trade Park
Dalmarnock Road
Glasgow
G73 1AN
United Kingdom

[END OF DOCUMENT]

Engineering Specification: ETKR Range (Ver 2.1 – May 2019)

©Evolution Fasteners (UK) Ltd (2019), Clyde Gateway Trade Park, Dalmarnock Road, Glasgow, G73 1AN. Tests marked “NC” in this document are not included in the UKAS schedule of accreditation for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. This document shall not be reproduced except in full, without written approval. This document does not absolve any third party of their obligations under the Building Regulations, the Construction (Design and Management) Regulations or any other burden. This document is provided for educational purposes only and is provided without prejudice, without recourse, non-assumptist, errors and omissions excepted, no assured value, no liability, all rights reserved.