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EN 1995-1-1

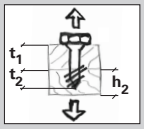
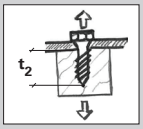
Timber to Timber and Steel to Timber Connections

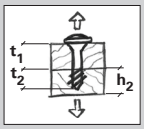
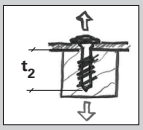
WF

WFD WFO WFR

Data Sheet
No. 01 1.01

Axial Capacity

WFD System	Fastener Length	Thread Length	Characteristic Withdrawal Capacity Timber to Timber Connection (Pull-through of the Head) 	Characteristic Withdrawal Capacity Steel to Timber Connection (Pull-out of the Thread) $t_2 \geq l_{ef}$ 
	l in mm	l_{ef} in mm		$R_{ax,k}$ in kN
WFD-T-H12-8xL	70	49	$R_{ax,k}$ = 2,10 kN if $t_2 \geq$ 32 mm	4,27
	80	54		4,71
$t_1 \geq$ 30 mm	100	65		5,67
	120	84		7,32
	140			
	160	100		8,72
	ı			
	400			
WFD-T-H15-10xL	100	65	$R_{ax,k}$ = 3,76 kN if $t_2 \geq$ 40 mm	6,37
	120	84		8,23
$t_1 \geq$ 40 mm	140	108		10,58
	160			
	180			
	200	125		12,25
	ı			
	400			
WFD-T-H17-12xL	120	84	minimum penetration depths not kept	8,97
	140	100	$R_{ax,k}$ = 4,83 kN if $t_2 \geq$ 48 mm and $h_2 \geq$ 80 mm	10,68
$t_1 \geq$ 80 mm	160			
	180	125		13,35
	200			
	220			
	240	144		15,38
	ı			
	400			

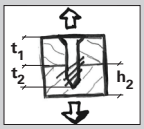
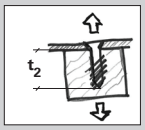
WFO System	Fastener Length	Thread Length	Characteristic Withdrawal Capacity Timber to Timber Connection (Pull-through of the Head or Pull-out of the Thread) 	Characteristic Withdrawal Capacity Steel to Timber Connection (Pull-out of the Thread) $t_2 \geq l_{ef}$ 
	l in mm	l_{ef} in mm		$R_{ax,k}$ in kN
WFO-T-S20-8xL	80	54	$R_{ax,k}$ = 2,74 kN if $t_2 \geq$ 32 mm	4,62
	100		Pull-out of the thread is decisive, see column on the right →	
$t_1 \geq$ 30 mm	120			
	140	84	$R_{ax,k}$ = 7,04 kN if $t_2 \geq$ 84 mm	7,19
	160			
	180	100		8,56
	ı			
	400			
WFO-T-S25-10xL	100	60	Pull-out of the thread is decisive, see column on the right →	5,70
	120			
$t_1 \geq$ 40 mm	140			
	160	100	Pull-out of the thread is decisive, see column on the right →	9,50
	ı			
	400			

Entire fastener range see following pages.

According to EN 1995-1-1:2004 + AC:2006 + A1:2008 and ETA-12/0373.
True for solid timber with a characteristic density of 350 kg/m³ (C24) if the angle between fastener and grain is minimum 45° and maximum 90°. Reduce values between 0° and 45°!
Keep the minimum headside penetration length t_1 and the minimum pointside penetration length t_2 as well as when indicated the minimum member thickness h!
Keep the minimum distances to the unloaded edge $a_{4,c}$ (see lateral capacity)!
This table is meant as a tool for pre-design. The responsability for the use and the suitable application of the tables remain with the user. No guarantee for correctness can be given. For further inquiries the SFS consultants are at your disposal.

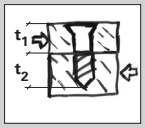
All calculations must be verified and signed off by the planner in charge before the work is performed.

Axial Capacity

WFR System $t_1 \geq 24$ mm	Fastener Length	Thread Length	Characteristic Withdrawal Capacity Timber to Timber Connection (Pull-through of the Head) 	Charactieristic Withdrawal Capacity Steel to Timber Connection (Pull-out of the Thread) $t_2 \geq l_{ef}$ 
	l in mm	l_{ef} in mm		$R_{ax,k}$ in kN
WFR-T-T20-4xL	50	30	$R_{ax,k}$ = 1,09 kN if $t_2 \geq 24$ mm	1,72
	60	35		2,00
	70			
WFR-T-T20-4,5xL	50	29	$R_{ax,k}$ = 1,43 kN if $t_2 \geq 24$ mm	1,74
	60	34		2,03
	70	39		2,33
	80	44		2,63
WFR-T-T25-5xL	80	47	$R_{ax,k}$ = 1,46 kN if $t_2 \geq 24$ mm	3,20
	90			
	100	55		3,74
	110	65		4,42
	120			
WFR-T-T30-6xL	70	39	$R_{ax,k}$ = 2,10 kN if $t_2 \geq 27$ mm	3,04
	80	48		3,74
	90	48		
	100	54		4,21
	110	64		4,99
	l			
	300			

Entire fastener range see following pages. Keep the remarks on the bottom of page 2!

Lateral Capacity



			WFD			**WFO**		**WFR**			
		Diameter d in mm	**8**	**10**	**12**	**8**	**10**	**4**	**4,5**	**5**	**6**
The angle α of the load to the grain must be equal in both timber members (otherwise calculate for α = 90°).	α = 0°	Minimum penetration length t_{min} in mm	50	60	70	50	60	30	35	40	50
		Minimum distance to the unloaded edge $a_{4,c}$ in mm	24	30	36	24	30	12	14	15	18
		Characteristic load-carrying capacity $F_{v,Rk}$ in kN including rope effect	3,57	4,90	6,76	4,14	5,41	0,95	1,18	1,39	2,01
	α = 90°	Minimum penetration length t_{min} in mm	60	70	90	60	70	30	35	40	50
		Minimum distance to the loaded edge $a_{4,t}$ in mm	32	40	48	32	40	28	32	50	60
		Characteristic load-carrying capacity $F_{v,Rk}$ in kN including rope effect	3,06	4,23	5,80	3,71	4,74	0,95	1,18	1,39	2,01

Entire fastener range see following pages.

According to EN 1995-1-1:2004 + AC:2006 + A1:2008 and ETA-12/0373.
True for single shear connections in solid timber with a characteristic density of 350 kg/m³ (C24) if the fastener is set perpendicular to the grain.
Keep the required penetration length in each of the timber members! Thus the fastener must be at least twice as long as the minimum penetration length t_{min}!
This table is meant as a tool for pre-design. The responsability for the use and the suitable application of the tables remain with the user. No guarantee for correctness can be given. For further inquiries the SFS consultants are at your disposal.

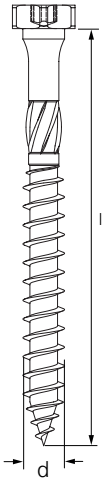
All calculations must be verified and signed off by the planner in charge before the work is performed.

A comprehensive range for timber to timber and steel to timber connections

WFD-T-H12-8 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 8 mm
Drive: TORX® T30 / hex H12

WFD-T-H15-10 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 10 mm
Drive: TORX® T40 / hex H15

WFD-T-H17-12 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 12 mm
Drive: TORX® T40 / hex H17



Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFD	T	H12	8	40
WFD	T	H12	8	50
WFD	T	H12	8	60
WFD	T	H12	8	70
WFD	T	H12	8	80
WFD	T	H12	8	100
WFD	T	H12	8	120
WFD	T	H12	8	140
WFD	T	H12	8	160
WFD	T	H12	8	180
WFD	T	H12	8	200
WFD	T	H12	8	220
WFD	T	H12	8	240
WFD	T	H12	8	260
WFD	T	H12	8	280
WFD	T	H12	8	300
WFD	T	H12	8	320
WFD	T	H12	8	340
WFD	T	H12	8	360
WFD	T	H12	8	380
WFD	T	H12	8	400

Fastener Range

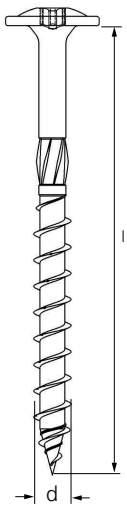
Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFD	T	H15	10	60
WFD	T	H15	10	70
WFD	T	H15	10	80
WFD	T	H15	10	100
WFD	T	H15	10	120
WFD	T	H15	10	140
WFD	T	H15	10	160
WFD	T	H15	10	180
WFD	T	H15	10	200
WFD	T	H15	10	220
WFD	T	H15	10	240
WFD	T	H15	10	260
WFD	T	H15	10	280
WFD	T	H15	10	300
WFD	T	H15	10	320
WFD	T	H15	10	340
WFD	T	H15	10	360
WFD	T	H15	10	380
WFD	T	H15	10	400

Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFD	T	H17	12	60
WFD	T	H17	12	80
WFD	T	H17	12	100
WFD	T	H17	12	120
WFD	T	H17	12	140
WFD	T	H17	12	160
WFD	T	H17	12	180
WFD	T	H17	12	200
WFD	T	H17	12	220
WFD	T	H17	12	240
WFD	T	H17	12	260
WFD	T	H17	12	280
WFD	T	H17	12	300
WFD	T	H17	12	320
WFD	T	H17	12	340
WFD	T	H17	12	360
WFD	T	H17	12	380

WFO-T-S20-8 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 8 mm
Drive: TORX® T40

WFO-T-S25-10 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 10 mm
Drive: TORX® T50



Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFO	T	S20	8	80
WFO	T	S20	8	100
WFO	T	S20	8	120
WFO	T	S20	8	140
WFO	T	S20	8	160
WFO	T	S20	8	180
WFO	T	S20	8	200
WFO	T	S20	8	220
WFO	T	S20	8	240
WFO	T	S20	8	260
WFO	T	S20	8	280
WFO	T	S20	8	300
WFO	T	S20	8	320
WFO	T	S20	8	340
WFO	T	S20	8	360
WFO	T	S20	8	380
WFO	T	S20	8	400

Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFO	T	S25	10	100
WFO	T	S25	10	120
WFO	T	S25	10	140
WFO	T	S25	10	160
WFO	T	S25	10	180
WFO	T	S25	10	200
WFO	T	S25	10	220
WFO	T	S25	10	240
WFO	T	S25	10	260
WFO	T	S25	10	280
WFO	T	S25	10	300
WFO	T	S25	10	320
WFO	T	S25	10	340
WFO	T	S25	10	360
WFO	T	S25	10	380
WFO	T	S25	10	400

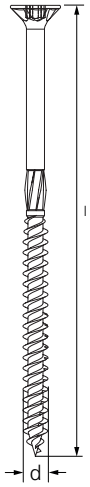
A comprehensive range for timber to timber and steel to timber connections

WFR-T-T20-4 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 4 mm
Drive: TORX® T20

WFR-T-T20-4,5 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 4,5 mm
Drive: TORX® T20

WFR-T-T25-5 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 5 mm
Drive: TORX® T25

WFR-T-T30-6 x L
Material: Carbon steel
Coating: zinc electroplating
Diameter: 6 mm
Drive: TORX® T30



Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFR	T	T20	4	20
WFR	T	T20	4	25
WFR	T	T20	4	30
WFR	T	T20	4	35
WFR	T	T20	4	40
WFR	T	T20	4	45
WFR	T	T20	4	50
WFR	T	T20	4	60
WFR	T	T20	4	70

Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFR	T	T20	4,5	20
WFR	T	T20	4,5	25
WFR	T	T20	4,5	30
WFR	T	T20	4,5	35
WFR	T	T20	4,5	40
WFR	T	T20	4,5	45
WFR	T	T20	4,5	50
WFR	T	T20	4,5	60
WFR	T	T20	4,5	70
WFR	T	T20	4,5	80

Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFR	T	T25	5	20
WFR	T	T25	5	25
WFR	T	T25	5	30
WFR	T	T25	5	35
WFR	T	T25	5	40
WFR	T	T25	5	50
WFR	T	T25	5	60
WFR	T	T25	5	70
WFR	T	T25	5	80
WFR	T	T25	5	90
WFR	T	T25	5	100
WFR	T	T25	5	110
WFR	T	T25	5	120

Fastener Range

Type	Material T = carbon steel	Drive	Diameter d in mm	Length l in mm
WFR	T	T30	6	50
WFR	T	T30	6	60
WFR	T	T30	6	70
WFR	T	T30	6	80
WFR	T	T30	6	90
WFR	T	T30	6	100
WFR	T	T30	6	110
WFR	T	T30	6	120
WFR	T	T30	6	130
WFR	T	T30	6	140
WFR	T	T30	6	150
WFR	T	T30	6	160
WFR	T	T30	6	180
WFR	T	T30	6	200
WFR	T	T30	6	220
WFR	T	T30	6	240
WFR	T	T30	6	260
WFR	T	T30	6	280
WFR	T	T30	6	300

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Turn ideas into reality.