TOGE TSM Multiground

Female threaded screw for various substrates

Easy Installation
Easy, fast and safe installation with a impact screwdriver. This makes overhead work in particular much easier.

Flush with surface
The flush surface installation results in a clean installation appearance without any interfering elements.

Internal thread
The practical internal thread enables use for a wide range of applications.

Easily demountable
If required, the TOGE TSM Multiground can be quickly and easily dismounted.

High load values
The special thread geometry ensures secure hold and high loads in concrete.

Small edge distances
Small edge distances and spacing allow particularly close-edge and closely spaced installation.

Approval

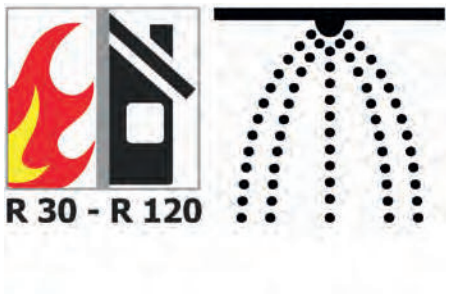
Approval
European technical assessment ETA-23/0542.

Base Material
Approved for concrete strenght classes from C20/25 to C50/60.

Cracked and non-cracked concrete.

Suitable for masonry and wood.
Recommended loads for wood see p. 6-8

Material
Steel, zinc-plated.



Technical characteristics for concrete

Multiple fastening without fire exposure, Steel

Screw size TSM M				TSM M 8 IM6	TSM M 10 IM8	TSM M 12 IM10
Nominal embedment depth	h_{nom}		**[mm]**	**40**	**40**	**40**
Nominal diameter of drill bit	d_0		[mm]	8	10	12
Depth of drill hole	h_1 min		[mm]	50	50	50
Effective anchorage depth	h_{ef}		[mm]	31	31	30
Diameter of clearance hole in the fixture	d_f max		[mm]	7	9	12
Minimum edge distance	C_{min}		[mm]	40	40	40
Minimum spacing	S_{min}		[mm]	30	40	40
Minimum base material thickness	h_{min}		[mm]	80	80	80
Installation torque (for metrical thread)	T_{inst}		[Nm]	4	8	15
Minimum screw-in depth metrical thread			[mm]	8	8	8
Maximum torque (with impact screwdriver)			[Nm]	180	180	180
Permissible load for metrical thread of tension class 4.8						
Permissible tension load in cracked concrete [1) 3)]	N_{per}	4.8	[kN]	2,6	2,8	1,8
Permissible shear load in cracked concrete [2) 3)]	V_{per}	4.8	[kN]	2,3	2,8	2,3
Persmissible tension load in uncracked concrete [1) 3)]	N_{per}	4.8	[kN]	3,1	3,8	2,2
Persmissible shear load in uncracked concrete [2) 3)]	V_{per}	4.8	[kN]	2,3	4,0	3,2
Persmissible bending moment [2) 3)]	M_{per}	4.8	[kN]	2,9	7,1	13,7
Permissible load for metrical thread of tension class 5.8						
Permissible tension load in cracked concrete [1) 3)]	N_{per}	5.8	[kN]	2,6	2,8	1,8
Permissible shear load in cracked concrete [2) 3)]	V_{per}	5.8	[kN]	2,8	2,8	2,3
Persmissible tension load in uncracked concrete [1) 3)]	N_{per}	5.8	[kN]	3,1	3,8	2,2
Persmissible shear load in uncracked concrete [2) 3)]	V_{per}	5.8	[kN]	2,9	4,0	3,2
Persmissible bending moment [2) 3)]	M_{per}	5.8	[kN]	3,6	8,8	13,7
Permissible load for metrical thread of tension class 8.8						
Permissible tension load in cracked concrete [1) 3)]	N_{zul}	8.8	[kN]	2,6	2,8	1,8
Permissible shear load in cracked concrete [2) 3)]	V_{zul}	8.8	[kN]	2,8	2,8	2,3
Persmissible tension load in uncracked concrete [1) 3)]	N_{zul}	8.8	[kN]	3,1	3,8	2,2
Persmissible shear load in uncracked concrete [2) 3)]	V_{zul}	8.8	[kN]	3,4	4,0	3,2
Persmissible bending moment [2) 3)]	M_{zul}	8.8	[kN]	5,0	8,8	13,7

[1)] For the determination of the approved loads, the partial safety factor from the approval γM=1,5 was taken into account for material resistance and a partial safety factor of γF=1,4 for load actions.

[2)] For the determination of the approved loads, the partial safety factor from the approval γM=1,25 was taken into account for material resistance and a partial safety factor of γF=1,4 for load actions.

[3)] These values apply without influence of the spacing and edge distances.

Technical characteristics for concrete

Multiple fastening under fire exposure, Steel

Screw size TSM M				TSM M 8 IM6	TSM M 10 IM8	TSM M 12 IM10
Nominal embedment depth		h_{nom}	[mm]	**40**	**40**	**40**
Permissible load under tensile and shear use ($F_{per,fi} = N_{per,fi} = V_{per,fi}$) [1) 2)]						
Fire resistance class						
R 30	Approved load	$F_{per,fi\ 30}$	[kN]	0,9	0,9	0,8
R 60		$F_{perl,fi\ 60}$	[kN]	0,9	0,9	0,8
R 90		$F_{per,fi\ 90}$	[kN]	0,9	0,9	0,8
R 120		$F_{per,fi\ 120}$	[kN]	0,7	0,7	0,7
R 30		$M_{per,fi\ 30}$	[Nm]	0,63	1,81	4,28
R 60		$M_{per,fi\ 60}$	[Nm]	0,49	1,36	3,12
R 90		$M_{per,fi\ 90}$	[Nm]	0,34	0,91	1,97
R 120		$M_{per,fi\ 120}$	[Nm]	0,27	0,68	1,39
Edge distance						
R 30 to R 120		$C_{cr,fi}$	[mm]	$2 \times h_{ef}$		
The edge distance must be at least 300 mm, if the fire load attacks from more than one side.						
Spacing						
R 30 to R 120		$S_{cr,fi}$	[mm]	$4 \times h_{ef}$		
Concrete pry-out failure						
R 30 to R 120		k	[-]	1,0		
In wet concrete, the embedment depth must be increased by at least 30 mm.						

[1)] For the determination of the approved loads, the partial safety factor from the approval γM=1,0 was taken into account for material resistance and a partial safety factor of γF=1,0 for load actions.

[2)] These values apply without influence of the spacing and edge distances.

Technical characteristics for wood

Recommended loads for pure tensile stress

Screw size TSM M			TSM M 8 IM6			TSM M 10 IM8			TSM M 12 IM10		
KLED *			Perm.	Medium	Short	Perm.	Medium	Short	Perm.	Medium	Short
k_{mod} *			0,6	0,8	1	0,6	0,8	1	0,6	0,8	1
VH *	BSH *	pk [kg/m³]	Recommended loads for NKL1 and NKL2 $F_{ax,zul}$ [kN] 1) 2) 3)								
C16		310	0,6	0,7	0,9	0,8	1,0	1,2	0,6	0,7	0,8
C20		330	0,7	0,8	1,0	0,8	1,0	1,3	0,6	0,7	0,9
C22	GL20h	340	0,7	0,8	1,0	0,9	1,1	1,3	0,6	0,7	0,9
C24		350	0,7	0,8	1,0	0,9	1,1	1,3	0,6	0,7	0,9
	GL20c	355	0,7	0,8	1,1	0,9	1,1	1,3	0,6	0,7	0,9
	GL24c	365	0,7	0,8	1,1	0,9	1,1	1,4	0,6	0,8	1,0
C30		380	0,7	0,9	1,1	0,9	1,1	1,4	0,7	0,8	1,0
	GL24h	385	0,7	0,9	1,1	1,0	1,1	1,4	0,7	0,8	1,0
C35	GL28c	390	0,7	0,9	1,1	1,0	1,2	1,5	0,7	0,8	1,0
C40	GL32c	400	0,8	0,9	1,1	1,0	1,2	1,5	0,7	0,8	1,0
	GL28h	425	0,8	1,0	1,2	1,0	1,2	1,6	0,7	0,9	1,1
	GL32h	440	0,8	1,0	1,2	1,1	1,3	1,6	0,7	0,9	1,1

* According to DIN EN 1995-1-1

1) A reference bulk density of pa= 350 kg/m³ was used to determine the recommended loads.

2) The specified values apply regardless of center and edge distances and for a fixing point n_{ef} = 1.

3) To determine the recommended loads, the partial safety factor γ_M = 1.3 was used on the resistance side and a partial safety factor γ_F = 1.35 for permanent and γ_F = 1.5 for medium/short KLED.

Technical characteristics for wood

Recommended loads for pure shear force loading for a load-fiber angle of 0°

Screw size TSM M			TSM M 8 IM6			TSM M 10 IM8			TSM M 12 IM10		
KLED *			Perm.	Medium	Short	Perm.	Medium	Short	Perm.	Medium	Short
k_{mod} *			0,6	0,8	1	0,6	0,8	1	0,6	0,8	1
VH *	BSH *	pk [kg/m³]	Recommended loads for NKL1 and NKL2 with load-fiber angle 0° $F_{v,zul}$ [kN] [1) 2) 3)]								
C16		310	1,3	1,6	2,0	1,5	1,8	2,3	1,7	2,1	2,6
C20		330	1,4	1,7	2,1	1,6	1,9	2,4	1,8	2,2	2,8
C22	GL20h	340	1,4	1,7	2,1	1,7	2,2	2,8	1,9	2,3	2,8
C24		350	1,5	1,8	2,2	1,7	2,0	2,5	1,9	2,3	2,9
	GL20c	355	1,5	1,8	2,2	1,7	2,1	2,6	2,0	2,4	3,0
	GL24c	365	1,5	1,8	2,3	1,8	2,1	2,7	2,0	2,5	3,0
C30		380	1,6	1,9	2,4	1,9	2,2	2,8	2,1	2,5	3,2
	GL24h	385	1,6	1,9	2,4	1,9	2,3	2,8	2,2	2,6	3,2
C35	GL28c	390	1,6	2,0	2,5	1,9	2,3	2,9	2,2	2,6	3,3
C40	GL32c	400	1,7	2,0	2,5	1,9	2,4	2,9	2,2	2,7	3,3
	GL28h	425	1,8	2,1	2,7	2,1	2,5	3,1	2,4	2,8	3,5
	GL32h	440	1,9	2,2	2,8	2,2	2,6	3,2	2,4	2,9	3,7

* According to DIN EN 1995-1-1

[1)] A reference bulk density of pa= 350 kg/m³ was used to determine the recommended loads.

[2)] The specified values apply regardless of center and edge distances and for a fixing point n_{ef} = 1.

[3)] To determine the recommended loads, the partial safety factor γ_M = 1.3 was used on the resistance side and a partial safety factor γ_F = 1.35 for permanent and γ_F = 1.5 for medium/short KLED. The loads were determined with a k_{90} coefficient in accordance with DIN EN 1995-1-1.

Technical characteristics for wood

Recommended loads for pure shear force loading for a load-fiber angle of 90°

Screw size TSM M			TSM M 8 IM6			TSM M 10 IM8			TSM M 12 IM10		
KLED *			Perm.	Medium	Short	Perm.	Medium	Short	Perm.	Medium	Short
k_{mod} *			0,6	0,8	1	0,6	0,8	1	0,6	0,8	1
VH *	BSH *	pk [kg/m³]	Recommended loads for NKL1 and NKL2 with load-fiber angle 90° $F_{v,zul}$ [kN] [1) 2) 3)]								
C16		310	0,8	1,0	1,3	1,0	1,2	1,5	1,1	1,3	1,7
C20		330	0,9	1,1	1,4	1,1	1,3	1,6	1,2	1,4	1,8
C22	GL20h	340	0,9	1,1	1,4	1,1	1,3	1,6	1,2	1,5	1,8
C24		350	1,0	1,1	1,4	1,1	1,3	1,7	1,3	1,5	1,9
	GL20c	355	1,0	1,2	1,5	1,1	1,4	1,7	1,3	1,5	1,9
	GL24c	365	1,0	1,2	1,5	1,2	1,4	1,7	1,3	1,6	2,0
C30		380	1,1	1,2	1,6	1,2	1,5	1,8	1,4	1,6	2,1
	GL24h	385	1,1	1,3	1,6	1,2	1,5	1,8	1,4	1,7	2,1
C35	GL28c	390	1,1	1,3	1,6	1,2	1,5	1,9	1,4	1,7	2,1
C40	GL32c	400	1,1	1,3	1,6	1,3	1,5	1,9	1,4	1,7	2,2
	GL28h	425	1,2	1,4	1,8	1,4	1,6	2,0	1,5	1,8	2,3
	GL32h	440	1,2	1,4	1,8	1,4	1,7	2,1	1,5	1,9	2,4

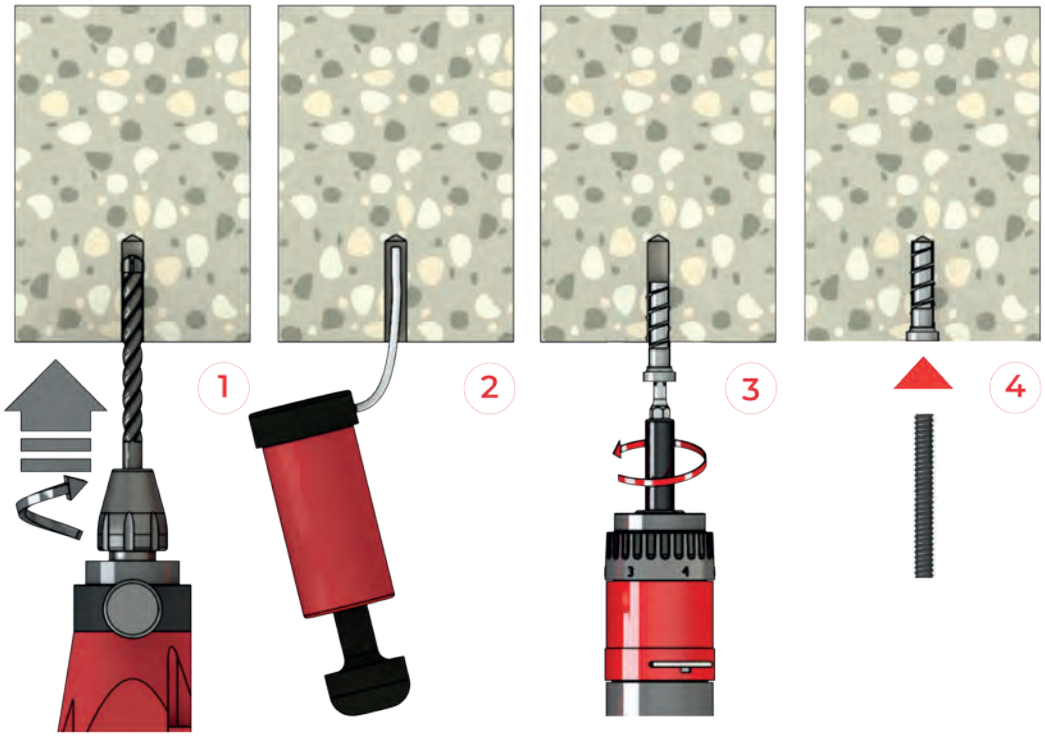
* According to DIN EN 1995-1-1

1) A reference bulk density of pa= 350 kg/m³ was used to determine the recommended loads.

2) The specified values apply regardless of center and edge distances and for a fixing point n_{ef} = 1.

3) To determine the recommended loads, the partial safety factor γ_M = 1.3 was used on the resistance side and a partial safety factor γ_F = 1.35 for permanent and γ_F = 1.5 for medium/short KLED. The loads were determined with a k_{90} coefficient in accordance with DIN EN 1995-1-1.

Installation Instructions *



1) Create drill hole with hammerdrill or hollow drill bit.

2) Thoroughly clean drill hole.

3) Screw in TOGE TSM Multiground with impact screwdriver or wrench.

4) Screw must be screwed in flush with the surface of the concrete. The attachment part is fastened with a standard metric screw or threaded rod. The tightening torque of the metric thread must be observed.

* The illustration shows the concrete substrate as an example. However, it applies equally to wooden or masonry substrates.