

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-11/0191  
of 1 June 2022

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Trade name of the construction product

Product family  
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment  
contains

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

This version replaces

Deutsches Institut für Bautechnik

nonut@-TDBL-T-13.4xL, nonut@-TDNL-13.4xL,  
nonut@-TDBLF-T-13.4xL, nonut@-TDN-13.4xL,  
nonut@-TDBL-T-10.6xL, nonut@-TDNL-10.6xL,  
nonut@-TDBLF-T-10.6xL, nonut@-TDN-10.6xL  
nonut@-TDBL-T-8.6xL, nonut@-TDNL-8.6xL,  
nonut@-TDBLF-T-8.6xL, nonut@-TDN-8.6xL  
nonut@-TDBLF-T-F-8.6xL, nonut@-TDN-LH-8.6xL

Self tapping screws

SFS Group Schweiz AG  
Rosenbergsaustasse 10  
CH - 9435 Heerbrugg  
SCHWEIZ

Plants of SFS Group Schweiz AG

39 pages including 35 annexes which form an integral  
part of this assessment

EAD 330046-01-0602

ETA-11/0191 issued on 6 May 2021

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

## Specific part

### 1 Technical description of the product

The fastening screws are self-tapping screws made of carbon steel with anticorrosion coating (listed in Annex 1).

The components and the system setup of the product are given in Annex (1-34).

### 2 Specification of the intended use in accordance with the applicable European Assessment Document 330046-01-0602

The fastening screws are intended to be used for fastening metal sheeting to metal substructures. The sheeting can either be used as wall or roof cladding or as load bearing wall and roof element. The fastening screws can also be used for the fastening of any other thin gauge metal members. The intended use comprises fastening screws and connections for indoor applications. Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads). The fastening screws are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annex (1-35).

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastening screws of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means 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

#### 3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Shear Resistance of the Connection	see Annexes to this ETA
Tension Resistance of the Connection	see Annexes to this ETA
Design Resistance in combination of tension and shear forces (interaction)	see Annexes to this ETA
Check of Deformation Capacity in case of constraining forces due to temperature	No performance assessed
Durability	No performance assessed

#### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Performance Class A1 in accordance with EC decision 96/603/EC (as amended)

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

In accordance with EAD 330046-01-0602, the applicable European legal act is: Commission Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: 2+

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

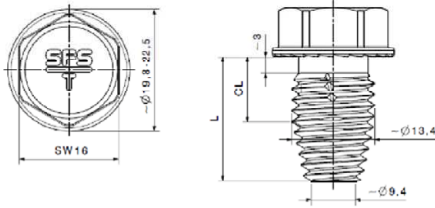
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 1 June 2022 by the Deutsches Institut für Bautechnik

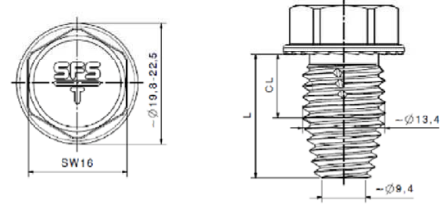
BD Dr.-Ing. Ronald Schwuchow  
Head of Section

*beglaubigt:*  
Stojanovic

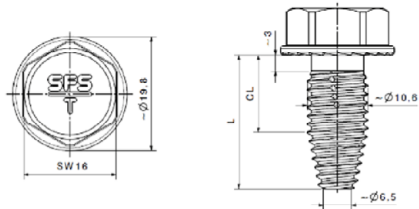




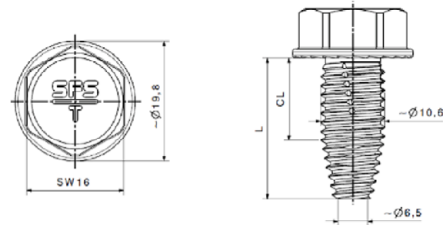
nonut®-TDBL-T-13.4xL  
nonut®-TDNL-13.4xL



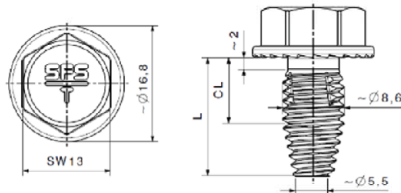
nonut®-TDBLF-T-13.4xL  
nonut®-TDN-13.4xL



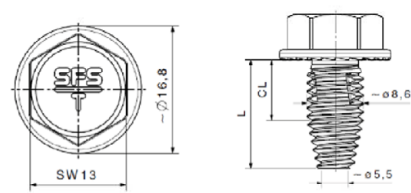
nonut®-TDBL-T-10.6xL  
nonut®-TDNL-10.6xL



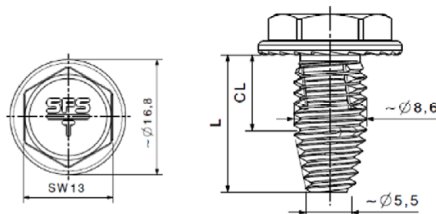
nonut®-TDBLF-T-10.6xL  
nonut®-TDN-10.6xL



nonut®-TDBL-T-8.6xL  
nonut®-TDNL-8.6xL



nonut®-TDBLF-T-8.6xL  
nonut®-TDN-8.6xL



nonut®-TDBLF-T-F-8.6xL  
nonut®-TDN-LH-8.6xL

Fasteners for connecting steel components

Variations of nonut®

Annex 1

English translation prepared by DIBt

## Designations and abbreviations used in the Annexes

### Materials and dimensions

Relevant materials and dimensions specified in the nonut® annexes:

Screw	Material of the nonut®
Component I	Material of component I (component adjacent to the screw head)
Component II	Material of component II (substructure)
$t_I$	Thickness of component I
$t_{II}$	Thickness of component II
$d_{dp}$	Pre-drill diameter of component I and component II
$d_{dp,I}$	Pre-drill diameter of component I
$d_{dp,II}$	Pre-drill diameter of component II
CL	Load bearing thread area of the nonut® that can be used for design (CL see annex 1)

Thickness  $t_{II}$  corresponds to the load-bearing screw-in length of the nonut® in component II, if the load-bearing screw-in length does not cover the entire thickness of component II. The area CL of the nonut® is load-bearing (CL see annex 1).

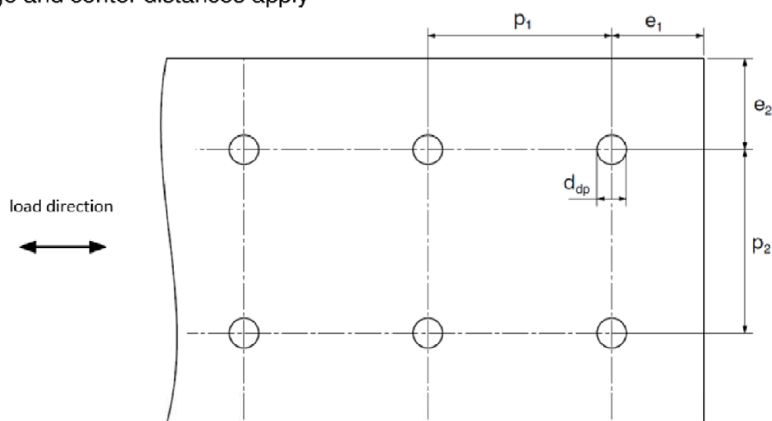
### Performances

The relevant performances for design are given in the annexes:

$N_{R,k}$	Characteristic value of longitudinal tensile strength
$V_{R,k}$	Characteristic value of the transverse tensile strength

### Edge and center distances

The following minimum edge and center distances apply



$$\begin{aligned}
 p_1 &\geq 50,0 \text{ mm} \\
 e_1 &\geq 25,0 \text{ mm} \\
 p_2 &\geq 50,0 \text{ mm} \\
 e_2 &\geq 25,0 \text{ mm} \\
 d_{pd} &\text{ see Annexes}
 \end{aligned}$$

## Fasteners for connecting steel components

Designations, abbreviations and edge distances

**Annex 2**

### Determination of Design Values

The design value of tension and shear resistance has to be determined as follows:

$$N_{R,d} = \frac{N_{R,k}}{\gamma_M} \qquad V_{R,d} = \frac{V_{R,k}}{\gamma_M}$$

The characteristic values  $N_{R,k}$  and  $V_{R,k}$  are given in the Annexes. For intermediate dimension of metal member or sheeting or substructure the characteristic value may be determined by linear interpolation.

The recommended partial safety factor  $\gamma_M = 1,33$  is used, if no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

For asymmetric metal substructures with thickness  $t_{II} < 5$  mm (for instance Z- or C-shaped profiles), the characteristic value  $N_{R,k}$  given in the Annexes has to be reduced to 70%.

In case of combined tension and shear forces the following interaction equation is taken into account:

$$\frac{N_{S,d}}{N_{R,d}} + \frac{V_{S,d}}{V_{R,d}} \leq 1,0$$

$N_{S,d}$  and  $V_{S,d}$  indicate the design values of applied tension and shear forces.

### Installation conditions

The installation is carried out according to the manufacturer's instructions.

The nonut® are fixed rectangular to the surface of the metal member or sheeting.

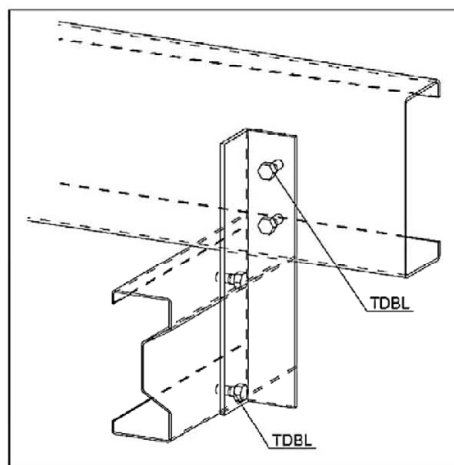
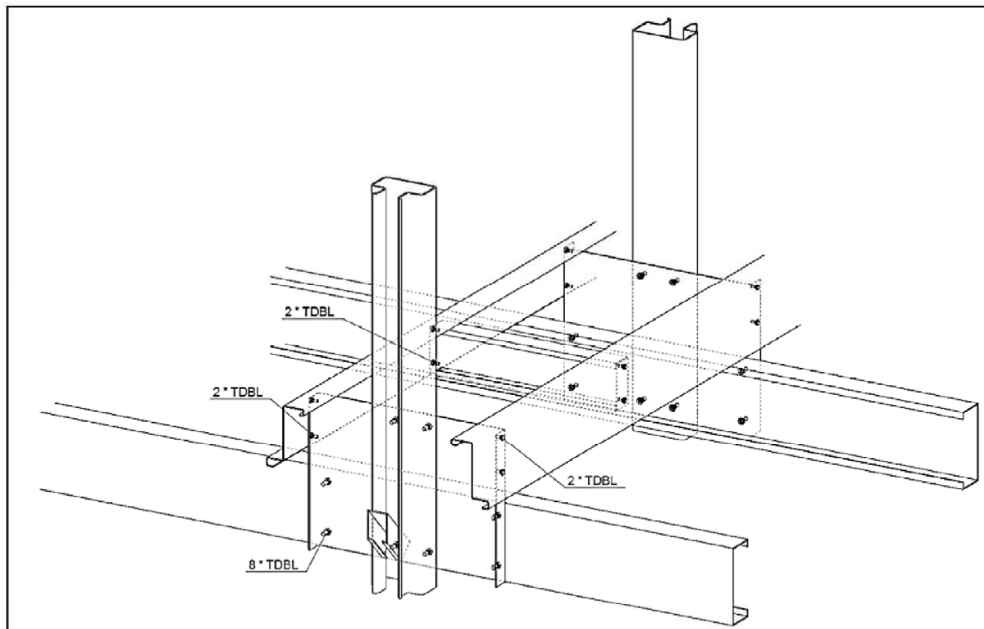
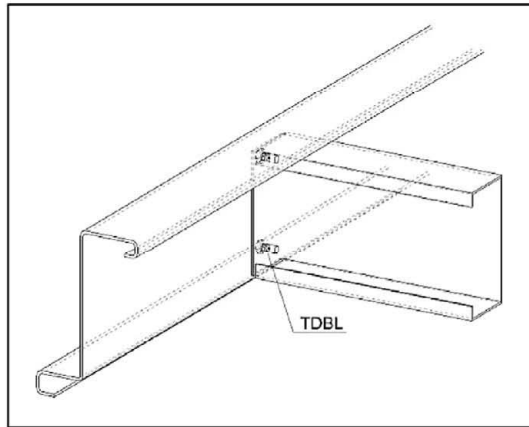
The metal member or sheeting and substructure are in contact to each other.

The nonut® may be used in the deep-freeze areas up to a temperature of -35 degrees Celsius.

**Fasteners for connecting steel components**

Basics for design

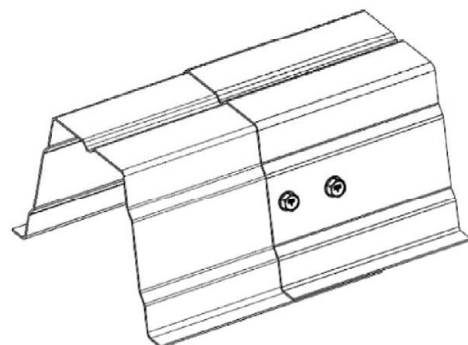
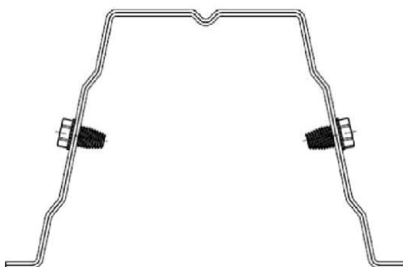
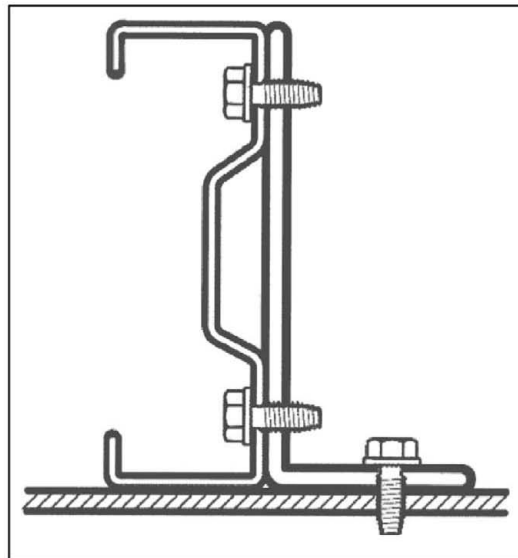
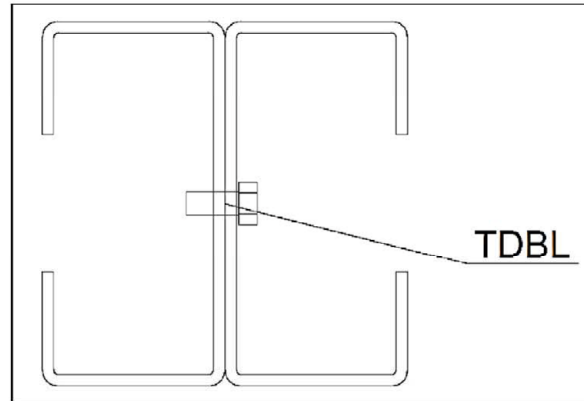
**Annex 3**



**Fasteners for connecting steel components**

Examples of applications

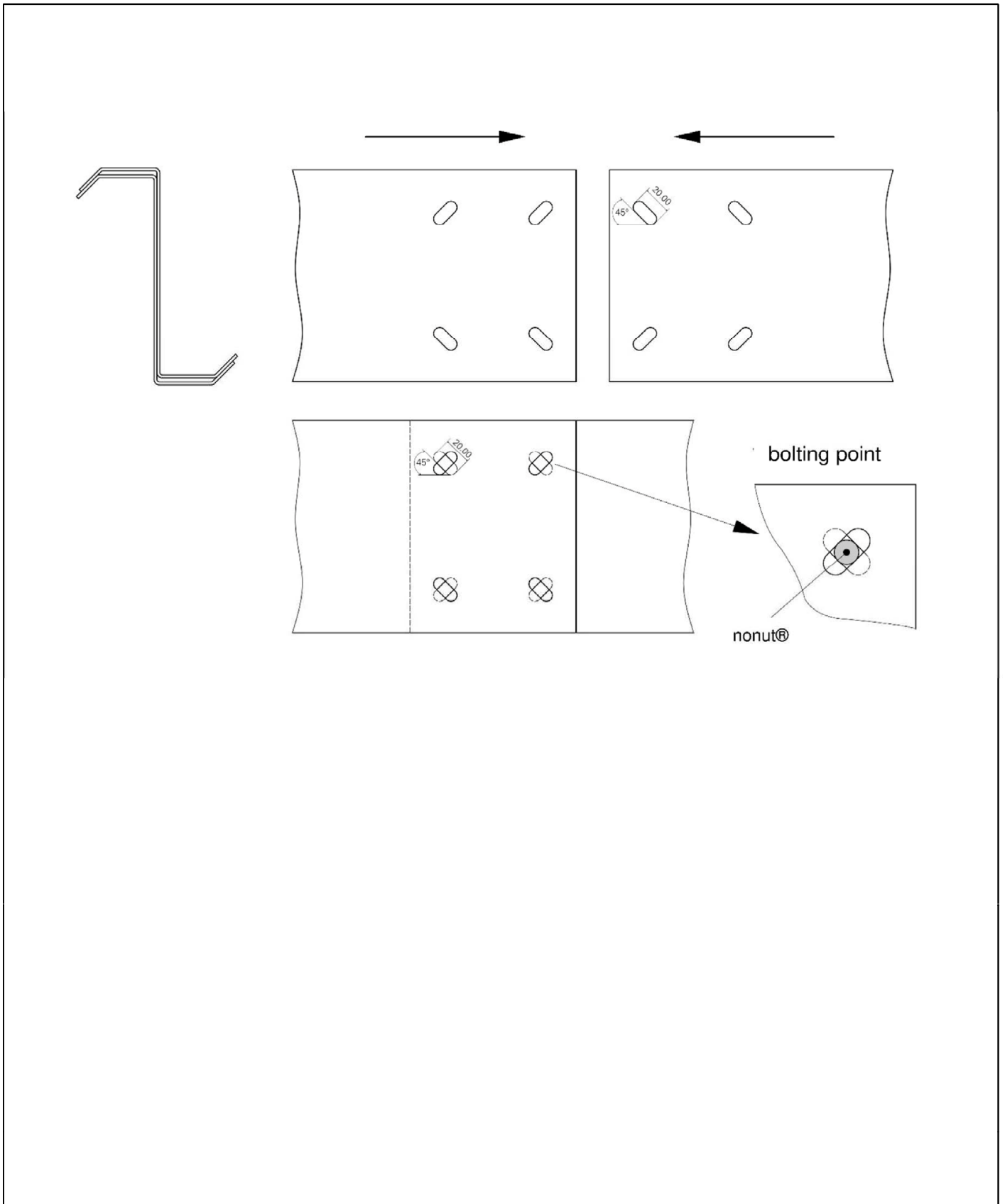
**Annex 4**



**Fasteners for connecting steel components**

Examples of applications

**Annex 5**



**Fasteners for connecting steel components**

Examples of applications for nonut®-TDBL-T 10,6 x L

**Annex 6**

Table 1: Fastener nonut®-TDBL 13,4 x L, Application in connections with combined tensile/shear force or exclusive shear force

Screw	Component I (component to be fixed)	Component II (Substructure)	Boundary conditions	Annex
	S235 to S355 according DIN EN 10025-2, S280GD to S450GD and HX300LAD to HX460LAD according DIN EN 10346			
TDBL-T-13,4xL or TDBLF-T-13,4xL	5,00 mm $\leq t_I \leq 17,00$ mm Pre-drill diameter: 15,0 mm	3,00 mm $< t_{II} \leq 5,00$ mm Pre-drill diameter: 12,5 mm	$t_I + t_{II} \leq 20,0$ mm	10
		5,00 mm $< t_{II} \leq 15,00$ mm Pre-drill diameter: 13,0 mm		11
TDBL-T-13,4xL TDBLF-T-13,4xL	1,00 mm $\leq t_I \leq 4,00$ mm Pre-drill diameter: 12,5 mm	1,50 mm $\leq t_{II} \leq 6,00$ mm Pre-drill diameter: 12,5 mm	$3,0 \leq t_I + t_{II} \leq 8,0$ mm $t_I \leq t_{II}$ for $t_{II} > 2,0$ mm	12
				13
TDBL-T-13,4xL	1,00 mm $\leq t_I \leq 4,00$ mm Pre-drill diameter: 13,0 mm	5,00 mm $\leq t_{II} \leq 19,00$ mm Pre-drill diameter: 13,0 mm	$t_I \leq t_{II}$ $6,0 \leq t_I + t_{II} \leq 20,0$ mm	14
				15

**Fasteners for connecting steel components**

TDBL-T-13,4xL and TDBLF-T-13,4xL

**Annex 7**

Table 2: Fastener nonut®-TDBL 10,6 x L, Application in connections with combined tensile/shear force or exclusive shear force

Screw	Component I (component to be fixed)	Component II (Substructure)	Boundary conditions	Annex
	S235 to S355 according DIN EN 10025-2, S280GD to S450GD and HX300LAD to HX460LAD according DIN EN 10346			
TDBL-T-10,6xL or TDBLF-T-10,6xL	5,00 mm ≤ t <sub>I</sub> ≤ 17,00 mm Pre-drill diameter: 12,0 mm	3,00 mm ≤ t <sub>II</sub> ≤ 15,00 mm Pre-drill diameter: 10,0 mm		16 17
	2 x 0,88 mm ≤ t <sub>I</sub> ≤ 2 x 2,00 mm Pre-drill diameter: 10,0 mm	t <sub>II</sub> ≥ 3,00 mm Pre-drill diameter: 10,0 mm	t <sub>I</sub> ≤ t <sub>II</sub>	18 19
TDBL-T-10,6xL	2 x 0,88 mm ≤ t <sub>I</sub> ≤ 2 x 2,00 mm elongated hole 8,5 mm x 28,5 mm	t <sub>II</sub> ≥ 3,00 mm Pre-drill diameter: 10,0 mm	t <sub>I</sub> ≤ t <sub>II</sub>	20
	0,88 mm ≤ t <sub>I</sub> ≤ 4,00 mm elongated hole 8,5 mm x 28,5 mm	1,00 mm ≤ t <sub>II</sub> < 3,00 mm Pre-drill diameter: 9,0 mm	t <sub>I</sub> ≤ t <sub>II</sub>	21
		t <sub>II</sub> ≥ 3,00 mm Pre-drill diameter: 10,0 mm	t <sub>I</sub> ≤ t <sub>II</sub>	22
	1,00 mm ≤ t <sub>I</sub> ≤ 4,00 mm Pre-drill diameter: 9,0 mm	1,00 mm ≤ t <sub>II</sub> ≤ 3,00 mm Pre-drill diameter: 9,0 mm	t <sub>I</sub> ≤ t <sub>II</sub>	23
	1,00 mm ≤ t <sub>I</sub> ≤ 4,00 mm Pre-drill diameter: 10,0 mm	3,00 mm ≤ t <sub>II</sub> ≤ 15,00 mm Pre-drill diameter: 10,0 mm	t <sub>I</sub> ≤ t <sub>II</sub>	24
	1,00 mm ≤ t <sub>I</sub> ≤ 3,00 mm see Annex	1,00 mm ≤ t <sub>II</sub> ≤ 3,00 mm	t <sub>I</sub> ≤ t <sub>II</sub>	25
		see Annex	see Annex	26

**Fasteners for connecting steel components**

TDBL-T-10,6xL and TDBLF-T-10,6xL

**Annex 8**



Table 3: Fastener nonut®-TDBL 8,6 x L, Application in connections with combined tensile/shear force or exclusive shear force

Screw	Component I (component to be fixed)	Component II (Substructure)	Boundary conditions	Annex
	S235 to S355 according DIN EN 10025-2, S280GD to S450GD and HX300LAD to HX460LAD according DIN EN 10346			
TDBL-T-8,6xL	0,88 mm ≤ t <sub>I</sub> ≤ 3,00 mm Pre-drill diameter: 7,5 mm	0,88 mm ≤ t <sub>II</sub> < 3,00 mm Pre-drill diameter: 7,5 mm	t <sub>I</sub> ≤ t <sub>II</sub>	27
	0,88 mm ≤ t <sub>I</sub> ≤ 3,00 mm Pre-drill diameter: 8,0 mm	t <sub>II</sub> ≥ 3,00 mm Pre-drill diameter: 8,0 mm		28
	2 x 0,88 mm ≤ t <sub>I</sub> ≤ 2 x 2,00 mm Pre-drill diameter: 8,0 mm	t <sub>II</sub> ≥ 3,00 mm Pre-drill diameter: 8,0 mm	-	29
	0,88 mm ≤ t <sub>I</sub> ≤ 2,00 mm elongated hole 6,5 mm x 10,0 mm	0,88 mm ≤ t <sub>II</sub> < 3,00 mm Pre-drill diameter: 7,5 mm	t <sub>I</sub> ≤ t <sub>II</sub>	30
		t <sub>II</sub> ≥ 3,00 mm Pre-drill diameter: 8,0 mm		31
	2 x 0,88 mm ≤ t <sub>I</sub> ≤ 2 x 2,00 mm elongated hole 6,5 mm x 10,0 mm	t <sub>II</sub> ≥ 3,00 mm Pre-drill diameter: 8,0 mm	-	32
	0,88 mm ≤ t <sub>I</sub> ≤ 2,00 mm elongated hole 6,5 mm x 10,0 mm	t <sub>II</sub> ≥ 0,88 mm elongated hole 6,5 mm x 10,0 mm	t <sub>I</sub> ≤ t <sub>II</sub>	33
				34
2 x 0,88 mm ≤ t <sub>I</sub> ≤ 2 x 2,00 mm elongated hole 6,5 mm x 10,0 mm	t <sub>II</sub> ≥ 3,00 mm elongated hole 6,5 mm x 10,0 mm	-	35	

**Fasteners for connecting steel components**

TDBL-T-8,6xL and TDBLF-T-8,6xL

**Annex 9**

English translation prepared by DIBt

	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p> <p>Component II: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: <math>d_{pd,I} = 15.0</math> mm Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]													
		3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00	10.00	12.00	15.00			
		$d_{pd,II} = 12.5$ mm					$d_{pd,II} = 13.0$ mm								
$V_{R,k}$ [kN]	$t_I$ [mm]	5.00	6.00	7.00	8.00	10.00	12.00	17.00	5.00	6.00	7.00	8.00	10.00	12.00	15.00
		10,83	10,83	10,83	10,83	10,83	10,83	10,83	9,32	9,32	9,32	9,32	9,32	9,32	9,32
		16,12	16,12	16,12	16,12	16,12	16,12	-	11,21	11,21	11,21	11,21	11,21	11,21	-
		21,41	21,41	21,41	21,41	21,41	21,41	-	13,10	13,10	13,10	13,10	13,10	13,10	-
		21,95	21,95	21,95	21,95	21,95	21,95	-	15,61	15,61	15,61	15,61	15,61	15,61	-
		22,48	22,48	22,48	22,48	22,48	22,48	-	18,12	18,12	18,12	18,12	18,12	18,12	-
		22,48	23,58	23,58	23,58	23,58	23,58	-	18,98	23,26	23,30	23,30	23,30	23,30	18,98
$N_{R,k}$ [kN]	$t_I$ [mm]	5.00	6.00	7.00	8.00	10.00	12.00	17.00	5.00	6.00	7.00	8.00	10.00	12.00	15.00
		10,83	10,83	10,83	10,83	10,83	10,83	10,83	9,32	9,32	9,32	9,32	9,32	9,32	9,32
		16,12	16,12	16,12	16,12	16,12	16,12	-	11,21	11,21	11,21	11,21	11,21	11,21	-
		21,41	21,41	21,41	21,41	21,41	21,41	-	13,10	13,10	13,10	13,10	13,10	13,10	-
		21,95	21,95	21,95	21,95	21,95	21,95	-	15,61	15,61	15,61	15,61	15,61	15,61	-
		22,48	22,48	22,48	22,48	22,48	22,48	-	18,12	18,12	18,12	18,12	18,12	18,12	-
		22,48	23,58	23,58	23,58	23,58	23,58	-	18,98	23,26	23,30	23,30	23,30	23,30	18,98

- If  $t_I$  and  $t_{II}$  are made of S275 or S320GD the values can be increased by 8.3%.
- If  $t_I$  and  $t_{II}$  are made of S350GD or HX340LAD the values can be increased by 16,0 %.

<p><b>Fasteners for connecting steel components</b></p> <p>nonut®-TDBL-T-13,4 x L nonut®-TDBLF-T-13,4 x L</p>	<p><b>Annex 10</b></p>
---	------------------------

	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p> <p>Component II: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: <math>d_{pd,I} = 15.0</math> mm Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]													
		3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00	10.00	12.00	15.00			
		$d_{pd,II} = 12.5$ mm					$d_{pd,II} = 13.0$ mm								
$V_{R,k}$ [kN]	$t_I$ [mm]	5.00	6.00	7.00	8.00	10.00	12.00	17.00	5.00	6.00	7.00	8.00	10.00	12.00	17.00
	5.00	13,84	20,60	27,36	28,05	28,73	28,73	28,73	28,73	28,73	28,73	28,73	28,73	28,73	28,73
	6.00	13,84	20,60	27,36	28,05	28,73	30,12	30,12	30,12	30,12	30,12	30,12	30,12	-	-
	7.00	13,84	20,60	27,36	28,05	28,73	30,12	30,67	30,67	30,67	30,67	30,67	30,67	-	-
	8.00	13,84	20,60	27,36	28,05	28,73	30,12	30,67	31,22	31,22	31,22	31,22	31,22	-	-
	10.00	13,84	20,60	27,36	28,05	28,73	30,12	30,67	31,22	41,32	-	-	-	-	-
	12.00	13,84	20,60	27,36	28,05	28,73	30,12	30,67	31,22	-	-	-	-	-	-
$N_{R,k}$ [kN]	$t_I$ [mm]	5.00	6.00	7.00	8.00	10.00	12.00	17.00	5.00	6.00	7.00	8.00	10.00	12.00	17.00
	5.00	11,91	14,32	16,73	19,94	23,15	24,25	24,25	24,25	24,25	24,25	24,25	24,25	24,25	24,25
	6.00	11,91	14,32	16,73	19,94	23,15	29,72	29,72	29,72	29,72	29,72	29,72	29,72	-	-
	7.00	11,91	14,32	16,73	19,94	23,15	29,78	31,18	31,18	31,18	31,18	31,18	31,18	-	-
	8.00	11,91	14,32	16,73	19,94	23,15	29,78	32,64	32,64	32,64	32,64	32,64	32,64	-	-
	10.00	11,91	14,32	16,73	19,94	23,15	29,78	33,67	37,56	44,44	-	-	-	-	-
	12.00	11,91	14,32	16,73	19,94	23,15	29,78	33,67	37,56	-	-	-	-	-	-
17.00	11,91	-	-	-	-	-	-	-	-	-	-	-	-	-	

No further specifications.

**Fasteners for connecting steel components**

nonut®-TDBL-T-13,4 x L  
nonut®-TDBLF-T-13,4 x L

**Annex 11**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p> <p>Component II: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = 12.5</math> mm Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]										
		1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	6.00	
		$d_{pd,II} = 12.5$ mm										
<b><math>V_{R,k}</math> [kN]</b>	$t_I$ [mm]	1.00	-	-	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	6,55	6,55	6,55	6,55
		1.13	-	-	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	7,62	7,62	7,62	7,62
		1.25	5,41 <sup>a)</sup>	5,84 <sup>a)</sup>	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	6,26 <sup>a)</sup>	8,62	8,62	8,62	8,62
		1.50	5,56 <sup>a)</sup>	6,65 <sup>a)</sup>	7,75 <sup>a)</sup>	7,75 <sup>a)</sup>	7,75 <sup>a)</sup>	10,69	10,69	10,69	10,69	10,69
		1.75	5,56 <sup>a)</sup>	8,14 <sup>a)</sup>	9,23 <sup>a)</sup>	9,23 <sup>a)</sup>	9,23 <sup>a)</sup>	11,31	11,31	11,31	11,31	11,31
		2.00	5,56 <sup>a)</sup>	8,14 <sup>a)</sup>	10,72 <sup>a)</sup>	10,72 <sup>a)</sup>	11,93	11,93	11,93	11,93	11,93	11,93
		2.50	-	-	-	12,92	13,99	13,99	13,99	13,99	13,99	13,99
		3.00	-	-	-	-	16,06	16,06	16,06	16,06	16,06	-
		3.50	-	-	-	-	-	18,86	18,86	18,86	-	-
		4.00	-	-	-	-	-	-	21,66	-	-	-
<b><math>N_{R,k}</math> [kN]</b>	$t_I$ [mm]	1.00	-	-	4,64 <sup>a)</sup>	5,19 <sup>a)</sup>	5,19 <sup>a)</sup>	5,19 <sup>a)</sup>	5,19	5,19	5,19	5,19
		1.13	-	-	4,64 <sup>a)</sup>	6,75 <sup>a)</sup>	6,75 <sup>a)</sup>	6,75 <sup>a)</sup>	6,75	6,75	6,75	6,75
		1.25	3,12 <sup>a)</sup>	3,88 <sup>a)</sup>	4,64 <sup>a)</sup>	7,56 <sup>a)</sup>	8,19 <sup>a)</sup>	8,19 <sup>a)</sup>	8,19	8,19	8,19	8,19
		1.50	3,12 <sup>a)</sup>	3,88 <sup>a)</sup>	4,64 <sup>a)</sup>	7,56 <sup>a)</sup>	9,32 <sup>a)</sup>	11,20	11,20	11,20	11,20	11,20
		1.75	3,12 <sup>a)</sup>	3,88 <sup>a)</sup>	4,64 <sup>a)</sup>	7,56 <sup>a)</sup>	9,32 <sup>a)</sup>	11,21	12,23	12,23	12,23	12,23
		2.00	3,12 <sup>a)</sup>	3,88 <sup>a)</sup>	4,64 <sup>a)</sup>	7,56 <sup>a)</sup>	9,32	11,21	13,10	13,27	13,27	13,27
		2.50	-	-	-	7,56	9,32	11,21	13,10	13,30	13,30	-
		3.00	-	-	-	-	9,32	11,21	13,10	13,34	13,34	-
		3.50	-	-	-	-	-	11,21	13,10	14,85	-	-
		4.00	-	-	-	-	-	-	13,10	-	-	-

- If  $t_I$  and  $t_{II}$  are made of S275 or S320GD the values can be increased by 8.3%.
- If  $t_I$  and  $t_{II}$  are made of S350GD or HX340LAD the values can be increased by 16,0 %.
- Connections marked with <sup>a)</sup> must be executed with nonut®-TDBLF-T-13,4 x L.

**Fasteners for connecting steel components**

nonut®-TDBL-T-13,4 x L  
nonut®-TDBLF-T-13,4 x L

**Annex 12**

English translation prepared by DIBt

	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p> <p>Component II: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: <math>d_{pd,I} = 12.5</math> mm Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]										
		1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	6.00	
		$d_{pd,II} = 12.5$ mm										
<b><math>V_{R,k}</math> [kN]</b>	1.00	-	-	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	8,37	8,37	8,37	8,37	
	1.13	-	-	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	9,74	9,74	9,74	9,74	
	1.25	6,91 <sup>a)</sup>	7,46 <sup>a)</sup>	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	8,00 <sup>a)</sup>	11,01	11,01	11,01	11,01	
	1.50	7,10 <sup>a)</sup>	8,50 <sup>a)</sup>	9,90 <sup>a)</sup>	9,90 <sup>a)</sup>	9,90 <sup>a)</sup>	13,65	13,65	13,65	13,65	13,65	
	1.75	7,10 <sup>a)</sup>	10,40 <sup>a)</sup>	11,79 <sup>a)</sup>	11,79 <sup>a)</sup>	11,79 <sup>a)</sup>	14,45	14,45	14,45	14,45	14,45	
	$t_I$ [mm]	2.00	7,10 <sup>a)</sup>	10,40 <sup>a)</sup>	13,69 <sup>a)</sup>	13,69 <sup>a)</sup>	15,25	15,25	15,25	15,25	15,25	15,25
		2.50	-	-	-	16,51	17,88	17,88	17,88	17,88	17,88	17,88
		3.00	-	-	-	-	20,52	20,52	20,52	20,52	20,52	-
		3.50	-	-	-	-	-	24,10	24,10	24,10	-	-
	4.00	-	-	-	-	-	-	27,67	-	-	-	
<b><math>N_{R,k}</math> [kN]</b>	1.00	-	-	5,93 <sup>a)</sup>	6,63 <sup>a)</sup>	6,63 <sup>a)</sup>	6,63 <sup>a)</sup>	6,63	6,63	6,63	6,63	
	1.13	-	-	5,93 <sup>a)</sup>	8,63 <sup>a)</sup>	8,63 <sup>a)</sup>	8,63 <sup>a)</sup>	8,63	8,63	8,63	8,63	
	1.25	3,98 <sup>a)</sup>	4,95 <sup>a)</sup>	5,93 <sup>a)</sup>	9,66 <sup>a)</sup>	10,47 <sup>a)</sup>	10,47 <sup>a)</sup>	10,47	10,47	10,47	10,47	
	1.50	3,98 <sup>a)</sup>	4,95 <sup>a)</sup>	5,93 <sup>a)</sup>	9,66 <sup>a)</sup>	11,91 <sup>a)</sup>	14,31	14,31	14,31	14,31	14,31	
	1.75	3,98 <sup>a)</sup>	4,95 <sup>a)</sup>	5,93 <sup>a)</sup>	9,66 <sup>a)</sup>	11,91 <sup>a)</sup>	14,32	15,63	15,63	15,63	15,63	
	$t_I$ [mm]	2.00	3,98 <sup>a)</sup>	4,95 <sup>a)</sup>	5,93 <sup>a)</sup>	9,66 <sup>a)</sup>	11,91	14,32	16,73	16,95	16,95	16,95
		2.50	-	-	-	9,66	11,91	14,32	16,73	17,00	17,00	-
		3.00	-	-	-	-	11,91	14,32	16,73	17,05	17,05	-
		3.50	-	-	-	-	-	14,32	16,73	18,98	-	-
	4.00	-	-	-	-	-	-	16,73	-	-	-	

- Connections marked with <sup>a)</sup> must be executed with nonut®-TDBLF-T-13,4 x L.

<b>Fasteners for connecting steel components</b>	<b>Annex 13</b>
nonut®-TDBL-T-13,4 x L nonut®-TDBLF-T-13,4 x L	

	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p> <p>Component II: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: <math>d_{pd,I} = 13.0</math> mm Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]									
		5.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	19.00	
		$d_{pd,II} = 13.0$ mm									
$V_{R,k}$ [kN]	1.00	7,94	7,94	7,94	7,94	7,94	7,94	7,94	7,94	7,94	
	1.13	8,85	8,85	8,85	8,85	8,85	8,85	8,85	8,85	-	
	1.25	9,69	9,69	9,69	9,69	9,69	9,69	9,69	9,69	-	
	1.50	11,44	11,44	11,44	11,44	11,44	11,44	11,44	11,44	-	
	1.75	12,97	12,97	12,97	12,97	12,97	12,97	12,97	12,97	-	
	$t_I$ [mm]	2.00	14,51	14,51	14,51	14,51	14,51	14,51	14,51	14,51	-
		2.50	14,96	14,96	14,96	14,96	14,96	14,96	14,96	-	-
		3.00	15,41	15,41	15,41	15,41	15,41	15,41	15,41	-	-
		3.50	18,32	18,32	18,32	18,32	18,32	18,32	18,32	-	-
		4.00	21,23	21,23	21,23	21,23	21,23	21,23	21,23	-	-
$N_{R,k}$ [kN]		1.00	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06	6.06
	1.13	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	-	
	1.25	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	-	
	1.50	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	-	
	1.75	11.09	11.09	11.09	11.09	11.09	11.09	11.09	11.09	-	
	$t_I$ [mm]	2.00	12.33	12.33	12.33	12.33	12.33	12.33	12.33	12.33	-
		2.50	12.59	12.59	12.59	12.59	12.59	12.59	12.59	-	-
		3.00	12.84	12.84	12.84	12.84	12.84	12.84	12.84	-	-
		3.50	14.25	14.25	14.25	14.25	14.25	14.25	14.25	-	-
		4.00	15.65	15.65	15.65	15.65	15.65	15.65	15.65	-	-

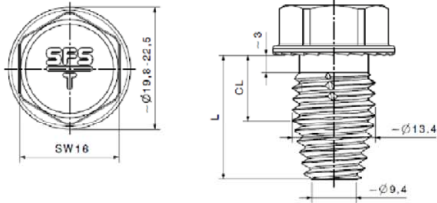
- If  $t_I$  and  $t_{II}$  are made of S275 or S320GD the values can be increased by 8.3%.
- If  $t_I$  and  $t_{II}$  are made of S350GD or HX340LAD the values can be increased by 16,0 %.

**Fasteners for connecting steel components**

nonut®-TDBL-T-13,4 x L

**Annex 14**





Materials

Screw: Carbon steel  
tempered and coated

Component I: S355 – EN 10025-2  
S390GD to S450GD – EN 10346  
HX420LAD to HX460LAD – EN 10346

Component II: S355 – EN 10025-2  
S390GD to S450GD – EN 10346  
HX420LAD to HX460LAD – EN 10346

Pre-drill diameter

Component I:  $d_{pd,I} = 13.0 \text{ mm}$   
Component II:  $d_{pd,II}$  see table

		$t_{II} \text{ [mm]}$									
		5.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	19.00	
		$d_{pd,II} = 13.0 \text{ mm}$									
$V_{R,k} \text{ [kN]}$	1.00	10,14	10,14	10,14	10,14	10,14	10,14	10,14	10,14	10,14	
	1.13	11,31	11,31	11,31	11,31	11,31	11,31	11,31	11,31	-	
	1.25	12,38	12,38	12,38	12,38	12,38	12,38	12,38	12,38	-	
	1.50	14,62	14,62	14,62	14,62	14,62	14,62	14,62	14,62	-	
	1.75	16,58	16,58	16,58	16,58	16,58	16,58	16,58	16,58	-	
	$t_I \text{ [mm]}$	2.00	18,54	18,54	18,54	18,54	18,54	18,54	18,54	18,54	-
		2.50	19,12	19,12	19,12	19,12	19,12	19,12	19,12	-	-
		3.00	19,69	19,69	19,69	19,69	19,69	19,69	19,69	-	-
		3.50	23,41	23,41	23,41	23,41	23,41	23,41	23,41	-	-
		4.00	27,13	27,13	27,13	27,13	27,13	27,13	27,13	-	-
$N_{R,k} \text{ [kN]}$	1.00	7,80	7,80	7,80	7,80	7,80	7,80	7,80	7,80	7,80	
	1.13	9,05	9,05	9,05	9,05	9,05	9,05	9,05	9,05	-	
	1.25	10,21	10,21	10,21	10,21	10,21	10,21	10,21	10,21	-	
	1.50	12,61	12,61	12,61	12,61	12,61	12,61	12,61	12,61	-	
	1.75	13,90	13,90	13,90	13,90	13,90	13,90	13,90	13,90	-	
	$t_I \text{ [mm]}$	2.00	15,19	15,19	15,19	15,19	15,19	15,19	15,19	15,19	-
		2.50	15,78	15,78	15,78	15,78	15,78	15,78	15,78	-	-
		3.00	16,37	16,37	16,37	16,37	16,37	16,37	16,37	-	-
		3.50	18,10	18,10	18,10	18,10	18,10	18,10	18,10	-	-
		4.00	19,84	19,84	19,84	19,84	19,84	19,84	19,84	-	-

No further specifications.

**Fasteners for connecting steel components**

nonut®-TDBL-T-13,4 x L

**Annex 15**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p> <p>Component II: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = 12.0</math> mm Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]									
		3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	15.00	
		$d_{pd,II} = 10.0$ mm									
<b><math>V_{R,k}</math> [kN]</b>	5.00	11,68 <sup>a)</sup>	15,86 <sup>a)</sup>	20,04 <sup>a)</sup>	20,04 <sup>a)</sup>	20,04 <sup>a)</sup>	20,04 <sup>a)</sup>	20,04 <sup>a)</sup>	20,04 <sup>a)</sup>	20,04 <sup>a)</sup>	
	6.00	11,68 <sup>a)</sup>	15,86 <sup>a)</sup>	20,04 <sup>a)</sup>	22,01 <sup>a)</sup>	22,01 <sup>a)</sup>	22,01 <sup>a)</sup>	22,01 <sup>a)</sup>	22,01 <sup>a)</sup>	-	
	8.00	11,68 <sup>a)</sup>	15,86 <sup>a)</sup>	20,04 <sup>a)</sup>	22,01 <sup>a)</sup>	32,39	32,39	32,39	-	-	
	<b><math>t_I</math> [mm]</b>	10.00	11,68 <sup>a)</sup>	15,86 <sup>a)</sup>	20,04 <sup>a)</sup>	22,01 <sup>a)</sup>	32,39	32,39	-	-	-
		12.00	11,68 <sup>a)</sup>	15,86 <sup>a)</sup>	20,04 <sup>a)</sup>	22,01 <sup>a)</sup>	32,39	-	-	-	-
<b><math>N_{R,k}</math> [kN]</b>	5.00	7,25 <sup>a)</sup>	11,29 <sup>a)</sup>	15,76 <sup>a)</sup>	22,47 <sup>a)</sup>	22,70 <sup>a)</sup>	22,70 <sup>a)</sup>	22,70 <sup>a)</sup>	22,70 <sup>a)</sup>	22,70 <sup>a)</sup>	
	6.00	7,25 <sup>a)</sup>	11,29 <sup>a)</sup>	15,76 <sup>a)</sup>	22,47 <sup>a)</sup>	28,74 <sup>a)</sup>	28,74 <sup>a)</sup>	28,74 <sup>a)</sup>	28,74 <sup>a)</sup>	-	
	8.00	7,25 <sup>a)</sup>	11,29 <sup>a)</sup>	15,76 <sup>a)</sup>	22,47 <sup>a)</sup>	29,65 <sup>a)</sup>	29,76 <sup>a)</sup>	29,76 <sup>a)</sup>	-	-	
	<b><math>t_I</math> [mm]</b>	10.00	7,25 <sup>a)</sup>	11,29 <sup>a)</sup>	15,76 <sup>a)</sup>	22,47 <sup>a)</sup>	29,65 <sup>a)</sup>	40,61	-	-	-
		12.00	7,25 <sup>a)</sup>	11,29 <sup>a)</sup>	15,76 <sup>a)</sup>	22,47 <sup>a)</sup>	29,65 <sup>a)</sup>	-	-	-	-

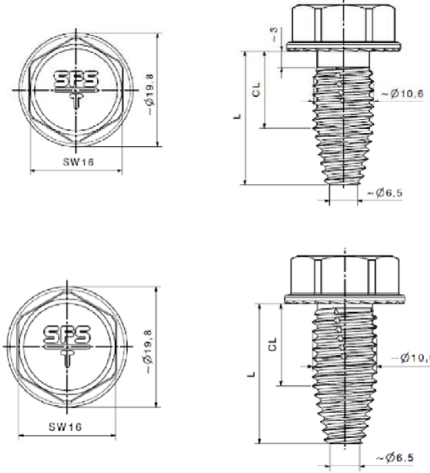
- If  $t_I$  and  $t_{II}$  are made of S275 or S320GD the values marked with <sup>a)</sup> can be increased by 8.3%
- If  $t_I$  and  $t_{II}$  are made of S350GD or HX340LAD the values marked with <sup>a)</sup> can be increased by 16,0 %.

**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 16**



	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p> <p>Component II: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = 12.0 \text{ mm}</math> Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]									
		3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	15.00	
		$d_{pd,II} = 10.0 \text{ mm}$									
<b><math>V_{R,k}</math> [kN]</b>	5.00	14,92	20,26	25,60	25,60	25,60	25,60	25,60	25,60	25,60	
	6.00	14,92	20,26	25,60	28,12	28,12	28,12	28,12	28,12	-	
	8.00	14,92	20,26	25,60	28,12	32,39	32,39	32,39	-	-	
	<b><math>t_I</math> [mm]</b>	10.00	14,92	20,26	25,60	28,12	32,39	32,39	-	-	-
	12.00	14,92	20,26	25,60	28,12	32,39	-	-	-	-	
<b><math>N_{R,k}</math> [kN]</b>	5.00	9,26	14,43	20,14	28,71	29,01	29,01	29,01	29,01	29,01	
	6.00	9,26	14,43	20,14	28,71	36,72	36,72	36,72	36,72	-	
	8.00	9,26	14,43	20,14	28,71	37,89	38,03	38,03	-	-	
	<b><math>t_I</math> [mm]</b>	10.00	9,26	14,43	20,14	28,71	37,89	41,48	-	-	-
	12.00	9,26	14,43	20,14	28,71	37,89	-	-	-	-	

No further specifications.

**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 17**

	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p> <p>Component II: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: <math>d_{pd,I} = 10.0 \text{ mm}</math> Component II: <math>d_{pd,II}</math> see table</p>

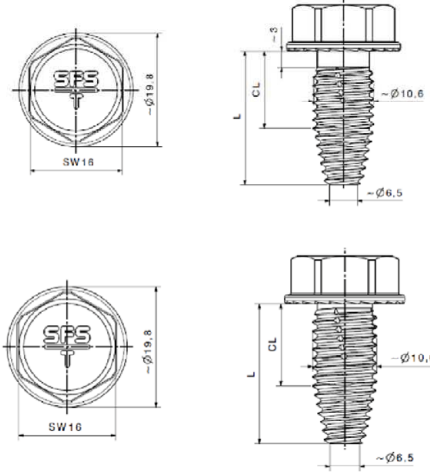
		$t_{II} \text{ [mm]}$			
		3.00	4.00	5.00	$\geq 6.00$
		$d_{pd,II} = 10.0 \text{ mm}$			
<b><math>V_{R,k} \text{ [kN]}</math></b>	$t_I \text{ [mm]}$				
	2 x 0.88	10,31	10,31	10,31	10,31
	2 x 0.90	10,39	10,39	10,39	10,39
	2 x 1.00	10,79	10,79	10,79	10,79
	2 x 1.13	10,89	10,89	10,89	10,89
	2 x 1.25	10,98	10,98	10,98	10,98
	2 x 1.50	13,11	13,11	13,11	13,11
	2 x 1.75	13,42	13,42	13,42	13,42
2 x 2.00	13,74	14,39	14,39	14,39	
<b><math>N_{R,k} \text{ [kN]}</math></b>	$t_I \text{ [mm]}$				
	2 x 0.88	7,25	8,01	8,01	8,01
	2 x 0.90	7,25	8,14	8,14	8,14
	2 x 1.00	7,25	8,79	8,79	8,79
	2 x 1.13	7,25	10,74	10,74	10,74
	2 x 1.25	7,25	11,29	12,54	12,54
	2 x 1.50	7,25	11,29	15,76	17,44
	2 x 1.75	7,25	11,29	15,76	19,59
2 x 2.00	7,25	11,29	15,76	21,74	

- If  $t_I$  and  $t_{II}$  are made of S275 or S320GD the values can be increased by 8.3%.
- If  $t_I$  and  $t_{II}$  are made of S350GD or HX340LAD the values can be increased by 16,0 %.

**Fasteners for connecting steel component**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 18**

	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p> <p>Component II: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: <math>d_{pd,I} = 10.0 \text{ mm}</math> Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II} \text{ [mm]}$			
		3.00	4.00	5.00	$\geq 6.00$
		$d_{pd,II} = 10.0 \text{ mm}$			
<b><math>V_{R,k}</math> [kN]</b>	$t_i$ [mm]	11,97	11,97	11,97	11,97
	2 x 0.88	11,97	11,97	11,97	11,97
	2 x 0.90	12,28	12,28	12,28	12,28
	2 x 1.00	13,78	13,78	13,78	13,78
	2 x 1.13	13,91	13,91	13,91	13,91
	2 x 1.25	14,03	14,03	14,03	14,03
	2 x 1.50	16,75	16,75	16,75	16,75
	2 x 1.75	17,15	17,15	17,15	17,15
<b><math>N_{R,k}</math> [kN]</b>	$t_i$ [mm]	17,56	18,39	18,39	18,39
	2 x 0.88	9,20	9,20	9,20	9,20
	2 x 0.90	9,26	9,44	9,44	9,44
	2 x 1.00	9,26	10,68	10,68	10,68
	2 x 1.13	9,26	12,95	12,95	12,95
	2 x 1.25	9,26	14,43	15,05	15,05
	2 x 1.50	9,26	14,43	20,14	22,29
	2 x 1.75	9,26	14,43	20,14	25,03
2 x 2.00	9,26	14,43	20,14	27,78	

No further specifications.

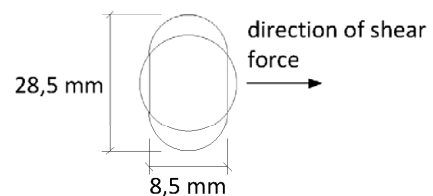
**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 19**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 to S355 – EN 10025-2 S280GD to S450GD – EN 10346 HX300LAD to HX460LAD – EN 10346</p> <p>Component II: S235 to S355 – EN 10025-2 S280GD to S450GD – EN 10346 HX300LAD to HX460LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = 8.5 \times 28.5</math> mm (elongated hole) Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]		
		3.00	$\geq 4.00$	
		$d_{pd,II} = 10.0$ mm		
<b><math>V_{R,k}</math> [kN]</b>	$2 \times 0.88$	6,27	6,27	
	$2 \times 0.90$	6,82	6,82	
	$2 \times 1.00$	9,54 <sup>a)</sup>	9,54 <sup>a)</sup>	
	$2 \times 1.13$	9,61	9,61	
	<b><math>t_I</math> [mm]</b>	$2 \times 1.25$	9,68	9,68
		$2 \times 1.50$	10,75 <sup>a)</sup>	10,75 <sup>a)</sup>
		$2 \times 1.75$	12,32 <sup>a)</sup>	12,32 <sup>a)</sup>
		$2 \times 2.00$	13,90 <sup>a)</sup>	13,90 <sup>a)</sup>
<b><math>N_{R,k}</math> [kN]</b>	$2 \times 0.88$	4,28	4,28	
	$2 \times 0.90$	4,33	4,33	
	$2 \times 1.00$	4,61 <sup>a)</sup>	4,61 <sup>a)</sup>	
	$2 \times 1.13$	6,23	6,23	
	<b><math>t_I</math> [mm]</b>	$2 \times 1.25$	7,25 <sup>a)</sup>	7,72
		$2 \times 1.50$	7,25 <sup>a)</sup>	8,05 <sup>a)</sup>
		$2 \times 1.75$	7,25 <sup>a)</sup>	8,57 <sup>a)</sup>
		$2 \times 2.00$	7,25 <sup>a)</sup>	9,09 <sup>a)</sup>



- If  $t_I$  and  $t_{II}$  are made of S275 or S320GD the values can be increased by 8.3%.
- If  $t_I$  and  $t_{II}$  are made of S350GD or HX340LAD the values can be increased by 16,0 %.
- If  $t_I$  and  $t_{II}$  are made of S355 or S390GD to S450GD or HX420LAD to HX460LAD the values marked with <sup>a)</sup> can be increased by 27,8 %.

**Fasteners for connecting steel components**

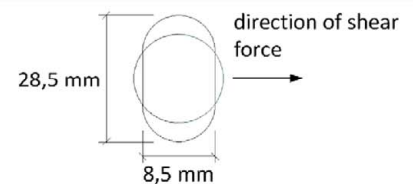
nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 20**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p> <p>Component II: S235 to S275 – EN 10025-2 S280GD to S350GD – EN 10346 HX300LAD to HX380LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = 8.5 \times 28.5 \text{ mm}</math> (elongated hole) Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II} \text{ [mm]}$											
		1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	$\geq 8.00$		
		$d_{pd,II} = 9.0 \text{ mm}$						$d_{pd,II} = 10.0 \text{ mm}$					
$V_{R,k} \text{ [kN]}$	$t_I \text{ [mm]}$	0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	$\geq 8.00$
	1.00	1,98	2,02	2,20	2,20	2,20	2,20	2,20	2,20	2,20	2,20	2,20	2,20
	1.13	1,98	2,02	2,20	2,94	2,94	2,94	2,94	2,94	2,94	2,94	2,94	2,94
	1.25	1,98	2,02	2,20	3,63	3,63	3,63	3,63	3,63	3,63	3,63	3,63	3,63
	1.50	1,98	2,02	2,20	3,63	5,06	5,06	5,06	5,06	5,06	5,06	5,06	5,06
	1.75	1,98	2,02	2,20	3,63	5,06	6,77	6,77	6,77	6,77	6,77	6,77	6,77
	2.00	1,98	2,02	2,20	3,63	5,06	6,77	8,47	8,47	8,47	8,47	8,47	8,47
	3.00	1,98	2,02	2,20	3,63	5,06	6,77	8,47	13,52	13,52	13,52	13,52	13,52
	4.00	1,98	2,02	2,20	3,63	5,06	6,77	8,47	13,52	16,07	16,07	16,07	16,07
$N_{R,k} \text{ [kN]}$	$t_I \text{ [mm]}$	0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	$\geq 8.00$
	1.00	1,66	1,74	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75	1,75
	1.13	1,66	1,74	2,12	2,19	2,60	2,76	2,76	2,76	2,76	2,76	2,76	2,76
	1.25	1,66	1,74	2,12	2,60	3,36	3,36	3,36	3,36	3,36	3,36	3,36	3,36
	1.50	1,66	1,74	2,12	2,60	3,44	4,26	4,60	4,60	4,60	4,60	4,60	4,60
	1.75	1,66	1,74	2,12	2,60	3,44	4,26	5,08	5,53	5,53	5,53	5,53	5,53
	2.00	1,66	1,74	2,12	2,60	3,44	4,26	5,08	6,46	6,46	6,46	6,46	6,46
	3.00	1,66	1,74	2,12	2,60	3,44	4,26	5,08	7,25	9,28	9,28	9,28	9,28
	4.00	1,66	1,74	2,12	2,60	3,44	4,26	5,08	7,25	11,29	11,54	11,54	11,54

- If  $t_I$  and  $t_{II}$  are made of S275 or S320GD the values can be increased by 8.3%.
- If  $t_I$  and  $t_{II}$  are made of S350GD or HX340LAD the values can be increased by 16,0 %.



**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

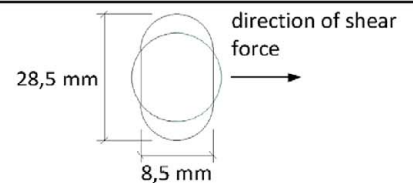
**Annex 21**

English translation prepared by DIBt

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p> <p>Component II: S355 – EN 10025-2 S390GD to S450GD – EN 10346 HX420LAD to HX460LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = 8.5 \times 28.5 \text{ mm}</math> (elongated hole) Component II: <math>d_{pd,II}</math> see table</p>

		$t_{II}$ [mm]											
		1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	$\geq 8.00$		
		$d_{pd,II} = 9.0 \text{ mm}$							$d_{pd,II} = 10.0 \text{ mm}$				
$V_{R,k}$ [kN]	$t_I$ [mm]	0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	$\geq 8.00$
	2.53	2.58	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81
	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76
	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64
	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46
	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64	8.64
	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83
	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27	17.27
	18.71	18.71	18.71	18.71	18.71	18.71	18.71	18.71	18.71	18.71	18.71	18.71	18.71
$N_{R,k}$ [kN]	$t_I$ [mm]	0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	$\geq 8.00$
	1.96	2.08	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53
	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29
	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87
	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06
	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26
11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	11.85	
14.74	14.74	14.74	14.74	14.74	14.74	14.74	14.74	14.74	14.74	14.74	14.74	14.74	

No further specifications.

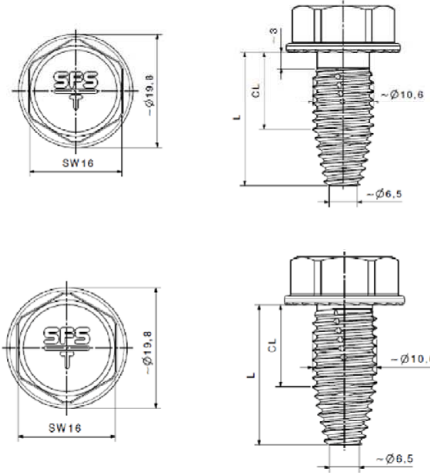


**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 22**



	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p> <p>Component II: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: <math>d_{pd,I} = d_{pd,II}</math> Component II: see table</p>

		$t_{II}$ [mm]									
		1.00	1.25	1.50	2.00	3.00	4.00	5.00	6.00	8.00	≥ 10.00
		$d_{pd,I} = d_{pd,II} = 9.0$ mm					$d_{pd,I} = d_{pd,II} = 10.0$ mm				
<b><math>V_{R,k}</math> [kN]</b>	1.00	3,04	3,31	3,58	3,96	5,47	5,47	5,47	5,47	5,47	5,47
	1.13	-	4,34	4,47	4,65	6,24	6,24	6,24	6,24	6,24	6,24
	1.25	-	5,30	5,30	5,30	6,95	7,59	7,59	7,59	7,59	7,59
	1.50	-	-	6,46	6,46	8,43	10,41	10,41	10,41	10,41	10,41
	$t_I$ [mm]	1.75	-	-	-	8,43	9,49	10,41	11,86	12,88	12,88
	2.00	-	-	-	10,40	10,54	11,28	13,32	15,36	15,36	15,36
	3.00	-	-	-	-	14,76	14,76	16,42	18,08	24,56	24,56
	4.00	-	-	-	-	-	20,81	20,81	20,81	24,56	24,56
<b><math>N_{R,k}</math> [kN]</b>	1.00	1,75	2,60	3,44	4,41	4,41	4,41	4,41	4,41	4,41	4,41
	1.13	-	2,60	3,44	5,08	5,85	5,85	5,85	5,85	5,85	5,85
	1.25	-	2,60	3,44	5,08	7,18	7,18	7,18	7,18	7,18	7,18
	1.50	-	-	3,44	5,08	7,25	9,95	9,95	9,95	9,95	9,95
	$t_I$ [mm]	1.75	-	-	-	5,08	7,25	11,29	12,46	12,46	12,46
	2.00	-	-	-	5,08	7,25	11,29	14,97	14,97	14,97	14,97
	3.00	-	-	-	-	7,25	11,29	14,97	14,97	14,97	14,97
	4.00	-	-	-	-	-	11,29	14,97	14,97	14,97	14,97

No further specifications.

**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 23**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX340LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX340LAD to HX460LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = d_{pd,II}</math> Component II: see table</p>

		$t_{II}$ [mm]									
		1.00	1.25	1.50	2.00	3.00	4.00	5.00	6.00	8.00	$\geq 10.00$
		$d_{pd,I} = d_{pd,II} = 9.0$ mm					$d_{pd,I} = d_{pd,II} = 10.0$ mm				
<b><math>V_{R,k}</math> [kN]</b>	1.00	3,46	3,52	3,58	4,11	6,23	6,23	6,23	6,23	6,23	6,23
	1.13	-	4,83	4,85	5,11	7,06	7,06	7,06	7,06	7,06	7,06
	1.25	-	6,03	6,03	6,03	7,83	8,62	8,62	8,62	8,62	8,62
	1.50	-	-	7,00	7,00	9,43	11,85	11,85	11,85	11,85	11,85
	1.75	-	-	-	8,90	10,32	11,85	13,02	13,90	13,90	13,90
	2.00	-	-	-	10,80	11,21	12,44	14,19	15,95	15,95	15,95
	3.00	-	-	-	-	14,76	14,76	17,29	19,83	24,56	24,56
	4.00	-	-	-	-	-	23,70	23,70	23,70	24,56	24,56
<b><math>N_{R,k}</math> [kN]</b>	1.00	2,04	3,03	4,02	5,02	5,02	5,02	5,02	5,02	5,02	5,02
	1.13	-	3,03	4,02	5,92	6,52	6,52	6,52	6,52	6,52	6,52
	1.25	-	3,03	4,02	5,92	7,91	7,91	7,91	7,91	7,91	7,91
	1.50	-	-	4,02	5,92	8,46	10,79	10,79	10,79	10,79	10,79
	1.75	-	-	-	5,92	8,46	13,17	13,17	13,17	13,17	13,17
	2.00	-	-	-	5,92	8,46	13,18	15,55	15,55	15,55	15,55
	3.00	-	-	-	-	8,46	13,18	15,55	15,55	15,55	15,55
	4.00	-	-	-	-	-	13,18	15,55	15,55	15,55	15,55

No further specifications.

**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

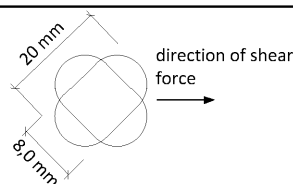
**Annex 24**



	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p> <p>Component II: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: elongated hole 8,0 mm x 20,0 mm Component II: elongated hole 8,0 mm x 20,0 mm</p>

		$t_{II}$ [mm]						
		1,00	1,13	1,25	1,50	1,75	2,00	3,00
		$d_{pd,I} = d_{pd,II} = 8,0 \times 20,0 \text{ mm}$						
<b><math>V_{R,k}</math> [kN]</b>	1.00	1,45	1,45	1,45	1,45	1,45	1,45	1,45
	1.13	-	1,78	1,78	1,78	1,78	1,78	1,78
	1.25	-	-	2,09	2,09	2,09	2,09	2,09
	1.50	-	-	-	2,74	2,74	2,74	2,74
	1.75	-	-	-	-	3,39	3,39	3,39
	2.00	-	-	-	-	-	4,04	4,04
	3.00	-	-	-	-	-	-	10,41
<b><math>N_{R,k}</math> [kN]</b>	1.00	-	-	-	-	-	-	-
	1.13	-	-	-	-	-	-	-
	1.25	-	-	-	-	-	-	-
	1.50	-	-	-	-	-	-	-
	1.75	-	-	-	-	-	-	-
	2.00	-	-	-	-	-	-	-
	3.00	-	-	-	-	-	-	-

Further specifications:



**Fasteners for connecting steel components**

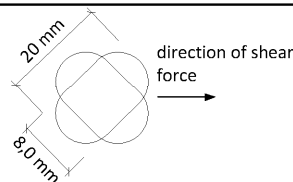
nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 25**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: elongated hole 8,0 mm x 20,0 mm Component II: elongated hole 8,0 mm x 20,0 mm</p>

		$t_{II}$ [mm]						
		1,00	1,13	1,25	1,50	1,75	2,00	3,00
		$d_{pd,I} = d_{pd,II} = 8,0 \times 20,0 \text{ mm}$						
<b><math>V_{R,k}</math> [kN]</b>	1.00	1,65	1,65	1,65	1,65	1,65	1,65	1,65
	1.13	-	2,03	2,03	2,03	2,03	2,03	2,03
	1.25	-	-	2,39	2,39	2,39	2,39	2,39
	1.50	-	-	-	3,13	3,13	3,13	3,13
	1.75	-	-	-	-	3,86	3,86	3,86
	2.00	-	-	-	-	-	4,60	4,60
<b><math>N_{R,k}</math> [kN]</b>	1.00	-	-	-	-	-	-	-
	1.13	-	-	-	-	-	-	-
	1.25	-	-	-	-	-	-	-
	1.50	-	-	-	-	-	-	-
	1.75	-	-	-	-	-	-	-
	2.00	-	-	-	-	-	-	-
3.00	-	-	-	-	-	-	-	

Further specifications:



**Fasteners for connecting steel components**

nonut®-TDBL-T-10,6 x L  
nonut®-TDBLF-T-10,6 x L

**Annex 26**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p> <p>Component II: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = d_{pd,II}</math> Component II: see table</p>

		$t_{II}$ [mm]												
		0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	8.00	≥ 10.00
		$d_{pd,I} = d_{pd,II} = 7.5$ mm							$d_{pd,I} = d_{pd,II} = 8.0$ mm					
<b>V<sub>R,k</sub> [kN]</b>	0.88	2,46	2,49	2,64	2,82	2,99	3,35	3,70	4,06	4,06	4,06	4,06	4,06	4,06
	0.90	-	2,54	2,68	2,88	3,05	3,35	3,70	4,06	4,24	4,24	4,24	4,24	4,24
	1.00	-	-	2,91	3,17	3,37	3,37	3,70	4,06	5,15	6,00	6,00	6,00	6,00
	1.13	-	-	-	3,56	3,77	3,92	3,92	4,06	6,33	8,29	8,29	8,29	8,29
	1.25	-	-	-	-	4,15	4,44	4,44	4,44	7,42	10,40	10,40	10,40	10,40
	1.50	-	-	-	-	-	5,51	6,19	6,19	7,42	10,40	11,23	11,23	11,23
	1.75	-	-	-	-	-	-	7,94	8,28	8,28	10,40	11,94	11,94	11,94
	2.00	-	-	-	-	-	-	-	10,37	9,63	10,40	12,64	14,88	14,88
<b>N<sub>R,k</sub> [kN]</b>	0.88	1,12	1,16	1,33	1,59	1,83	2,59	3,18	3,18	3,18	3,18	3,18	3,18	3,18
	0.90	-	1,16	1,33	1,59	1,83	2,59	3,24	3,24	3,24	3,24	3,24	3,24	3,24
	1.00	-	-	1,33	1,59	1,83	2,59	3,24	3,55	3,55	3,55	3,55	3,55	3,55
	1.13	-	-	-	1,59	1,83	2,59	3,24	3,89	4,37	4,37	4,37	4,37	4,37
	1.25	-	-	-	-	1,83	2,59	3,24	3,89	5,12	5,12	5,12	5,12	5,12
	1.50	-	-	-	-	-	2,59	3,24	3,89	7,88	9,07	9,07	9,07	9,07
	1.75	-	-	-	-	-	-	3,24	3,89	7,88	10,29	10,29	10,29	10,29
	2.00	-	-	-	-	-	-	-	3,89	7,88	10,91	11,51	11,51	11,51
3.00	-	-	-	-	-	-	-	-	7,88	10,91	11,51	11,51	11,51	

No further specifications.

**Fasteners for connecting steel components**

nonut®-TDBL-T-8,6 x L  
nonut®-TDBLF-T-F-8,6 x L

**Annex 27**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = d_{pd,II}</math> Component II: see table</p>

		$t_{II}$ [mm]												
		0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	6.00	8.00	$\geq 10.00$
		$d_{pd,I} = d_{pd,II} = 7.5$ mm							$d_{pd,I} = d_{pd,II} = 8.0$ mm					
<b><math>V_{R,k}</math> [kN]</b>	0.88	2,81	2,84	3,00	3,21	3,41	3,81	4,22	4,62	4,62	4,62	4,62	4,62	4,62
	0.90	-	2,89	3,05	3,28	3,47	3,81	4,22	4,62	4,81	4,81	4,81	4,81	4,81
	1.00	-	-	3,32	3,60	3,81	3,81	4,22	4,62	5,74	6,61	6,61	6,61	6,61
	1.13	-	-	-	4,02	4,25	4,42	4,42	4,62	6,94	8,96	8,96	8,96	8,96
	1.25	-	-	-	-	4,66	4,98	4,98	4,98	8,06	11,13	11,13	11,13	11,13
	1.50	-	-	-	-	-	6,16	6,74	6,74	8,06	11,13	12,79	12,79	12,79
	1.75	-	-	-	-	-	-	8,49	8,78	8,78	11,13	13,06	13,06	13,06
	2.00	-	-	-	-	-	-	-	10,83	10,03	11,13	13,33	15,54	15,54
	3.00	-	-	-	-	-	-	-	-	15,03	15,03	17,01	18,99	26,30
<b><math>N_{R,k}</math> [kN]</b>	0.88	1,23	1,27	1,52	1,72	1,91	2,76	3,52	3,52	3,52	3,52	3,52	3,52	3,52
	0.90	-	1,27	1,52	1,72	1,91	2,76	3,59	3,61	3,61	3,61	3,61	3,61	3,61
	1.00	-	-	1,52	1,72	1,91	2,76	3,59	4,05	4,05	4,05	4,05	4,05	4,05
	1.13	-	-	-	1,72	1,91	2,76	3,59	4,43	4,77	4,77	4,77	4,77	4,77
	1.25	-	-	-	-	1,91	2,76	3,59	4,43	5,43	5,43	5,43	5,43	5,43
	1.50	-	-	-	-	-	2,76	3,59	4,43	8,97	9,78	9,78	9,78	9,78
	1.75	-	-	-	-	-	-	3,59	4,43	8,97	10,87	10,87	10,87	10,87
	2.00	-	-	-	-	-	-	-	4,43	8,97	11,96	11,96	11,96	11,96
	3.00	-	-	-	-	-	-	-	-	8,97	11,96	11,96	11,96	11,96

No further specifications.

**Fasteners for connecting steel components**

nonut®-TDBL-T-8,6 x L  
nonut®-TDBLF-T-F-8,6 x L

**Annex 28**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p><b>Pre-drill diameter</b></p> <p>Component I: <math>d_{pd,I} = d_{pd,II}</math> Component II: see table</p>
--	--

		$t_{II}$ [mm]			
		3.00	4.00	$\geq 6.00$	
		$d_{pd,I} = d_{pd,II} = 8.0$ mm			
<b><math>V_{R,k}</math> [kN]</b>	$2 \times 0.88$	10,17	10,17	10,17	
	$2 \times 0.90$	10,42	10,42	10,42	
	$2 \times 1.00$	11,69	11,69	11,69	
	$2 \times 1.13$	11,69	15,90	15,90	
	<b><math>t_I</math> [mm]</b>	$2 \times 1.25$	11,69	19,79	19,79
		$2 \times 1.50$	11,69	19,79	24,59
		$2 \times 1.75$	11,69	19,79	24,59
		$2 \times 2.00$	11,69	19,79	24,59
<b><math>N_{R,k}</math> [kN]</b>	$2 \times 0.88$	3,52	3,52	3,52	
	$2 \times 0.90$	3,61	3,61	3,61	
	$2 \times 1.00$	4,05	4,05	4,05	
	$2 \times 1.13$	4,77	4,77	4,77	
	<b><math>t_I</math> [mm]</b>	$2 \times 1.25$	5,43	5,43	5,43
		$2 \times 1.50$	8,97	9,78	9,78
		$2 \times 1.75$	8,97	10,87	10,87
		$2 \times 2.00$	8,97	11,96	11,96

No further specifications.

**Fasteners for connecting steel components**

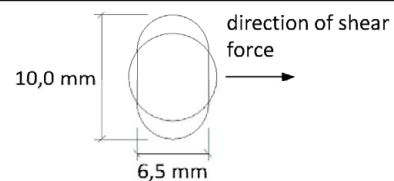
nonut®-TDBL-T-8,6 x L  
nonut®-TDBLF-T-F-8,6 x L

**Annex 29**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p> <p>Component II: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: elongated hole 6,5 mm x 10,0 mm Component II: see table</p>

		$t_{II}$ [mm]											
		0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	$\geq 6.00$	
		$d_{pd,II} = 7.5$ mm							$d_{pd,II} = 8.0$ mm				
$V_{R,k}$ [kN]	0.88	1,52	1,55	1,64	1,81	1,95	2,24	2,53	2,82	2,82	2,82	2,82	
	0.90	-	1,54	1,64	1,82	1,97	2,24	2,53	2,82	3,10	3,10	3,10	
	1.00	-	-	1,64	1,88	2,04	2,24	2,53	2,92	4,49	4,49	4,49	
	1.13	-	-	-	1,95	2,15	2,33	2,53	2,92	4,49	4,66	4,66	
	$t_I$ [mm]	1.25	-	-	-	-	2,24	2,41	2,53	2,92	4,49	4,82	5,08
		1.50	-	-	-	-	-	2,59	2,59	2,92	4,49	4,82	5,94
		1.75	-	-	-	-	-	-	2,59	2,92	4,49	4,82	5,94
		2.00	-	-	-	-	-	-	-	2,92	4,49	4,82	5,94
$N_{R,k}$ [kN]	0.88	1,12	1,16	1,33	1,59	1,83	2,59	3,24	3,52	3,52	3,52	3,52	
	0.90	-	1,16	1,33	1,59	1,83	2,59	3,24	3,54	3,54	3,54	3,54	
	1.00	-	-	1,33	1,59	1,83	2,59	3,24	3,62	3,62	3,62	3,62	
	1.13	-	-	-	1,59	1,83	2,59	3,24	3,89	4,65	4,65	4,65	
	$t_I$ [mm]	1.25	-	-	-	-	1,83	2,59	3,24	3,89	5,60	5,60	5,60
		1.50	-	-	-	-	-	2,59	3,24	3,89	7,63	7,63	7,63
		1.75	-	-	-	-	-	-	3,24	3,89	7,63	7,63	7,63
		2.00	-	-	-	-	-	-	-	3,89	7,63	7,63	7,63

Further specifications:



**Fasteners for connecting steel components**

nonut®-TDBL-T-8,6 x L  
nonut®-TDBLF-T-F-8,6 x L

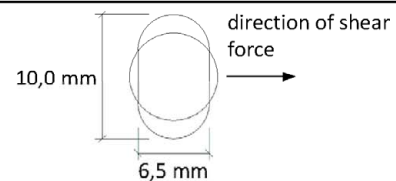
**Annex 30**



	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Bauteil I: elongated hole 6,5 mm x 10,0 mm Bauteil II: see table</p>

		$t_{II}$ [mm]										
		0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00	$\geq 6.00$
		$d_{pd,II} = 7.5$ mm							$d_{pd,II} = 8.0$ mm			
$V_{R,k}$ [kN]	0.88	1,74	1,76	1,64	2,06	2,22	2,55	2,88	3,21	3,21	3,21	3,21
	0.90	-	1,76	1,64	2,08	2,24	2,55	2,88	3,21	3,53	3,53	3,53
	1.00	-	-	1,87	2,14	2,33	2,55	2,88	3,33	5,12	5,12	5,12
	1.13	-	-	-	2,22	2,44	2,65	2,88	3,33	5,12	5,31	5,31
	1.25	-	-	-	-	2,55	2,75	2,88	3,33	5,12	5,48	5,78
	1.50	-	-	-	-	-	2,95	2,95	3,33	5,12	5,48	6,77
	1.75	-	-	-	-	-	-	2,95	3,33	5,12	5,48	6,77
	2.00	-	-	-	-	-	-	-	3,33	5,12	5,48	6,77
$N_{R,k}$ [kN]	0.88	1,23	1,27	1,52	1,72	1,91	2,76	3,59	4,01	4,01	4,01	4,01
	0.90	-	1,27	1,52	1,72	1,91	2,76	3,59	4,03	4,03	4,03	4,03
	1.00	-	-	1,52	1,72	1,91	2,76	3,59	4,13	4,13	4,13	4,13
	1.13	-	-	-	1,72	1,91	2,76	3,59	4,43	5,30	5,30	5,30
	1.25	-	-	-	-	1,91	2,76	3,59	4,43	6,37	6,37	6,37
	1.50	-	-	-	-	-	2,76	3,59	4,43	8,69	8,69	8,69
	1.75	-	-	-	-	-	-	3,59	4,43	8,69	8,69	8,69
	2.00	-	-	-	-	-	-	-	4,43	8,69	8,69	8,69

Further specifications:



**Fasteners for connecting steel components**

nonut®-TDBL-T-8,6 x L  
nonut®-TDBLF-T-F-8,6 x L

**Annex 31**

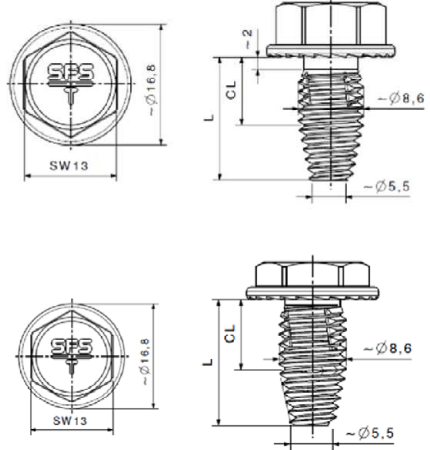
	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: elongated hole 6,5 mm x 10,0 mm Component II: see table</p>

		$t_{II}$ [mm]			
		3.00	4.00	$\geq 6.00$	
		$d_{pd,II} = 8.0$ mm			
<b><math>V_{R,k}</math> [kN]</b>	$t_I$ [mm]	2 x 0.88	5,69	5,69	5,69
		2 x 0.90	5,98	5,98	5,98
		2 x 1.00	7,41	7,41	7,41
		2 x 1.13	7,41	8,72	8,72
		2 x 1.25	7,41	9,93	9,93
		2 x 1.50	7,41	9,93	12,40
		2 x 1.75	7,41	9,93	12,40
		2 x 2.00	7,41	9,93	12,40
<b><math>N_{R,k}</math> [kN]</b>	$t_I$ [mm]	2 x 0.88	4,01	4,01	4,01
		2 x 0.90	4,03	4,03	4,03
		2 x 1.00	4,13	4,13	4,13
		2 x 1.13	5,30	5,30	5,30
		2 x 1.25	6,37	6,37	6,37
		2 x 1.50	8,69	8,69	8,69
		2 x 1.75	8,69	8,69	8,69
		2 x 2.00	8,69	8,69	8,69

<p>Further specifications:</p>	
--------------------------------	--

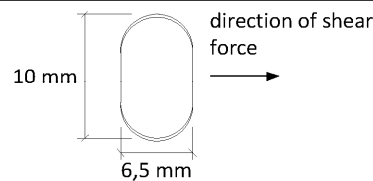
<p><b>Fasteners for connecting steel components</b></p>	<p><b>Annex 32</b></p>
<p>nonut®-TDBL-T-8,6 x L nonut®-TDBLF-T-F-8,6 x L</p>	



	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p> <p>Component II: S235 – EN 10025-2 S280GD to S320GD – EN 10346 HX300LAD – EN 10346</p>
	<p><b>Pre-drill diameter</b></p> <p>Component I: elongated hole 6,5 mm x 10,0 mm Component II: elongated hole 6,5 mm x 10,0 mm</p>

		$t_{II}$ [mm]									
		0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00
		$d_{pd.I} = d_{pd.II} = \text{elongated hole } 6.5 \text{ mm} \times 10.0 \text{ mm}$									
$V_{R,k}$ [kN]	$t_i$ [mm]	0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00
		1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52	1,52
		-	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		-	-	1,64	1,64	1,64	1,64	1,64	1,64	1,64	1,64
		-	-	-	1,95	1,95	1,95	1,95	1,95	1,95	1,95
		-	-	-	-	2,24	2,24	2,24	2,24	2,24	2,24
		-	-	-	-	-	2,59	2,59	2,59	2,59	2,59
		-	-	-	-	-	-	2,59	2,59	2,59	2,59
$N_{R,k}$ [kN]	$t_i$ [mm]	0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-

Further specifications:



**Fasteners for connecting steel components**

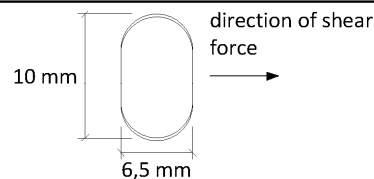
nonut®-TDBL-T-8,6 x L  
nonut®-TDBLF-T-F-8,6 x L

**Annex 33**

	<p><u>Materials</u></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p>
	<p><u>Pre-drill diameter</u></p> <p>Component I: elongated hole 6,5 mm x 10,0 mm Component II: elongated hole 6,5 mm x 10,0 mm</p>

		$t_{II}$ [mm]									
		0.88	0.90	1.00	1.13	1.25	1.50	1.75	2.00	3.00	4.00
		$d_{pd,I} = d_{pd,II} = \text{elongated hole } 6.5 \text{ mm} \times 10.0 \text{ mm}$									
$V_{R,k}$ [kN]	$t_I$ [mm]	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74
	0.88	-	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76
	0.90	-	-	1,87	1,87	1,87	1,87	1,87	1,87	1,87	1,87
	1.00	-	-	-	2,22	2,22	2,22	2,22	2,22	2,22	2,22
	1.13	-	-	-	-	2,55	2,55	2,55	2,55	2,55	2,55
	1.25	-	-	-	-	-	2,95	2,95	2,95	2,95	2,95
	1.50	-	-	-	-	-	-	2,95	2,95	2,95	2,95
	1.75	-	-	-	-	-	-	-	2,95	2,95	2,95
2.00	-	-	-	-	-	-	-	-	2,95	2,95	
$N_{R,k}$ [kN]	$t_I$ [mm]	-	-	-	-	-	-	-	-	-	-
	0.88	-	-	-	-	-	-	-	-	-	-
	0.90	-	-	-	-	-	-	-	-	-	-
	1.00	-	-	-	-	-	-	-	-	-	-
	1.13	-	-	-	-	-	-	-	-	-	-
	1.25	-	-	-	-	-	-	-	-	-	-
	1.50	-	-	-	-	-	-	-	-	-	-
	1.75	-	-	-	-	-	-	-	-	-	-
2.00	-	-	-	-	-	-	-	-	-	-	

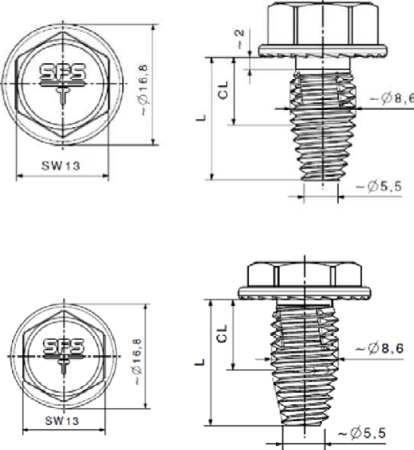
Further specifications:



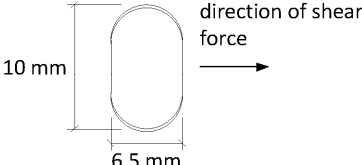
**Fasteners for connecting steel components**

nonut®-TDBL-T-8,6 x L  
nonut®-TDBLF-T-F-8,6 x L

**Annex 34**

	<p><b>Materials</b></p> <p>Screw: Carbon steel tempered and coated</p> <p>Component I: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p>Component II: S275 to S355 – EN 10025-2 S350GD to S450GD – EN 10346 HX380LAD to HX460LAD – EN 10346</p> <p><b>Pre-drill diameter</b></p> <p>Component I: elongated hole 6,5 mm x 10,0 mm Component II: elongated hole 6,5 mm x 10,0 mm</p>
---	--

		$t_{II}$ [mm]			
		3.00	4.00	$\geq 6.00$	
		$d_{pd.I} = d_{pd.II} =$ elongated hole 6,5 mm x 10,0 mm			
<b>V<sub>R,k</sub> [kN]</b>	2 x 0.88	2,19	2,19	2,19	
	2 x 0.90	2,19	2,19	2,19	
	2 x 1.00	2,19	2,19	2,19	
	2 x 1.13	2,78	2,78	2,78	
	<b>t<sub>I</sub> [mm]</b>	2 x 1.25	3,33	3,33	3,33
		2 x 1.50	3,48	3,48	3,48
		2 x 1.75	3,48	3,48	3,48
		2 x 2.00	3,48	3,48	3,48
<b>N<sub>R,k</sub> [kN]</b>	2 x 0.88	-	-	-	
	2 x 0.90	-	-	-	
	2 x 1.00	-	-	-	
	2 x 1.13	-	-	-	
	<b>t<sub>I</sub> [mm]</b>	2 x 1.25	-	-	-
		2 x 1.50	-	-	-
		2 x 1.75	-	-	-
		2 x 2.00	-	-	-

<p>Further specifications:</p>	
--------------------------------	--

<p><b>Fasteners for connecting steel components</b></p>	<p><b>Annex 35</b></p>
<p>nonut®-TDBL-T-8,6 x L nonut®-TDBLF-T-F-8,6 x L</p>	