

Allgemeine
bauaufsichtliche
Zulassung/
Allgemeine
Bauartgenehmigung

Approval Body for Construction Products
and Construction Techniques
Structural Safety Control Authority
Public-Law Institution financed by the federal and state
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dans la construction, and World Federation of Technical
Assessment Organisations.

National Technical Approval (aBZ)
General Construction Technique Permit (aBG)*
TN: Sometimes aBG is translated with "general
type approval"

Date: 18 February 2021

Ref.: I 88-1.14.4-111/21

[Approval] Number:
Z-14.4-872

Period of validity
18 February 2021
18 February 2021

Applicant:
SFS intec AG
Division Construction
Rosenbergsaustraße 10
9435 HEERBRUGG
SWITZERLAND

Subject of this notification:

SC5/...-12...-5.5xL and SC6/...-12 -U-6.3xL winged self-drilling fasteners for connecting
wood-based panels with thin-walled steel profiles

The above-mentioned subject of regulation is herewith granted approval/permit by the German building
authorities.

This notification comprises seven pages and five annexes.



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TN: This translation was not officially approved by the German construction Engineering Institute
(*Deutsches Institut für Bautechnik*).



I. GENERAL PROVISIONS

1. This notification is proof of the fitness for use and applicability of the subject of regulation in accordance with German the Regional Building Regulations (*Landesbauordnungen*).
2. This notification does not replace the permits, approvals and certificates prescribed by law for carrying out building projects.
3. This notification is provided without prejudice to the rights of third parties, in particular private property rights.
4. Notwithstanding further regulations in the “Specific Provisions”, copies of this notification shall be made available to users and applicators of the subject of regulation. In addition, the user or applicator of the subject of regulation must be informed that this notification must be available wherever it is used or applied. Upon request, copies of this notification shall also be placed at the disposal of the authorities involved.
5. This notification may only be reproduced in full. Partial publication requires the consent of the German Construction Engineering Institute (*Deutsches Institut für Bautechnik*). Texts and drawings in advertising brochures may not contradict this notification. Translations of this notification must contain the note “This translation was not officially approved by the German construction Engineering Institute (*Deutsches Institut für Bautechnik*).
6. This notification is valid until revoked. The provisions may subsequently be supplemented and amended, in particular, if this is required by new technical findings.
7. This notification refers to the information provided and documents submitted by the applicant. Any change to these basic principles is not covered by this notification and must be disclosed to the German Construction Engineering Institute (*Deutsches Institut für Bautechnik*) without delay.
8. The General Construction Technique Permit (*allgemeine Bauartgenehmigung*) covered by this notification is also deemed to be a National Technical Approval (*allgemeine bauaufsichtliche Zulassung*) for the type of construction.



II. SPECIFIC PROVISIONS

1. Subject of regulation and field of use or application

1.1 Subject of approval and field of use

Subject of approval are the SC5/...-12...-5.5xL and SC6/...-12...-U-6.3xL winged self-drilling fasteners by SFS intec AG with the nominal diameters 5.5 mm and 6.3 mm for the load-transmitting connection of wood-based panels (hereinafter referred to as component I) with thin-walled steel profiles (hereinafter referred to as component II). Illustrations of the winged self-drilling fasteners may be found in Annex 1.

1.2 Subject of permit and field of application

Subjects of permit are the connections made with the winged self-drilling fasteners in case these are subject to static and quasistatic actions.

For the dimensioning and execution of these connections as well as of the roof, ceiling and wall elements manufactured with the aforementioned building products, the German Technical Building Regulations must be observed, unless otherwise specified below.

2 Provisions for the construction products

2.1 Properties and composition

2.1.1 Dimensions

The principal dimensions of the winged self-drilling fasteners are indicated in Annex 1. Further specifications regarding dimensions and tolerances are filed with the German Construction Engineering Institute (*Deutsches Institut für Bautechnik*).

2.1.2 Material

The winged self-drilling fasteners are made of quenched and tempered steel with the material number 1.5502 pursuant to DIN EN 10263-4.¹

Further specifications regarding the material properties of the winged self-drilling fasteners are filed with the German construction Engineering Institute (*Deutsches Institut für Bautechnik*).

The mechanical properties are to be verified in accordance with the inspections and tests stipulated in 3.1 of DIN EN 10204².

2.2 Marking

The packaging of the winged self-drilling fasteners or the enclosed leaflet shall be marked by the manufacturer with the conformity mark Ü (*Ü-Zeichen*) in accordance with the decrees on conformity marking of the States of the Federal Republic of Germany. Marking is only allowed if the conditions given in clause 2.3 are satisfied.

All packaging shall have an additional label with information about the production plant (factory code), the description, the geometry and the composition of the winged self-drilling fasteners.

Z190.21

1.14.4-111/21

¹ DIN EN 10263-4

Steel rod, bars and wire for cold heading and cold extrusion - Part 4: Technical delivery conditions for steels for quenching and tempering

² DIN EN 10204:2005-01

Metallic products - Types of inspection documents



2.3 Attestation of conformity

2.3.1 General

The attestation of conformity of the winged self-drilling fasteners with the provisions of the general building inspectorate approval covered by this notification shall be provided for each production plant by a declaration of conformity issued by the manufacturer on the basis of factory production control along with a certificate of conformity issued by a certification body recognised for this purpose as well as a regular external surveillance executed by an approved surveillance body in accordance with the following provisions.

For issuance of the certificate of conformity and for external surveillance, including the required product testing, the manufacturer of the construction products shall work with an approved certification body and an approved inspection body.

The manufacturer shall declare that a certificate of conformity has been granted and make said declaration evident by marking the construction products with the mark of conformity (*Ü-Zeichen*) stating the intended use.

The certification body shall send a copy of the certificate of conformity issued by the same to the German Construction Engineering Institute (*Deutsches Institut für Bautechnik*).

Regarding the extent, nature and frequency of the factory production control and external surveillance, the "Principles for the proof of conformity for fasteners in lightweight metal construction" of the German construction Engineering Institute (*Deutsches Institut für Bautechnik*), August 1999 (see issue 6/1999 of "*DIBt Mitteilungen*") shall apply.

2.3.2 Factory production control

A factory production control system shall be set up and implemented in each production facility. Factory production control is understood to be the continuous surveillance of production by the manufacturer to ensure that the manufactured construction products are in compliance with the provisions of this national technical approval.

The results of the factory production control shall be recorded and evaluated. The records shall include at least the following information:

- description of the construction product or basic material and components,
- type of control or testing,
- date of manufacture and date of testing of the construction product or basic material or components,
- results of control and testing and comparison with the requirements filed with the German construction Engineering Institute (*Deutsches Institut für Bautechnik*),
- signature of the individual responsible for the factory production control.

The records shall be kept for at least five years and be presented to the inspection body involved in the external surveillance. On request, they shall be presented to the German Construction Engineering Institute (*Deutsches Institut für Bautechnik*) and to the German Construction Supervisory Authorities.

If the test results are unsatisfactory, the manufacturer shall immediately take the measures required to eliminate the defect. Construction products that do not meet requirements shall be dealt in such a way as to preclude mixing with or being mistaken for construction products that comply with requirements. Once the defect has been eliminated, retesting must be done immediately, where technically possible and if necessary to demonstrate elimination of the defect.

2.3.3 External surveillance

The factory production control system at each production facility shall be inspected regularly, i.e. at least once a year, by means of external surveillance.



External surveillance shall include initial type-testing and random sample testing of the winged self-drilling fasteners. Sampling and testing shall be the responsibility of the approved inspection body.

The results of certification and external surveillance shall be kept for at least five years. On request, the results shall be presented by the certification or inspection body to the German Construction Engineering Institute (*Deutsches Institut für Bautechnik*) and the German Construction Supervisory Authorities.

3 Provisions for planning, dimensioning and design

3.1 Planning

3.1.1 General

Table 1 of Annex 2 specifies the usable thickness ranges of component I. As to the thickness of component II (total thickness of the layer, *tt*), the specifications given in Table 2 of Annex 2 shall apply.

The types of panels to be fastened shall comply with the specifications given in Table 1 of Annex 2.

Component II (steel profile) consists of steel grades approved in accordance with DIN EN 10025-2³ or DIN EN 10346⁴ in accordance with the specifications given in Table 2 of Annex 2.

DIN EN 1995-1-1⁵ in conjunction with the national annex DIN EN 1995-1-1/NA⁶ and DIN EN 1993-1-3⁷ in conjunction with the national annex DIN EN 1993-1-3/NA⁸ shall apply as to the design and dimensioning of the connections made with the winged self-drilling fasteners as well as of the design and dimensioning of the construction products for building the roof, ceiling and wall elements mentioned in sections 1 and 2.1 unless otherwise specified in the following.

Only the wood-based panels listed in Table 1 of Annex 2 may be fastened to thin-walled steel profiles in accordance with the regulations of this notification.

The following values apply to the minimum values for edge distance and distance from the axis, unless otherwise specified in the tables with the load-bearing capacity values in the appendices:

1. Wood-based panels

$e_1 \geq 27$ mm for SC5/...-12 -5.5xL screw

$e_1 \geq 30$ mm for SC6/...-12 -U-6.3xL screw

$e_2 \geq 27$ mm for SC5/...-12 -5.5xL and SC6/...-12 -U-6.3xL screws unless otherwise stated in the following tables.

2. Steel substructure

$e_1 \geq 20$ mm for SC5/...-12 -5.5xL and SC6/...-12 -U-6,xL screws

$e_2 \geq 10$ mm for SC5/...-12 -5.5xL and SC6/...-12 -U-6.3xL screws

Z190.21

1.14.4-111/21

³ DIN EN 10025-2

Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels.

⁴ DIN EN 10346:2015-10

Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions.

⁵ DIN EN 1995-1-1:2010-12

Design of timber structures. Part 1-1: General - Common rules and rules for buildings

⁶ DIN EN 1995-1-1/NA:2013-08

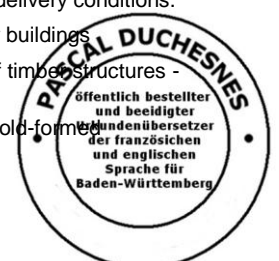
National Annex - Nationally determined parameters - Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings

⁷ DIN EN 1993-1-3:2010-12

Design of steel structures Part 1-3: General rules Supplementary rules for cold-formed members and sheeting

⁸ DIN EN 1993-1-3/NA:2017-05

National Annex - Nationally determined parameters - Eurocode 3: Design of steel structures - Part 1-3: steel structures Part 1-3: General rules - Supplementary rules for cold-formed members and sheeting



e₁ – End distance measured in the direction of load transfer

e₂ – Edge distance measured at right angles to the direction of load transfer

The distance between the screws must be at least 200 mm.

3.1.2 Corrosion protection

The winged self-drilling fasteners are galvanised (min. 8 µm) and may only be used without further corrosion protection in environments that correspond to the maximum corrosivity category C1 or C2 i.e. In accordance with DIN EN ISO 12944-2⁹.

3.2 Design

3.2.1 General

The verification concept for the design of the connections specified in DIN EN 1990¹⁰ in connection with the National Annex DIN EN 1990/NA¹¹ shall apply.

3.2.2 Characteristic value for tension resistance in the direction of the screw axis N_{R,k}

As to the characteristic values of the load-bearing capacity in the direction of the screw axis, the data in Table 3 of Annex 3 shall apply to the connections with SC5/...-12 -5.5xL winged self-drilling fasteners and the data in Table 4 in Annex 3 shall apply to the connections with SC6/...-12 -U-6.3xL winged self-drilling fasteners.

3.2.3 Characteristic value of the shear force resistance at right angles to the screw axis F_{V,Rk}

As to the characteristic values of the load-bearing capacity at right angles to the screw axis, the data in Table 5 and Table 6 of Annex 4, shall apply when using the panels for the bracing system (diaphragm action or disc action). For general applications where displacements up to 10 mm have no significant impact on the load-bearing capacity and/or usability, the characteristic values of the load-bearing capacity according to Tables 7 and 8 of the Annex 5 may be used.

For particleboards of nominal thickness 38 mm, there may be a groove with a maximum depth of 14 mm and a maximum width of 4 mm at the edge of the board nearest to the connection. In this case, the load-bearing capacity values according to Tables 5 to 8 in Annexes 4 and 5 shall be reduced to 90 %. In all other cases, the depth of the groove shall be added to the edge distance.

3.2.4 Design values of the load-bearing capacity

The following applies to the determination of the design values of the load-bearing capacity from the characteristic values:

$$F_{V,Rd} = \frac{V_{R,k} * k_{mod}}{\gamma_M}$$

$$F_{ax,Rd} = \frac{N_{R,k} * k_{mod}}{\gamma_M}$$

N_{R,k} in accordance with Tables 3 and 4 of Annex 3

V_{R,k} in accordance with Tables 5 and 6 of Annex 4 as well as Tables 7 and 8 of Annex 5

k_{mod} in accordance with DIN EN 1995-1-1⁵

γ_M = 1.3 in accordance with DIN EN 1995-1-1/NA⁶

Z190.21

1.14.4-111/21

⁹ DIN EN ISO 12944-2:1998-7 Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments

¹⁰ DIN EN 1990:2010-12 National Annex - Nationally Determined Parameters - Eurocode: Basis of structural design

¹¹ DIN EN 1990/NA:2010-12 National Annex - Eurocode: Basis of structural design



3.2.5 Combined stress

In the case of combined stress or loading both in the direction of the screw axis and at right angles to it, the verification must be carried out in accordance with DIN EN 1995-1-1⁵, expression (8.28).

3.2.6 Verification of the racking¹² for roof, ceiling and wall elements

The verification of the racking for roof, ceiling and wall elements manufactured with the building products mentioned in sections 1 and 2.1 shall be carried out according to DIN EN 1995-1-1⁵, sections 9.2.3 and 9.2.4 in conjunction with the national annex DIN EN 1995-1-1/NA⁶.

For the ultimate limit state design of thin-walled steel sections, DIN EN 1993-1-3⁷ applies in conjunction with the national annex DIN EN 1993-1-3/NA⁸.

3.3 Provisions for execution

The company carrying out the construction shall submit a declaration of conformity in accordance with Para. 5 of s. 6 a in conjunction with Para 2 of s. 21 of the German Model Building Code (*Musterbauordnung, MBO*) to confirm the conformity of the execution with the type approval covered by this notification.

Connections in accordance with the regulations of this notification may only be executed by companies that have the required experience to do so, unless provision is made for initial instruction of the installation personnel by specialists who have experience in this field.

The winged self-drilling fasteners must be screwed in using an impact driver or a setting tool with the appropriate depth stop.

The components to be connected must be flat and lie directly on top of each other.

The winged self-drilling fasteners must be inserted at right angles to the surface of the component to ensure a perfect load-bearing connection. The screw head must be approximately flush with the top of the panel after setting.

After setting, at least two full threads of the winged self-drilling fasteners must protrude above the face of component II.

4 Provisions for use, maintenance and servicing

Screws orderly used in load-bearing connections that have become loosened due to stress or loading may only be replaced by self-tapping screws with a larger diameter, whereby the hole for the thicker screw must be drilled out to fit. Screws must not be reused. As an alternative to replacing the screws, additional holes may be drilled and new winged self-drilling fasteners installed.

Dr.-Ing. Ronald Schwuchow
Head of Division

Certified

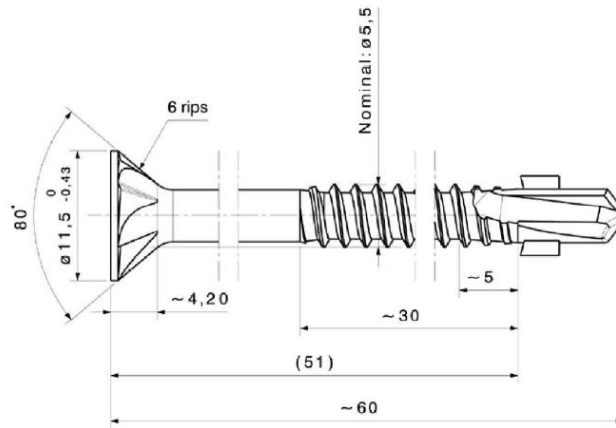
Z190.21

1.14.4-111/21

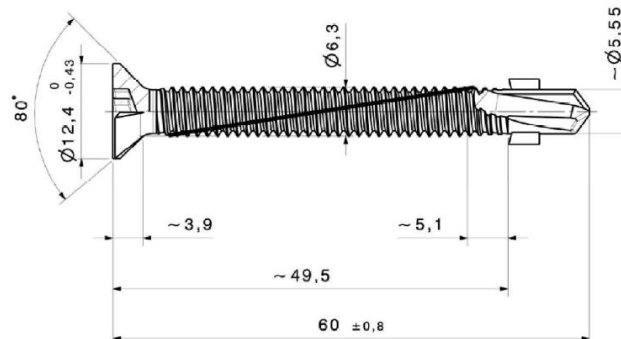


¹² TN: Racking: effect caused by horizontal actions in the plane of the element.

National Technical Approval (aBZ)
General Construction Technique Permit (aBG) No. Z-14.4-872 dated 18 February 2021



SC5/...-12...-5.5xL winged self-drilling fastener



SC6/...-12 -U-6.3xL winged self-drilling fastener

SC5/...-12...-5.5xL and SC6/...-12 -U-6.3xL winged self-drilling fasteners
for connecting wood-based panels with thin-walled steel profiles

Winged self-drilling fasteners

Annex 1

Z185.21

1.14.4-111/21



National Technical Approval (aBZ)
General Construction Technique Permit (aBG) No. Z-14.4-872 dated 18 February 2021

Table 1 Panel types that may be used for component I

Panel type	Classification	Regulations	Thickness range From - to	Minimum raw density [kg/m ³]
Resin-bonded particleboard P4 + P6	P2 P4 P6	DIN EN 312 ⁹	16 mm – 38 mm	600
OBS panel	OSB 3	DIN EN 300 ¹⁰	≥ 12 mm	550

Table 2 Steel substrates that may be used for component II

Steel grade	Regulations	Minimum tensile strength [N/mn ²]	Thickness range from... to... for winged self- drilling fastener	
			SC5/...-12CC-5.5xL	SC6/...-12-U-6.3xL
S280GD	DIN EN 10346 ³	360	1.75 mm – 5.00 mm	2.50 mm – 6.00 mm
S320GD		390		
S350GD		420		
S390GD		460		
HX460 LAD		500		
S235	DIN EN 10025-2 ²	360		
S275		410		
S355		470		

⁹ DIN EN 312:2010-12 Particleboards - Specifications
¹⁰ DIN EN 300 2006-09 Oriented Strand Boards (OSB) -
Definitions, classification and specifications

SC5/...-12...-5.5xL and SC6/...-12 -U-6.3xL winged self-drilling fasteners for connecting wood-based panels with thin-walled steel profiles

Panel types and steel substrates that may be used

Annex 2

Z185.21

1.14.4-111/21



National Technical Approval (aBZ)
General Construction Technique Permit (aBG) No. Z-14.4-872 dated 18 February 2021

Table 3 Characteristic value for tension resistance $N_{R,k}$ for SC5/...-12...-5.5xL winged self-drilling fasteners

Panel type	Component I		Component II N_{Rk} [kN]	
	Class	Nominal thickness [mm]	$\geq S235$ or $S280GD$ $1.75 \text{ mm} \leq t_N < 2.50 \text{ mm}$	$\geq S275$ or $S320GD$ $2.50 \text{ mm} \leq t_N \leq 5.00 \text{ mm}$
Resin-bonded particleboard as per DIN EN 312 [1]	P2	≥ 16	1.64	1.64
	P2	≥ 25	2.48	2.81
	P4	≥ 38	2.48	3.60
	P6	≥ 38	2.48	3.83
Oriented Strand Board (OSB panel) as per DIN EN 300 [2]	OSB 3	≥ 12	1.29	1.29
		≥ 22	1.62	1.62

The tensile strength f_u of the steel grades for component II is limited to 560 N/mm².

Table 4 Characteristic value for tensile resistance $N_{R,k}$ for SC6/...-12 -U-6.3xL winged self-drilling fasteners

Panel type	Component I		Component II N_{Rk} [kN]
	Class	Nominal thickness [mm]	$\geq S275$ or $S320GD$ $2.50 \text{ mm} \leq t_N \leq 5.00 \text{ mm}$
Resin-bonded particleboard as per DIN EN 312 [1]	P2	≥ 16	1.58
	P2	≥ 25	2.33
	P4	≥ 38	3.24
	P6	≥ 38	3.40
Oriented Strand Board (OSB panel) as per DIN EN 300 [2]	OSB 3	≥ 12	1.13
		≥ 22	1.41

The tensile strength f_u of the steel grades for component II is limited to 560 N/mm².

SC5/...-12...-5.5xL and SC6/...-12 -U-6.3xL winged self-drilling fasteners for connecting wood-based panels with thin-walled steel profiles

Characteristic value for tensile strength $N_{R,k}$

Annex 3



National Technical Approval (aBZ)
General Construction Technique Permit (aBG) No. Z-14.4-872 dated 18 February 2021

Table 5 Characteristic value for shear force resistance $V_{R,k}$ for application with SC5/...-12...5.5xL winged self-drilling fasteners

Component I			Component II		Edge distance e_1	
Panel type	Class	Nominal thickness [mm]	Steel grade	Nominal thickness [mm]	$e_1 \geq 27$ mm $e_2 \geq 75$ mm	$e_1 \geq 75$ mm $e_2 \geq 25$ mm
Resin-bonded particleboard as per DIN EN 312 [1]	P2	16	S235 S280GD	1.75	2.16	2.04
			\geq S390GD \geq S355	2.5	2.47	2.36
	P2	25	S235 S280GD	1.75	2.44	2.50
			\geq S390GD \geq S355	2.5	2.55	2.78
	P4	38	S235 S280GD	1.75	2.77	2.92
			\geq S390GD \geq S355	2.5	2.97	2.97
	P6	38	S235 S280GD	1.75	3.32	3.30
			\geq S390GD \geq S355	2.5	3.32	3.34
Oriented Strand Board (OSB panel) as per DIN EN 300 [2]	OSB 3	22	\geq S235	1.75	1.79	1.79

Table 6 Characteristic value for shear force resistance $V_{R,k}$ for application with SC6/...-12 -U-6.3xL winged self-drilling fasteners

Component I			Component II		Edge distance e_1	
Panel type	Class	Nominal thickness [mm]	Steel grade	Nominal thickness [mm]	$e_1 \geq 27$ mm $e_2 \geq 75$ mm	$e_1 \geq 75$ mm $e_2 \geq 25$ mm
Resin-bonded particleboard as per DIN EN 312 [1]	P2	16	\geq S320GD \geq S2755	2.5	2.57	2.34
	P2	25			3.15	3.01
	P4	38			3.22	3.49
	P6	38			3.72	3.83
Oriented Strand Boards (OSB panel) as per DIN EN 300 [2]	OSB 3	12	\geq S320GD	2.5	1.82	1.91
		22	\geq S2755		2.36	2.09

SC5/...-12...-5.5xL and SC6/...-12 -U-6.3xL winged self-drilling fasteners for connecting wood-based panels with thin-walled steel profiles

Characteristic shear force resistance $V_{R,k}$ when used for stiffening purposes or diaphragm action or disc action

Annex 4



National Technical Approval (aBZ)
General Construction Technique Permit (aBG) No. Z-14.4-872 dated 18 February 2021

Table 7 Characteristic value for shear force resistance $V_{R,k}$ for application with SC5/...-12...-5.5xL winged self-drilling fasteners						
Component I			Component II		Edge distance e_1	
Panel type	Class	Nominal thickness [mm]	Steel grade	Nominal thickness [mm]	$e_1 \geq 27$ mm $e_2 \geq 75$ mm	$e_1 \geq 75$ mm $e_2 \geq 25$ mm
Resin-bonded particleboard as per DIN EN 312 [1]	P2	16	S235 S280GD	1.75	2.35	2.64
			\geq S390GD \geq S355	2.5	2.55	3.05
	P2	25	S235 S280GD	1.75	3.29	3.80
			\geq S390GD \geq S355	2.5	3.40	4.33
	P4	38	S235 S280GD	1.75	3.38	5.69
			\geq S390GD \geq S355	2.5	3.41	5.68
	P6	38	S235 S280GD	1.75	3.89	6.38
			\geq S390GD \geq S355	2.5	4.27	6.92
Oriented Strand Board (OSB panel) as per DIN EN 300 [2]	OSB 3	22	\geq S235	1.75	2.47	2.83

Table 8 Characteristic value for shear force resistance $V_{R,k}$ for application with SC6/...-12... -U-6.3xL winged self-drilling fasteners						
Component I			Component II		Edge distance e_1	
Panel type	Class	Nominal thickness [mm]	Steel grade	Nominal thickness [mm]	$e_1 \geq 27$ mm $e_2 \geq 75$ mm	$e_1 \geq 75$ mm $e_2 \geq 25$ mm
Resin-bonded particleboard as per DIN EN 312 [1]	P2	16	\geq S320GD \geq S2755	2.5	2.80	2.76
	P2	25			3.67	4.77
	P4	38			3.91	6.27
	P6	38			4.92	7.21
Oriented Strand Board (OSB panel) as per DIN EN 300 [2]	OSB 3	12	\geq S320GD \geq S2755	2.5	2.08	2.23
		22			3.92	3.84

SC5/...-12...-5.5xL and SC6/...-12 -U-6.3xL winged self-drilling fasteners for connecting wood-based panels with thin-walled steel profiles	Annex 5
Characteristic value for shear force resistance $V_{R,k}$ for general use	



This is a certified true translation of the original document presented to me in German.
The original document comprises 12 pages.
Sworn translator, duly commissioned by the Regional Court of Tübingen.
17 March 2021.

Pascal Duchesnes  

