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European Technical Assessment

ETA-20/1178
of 15/12/2020

General Part

Technical Assessment Body Issuing the European Technical Assessment:	Element Materials Technology Rotterdam B.V.
Trade Name of the Construction Product:	DrillFast® Fasteners MatchFast® Fasteners TapFast® Fasteners
Product Family to Which the Construction Product Belongs:	EC PAC 33
Manufacturer:	FixFast Ltd Merlin House Seven Mile Lane Borough Green Sevenoaks Kent TN15 8QY UK
Manufacturing Plant(s):	Details Held on File by Element
This European Technical Assessment Contains:	51 Pages including 1 Annex which forms an integral part of this assessment.
This European Technical Assessment is Issued in Accordance with Regulation (EU) No 305/2011, On the Basis Of:	EAD 330046-01-0602 – “Fastening Screws for Metal Members and Sheeting”
This Version Replaces:	ETA 18/0943, Issued on 05/03/2020

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1 Technical Description of the Product

The DrillFast and MatchFast fastening screws are self-drilling screws manufactured of stainless steel and carbon steel and completed with aluminium sealing washers. The carbon steel screws are coated by a multiple layer organic coating

The material for the threaded part of the fastener can be identified from the head marking. The range of materials used for the fasteners is:

- All carbon steel fasteners: hardened SAE 1022 grade, no material mark
- DFX-CSK-4.8: 410 martensitic grade stainless steel, no material mark. The corrosion resistance assigned to this grade is the same as to carbon steel
- A2/304 austenitic grade, marked “A2” or “SS”
- A4/316 stainless steel, marked “A4”
- HCR fasteners: 1.4529 austenitic grade stainless steel, marked “HCR”

Most DrillFast (DF) fastener types have either a flanged 5/16” (~8 mm) AF Hex head or a flat or pan head for a Torx or Phillips drive. The Hex head flange is 11 mm diameter unless otherwise noted.

MatchFast (MF) fastener types have a head with a coloured cap of exterior grade glass-filled nylon for an 11 mm bi/hex drive. The carbon steel MF fasteners have a four-pronged split head to which the cap is fitted. The stainless steel MF fasteners have the cap fitted to the same 8 mm AF Hex head as the equivalent DF fasteners.

The Topdek (TD) head is designed to drill through the upper layers of a Kingspan Topdek panel and clamp the bottom corrugated steel layer directly to the substrate, which is a similar method to most of the other fasteners in this assessment, without the use of washers.

TapFast (TF) fasteners are High Corrosion Resistance (HCR) types made of 1.4529 stainless steel.

Washers are used to seal under the flange for exterior applications. They are conical washers of aluminium or A4/316 stainless steel with an EPDM (ethylene propylene diene monomer) seal bonded to the inner face. The screws are to be tightened so that the EPDM seal is slightly compressed.

Various coloured finishing options are available for fastener heads to match their appearance to the sheeting. An “(L)” in the drawing indicates that the fastener is available with a coloured lacquer finish.

The range of fastening screws covered in this assessment is listed below:

Table 1 DF2 / MF2: DrillFast / Matchfast for two steel sheets of up to 1 mm thick each (“stitching fasteners”)

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF2-CFX	Carbon steel	“secret fix” flat head	4.8	20
DF2-LS-4.8	Carbon steel	8 mm AF Hex head	4.8	20
DF2-LS-6.3	Carbon steel	8 mm AF Hex head	6.3	25
MF2-6.3	Carbon steel	11 mm bi/hex nylon cap	6.3	25
DF2-LS-8.0	Carbon steel	8 mm AF Hex head	8.0	25
MF2-8.0	Carbon steel	11 mm bi/hex nylon cap	8.0	25

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF2-SS-LS-4.8	A2/304 stainless steel	8 mm AF Hex head	4.8	25
DF2-SS-P-4.8	A2/304 stainless steel	Torx #25 pan head	4.8	20
MF2-SS-4.8	A2/304 stainless steel	11 mm bi/hex nylon cap	4.8	25
DF2-SS-LS-6.3	A2/304 stainless steel	8 mm AF Hex head	6.3	25
DF2-SS-P-6.3	A2/304 stainless steel	Torx #25 pan head	6.3	25
MF2-SS-6.3	A2/304 stainless steel	11 mm bi/hex nylon cap	6.3	25
DF2-SSA4-P-4.8	A4/316 stainless steel	Torx #25 pan head	4.8	20
DF2-SSA4-LS-6.3	A4/316 stainless steel	8 mm AF Hex head	6.3	25
DF2-SSA4-P-6.3	A4/316 stainless steel	Torx #25 pan head	6.3	25

Table 2 DF3 / MF3: DrillFast / Matchfast for point-side steel up to 3 mm thick

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF3-CF-4.8	Carbon steel	Pozi #2 flat wafer head	4.8	16
DF3-5.5	Carbon steel	8 mm AF Hex head	5.5	25 35 45 55 75 100
DF3-CF-5.5	Carbon steel	Pozi #2 flat wafer head	5.5	22
DF3-DP-5.5	Carbon steel	Torx #25 flat pan head	5.5	25
DF3-H15-5.5	Carbon steel	8 mm AF Hex head 15 mm flange	5.5	25
MF3-5.5	Carbon steel	11 mm bi/hex nylon cap	5.5	25 32 50
DF3-SS-4.8	A2/304 stainless steel	8 mm AF Hex head	4.8	25
DF3-SS-CF-4.8	A2/304 stainless steel	Phillips #2 flanged pan head	4.8	16 25
DF3-SS-5.5	A2/304 stainless steel	8 mm AF Hex head	5.5	25 35 55

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
				80 100
DF3-SSA4-5.5	A4/316 stainless steel	8 mm AF Hex head	5.5	35
DF3-SSA4-P-5.5	A4/316 stainless steel	Torx #25 pan head	5.5	25 35 50 75
DF3-TD-6.3	Carbon steel	Pozi #3 head for Topdek panels	6.3	30

Table 3 DF6: DrillFast for point-side steel 6 mm thick

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF6-SS-5.5	A2/304 stainless steel	8 mm AF Hex head	5.5	30
DF6-TD-6.3	Carbon steel	Pozi #3 head for Topdek panels	6.3	30

Table 4 DF8: DrillFast for point-side steel 8 mm thick

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF8-5.5	Carbon steel	8 mm AF Hex head	5.5	28

Table 5 DF12 / MF12: DrillFast / Matchfast for point-side steel 12 mm thick

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF12-5.5	Carbon steel	8 mm AF Hex head	5.5	38 60 80 100
MF12-5.5	Carbon steel	11 mm bi/hex nylon cap	5.5	40
DF12-CF-5.5	Carbon steel	Pozi #3 flanged countersunk pan head	5.5	38
DF12-H15-5.5	Carbon steel	8 mm AF Hex head 15 mm flange	5.5	38
DF12-SS-5.5	A2/304 stainless steel	8 mm AF Hex head	5.5	40 60
MF12-SS-5.5	A2/304 stainless steel	11 mm bi/hex nylon cap	5.5	40

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF12-SSA4-5.5	A4/316 stainless steel	8 mm AF Hex head	5.5	35
DF12-SSA4-P-5.5	A4/316 stainless steel	Torx #25 pan head	5.5	25 35 50 75
DF12-TD-6.3	Carbon steel	Pozi #3 head for Topdek panels	6.3	45

Table 6 DF25: DrillFast for point-side steel 25 mm thick

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DF25-6.3	Carbon steel	8 mm AF Hex head	6.3	65

Table 7 DFT / MFT: DrillFast / MatchFast for point-side timber

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DFT-5.5	Carbon steel	8 mm AF Hex head	5.5	25 35 45 65
MFT-5.5	Carbon steel	11 mm bi/hex nylon cap	5.5	35 45
DFT-SS-6.0	A2/304 stainless steel	8 mm AF Hex head	6.0	25 32 40 50 75 100
DFT-SSA4-P-4.9	A4/316 stainless steel	Torx #25 pan head	4.9	35
DFT-TD-6.5	Carbon steel	Pozi #3 head for Topdek panels	6.3	50

Table 8 DFX: DrillFast for thin point-side steel

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DFX-P-4.2	Carbon steel	Pozi #2 angled flat head	4.2	13
DFX-P-4.8	Carbon steel	Pozi #2 angled flat head	4.8	13

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
DFX-SS-CSK-4.8	410 stainless steel (Corrosion resistance as Carbon steel)	Pozi #2 countersunk head	4.8	16

Table 9 TF: TapFast for point-side timber substrates

FixFast Code	Fastener Material	Head type	Nominal diameter mm	Available lengths mm
TF-HCR-A-6.3	1.4529 stainless steel	8 mm AF Hex head	6.3	65
TF-HCR-C-6.3	1.4529 stainless steel	8 mm AF Hex head	6.3	35

The number following “DF” or “MF” in the FixFast code is generally the point-side capacity of the fastener in steel. Fasteners of the same diameter and material will have the same thread and tip for a given drilling capacity.

Sealing washers are supplied in the following diameters:

- Aluminium washers: 10 mm, 15 mm, 19 mm and 29 mm; coded A10, A15, A19 and A29 respectively.
- Aluminium washers with a coloured lacquer finish: 29 mm only, coded L29.
    - A4/316 stainless steel washers: 10 mm, 15 mm and 19 mm; coded S10, S15 and S19 respectively.

2 Specification of the Intended Use(s) in Accordance with the Applicable European Assessment Document (hereinafter EAD)

The screws in this assessment are intended to be used for connecting steel sheeting elements to steel or timber framing members, or to other steel sheets.

The component to be fastened (head-side) is referred to as substrate I, while the framing member or steel sheet (point-side) is referred to as substrate II.

The carbon steel screws may be used for indoor and outdoor applications with a corrosion category class C1 in accordance with Table B1 and Table B2 in EN 1993-1-3 and EN ISO 12944 2.

The A2/304, A4/316 and 1.4529 stainless steel screws may be used for indoor and outdoor applications with a corrosion category class of C1, C2 or C3. The A4/316 and 1.4529 screws may also be used for applications with a corrosion category of C4. The 1.4529 screws may also be used for applications with a corrosion category of C5.

The fastening screws are intended to be used with connections under predominantly static loads, such as wind and dead loads.

Under the provisions of this ETA and the assessment methods included in this evaluation report, the fastening screws may have an assumed intended working life of 25 years when installed in accordance with the manufacturer’s instructions.

The indications given in this document cannot be interpreted as a guarantee given by the manufacturer, but are regarded as means for choosing the appropriate 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

BWR	Characteristic	Assessment of Characteristic
1	**Mechanical Resistance and Stability**	**See ETA Section 3.1.1**
2	**Safety in Case of Fire**	**See ETA Section 3.1.2**
	Reaction to Fire	See ETA Section 3.1.2.1
	Resistance to Fire	See ETA Section 3.1.2.2
3	**Other Aspects**	
	Durability	See ETA Section 3.1.3.1

3.1 Methods of Verification

3.1.1 Mechanical Resistance and Stability

The mechanical resistance and stability has been determined as the characteristic shear and axial resistance of the fastening screws covered by this ETA. Values are given in Annex 1.

The axial resistance $N_{R,k}$ is taken as the minimum of the pull through and pull out resistances for the connection.

$$N_{\mathrm{R,k}} = \min \begin{bmatrix} N_{\mathrm{R,k,Pull\ through}} \\ N_{\mathrm{R,k,Pull\ out}} \end{bmatrix}$$

Derivation of design resistance values to be used when designing in accordance with Eurocode 3 shall be taken as described in 3.8.2.

3.1.2 Safety in Case of Fire

3.1.2.1 Reaction to Fire

The product is considered to satisfy the requirements of Class A1 with regards to classification for reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for further testing.

3.1.2.2 Resistance to Fire

The assessment of the fastening screws with regards to resistance to fire performance is relevant to the systems as assembled (as fastening screws, steel members and substructures) and not the screws alone. Therefore, there is no performance determined for this aspect.

3.1.3 Other Aspects

3.1.3.1 Durability

The carbon steel screws may be used for indoor and outdoor applications with a corrosion category class C1 in accordance with Table B1 and Table B2 in EN 1993-1-3 and EN ISO 12944 2.
The A2/304 stainless steel screws may be used for indoor and outdoor applications with a corrosion category class of C1, C2 or C3.

The A4/316 stainless steel screws may be used for indoor and outdoor applications with a corrosion category class of C1, C2, C3 or C4.
The 1.4529 stainless steel screws may be used for indoor and outdoor applications with a corrosion category class of C1, C2, C3, C4 or C5.

3.2 General Aspects Related to the Performance of the Product

3.2.1 Manufacturing

The Fixfast fastening screws are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing process assessed and detailed in the technical documentation.
The European Technical Assessment is issued for the products covered on the basis of agreed data/information that has been deposited with Element Materials Technology Rotterdam B.V. and which identifies the products that have been assessed and judged.

Changes to the products or the manufacturing process, that may result in the information submitted and held on file being incorrect, should be confirmed with Element Materials Technology Rotterdam B.V. before any modifications are implemented.

Element Materials Technology Rotterdam B.V. will decide on that basis whether or not such changes may affect the performance characteristics detailed in the ETAs and consequently the validity of the CE-marking. In that case additional assessment or modifications to the ETA and the corresponding evaluation report may be necessary.

3.2.2 Design of Connections Using the Product

For connections made with steel members and as described in the Annex of this ETA it is not required to consider and evaluate the limitations of the connections with regards to temperature effects. For other types of connections, the effect of temperature shall be considered for design purposes if the effect on the connections is not significant. Other types of connections affected by temperature are not covered by this ETA.

The characteristic capacities declared in this ETA are based on the dimensions, material properties, minimum effective length (minimum embedded threaded length in timber substrates) and nominal substrates thicknesses provided by the manufacturer and as stated in the ETA and its corresponding Annex.

To verify the design of connections made with the fastening screws listed in this ETA, the method given in EN 1990 is used to derive the design capacities based on the characteristic performance capacities stated in the Annex of this document.

Therefore, the design capacities to be used when designing in accordance with EN 1993-1-3 shall be derived using the following formulas:

Design shear resistance:

$$V_{\mathrm{R,d}} = \frac{V_{\mathrm{R,k}}}{\gamma_{\mathrm{M}}}$$

Design axial resistance:

$$N_{\mathrm{R,d}} = \frac{N_{\mathrm{R,k}}}{\gamma_{\mathrm{M}}}$$

Where γ_{M}= 1.33 if no other values are given in national regulations.

Where combined tension and shear forces occur within the connection, the interaction equation of EN1993-1-3, section 8.3 (8) must be verified, as follows:

$$\frac{N_{\mathrm{Sd}}}{N_{\mathrm{Rd}}} + \frac{V_{\mathrm{Sd}}}{V_{\mathrm{Rd}}} \leq 1.0$$

where $N_{S,d}$ and $V_{S,d}$ are the engineering design values for normal and shear forces respectively and $N_{R,d}$ and $V_{R,d}$ are the design resistance values in the connections for normal and shear forces respectively.

3.2.3 Installation

The installation must be carried out in accordance with the manufacturer's instructions which shall be provided to the installer. If carried out in accordance with the details given, the execution of the works should not promote bimetallic corrosion between metallic parts.

When shear forces act on the connection, the two components of the connection-substrate I and substrate II are connected to each other so that the fastening screws cannot incur additional bending stresses.

The fastening screws shall be installed perpendicular to the surface of the components and ensure the correct bearing is provided by the provision of the required washer specification. The fastener should be tightened so that the EPDM seal is slightly compressed to ensure a weathertight installation.

The fastening screws shall be selected as per recommendations of the manufacturer for the application required.

The installer shall fix the fastening screws in accordance with the provisions of this ETA.

3.2.3.1 Installation Instructions

It is the responsibility of the manufacturer to ensure that the information on the specific conditions particularly regarding the product and its mechanical performance characteristics described in this evaluation report is supplied to those who are concerned. This information may be provided by reproduction of the corresponding parts of the European Technical Assessment.

The installation information including any pre-drilling, torque moment and application limits shall be supplied either part of the packaging or on the enclosed technical data sheet.

3.2.4 Identification of the Product

The product shall be identified with the mark of the manufacturer and the CE marking information.

3.2.5 Packaging, Transport and Storage

The products should be packed in boxes bearing the manufacturer's name, product type, nominal size, quantity, date of manufacture and batch reference details.

3.2.6 Use, Maintenance and Repair

The assessment of fitness for use is based on the assumption that maintenance is not required during the assumed intended working life.
Should repair be necessary, this is normally achieved by replacement. An assessment must be made by a design professional in each case.

4 Assessment and Verification of Constancy of Performance (hereinafter AVCP) System Applied, with reference to its Legal Base

4.1 System of Assessment and Verification of Constancy of Performance

According to the Decision 98/2147/EC of the European Commission, as amended, the System(s) of Assessment and Verification of Constancy of Performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

5 Technical Details Necessary for the Implementation of the AVCP System, as foreseen in the applicable EAD

5.1 Tasks for the Manufacturer

5.1.1 Initial Type Testing of the Product

Initial Type Testing (ITT) and Assessment has been undertaken under the responsibility of the manufacturer to verify that the production line in question is able to manufacture products in conformity with this ETA.

Any changes in materials or the production process which would result in a change in the product characteristics, the tests and/or assessments shall be repeated for the appropriate characteristics. In such cases the necessary type testing has to be agreed between Element Materials Technology Rotterdam B.V. and the Notified Body.

5.1.2 Factory Production Control (FPC)

The manufacturer has a Factory Production Control System (FPC) and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of policies, procedures and work instructions. This FPC system ensures that the product is in conformity with this European Technical Assessment.

The manufacturer shall only use raw materials or components that are supplied with the relevant inspection documents. All incoming raw materials shall be subject to inspection, verification, controls and tests (as applicable) by the manufacturer.

The results of FPC are recorded and evaluated. These records include but are not limited to:

- Product specification and designation, basic materials and components
- Type(s) of Control testing
- Date of manufacture of the product and date of testing of the product or basic material and components
- Result of control and testing and, if appropriate, comparison with requirements
- Signature of the person responsible for FPC
- These records shall be presented to the Notified Body upon request.

5.1.3 Factory Testing / Assessment

In this context, testing is taken to mean physical testing and/or visual examination of the product/process.

The final products are checked visually and for dimensions as detailed in a prescribed test plan, which is part of the factory production control.

The manufacturer may only use the raw materials listed in the technical documentation of this ETA. The raw materials shall be subject to controls by the manufacturer.

The control shall include the test certificates presented by suppliers (comparison with nominal values), including verification of dimensions and determination of material properties, e.g. chemical composition, mechanical properties and thickness of the protective coating.

Details of the factory production control such as frequency, test methods, specificities, etc. are laid down in the prescribed Control Plan which has been deposited with Element Materials Technology Rotterdam B.V. and is made available to the Notified Body.

All measuring and testing equipment shall be regularly calibrated and inspected according to the documented FPC system. Production records shall be kept for each batch of fasteners for at least 10 years.

5.2 Tasks for the Notified Body

5.2.1 Initial Inspection of Factory and of Factory Production Control

An assessment of each production unit shall be carried out by the Notified Body to demonstrate that the factory production control is in conformity with the ETA and any subsidiary information. This assessment shall be based on an initial inspection of the factory. Subsequently continuing surveillance of factory production control, including verification that tests are being carried out to the prescribed test plan, is necessary to ensure continuing conformity with the ETA.

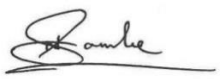
5.2.2 Continuing Surveillance

The Notified Body shall visit the factory twice a year for regular inspection. It shall be verified that the system of factory production control and the specified manufacturing process is maintained in accordance with this European Technical Assessment.

In cases where the provisions of this European Technical Assessment are no longer fulfilled, the conformity certificate shall be withdrawn.

Issued in Amsterdam, Netherlands on 15/12/2020

By



Niresh D Somlie

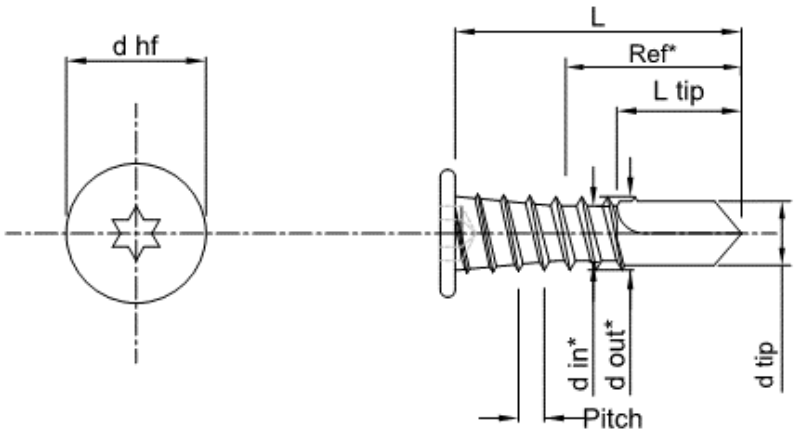
Technical Assessment Body Manager

Annex 1: Product Description and Application

In this annex, fasteners are sorted as follows:

1 – by Intended Use: Point Side Steel Substrate, Topdek, Point Side Timber Substrate
2 – by Thread tType: DF2, DF3, DF6, DF8, DF12, DF25, DFX, DFT, HCR
3 – by Thread Material: Carbon Steel, Stainless Steel
4 – by Thread Diameter
5 – by Manufacturer Code

DF2-CFX



L	20 mm
d out*	4.7 mm
d in*	3.90 mm
L tip	8 mm max
d tip	4.40 mm
d hf	9.0 mm
Pitch	1.58 mm
Ref	12 mm

* - d in* & d out* dimensions mesured within the ref* dimension

Product code
DF2-CFX-20

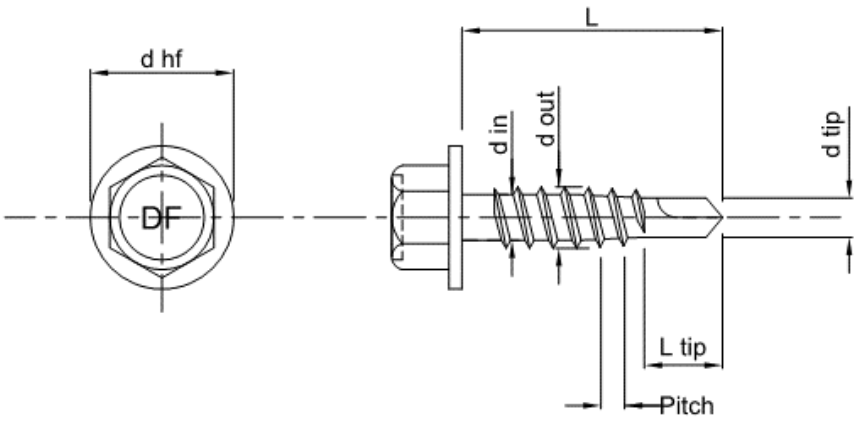
Length range

L (mm)	20
L_g (mm)	12

Material: SAE1022 carbon steel thread
Drill Capacity: For min 0.5 up to 2 mm thick steel
Head Type: CFX × 20 socket “secret fix” flat head
Washer: None

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥0.5	0.30	0.22	1.05	0.79
NO	≥0.5	≥1.2	0.87	0.65	1.85	1.39
NO	≥0.5	2.0	1.92	1.44	1.85	1.39

DF2-LS-4.8



L	20 mm
d out	4.70 mm
d in	3.50 mm
L tip	7 mm max
d tip	3.00 mm
d hf	10.5 mm
Pitch	1.61 mm

Product code DF2-LS-4.8 * 20

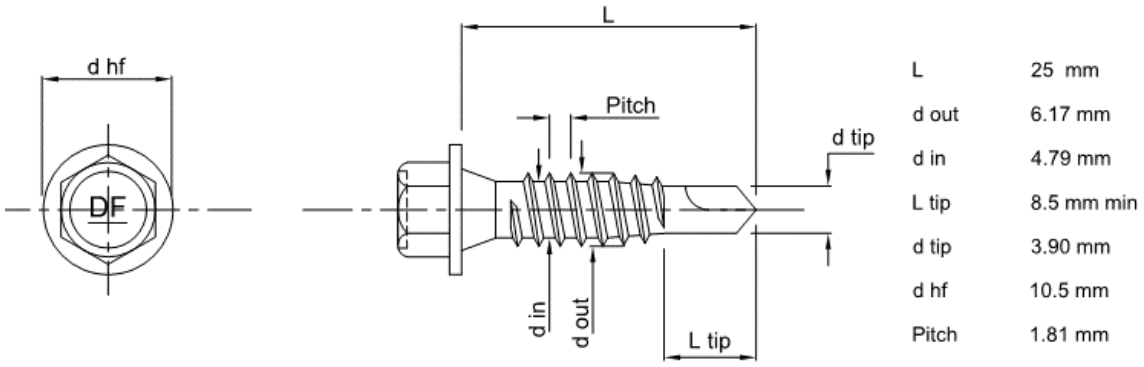
Length range

L (mm)	20
L_g (mm)	11

Material: SAE1022 carbon steel thread
Drill Capacity: 8 mm AF Hex head
Head Type: For up to 2 layers of 1.0 mm thick steel sheet
Washer: A14

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥0.5	0.56	0.42	1.05	0.79

DF2-LS-6.3



L	25 mm
d out	6.17 mm
d in	4.79 mm
L tip	8.5 mm min
d tip	3.90 mm
d hf	10.5 mm
Pitch	1.81 mm

Product code DF2-LS-6.3 * 25

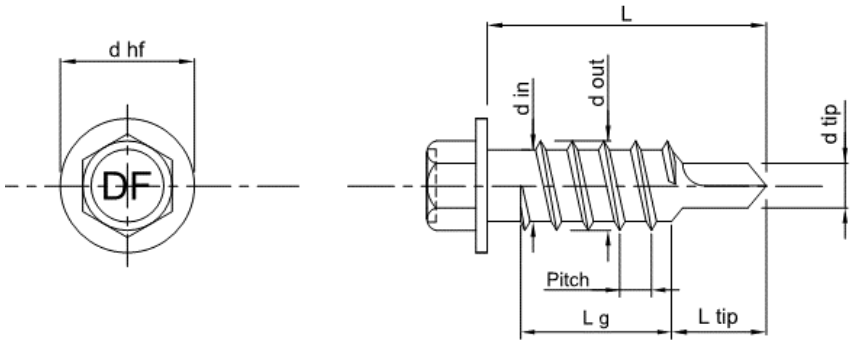
Length range

L (mm)	25
L_g (mm)	14

Material: SAE1022 carbon steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: A15, A19

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥0.5	0.64	0.48	1.05	0.79

DF2-LS-8.0



L	25 mm
d out	8.00 mm
d in	5.50 mm
L tip	9 mm max
L g	11 mm min
d tip	4.10 mm
d hf	12.4 mm
Pitch	3.00 mm

Product code DF2-LS-8.0 * 25

Length range

L (mm)	25
L_g (mm)	11

Material: SAE1022 carbon steel thread

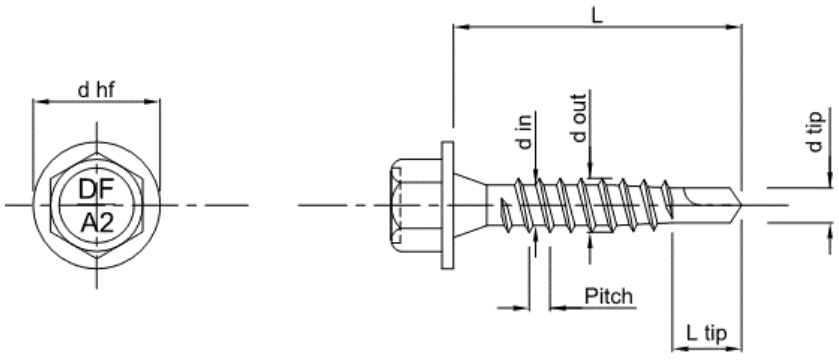
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet

Head Type: 8 mm AF Hex head

Washer: A15, A19

Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	**$N_{R,k}$ (kN)**	**$N_{R,d}$ (kN)**	**$V_{R,k}$ (kN)**	**$V_{R,d}$ (kN)**
Not required	≥0.5	≥0.5	0.91	0.68	1.05	0.79

DF2-SS-LS-4.8



L	25 mm
d out	4.71 mm
d in	3.50 mm
L tip	7 mm max
d tip	3.0 mm
d hf	10.5 mm
Pitch	1.61 mm

Product code DF2-SS-LS-4.8 * 25

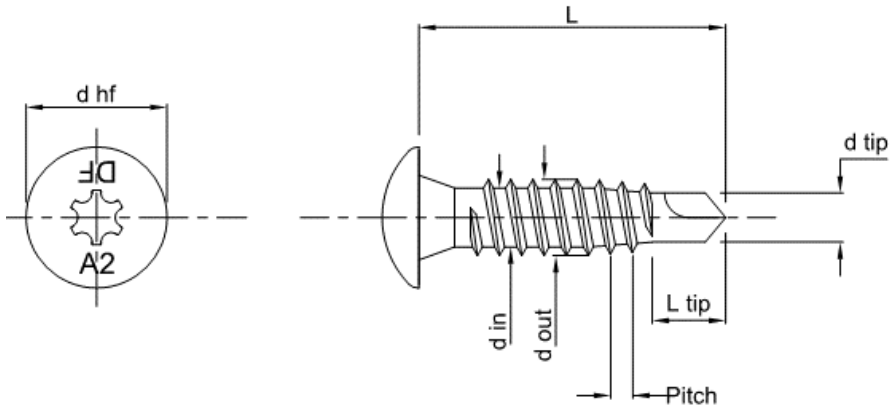
Length range

L (mm)	25
L_g (mm)	15

Material: A2/304 stainless steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: A15

Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	**$N_{R,k}$ (kN)**	**$N_{R,d}$ (kN)**	**$V_{R,k}$ (kN)**	**$V_{R,d}$ (kN)**
Not required	≥0.5	≥0.5	0.56	0.42	1.05	0.79

DF2-SS-P-4.8 / DF2-SSA4-P-4.8



L	20 mm
d out	4.71 mm
d in	3.50 mm
L tip	6 mm max
d tip	3.10 mm
d hf	11.7 mm
Pitch	1.61 mm

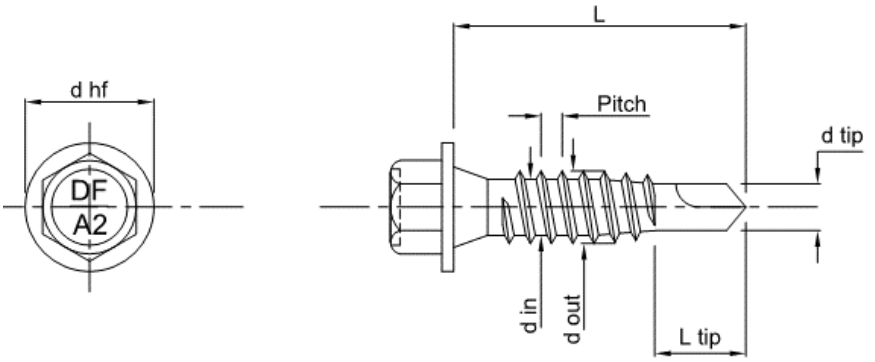
Product code DF2-SS-P(L)-4.8 * 20

DF2-SS-P-4.8
Length range
L (mm) 20
L_g (mm) 10
Material: A2/304 stainless steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: Torx #25 pan head
Washer: A10, A15

DF2-SSA4-P-4.8
Length range
L (mm) 20
L_g (mm) 10
Material: A4/316 stainless steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: Torx #25 pan head
Washer: S15, S19

Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	**$N_{R,k}$ (kN)**	**$N_{R,d}$ (kN)**	**$V_{R,k}$ (kN)**	**$V_{R,d}$ (kN)**
Not required	≥0.5	≥0.5	0.56	0.42	1.05	0.79

DF2-SS-LS-6.3 / DF2-SSA4-LS-6.3



L	25 mm
d out	6.17 mm
d in	4.79 mm
L tip	7 mm max
d tip	3.9 mm
d hf	10.5 mm
Pitch	1.81 mm

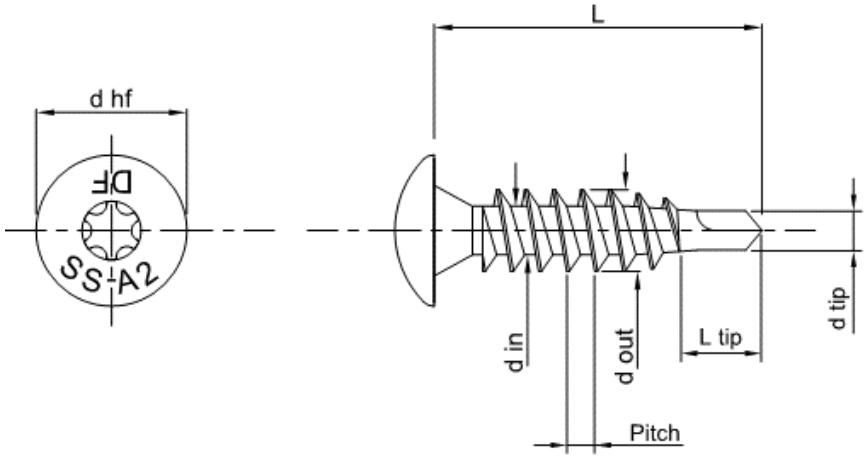
Product code DF2-SS-LS-6.3 * 25

DF2-SS-LS-6.3
Length range
L (mm) 25
L_g (mm) 13
Material: A2/304 stainless steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: A15, A19

DF2-SSA4-LS-6.3
Length range
L (mm) 25
L_g (mm) 13
Material: A4/316 stainless steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: S15, S19

Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	$N_{R,k}$ **(kN)**	$N_{R,d}$ **(kN)**	$V_{R,k}$ **(kN)**	$V_{R,d}$ **(kN)**
Not required	≥0.5	≥0.5	0.64	0.48	1.05	0.79

DF2-SS-P-6.3 / DF2-SSA4-P-6.3



L	25 mm
d out	6.17 mm
d in	3.97 mm
L tip	7 mm Max
d tip	3.35 mm
d hf	11.7 mm
Pitch	2.00 mm

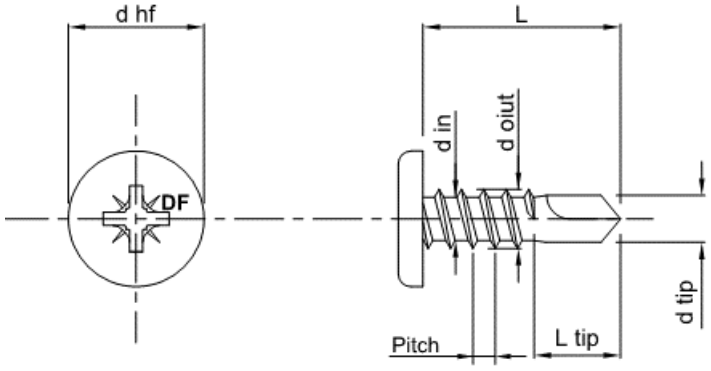
Product code DF2-SS-P(L)-6.3* 25

DF2-SS-P-6.3
Length range
L (mm) 25
L_g (mm) 15
Material: A2/304 stainless steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: Torx #25 pan head
Washer: A15, A19

DF2-SSA4-P-6.3
Length range
L (mm) 25
L_g (mm) 15
Material: A4/316 stainless steel thread
Drill Capacity: For 2 layers of 1.0 mm thick steel sheet
Head Type: Torx #25 pan head
Washer: S15, S19

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥0.5	0.64	0.48	1.05	0.79

DF3-CF-4.8



L	16.0 mm
d out	4.71 mm
d in	3.50 mm
L tip	7.0 mm
d tip	3.80 mm
d hf	11.1 mm
Pitch	1.61 mm

Product code DF3-CF-4.8 * 16

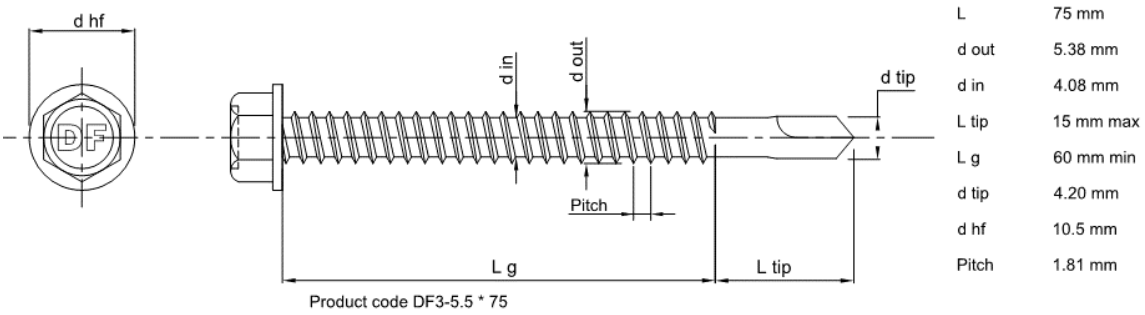
Length range

L (mm)	16
L_g (mm)	9

Material: SAE1022 carbon steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: Pozi #2 flat wafer head
Washer: None

Washer	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥1.2	1.13	0.85	1.85	1.39
NO	≥0.5	≥2.0	2.24	1.68	1.85	1.39
NO	≥0.5	3.0	2.39	1.80	1.85	1.39
NO	≥0.7	3.0	3.76	2.83	1.85	1.39

DF3-5.5



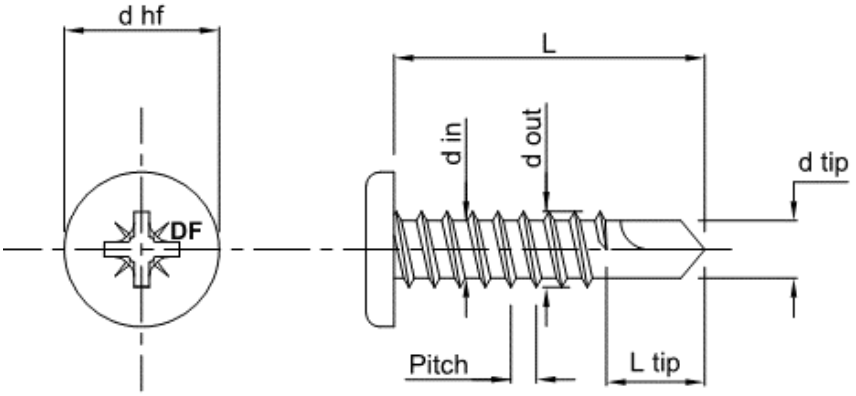
Length range

L (mm)	25	35	45	55	75	100
L_g (mm)	10	20	30	40	60	48

Material: SAE1022 carbon steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	**$N_{R,k}$ (kN)**	**$N_{R,d}$ (kN)**	**$V_{R,k}$ (kN)**	**$V_{R,d}$ (kN)**
Not required	≥0.5	≥1.2	1.43	1.08	2.02	1.52
Not required	≥0.5	≥2.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥2.0	2.75	2.07	2.02	1.52
YES	≥0.5	3.0	3.28	2.47	2.02	1.52
Not required	≥0.7	3.0	3.76	2.83	2.02	1.52
YES	≥0.7	3.0	4.90	3.68	2.02	1.52

DF3-CF-5.5



L	22 mm
d out	5.38 mm
d in	4.08 mm
L tip	8.0 mm
d tip	4.2 mm
d hf	11.1 mm
Pitch	1.81 mm

Product code DF3-CF-5.5 * 22

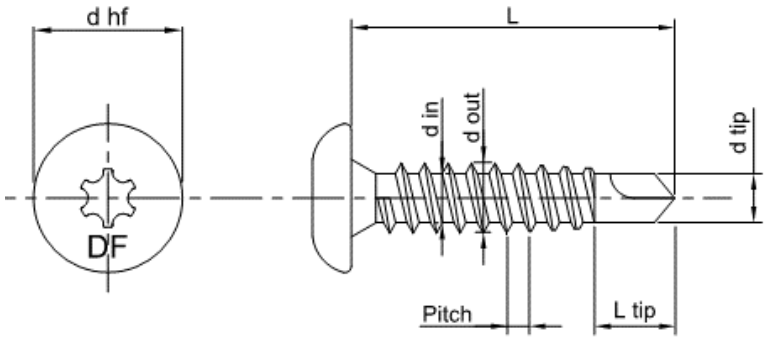
Length range

L (mm)	22
L_g (mm)	14

Material: SAE1022 carbon steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: Pozi #2 flat wafer head
Washer: None

Washer	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥1.2	1.43	1.08	2.02	1.52
NO	≥0.5	≥2.0	2.39	1.80	2.02	1.52
NO	≥0.7	≥2.0	2.75	2.07	2.02	1.52
NO	≥0.7	3.0	3.76	2.83	2.02	1.52

DF3-DP-5.5



L	25 mm
d out	5.38 mm
d in	3.85 mm
L tip	7 mm Max
d tip	3.87 mm
d hf	11.5 mm
Pitch	1.81 mm

Product code DF3-DP(L)-5.5 * 25

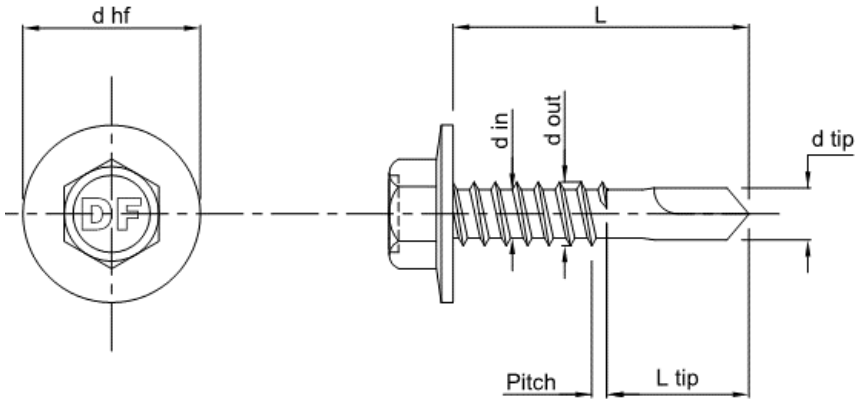
Length range

L (mm)	25
L_g (mm)	16

Material: SAE1022 carbon steel thread
Drill Capacity: For min 0.5 up to 3.0 mm thick steel sheet
Head Type: Pozi #25 flat pan head
Washer: A10, A15, A19

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥0.5	0.68	0.51	1.05	0.79
Not required	≥0.5	≥1.2	1.43	1.08	2.02	1.52
Not required	≥0.5	≥2.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥2.0	2.75	2.07	2.02	1.52
YES	≥0.5	3.0	3.28	2.47	2.02	1.52
Not required	≥0.7	3.0	3.76	2.83	2.02	1.52
YES	≥0.7	3.0	4.90	3.68	2.02	1.52

DF3-H15-5.5



L	25 mm
d out	5.38 mm
d in	4.10 mm
L tip	12.5 mm Max
d tip	4.20 mm
d hf	14.75 mm
Pitch	1.81 mm

Product code DF3-H15-5.5 * 25

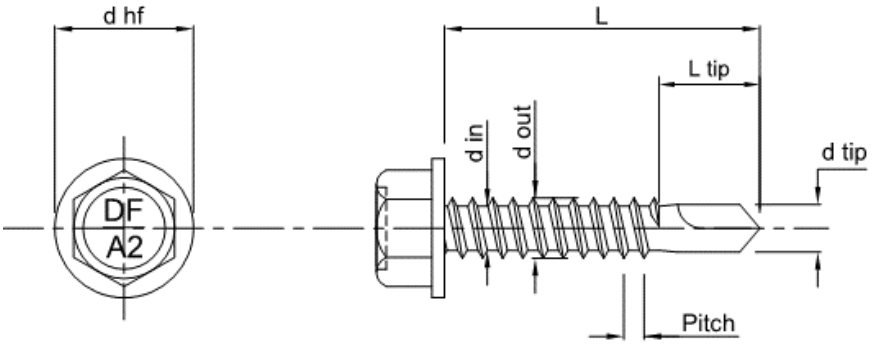
Length range

L (mm)	25
L_g (mm)	13

Material: SAE1022 carbon steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None

Washer	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥1.2	1.43	1.08	2.02	1.52
NO	≥0.5	≥2.0	2.75	2.07	2.02	1.52
NO	≥0.5	3.0	3.28	2.47	2.02	1.52
NO	≥0.7	3.0	4.90	3.68	2.02	1.52

DF3-SS-4.8



L	25 mm
d out	4.71 mm
d in	3.50 mm
L tip	8 mm Max
d tip	3.80 mm
d hf	10.5 mm
Pitch	1.61 mm

Product code DF3-SS-4.8 * 25

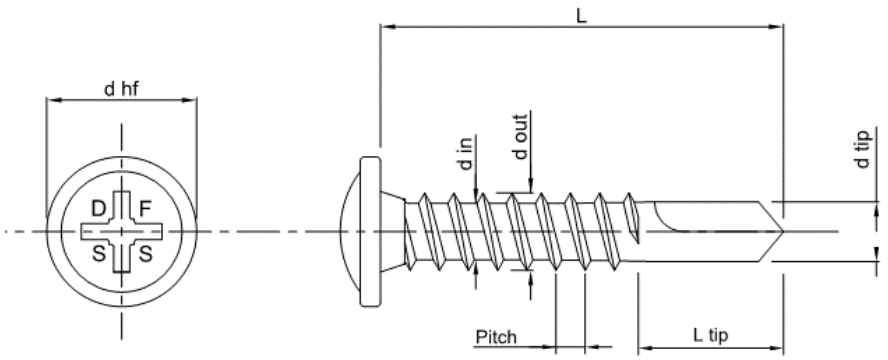
Length range

L (mm)	25
L_g (mm)	22

Material: A2/304 stainless steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, A15

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥1.2	1.13	0.85	1.85	1.39
Not required	≥0.5	≥2.0	2.24	1.68	1.85	1.39
Not required	≥0.5	3.0	2.39	1.80	1.85	1.39
YES	≥0.5	3.0	3.28	2.47	1.85	1.39
Not required	≥0.7	3.0	3.76	2.83	1.85	1.39
YES	≥0.7	3.0	4.13	3.11	1.85	1.39

DF3-SS-CF-4.8



L	25 mm
d out	4.71 mm
d in	3.50 mm
L tip	8 mm Max
d tip	3.80 mm
d hf	9.3 mm
Pitch	1.61 mm

Product code DF3-SS-CF-4.8 * 25

Length range

L (mm) 25

L_g (mm) 15

Material: A2/304 stainless steel thread

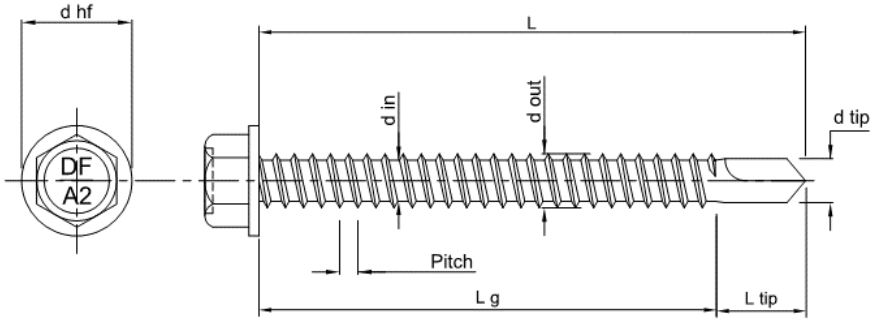
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet

Head Type: Phillips #2 flanged pan head

Washer: None

Washer	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥1.2	1.13	0.85	1.85	1.39
NO	≥0.5	≥2.0	2.03	1.53	1.85	1.39
NO	≥0.7	≥2.0	2.24	1.68	1.85	1.39
NO	≥0.7	3.0	2.89	2.18	1.85	1.39

DF3-SS-5.5 / DF3-SSA4-5.5



L	55 mm
d out	5.38 mm
d in	4.08 mm
L tip	10 mm max
L g	45 mm min
d tip	4.40 mm
d hf	10.5 mm
Pitch	1.81 mm

Product code DF3-SS-5.5 * 55

DF3-SS-5.5
Length range:

L (mm)	25	35	55	80	100
L_g (mm)	15	25	45	70	90

Material: A2/304 stainless steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

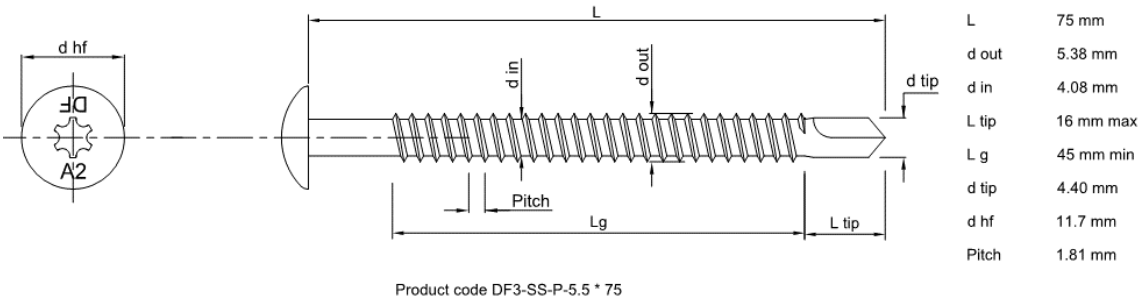
DF3-SSA4-5.5
Length range:

L (mm)	35
L_g (mm)	25

Material: A4/316 stainless steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, S15, S19

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥1.2	1.43	1.08	2.02	1.52
Not required	≥0.5	≥2.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥2.0	2.75	2.07	2.02	1.52
YES	≥0.5	3.0	3.28	2.47	2.02	1.52
Not required	≥0.7	3.0	3.76	2.83	2.02	1.52
YES	≥0.7	3.0	4.90	3.68	2.02	1.52

DF3-SSA4-P-5.5



Product code DF3-SS-P-5.5 * 75

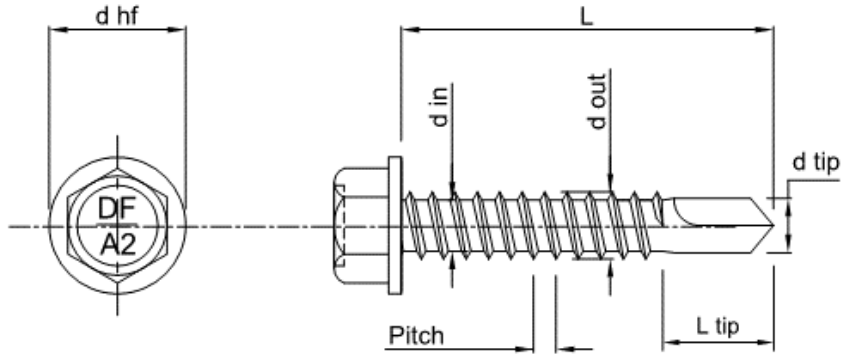
Length range

L (mm)	25	35	50	75
L_g (mm)	9	19	34	45

Material: A4/316 stainless steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: Torx #25 pan head
Washer: None, S10, S15, S19, A29

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥1.2	1.43	1.08	2.02	1.52
Not required	≥0.5	≥2.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥2.0	2.75	2.07	2.02	1.52
YES	≥0.5	3.0	3.28	2.47	2.02	1.52
Not required	≥0.7	3.0	3.76	2.83	2.02	1.52
YES	≥0.7	3.0	4.90	3.68	2.02	1.52

DF6-SS-5.5



L	30 mm
d out	5.38 mm
d in	4.08 mm
L tip	10 mm Max
d tip	4.70 mm
d hf	10.5 mm
Pitch	1.81 mm

Product code DF6-SS-5.5 * 30

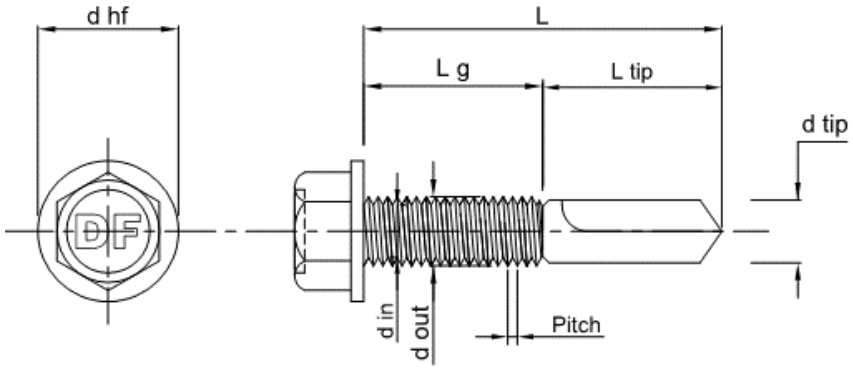
Length range

L (mm)	30
L_g (mm)	22

Material: A2/304 stainless steel thread
Drill Capacity: For min 3.0 up to 6.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥3.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥3.0	3.28	2.47	2.02	1.52
Not required	≥0.7	≥3.0	3.76	2.83	2.02	1.52
YES	≥0.7	≥3.0	5.10	3.84	2.02	1.52

DF8-5.5-28



L	28 mm
d out	5.40 mm
d in	4.15 mm
L tip	14 mm max
L g	14 mm min
d tip	4.87 mm
d hf	10.5 mm
Pitch	1.06 mm

Product code DF8-5.5 * 28

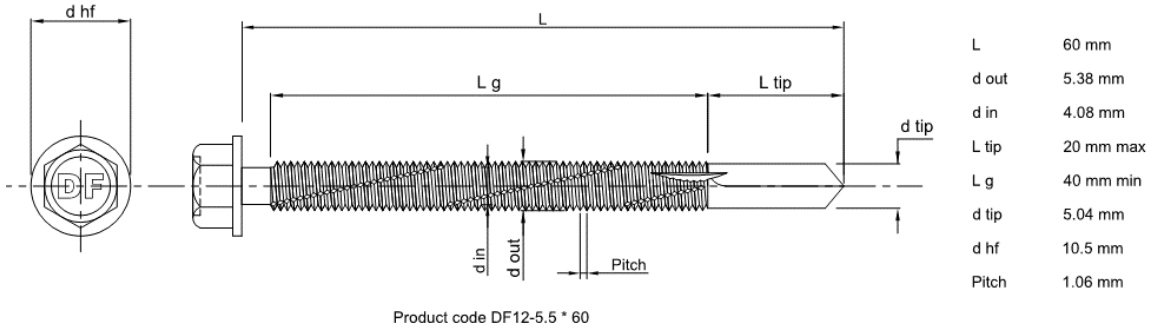
Length range

L (mm)	28
L_g (mm)	14

Material: SAE1022 carbon steel thread
Drill Capacity: For min 3.0 up to 8.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥3.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥3.0	2.69	2.02	2.02	1.52
YES	≥0.5	≥4.0	3.28	2.47	2.02	1.52
Not required	≥0.7	≥4.0	3.76	2.83	2.02	1.52
YES	≥0.7	≥4.0	4.20	3.16	2.02	1.52

DF12-5.5



Product code DF12-5.5 * 60

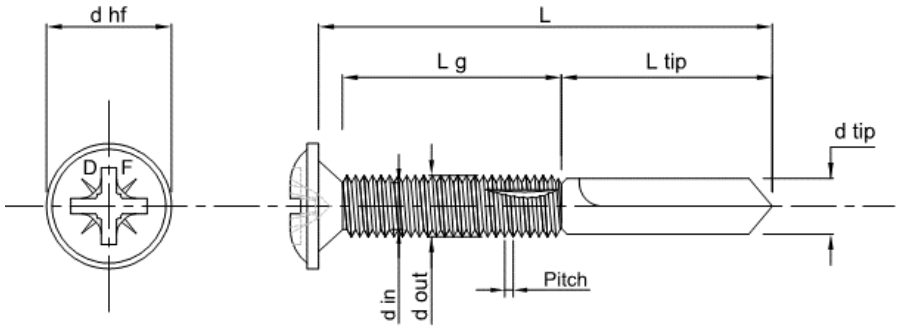
Length range

L (mm)	38	60	80	100
L_g (mm)	18	40	50	50

Material: SAE1022 carbon steel thread
Drill Capacity: For min 4.0 up to 12.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥4.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥4.0	3.28	2.47	2.02	1.52
Not required	≥0.7	≥4.0	3.76	2.83	2.02	1.52
YES	≥0.7	≥4.0	5.10	3.84	2.02	1.52

DF12-CF-5.5



L	38 mm
d out	5.38 mm
d in	4.08 mm
L tip	16 mm max
L g	18 mm min
d tip	5.04 mm
d hf	11.2 mm
Pitch	1.06 mm

Product code DF12-CF-5.5 * 38

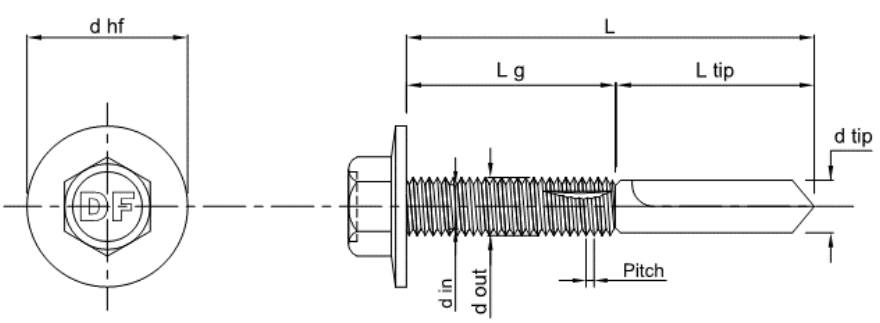
Length range

L (mm)	38
L_g (mm)	18

Material: SAE1022 carbon steel thread
Drill Capacity: For min 4.0 up to 12.0 mm thick steel sheet
Head Type: Pozi #3 flanged pan head
Washer: None

Washer	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥4.0	2.39	1.80	2.02	1.52
NO	≥0.7	≥4.0	3.76	2.83	2.02	1.52

DF12-H15-5.5



L	38 mm
d out	5.40 mm
d in	4.08 mm
L tip	19 mm max
L g	19 mm min
d tip	4.92 mm
d hf	14.50 mm
Pitch	1.06 mm

Product code DF12-H15-5.5 * 38

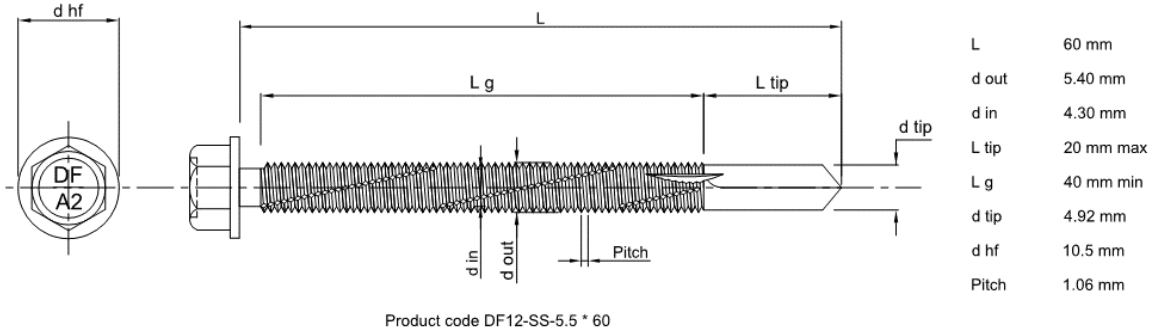
Length range

L (mm)	38
L_g (mm)	19

Material: SAE1022 carbon steel thread
Drill Capacity: For min 4.0 up to 12.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None

Washer	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥4.0	3.28	2.47	2.02	1.52
NO	≥0.7	≥4.0	5.10	3.84	2.02	1.52

DF12-SS-5.5 / DF12-SSA4-5.5



Product code DF12-SS-5.5 * 60

DF12-SS-5.5
Length range

L (mm)	40	60
L_g (mm) – min.	20	40

Material: A2/304 stainless steel thread
Drill Capacity: For min 4.0 up to 12.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

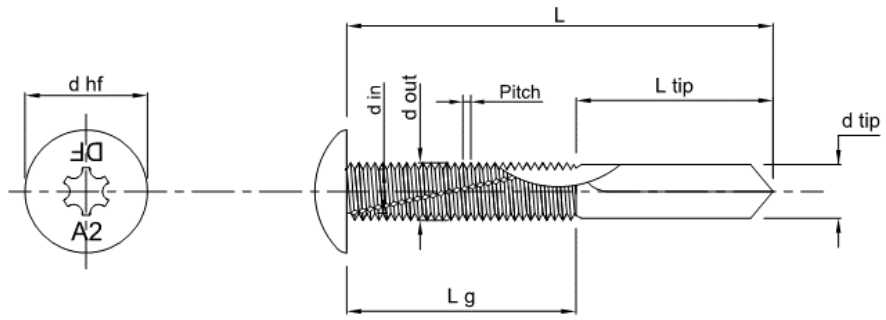
DF12-SSA4-5.5
Length range

L (mm)	40
L_g (mm) – min.	20

Material: A4/316 stainless steel thread
Drill Capacity: For min 4.0 up to 12.0 mm thick steel sheet
Head Type: 8 mm AF Hex head
Washer: None, S15, S19

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥4.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥4.0	3.15	2.36	2.02	1.52
Not required	≥0.7	≥4.0	3.15	2.36	2.02	1.52
YES	≥0.5	≥8.0	3.28	2.47	2.02	1.52
Not required	≥0.7	≥8.0	3.76	2.83	2.02	1.52
YES	≥0.7	≥8.0	5.10	3.84	2.02	1.52

DF12-SSA4-P-5.5



L	40 mm
d out	5.40 mm
d in	4.30 mm
L tip	19 mm max
L g	21 mm min
d tip	4.92 mm
d hf	11.7 mm
Pitch	1.06 mm

Product code DF12-SS-P(L)-5.5 * 40

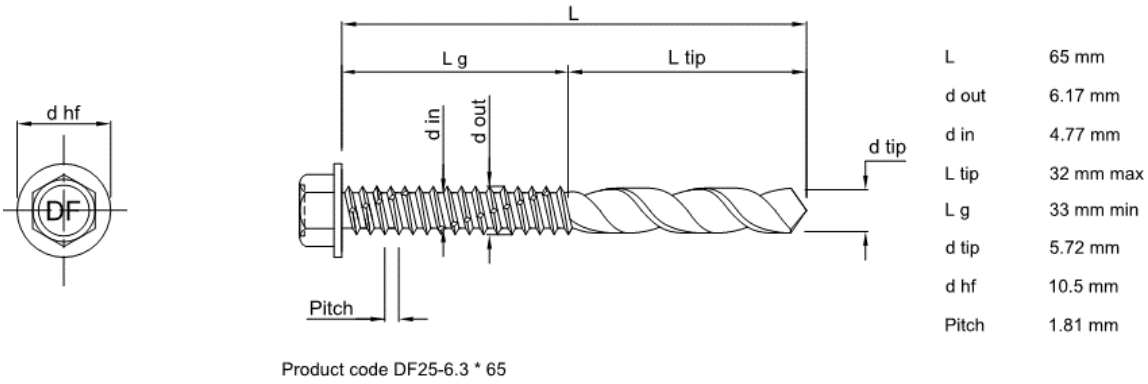
Length range

L (mm)	40
L_g (mm) – min.	21

Material: A4/316 stainless steel thread
Drill Capacity: For min 4.0 up to 12.0 mm thick steel sheet
Head Type: Torx #25 pan head
Washer: None, S10 S15, S19, A29

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥4.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥4.0	3.15	2.36	2.02	1.52
Not required	≥0.7	≥4.0	3.15	2.36	2.02	1.52
YES	≥0.5	≥8.0	3.28	2.47	2.02	1.52
Not required	≥0.7	≥8.0	3.76	2.83	2.02	1.52
YES	≥0.7	≥8.0	5.10	3.84	2.02	1.52

DF25-6.3



Product code DF25-6.3 * 65

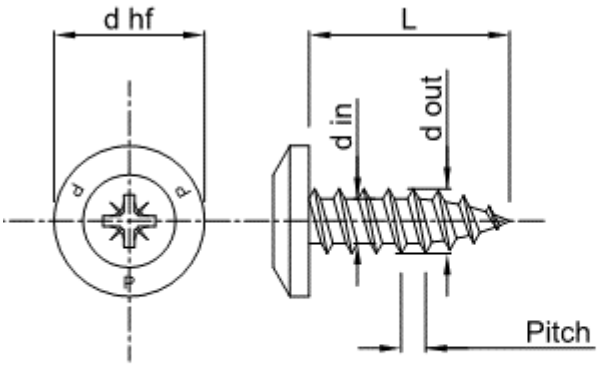
Length range

L (mm)	65
L_g (mm)	33

Material: SAE1022 carbon steel thread
Drill Capacity: For min 8.0 up to 25.0 mm thick steel
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥8.0	2.39	1.80	2.02	1.52
YES	≥0.5	≥8.0	3.28	2.47	2.02	1.52
Not required	≥0.7	≥8.0	3.76	2.83	2.02	1.52
YES	≥0.7	≥8.0	5.10	3.84	2.02	1.52

DFX-P-4.2



L	13 mm
d out	4.12 mm
d in	2.90 mm
d hf	9.5 mm
Pitch	1.61 mm

Product code DFX-P 4.2 * 13

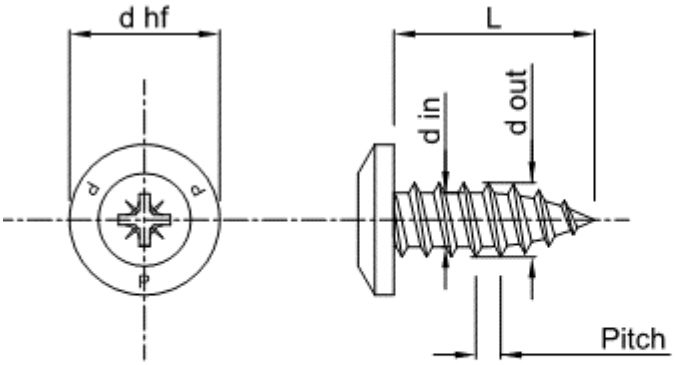
Length range

L (mm)	13
L_g (mm)	13

Material: SAE1022 carbon steel
Drill Capacity: For min 0.7 up to 1.2 mm thick steel sheet
Head Type: Pozi #2 angled flat head
Washer: None

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥0.7	0.91	0.69	1.91	1.43
NO	≥0.5	1.2	0.68	1.26	1.91	1.43

DFX-P-4.8



L	13 mm
d out	4.72 mm
d in	3.40 mm
d hf	9.5 mm
Pitch	1.61 mm

Product code DFX-P 4.8 * 13

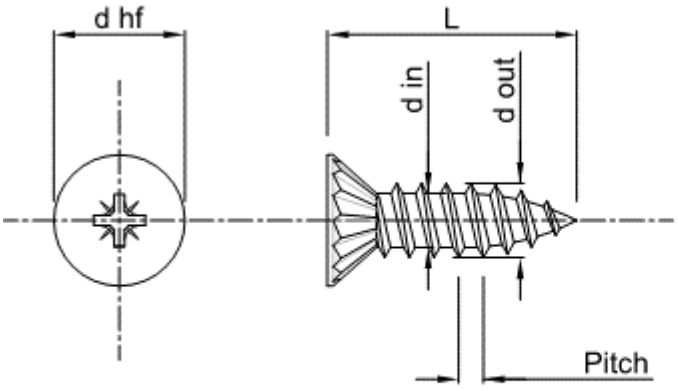
Length range

L (mm)	13
L_g (mm)	13

Material: SAE1022 carbon steel
Drill Capacity: For min 0.7 up to 1.2 mm thick steel sheet
Head Type: Pozi #2 angled flat head
Washer: None

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥0.7	1.06	0.80	1.91	1.43
NO	≥0.5	1.2	1.80	1.42	1.91	1.43

DFX-SS-CSK-4.8



L	16 mm
d out	4.72 mm
d in	3.40 mm
d hf	8.8 mm
Pitch	1.61 mm

Product code DFX-SS-CSK 4.8 * 16

Length range

L (mm)	16
L_g (mm)	16

Material: 410 stainless steel (a martensitic grade, so the corrosion resistance is considered as no better than for carbon steel)

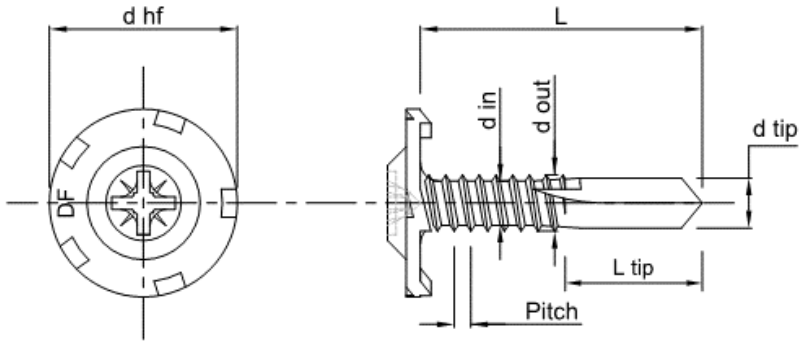
Drill Capacity: For min 0.7 up to 1.2 mm thick steel sheet

Head Type: Pozi #2 countersink head

Washer: None

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥0.7	1.06	0.80	1.48	1.12
NO	≥0.5	≥1.2	1.80	1.42	1.48	1.12

DF3-TD-6.3



L	30 mm
d out	6.17 mm
d in	4.79 mm
L tip	14 mm Max
d tip	5.15 mm
d hf	20.5 mm
Pitch	1.81 mm

Product code DF3-TD-6.3 * 30

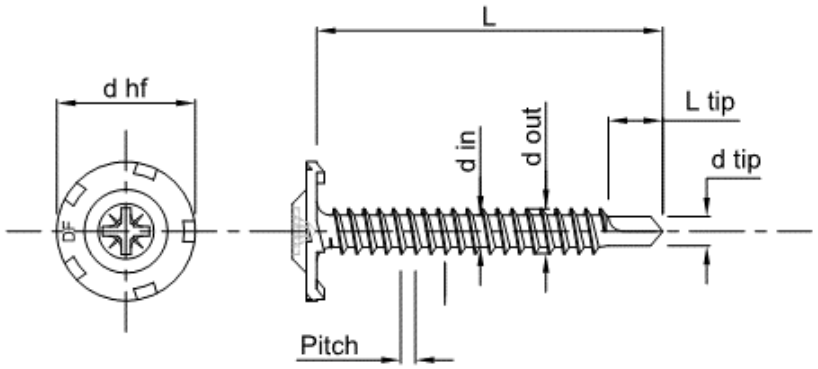
Length range

L (mm)	30
L_g (mm)	16

Material: SAE1022 carbon steel thread
Drill Capacity: For min 1.2 up to 3.0 mm thick steel sheet
Head Type: Pozi #3 head for Topdek panels
Washer: None

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥1.2	1.57	1.18	2.45	1.84
NO	≥0.5	≥2.0	2.95	2.22	2.45	1.84
NO	≥0.5	3.0	3.33	2.50	2.45	1.84
NO	≥0.7	3.0	4.97	3.74	2.45	1.84

DFT-TD-6.5



L	50 mm
d out	6.50 mm
d in	4.50 mm
L tip	5 mm min
d tip	4.25 mm
d hf	20.5 mm
Pitch	1.81 mm

Product code DFT-TD 6.5 * 50

Length range

L (mm)	50
L_g (mm)	-

Material: SAE1022 carbon steel thread
Drill Capacity: For timber
Head Type: Pozi #3 head for Topdek panels
Washer: None

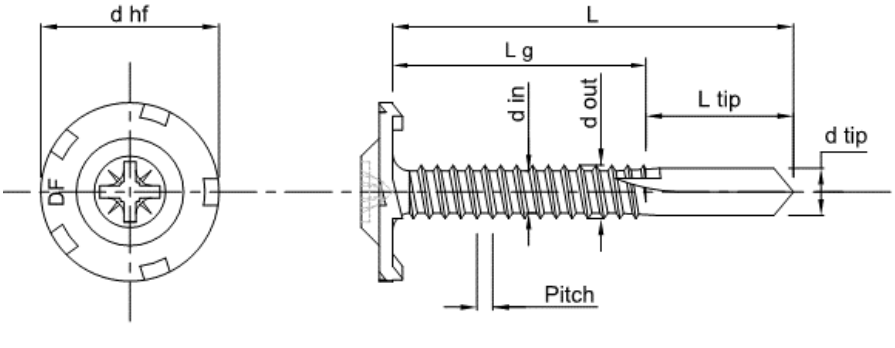
Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5 mm	40	2.04	1.53	2.45	1.84

Substrate II is the length of fastener thread assumed to be embedded in the timber substrate

$N_{R,k} = 2.04$ (kN) and $N_{R,d} = 1.53$ (kN) for the given embedded length in C16 timber or better and should be reduced proportionally for shorter embedded lengths. The head side value is not critical for substrates ≥0.5 mm thickness.

The embedded length should not be less than 6 times the outer thread diameter to comply with Eurocode 5.

DF12-TD-6.3



L	45 mm
d out	6.17 mm
d in	4.79 mm
L tip	18 mm Max
L g	27 mm min
d tip	5.50 mm
d hf	20 mm
Pitch	1.81 mm

Product code DF12-TD-6.3 * 45

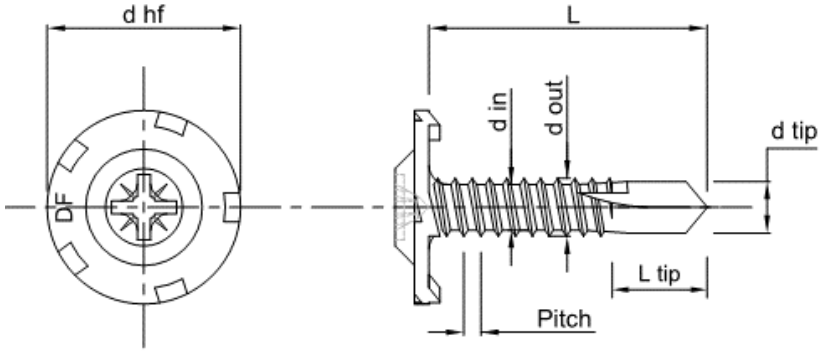
Length range

L (mm)	45
L_g (mm)	27

Material: SAE1022 carbon steel thread
Drill Capacity: For min 4.0 up to 12.0 mm thick steel sheet
Head Type: Pozi #3 head for Topdek panels
Washer: None

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥4.0	3.33	2.50	2.45	1.84
NO	≥0.7	≥4.0	4.97	3.74	2.45	1.84

DF6-TD-6.3



L	30 mm
d out	6.17 mm
d in	4.80 mm
L tip	10 mm Max
d tip	5.21 mm
d hf	20.0 mm
Pitch	1.81 mm

Product code DF6-TD-6.3 * 30

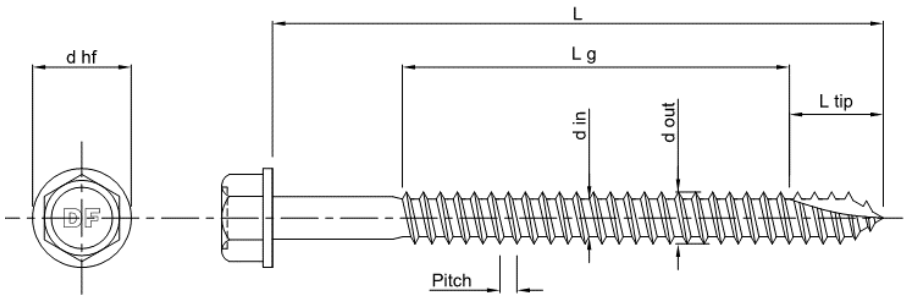
Length range

L (mm)	30
L_g (mm)	20

Material: SAE1022 carbon steel thread
Drill Capacity: For min 1.6 up to 6.0 mm thick steel sheet
Head Type: Pozi #3 head for Topdek panels
Washer: None

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
NO	≥0.5	≥1.2	1.57	1.18	2.45	1.84
NO	≥0.5	≥2.0	2.95	2.22	2.45	1.84
NO	≥0.5	≥3.0	3.33	2.50	2.45	1.84
NO	≥0.7	≥3.0	4.97	3.74	2.45	1.84

DFT-5.5



L	65 mm
d out	5.53 mm
d in	4.02 mm
L tip	10 mm max
L g	35 mm min
d hf	10.5 mm
Pitch	2.30 mm

Product code DFT-5.5 * 65

Length range

L (mm)	25	35	45	65
L_g (mm)	15	25	35	35

Material: SAE1022 carbon steel thread

Drill Capacity: Head side: for up to 1.2 mm thick steel sheet
Point side: for timber substrates

Head Type: 8 mm AF Hex head

Washer: None, A15, A19, A29

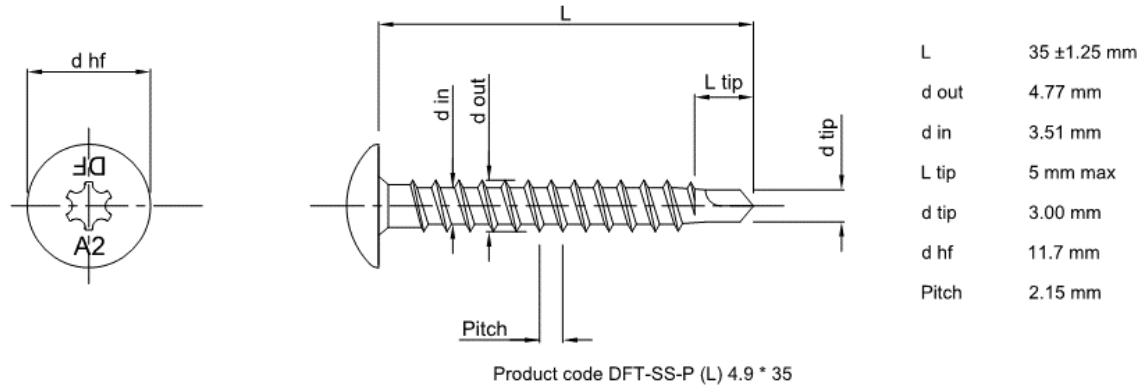
Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	15	1.12	0.85	1.75	1.31
Not required	≥0.5	25	1.86	1.40	1.75	1.31
Not required	≥0.5	35	2.39	1.80	1.75	1.31
YES	≥0.5	35	2.61	1.80	1.75	1.31
Not required	≥0.7	35	2.61	1.80	1.75	1.31

Substrate II is the length of fastener thread assumed to be embedded in the timber substrate

$N_{R,k} = 2.61$ (kN) and $N_{R,d} = 1.80$ (kN) for the longest embedded length in C16 timber or better and should be reduced proportionally for shorter embedded lengths unless the head side value is critical (underlined).

The embedded length should not be less than 6 times the outer thread diameter to comply with Eurocode 5.

DFT-SSA4-P-4.9



Product code DFT-SS-P (L) 4.9 * 35

Length range

L (mm)	35
L_g (mm)	27

Material: A4/316 stainless steel thread

Drill Capacity: Head side: for up to 1.2 mm thick steel sheet
Point side: for timber substrates

Head Type: Torx #25 pan head

Washer: None, S10, S15, S19

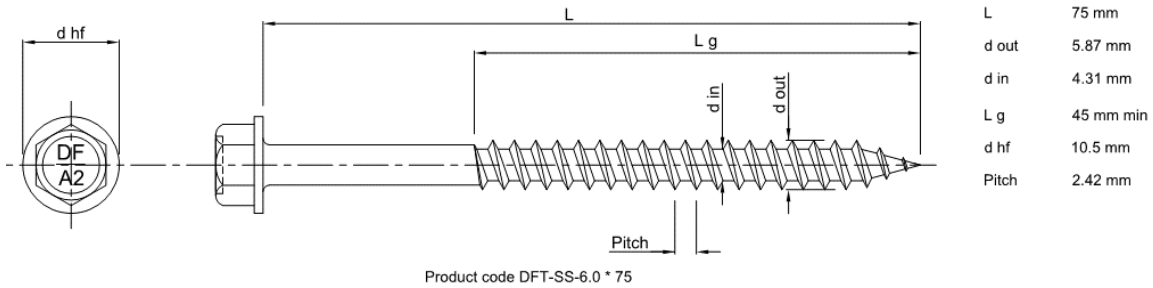
Washer ≥ 15 mm	**Substrate I t_I (mm)**	**Substrate II t_{II} (mm)**	**$N_{R,k}$ (kN)**	**$N_{R,d}$ (kN)**	**$V_{R,k}$ (kN)**	**$V_{R,d}$ (kN)**
Not required	≥0.5	27	1.55	1.17	1.75	1.31

Substrate II is the length of fastener thread assumed to be embedded in the timber substrate

$\boldsymbol{N_{R,k} = 1.55}$ (kN) and $\boldsymbol{N_{R,d} = 1.17}$ (kN) for the given embedded length in C16 timber or better and should be reduced proportionally for shorter embedded lengths. The head side value is not critical for substrates ≥0.5 mm thickness.

The embedded length should not be less than 6 times the outer thread diameter to comply with Eurocode 5.

DFT-SS-6.0



Product code DFT-SS-6.0 * 75

Length range

L (mm)	25	32	40	50	75	100
L_g (mm)	20	28	35	45	65	45

Material: A2/304 stainless steel thread
Drill Capacity: Head side: for up to 0.7 mm thick steel sheet
Point side: for timber substrates
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

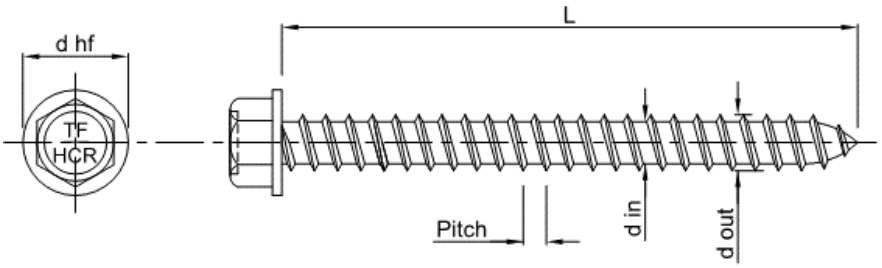
Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	20	1.34	1.01	1.75	1.31
Not required	≥0.5	28	1.88	1.41	1.75	1.31
Not required	≥0.5	35	2.35	1.76	1.75	1.31
Not required	≥0.5	45	2.39	1.80	1.75	1.31
YES	≥0.5	45	3.02	2.27	1.75	1.31
Not required	≥0.7	45	3.02	2.27	1.75	1.31
Not required	≥0.5	65	2.39	1.80	1.75	1.31
YES	≥0.5	65	3.28	2.47	1.75	1.31
Not required	≥0.7	65	3.76	2.83	1.75	1.31
YES	≥0.7	65	4.36	3.28	1.75	1.31

Substrate II is the length of fastener thread assumed to be embedded in the timber substrate

$\boldsymbol{N_{R,k} = 4.36}$ (kN) and $\boldsymbol{N_{R,d} = 3.28}$ (kN) for the longest embedded length in C16 timber or better and should be reduced proportionally for shorter embedded lengths unless the head side value is critical (underlined).

The embedded length should not be less than 6 times the outer thread diameter to comply with Eurocode 5.

TF-HCR-A-6.3



L	65 mm
d out	6.17 mm
d in	4.81 mm
d hf	10.5 mm
Pitch	2.54 mm

Product code TF-HCR-A 6.3 * 65

Length range

L (mm)	65
L_g (mm)	65

Material: 1.4529 stainless steel
Drill Capacity: For timber
Head Type: 8 mm AF Hex head
Washer: None, A15, A19, A29

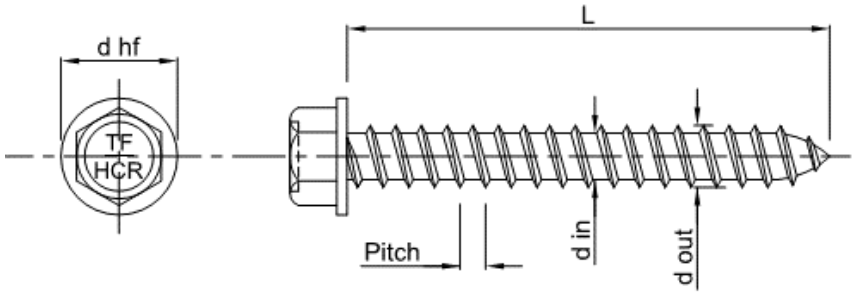
Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	64	2.39	1.80	2.02	1.52
YES	≥0.5	64	3.28	2.47	2.02	1.52
Not required	≥0.7	64	3.76	2.83	2.02	1.52
YES	≥0.7	64	5.10	3.84	2.02	1.52

Substrate II is the length of fastener thread assumed to be embedded in the timber substrate

$N_{R,k} = 6.48$ (kN) and $N_{R,d} = 4.87$ (kN) for the given embedded length in C16 timber or better and should be reduced proportionally for shorter embedded lengths unless the head side value is critical (underlined).

The embedded length should not be less than 6 times the outer thread diameter to comply with Eurocode 5.

TF-HCR-C



L	35 mm
d out	6.13 mm
d in	4.80 mm
d hf	10.5 mm
Pitch	1.81 mm

Product code TF-HCR-C 6.3 * 35

Length range

L (mm)	35
L_g (mm)	35

Material: 1.4529 stainless steel

Drill Capacity: For min 1.2 up to 3.0 mm thick steel or for timber

Head Type: 8 mm AF Hex head

Washer: None, A15, A19, A29

In Steel

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	≥1.2	1.89	1.42	2.02	1.52
Not required	≥0.5	≥1.8	2.39	1.80	2.02	1.52
YES	≥0.5	≥1.8	3.28	2.47	2.02	1.52
Not required	≥0.7	≥1.8	3.76	2.83	2.02	1.52
YES	≥0.7	≥1.8	5.10	3.84	2.02	1.52

In Timber

Washer ≥ 15 mm	Substrate I t_I (mm)	Substrate II t_{II} (mm)	$N_{R,k}$ (kN)	$N_{R,d}$ (kN)	$V_{R,k}$ (kN)	$V_{R,d}$ (kN)
Not required	≥0.5	34	2.39	1.80	2.02	1.52
YES	≥0.5	34	3.07	2.31	2.02	1.52
Not required	≥0.7	34	3.07	2.31	2.02	1.52

Substrate II is the length of fastener thread assumed to be embedded in the timber substrate

$N_{R,k} = 3.07$ (kN) and $N_{R,d} = 2.31$ (kN) for the given embedded length in C16 timber or better and should be reduced proportionally for shorter embedded lengths unless the head side value is critical (underlined).

The embedded length should not be less than 6 times the outer thread diameter to comply with Eurocode 5.