



ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
Internet www.etadanmark.dk

Authorised and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA



European Technical Assessment ETA-21/0951 of 2022/06/01

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 66 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

Blind rivets type AP, ASO, SSO and FN

Product family to which the above construction product belongs:

Blind rivets for connections of metal sheets and plates

Manufacturer:

SFS Group Schweiz AG
Rosenbergsaustrasse 10
CH-9435 Heerbrugg
Telephone: +41 71 727 51 51
www.sfs.com

Manufacturing plant:

Plants of SFS intec AG

This European Technical Assessment contains:

20 pages including 15 annexes which form an integral part of the document

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, based on:

European Assessment Document (EAD) No. 331064-00-0602: Blind rivets for connections of metal sheets and plates

This version replaces:

The ETA with the same number issued on 2021-12-13

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use.

The blind rivets type AP, ASO, SSO and FN are made of stainless steel and/or aluminum. The blind rivets and the corresponding connections are subject to tension and/or shear forces. Examples of the blind rivets are shown in Figure 1.

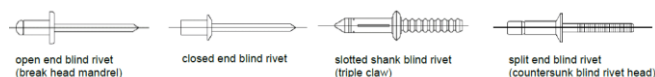


Figure 1: Examples of blind rivets

The blind rivets, described in this ETA are summarized in Table 1.

Rivet	Material	
	Sleeve	Mandrel
AP11 - Ø 5,0 FN-AI5-5x1 K11	EN AW 5019	1.4541 (A2)
AP14 - Ø 5,0 FN-AI5-5x1 K14	EN AW 5019	1.4541 (A2)
AP16 - Ø 5,0 FN-AI5-5x1 K16	EN AW 5019	1.4541 (A2)
AP15-R - Ø 4,0	EN AW 5754	1.4541 (A2)
AP15-R - Ø 4,0	EN AW 5019	1.4541 (A2)
ASO-D11 - Ø 5,0 FN-AI3-5x1 K11	EN AW 5754	1.4541 (A2)
ASO-D14 - Ø 5,0 FN-AI3-5x1 K14	EN AW 5754	1.4541 (A2)
ASO-D16 - Ø 5,0 FN-AI3-5x1 K16	EN AW 5754	1.4541 (A2)
SSO-D15 - Ø 5,0 FN-A4-5x1 K15	1.4578 (A4)	1.4571 (A4)
SSO-D15 - Ø 4,0	1.4578 (A4)	1.4571 (A4)
SSO-D15 - R - Ø 4,0	1.4578 (A4)	1.4571 (A4)

Table 1: Blind rivets, dimensions and material

See also annex 3-15 for more information about the blind rivets and the pre-drill diameter.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

Blind rivets type AP, ASO, SSO and FN are intended to be used for joining metal members. They are intended to be used for fastening metal sheeting to metal substructure, joining sheet metals or other thin-gauge metal members primarily applied in lightweight constructions or for the installation of panel material intended for façade applications. Appropriate blind rivets e.g., those with large rivet diameters might also be used for joining metal plates and metal members having structural function in metal constructions, the use of the products in soffit applications is allowed. The joined members are made from aluminium or steel and have parallel surfaces which might be coated.

Blind rivets are intended to be used in connections under static or quasi-static actions whereby the blind rivet is subjected to tension or shear forces.

More information in table, section 3: “Performance of the product and references to the methods used for its assessment”.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the blind rivets of 25 years, provided the manufacturers conditions laid down in the manufacturers data sheet for the packaging, transport, storage, installation, use, maintenance and repair are met.

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by the Technical Assessment Body issuing an ETA based on the EAD No. 331064-00-0602 but are regarded only as means for expressing the expected economically reasonable working life of the product.

3 Performance of the product and references to the methods used for its assessment

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability (BWR1)	
Nominal tensile load of blind rivet $F_{t,nom}$ [kN]	No performance assessed
Nominal shear load of blind rivet $F_{v,nom}$ [kN]	No performance assessed
Tension resistance of blind rivet $F_{t,Rk}$ [kN]	No performance assessed
Shear resistance of blind rivet $F_{v,Rk}$ [kN]	No performance assessed
Mandrel head retention capability $F_{hr,k}$ [kN]	No performance assessed
Pull-through resistance (blind rivet head) $F_{p,Rk}$ [kN]	No performance assessed
Pull-out resistance (blind rivet head) $F_{o,Rk}$ [kN]	No performance assessed
Tension resistance in certain joint $F_{j,t,Rk} = N_{Rk}$ [kN]	See annex 3-15
Shear resistance in certain joint $F_{j,v,Rk} = V_{R,k}$ [kN]	See annex 3-15
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The product is classified as Euroclass A1 in accordance with EN 13501-1 and EC Decision 96/603/EC.
3.3 Aspects of durability	
Corrosion protection	See annex 3-15

See additional information in section 3.8 – 3.9.

3.8 Methods of verification

The characteristic values of the blind rivets are based on the EAD 331064-00-0602.

3.9 General aspects related to the fitness for use of the product.

The European Technical Assessment is issued for the product based on agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide if such changes affect the ETA and consequently the validity of the CE marking based on the ETA and if so whether further

assessment or alterations to the ETA, shall be necessary.

The blind rivets type AP, ASO, SSO and FN are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

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

4.1 AVCP system

According to the Commission Decision 98/241/EC, as amended by the Commission Decision 2001/596/EC, the system(s) of assessment and verification of constancy of performance is system 2+ (see Annex V to Regulation (EU) No 305/2011).

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

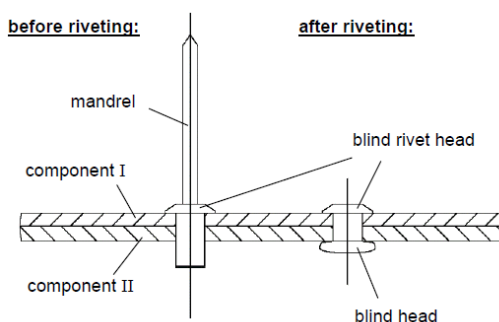
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2022-06-01 by



Thomas Bruun
Managing Director, ETA-Danmark

Examples of execution of a connection (from EAD 331064-00-0602)



Terms for materials

- Sleeve Material of the sleeve of the rivet
- Mandrel Material of the mandrel of the rivet
- Component I Material of the metal member or sheeting which is fastened to the substructure, panel materials intended for façade constructions (accessible for installation).
- Component II Material of the substructure where the blind head is formed.

Terms for dimensions

- t_I Thickness of component I
- t_{II} Thickness of component II
- $\Sigma(t_i)$ Sum of the thicknesses of all components

Terms for performances

- $V_{R,k}$ Characteristic value of shear resistance of the connection
 $V_{Rk} = F_{j,v,t,Rk}$ according to EAD 331064-00-0602
- $N_{R,k}$ Characteristic value of tension resistance of the connection
 $N_{Rk} = F_{j,t,Rk}$ according to EAD 331064-00-0602

Used terms in the Annexes	
Blind rivets for connections of metal sheets and plates	Annex 1

Determination of Design Values

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

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

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

The characteristic values $N_{R,k}$ and $V_{R,k}$ is given in the Annexes. For intermediate dimension of metal member or sheeting or substructure the characteristic value of the thinner dimension is used.

The recommended partial safety factor is $\gamma_M = 1,25$ if no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

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

Installation conditions

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

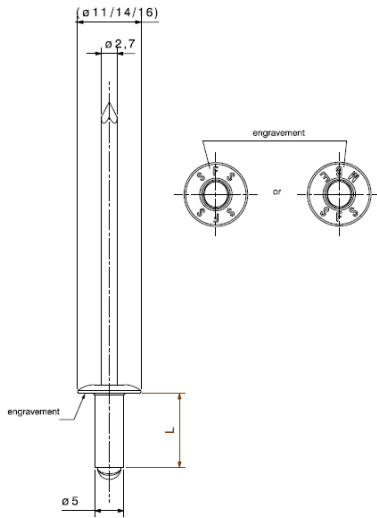
The rivets may only be used in connections where no or only negligibly small temperature-related constraint stresses occur.

The rivets may only be installed with machinery recommended by the manufacturer.

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

The thickness of the clamped components has to correspond to the clamping length of the rivet.

Basics for the design	Annex 2
Blind rivets for connections of metal sheets and plates	



Materials:

sleeve: Aluminum EN AW 5019 - EN 755-2
 mandrel: Stainless steel 1.4541 (A2) - EN 3506-1

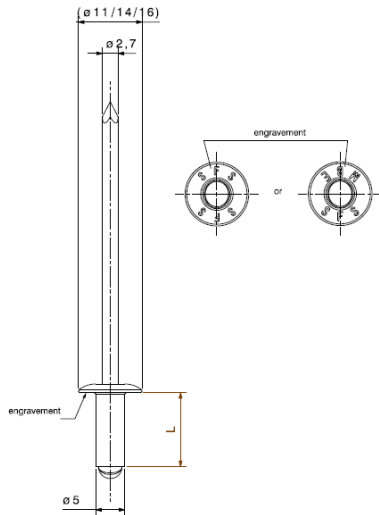
Component I: S280GD to S550GD – EN 10346

Component II: S280GD to S550GD – EN 10346
 S235 to S355 – EN 10025-1

Pre-drill-diameter: Ø 5,1 mm

		Thickness of component II t_{II} [mm]								
		0,50	0,63	0,75	0,88	1,00	1,25	1,50	$\geq 2,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	-	-	-	-	1,61
		0,63	-	-	-	-	-	-	-	1,86
		0,75	-	-	-	-	-	-	-	2,10
		0,88	-	-	-	-	-	-	-	2,10
		1,00	-	-	-	-	-	-	2,10	2,10
		1,25	-	-	-	-	-	2,10	2,10	2,10
		1,50	-	-	-	-	2,10	2,10	2,10	2,10
		$\geq 2,00$	1,06	1,47	1,86	1,98	2,10	2,10	2,10	2,10
	$N_{R,k}$ [kN]	0,50	-	-	-	-	-	1,42	1,42	
		0,63	-	-	-	-	-	1,42	1,42	
		0,75	-	-	-	-	-	1,42	1,42	
		0,88	-	-	-	-	-	1,42	1,42	
		1,00	-	-	-	-	1,26	1,42	1,42	
		1,25	-	-	0,87	1,07	1,26	1,42	1,42	
		1,50	0,38	0,64	0,87	1,07	1,26	1,42	1,42	
		$\geq 2,00$	0,38	0,64	0,87	1,07	1,26	1,42	1,42	

Blind rivet		Annex 3
FN-A15-5xL K11, AP11 – Ø 5,0 FN-A15-5xL K14, AP14 – Ø 5,0 FN-A15-5xL K16, AP16 – Ø 5,0		



Materials:

sleeve: Aluminum EN AW 5019 - EN 755-2
 mandrel: Stainless steel 1.4541 (A2) – EN 3506-1

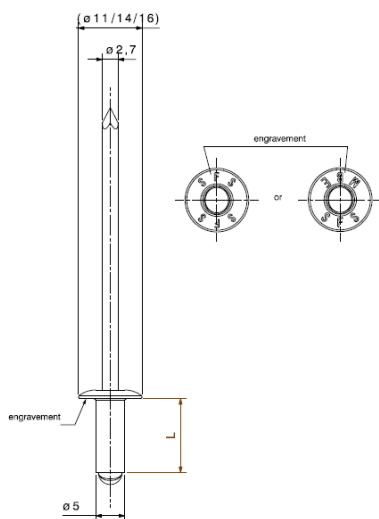
Component I: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Pre-drill-diameter: $\varnothing 5,1 \text{ mm}$

		Thickness of component II t_{II} [mm]								
		0,50	0,60	0,70	0,80	1,00	1,20	1,50	$\geq 2,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	-	-	-	0,70	0,70
		0,60	-	-	-	-	-	-	1,12	1,12
		0,70	-	-	-	-	-	-	1,55	1,55
		0,80	-	-	-	-	-	1,98	1,98	1,98
		1,00	-	-	-	-	1,15	1,98	1,98	1,98
		1,20	-	-	-	1,30	1,30	1,98	1,98	1,98
		1,50	0,44	0,72	1,01	1,30	1,30	1,98	1,98	1,98
		$\geq 2,00$	0,44	0,72	1,01	1,30	1,30	1,98	1,98	1,98
		$N_{R,k}$ [kN]	0,50	-	-	-	-	-	-	0,79
0,60	-		-	-	-	-	-	0,94	1,04	
0,70	-		-	-	-	-	-	0,94	1,30	
0,80	-		-	-	-	-	0,67	0,94	1,37	
1,00	-		-	-	-	0,50	0,67	0,94	1,37	
1,20	-		-	-	0,39	0,50	0,67	0,94	1,37	
1,50	0,18		0,25	0,32	0,39	0,50	0,67	0,94	1,37	
$\geq 2,00$	0,18		0,25	0,32	0,39	0,50	0,67	0,94	1,37	

Blind rivet		Annex 4
FN-A15-5xL K11, AP11 – $\varnothing 5,0$ FN-A15-5xL K14, AP14 – $\varnothing 5,0$ FN-A15-5xL K16, AP16 – $\varnothing 5,0$		



Materials:

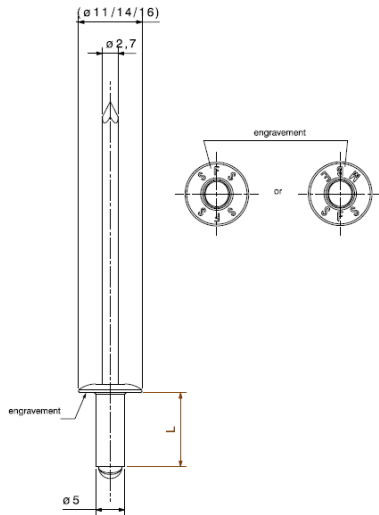
sleeve: Aluminum EN AW 5019 - EN 755-2
 mandrel: Stainless steel 1.4541 (A2) – EN 3506-1

Component I: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$
 Component II: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

Pre-drill-diameter: $\text{Ø } 5,1 \text{ mm}$

		Thickness of component II t_{II} [mm]								
		0,50	0,60	0,70	0,80	1,00	1,20	1,50	$\geq 2,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	-	-	-	0,91	0,91
		0,60	-	-	-	-	-	-	1,27	1,27
		0,70	-	-	-	-	-	-	1,62	1,62
		0,80	-	-	-	-	-	1,98	1,98	1,98
		1,00	-	-	-	-	1,49	1,98	1,98	1,98
		1,20	-	-	-	1,30	1,49	1,98	1,98	1,98
		1,50	0,57	0,81	1,06	1,30	1,49	1,98	2,12	2,12
		$\geq 2,00$	0,57	0,81	1,06	1,30	1,49	1,98	2,12	2,12
		$N_{R,k}$ [kN]	0,50	-	-	-	-	-	-	1,03
0,60	-		-	-	-	-	-	1,20	1,20	
0,70	-		-	-	-	-	-	1,23	1,38	
0,80	-		-	-	-	-	0,88	1,23	1,56	
1,00	-		-	-	-	0,65	0,88	1,23	1,56	
1,20	-		-	-	0,39	0,65	0,88	1,23	1,56	
1,50	0,23		0,29	0,34	0,39	0,65	0,88	1,23	1,56	
$\geq 2,00$	0,23		0,29	0,34	0,39	0,65	0,88	1,23	1,56	

Blind rivet	Annex 5
FN-A15-5xL K11, AP11 – Ø 5,0 FN-A15-5xL K14, AP14 – Ø 5,0 FN-A15-5xL K16, AP16 – Ø 5,0	



Materials:

sleeve: Aluminum EN AW 5754 - EN 755-2
 mandrel: Stainless steel 1.4541 (A2) – EN 3506-1

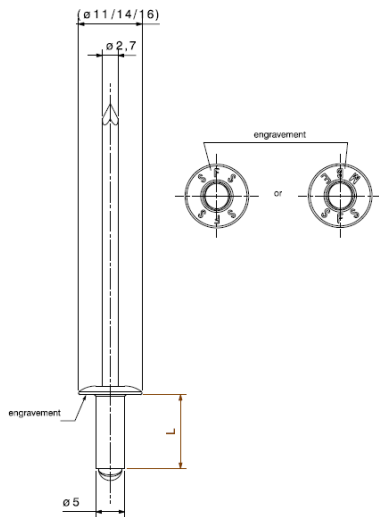
Component I: S280GD to S550GD – EN 10346

Component II: S280GD to S550GD – EN 10346
 S235 to S355 – EN 10025-1

Pre-drill-diameter: Ø 5,1 mm

		Thickness of component II t_{II} [mm]								
		0,50	0,63	0,75	0,88	1,00	1,25	1,50	$\geq 2,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	-	-	-	-	1,51
		0,63	-	-	-	-	-	-	-	1,54
		0,75	-	-	-	-	-	-	-	1,57
		0,88	-	-	-	-	-	-	-	1,57
		1,00	-	-	-	-	-	-	1,57	1,57
		1,25	-	-	-	-	-	1,57	1,57	1,57
		1,50	-	-	-	-	1,57	1,57	1,57	1,57
		$\geq 2,00$	1,03	1,23	1,41	1,49	1,57	1,57	1,57	1,57
		$N_{R,k}$ [kN]	0,50	-	-	-	-	-	-	1,42
0,63	-		-	-	-	-	-	1,42	1,42	
0,75	-		-	-	-	-	1,42	1,42	1,42	
0,88	-		-	-	-	-	1,42	1,42	1,42	
1,00	-		-	-	-	1,42	1,42	1,42	1,42	
1,25	-		-	0,85	1,20	1,42	1,42	1,42	1,42	
1,50	0,44		0,66	0,85	1,20	1,42	1,42	1,42	1,42	
$\geq 2,00$	0,44		0,66	0,85	1,20	1,42	1,42	1,42	1,42	

Blind rivet	
FN-AI3-5xL K11, ASO-D11 – Ø 5,0 FN-AI3-5xL K14, ASO-D14 – Ø 5,0 FN-AI3-5XL K16, ASO - D16 – Ø 5,0	Annex 6



Materials:

sleeve: Aluminum EN AW 5754 - EN 755-2
 mandrel: Stainless steel 1.4541 (A2) – EN 3506-1

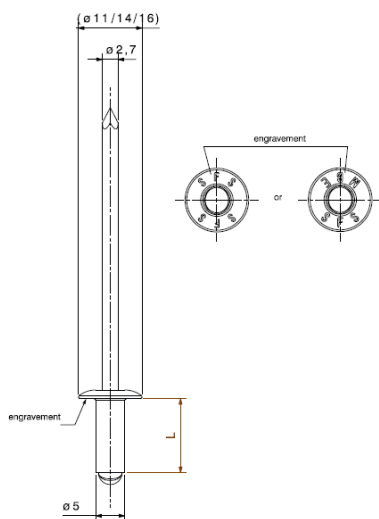
Component I: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Pre-drill-diameter: $\text{Ø } 5,1 \text{ mm}$

		Thickness of component II t_{II} [mm]								
		0,50	0,60	0,70	0,80	1,00	1,20	1,50		
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	-	-	-	0,73	0,73
		0,60	-	-	-	-	-	-	1,06	1,06
		0,70	-	-	-	-	-	-	1,39	1,39
		0,80	-	-	-	-	-	1,72	1,72	1,72
		1,00	-	-	-	-	1,08	1,72	1,72	1,72
		1,20	-	-	-	1,33	1,33	1,72	1,72	1,72
		1,50	0,45	0,75	1,04	1,33	1,33	1,72	1,72	1,72
		$\geq 2,00$	0,45	0,75	1,04	1,33	1,33	1,72	1,72	1,72
Thickness of component I t_I [mm]	$N_{R,k}$ [kN]	0,50	-	-	-	-	-	-	0,79	0,79
		0,60	-	-	-	-	-	-	0,96	1,04
		0,70	-	-	-	-	-	-	0,96	1,30
		0,80	-	-	-	-	-	0,69	0,96	1,45
		1,00	-	-	-	-	0,51	0,69	0,96	1,45
		1,20	-	-	-	0,60	0,51	0,69	0,96	1,45
		1,50	0,20	0,33	0,47	0,60	0,51	0,69	0,96	1,45
		$\geq 2,00$	0,20	0,33	0,47	0,60	0,51	0,69	0,96	1,45

Blind rivet	
FN-AI3-5xL K11, ASO-D11 – Ø 5,0 FN-AI3-5xL K14, ASO-D14 – Ø 5,0 FN-AI3-5XL K16, ASO - D16 - Ø 5,0	Annex 7



Materials:

sleeve: Aluminum EN AW 5754 - EN 755-2
 mandrel: Stainless steel 1.4541 (A2) – EN 3506-1

Component I: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

Pre-drill-diameter: $\varnothing 5,1 \text{ mm}$

		Thickness of component II t_{II} [mm]								
		0,50	0,60	0,70	0,80	1,00	1,20	1,50	$\geq 2,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	-	-	-	0,95	0,95
		0,60	-	-	-	-	-	-	1,21	1,21
		0,70	-	-	-	-	-	-	1,46	1,46
		0,80	-	-	-	-	-	1,72	1,72	1,72
		1,00	-	-	-	-	1,41	1,72	1,72	1,72
		1,20	-	-	-	1,33	1,41	1,72	1,72	1,72
		1,50	0,59	0,84	1,08	1,33	1,41	1,72	1,72	1,72
		$\geq 2,00$	0,59	0,84	1,08	1,33	1,41	1,72	1,72	1,72
		$N_{R,k}$ [kN]	0,50	-	-	-	-	-	-	1,03
0,60	-		-	-	-	-	-	1,20	1,20	
0,70	-		-	-	-	-	-	1,26	1,38	
0,80	-		-	-	-	-	0,90	1,26	1,56	
1,00	-		-	-	-	0,67	0,90	1,26	1,56	
1,20	-		-	-	0,60	0,67	0,90	1,26	1,56	
1,50	0,26		0,37	0,49	0,60	0,67	0,90	1,26	1,56	
$\geq 2,00$	0,26		0,37	0,49	0,60	0,67	0,90	1,26	1,56	

Blind rivet	Annex 8
FN-AI3-5xL K11, ASO-D11 – $\varnothing 5,0$ FN-AI3-5xL K14, ASO-D14 – $\varnothing 5,0$ FN-AI3-5XL K16, ASO – D16 – $\varnothing 5,0$	

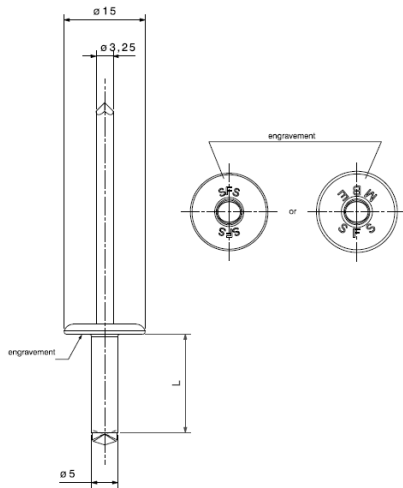
Materials:

sleeve: Stainless steel 1.4578 (A4) – EN 3506-1

mandrel: Stainless steel 1.4571 (A4) – EN 3506-1

Component I: S280GD to S550GD – EN 10346

Component II: S280GD to S550GD – EN 10346
S235 to S355 – EN 10025-1



Pre-drill-diameter: Ø 5,1 mm

		Thickness of component II t_{II} [mm]				
		2,00	2,50	3,00	$\geq 4,00$	
Thickness of component I t_I [mm]	$V_{R,k}$	2,00	3,60	3,60	3,60	3,60
	[kN]	2,50	3,60	3,60	3,60	3,60
		3,00	3,60	3,60	3,60	3,60
		$\geq 4,00$	3,60	3,60	3,60	3,60
$N_{R,k}$		2,00	2,85	2,85	2,85	2,85
	[kN]	2,50	2,85	2,85	2,85	2,85
		3,00	2,85	2,85	2,85	2,85
		$\geq 4,00$	2,85	2,85	2,85	2,85

Blind rivet	Annex 9
FN-A4-5xL K15, SSO-D15 – Ø 5,0	

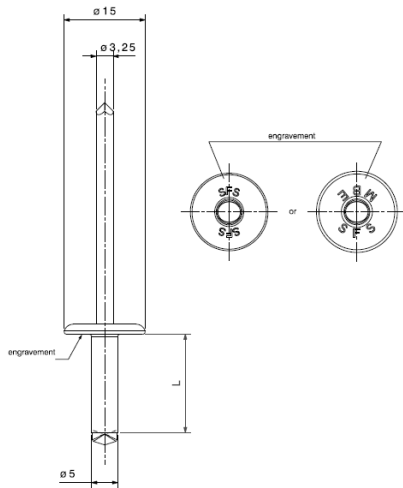
Materials:

sleeve: Stainless steel 1.4578 (A4) – EN 3506-1

mandrel: Stainless steel 1.4571 (A4) – EN 3506-1

Component I: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$



Pre-drill-diameter: $\varnothing 5,1 \text{ mm}$

		Thickness of component II t_{II} [mm]				
		2,00	2,50	3,00	$\geq 4,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	0,93
		0,60	-	-	-	1,22
		0,70	-	-	-	1,50
		0,80	-	-	-	1,78
		1,00	-	-	2,00	2,00
		1,20	-	-	2,24	2,24
		1,50	-	2,61	2,61	2,61
		2,00	2,45	2,61	2,61	2,61
		2,50	2,45	2,61	2,61	2,61
		3,00	2,45	2,61	2,61	2,61
	$\geq 4,00$	2,45	2,61	2,61	4,27	
	$N_{R,k}$ [kN]	0,50	0,51	0,51	0,51	0,51
		0,60	0,55	0,55	0,55	0,55
		0,70	1,21	1,59	1,59	1,59
		0,80	1,21	1,94	2,64	2,64
		1,00	1,21	1,94	2,29	2,29
		1,20	1,21	1,94	2,59	2,59
		1,50	1,21	1,94	2,68	3,04
		$\geq 2,00$	1,21	1,94	2,68	3,04

Blind rivet	Annex 10
FN-A4-5xL K15, SSO-D15 – $\varnothing 5,0$	

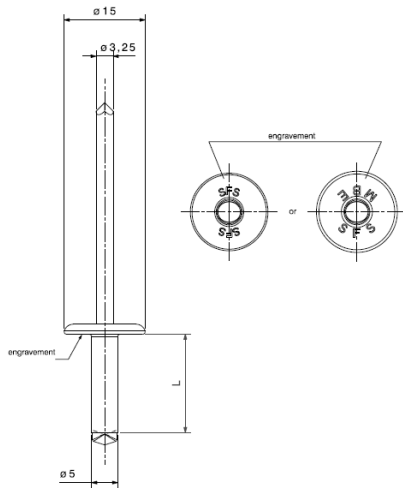
Materials:

sleeve: Stainless steel 1.4578 (A4) – EN 3506-1

mandrel: Stainless steel 1.4571 (A4) – EN 3506-1

Component I: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

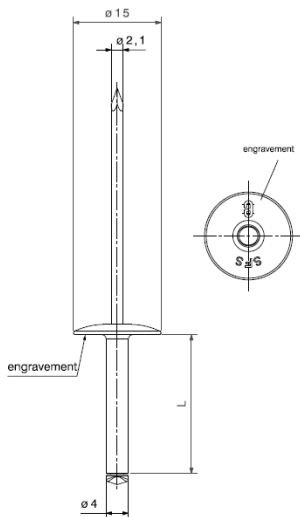
Component II: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$



Pre-drill-diameter: $\varnothing 5,1 \text{ mm}$

		Thickness of component II t_{II} [mm]				
		2,00	2,50	3,00	$\geq 4,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	0,50	-	-	-	1,22
		0,60	-	-	-	1,59
		0,70	-	-	-	1,95
		0,80	-	-	-	2,32
		1,00	-	-	2,60	2,60
		1,20	-	-	2,92	2,92
		1,50	-	3,40	3,40	3,40
		2,00	3,19	3,40	3,40	3,40
		2,50	3,19	3,40	3,40	3,40
		3,00	3,19	3,40	3,40	3,40
	$\geq 4,00$	3,19	3,40	3,40	4,27	
	$N_{R,k}$ [kN]	0,50	0,66	0,66	0,66	0,66
		0,60	0,72	0,72	0,72	0,72
		0,70	1,58	1,68	1,68	1,68
		0,80	1,58	2,13	2,64	2,64
		1,00	1,58	2,13	2,68	2,99
1,20		1,58	2,13	2,68	3,38	
1,50		1,58	2,13	2,68	3,95	
$\geq 2,00$	1,58	2,13	2,68	3,95		

Blind rivet	Annex 11
FN-A4-5xL K15, SSO-D15 – $\varnothing 5,0$	



Materials:

sleeve: Aluminum EN AW 5754 - EN 755-2 or

Aluminum EN AW 5019 - EN 755-2

mandrel: Stainless steel 1.4541 (A2) – EN 3506-1

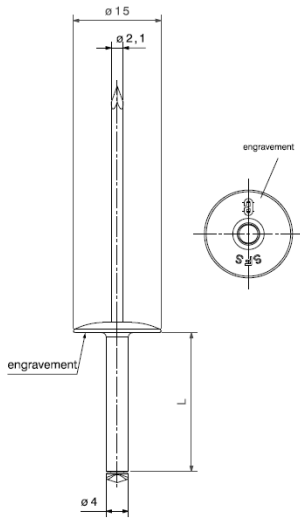
Component I: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Pre-drill-diameter: $\text{Ø } 4,1 \text{ mm}$

		Thickness of component II t_{II} [mm]				
		2,00	2,50	3,00	$\geq 4,00$	
Thickness of component I t_I [mm]	$V_{R,k}$	2,50	-	1,58	1,58	1,58
	[kN]	3,00	-	1,86	1,86	1,86
		3,50	-	1,86	1,86	1,86
		$\geq 4,00$	-	1,86	1,86	1,86
$N_{R,k}$		2,50	-	1,45	1,45	1,45
	[kN]	3,00	-	1,45	1,45	1,45
		3,50	-	1,45	1,45	1,45
		$\geq 4,00$	-	1,45	1,45	1,45

Blind rivet	Annex 12
AP15-R – Ø 4,0	



Materials:

sleeve: Aluminum EN AW 5754 - EN 755-2 or

Aluminum EN AW 5019 - EN 755-2

mandrel: Stainless steel 1.4541 (A2) – EN 3506-1

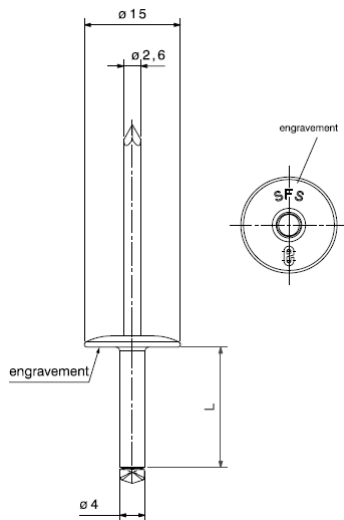
Component I: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

Pre-drill-diameter: $\text{Ø } 4,1 \text{ mm}$

		Thickness of component II t_{II} [mm]				
		2,00	2,50	3,00	$\geq 4,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	2,50	-	1,79	1,79	1,79
		3,00	-	1,86	1,86	1,86
		3,50	-	1,86	1,86	1,86
		$\geq 4,00$	-	1,86	1,86	1,86
	$N_{R,k}$ [kN]	2,50	-	1,88	1,88	1,88
		3,00	-	1,88	1,88	1,88
		3,50	-	1,88	1,88	1,88
		$\geq 4,00$	-	1,88	1,88	1,88

Blind rivet	Annex 13
AP15-R – Ø 4,0	



Materials:

sleeve: Stainless steel 1.4578 (A4) – EN 3506-1

mandrel: Stainless steel 1.4571 (A4) – EN 3506-1

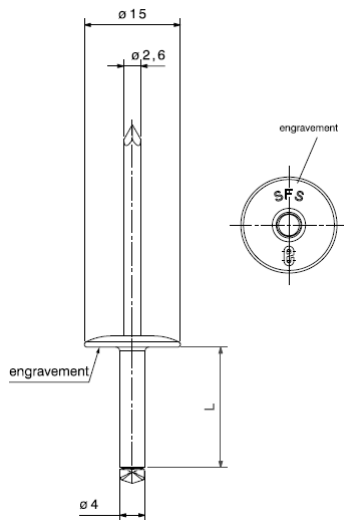
Component I: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$

Pre-drill-diameter: $\text{Ø } 4,1 \text{ mm}$

		Thickness of component II t_{II} [mm]				
		2,00	2,50	3,00	$\geq 4,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	2,00	-	-	-	2,03
		2,50	-	-	-	2,47
		3,00	-	-	2,92	2,92
		$\geq 4,00$	1,99	2,46	2,92	3,18
$N_{R,k}$ [kN]	2,00	1,13	1,76	2,39	3,45	
	2,50	1,13	1,76	2,39	3,45	
	3,00	1,13	1,76	2,39	3,45	
	$\geq 4,00$	1,13	1,76	2,39	3,45	

Blind rivet	
SSO-D15 – Ø 4,0 SSO-D15 - R– Ø 4,0	Annex 14



Materials:

sleeve: Stainless steel 1.4578 (A4) – EN 3506-1

mandrel: Stainless steel 1.4571 (A4) – EN 3506-1

Component I: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

Component II: Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$

Pre-drill-diameter: $\text{Ø } 4,1 \text{ mm}$

		Thickness of component II t_{II} [mm]				
		2,00	2,50	3,00	$\geq 4,00$	
Thickness of component I t_I [mm]	$V_{R,k}$ [kN]	2,00	-	-	-	2,64
		2,50	-	-	-	2,78
		3,00	-	-	2,92	2,92
		$\geq 4,00$	2,59	2,76	2,92	3,18
$N_{R,k}$ [kN]	2,00	1,47	1,93	2,39	3,45	
	2,50	1,47	1,93	2,39	3,45	
	3,00	1,47	1,93	2,39	3,45	
	$\geq 4,00$	1,47	1,93	2,39	3,45	

Blind rivet	Annex 15
SSO-D15 – Ø 4,0 SSO-D15 - R– Ø 4,0	