Declaration of Performance

No **2 - 028 - 210756 - 2021/0**

1.) Unique identification code of the product-type:
EJOT CROSSFIX

2.) Intended use:
Kits for external wall claddings

3.) Manufacturer:
EJOT Baubefestigungen GmbH, In der Stockwiese 35, 57334 Bad Laasphe

4.) System of AVCP:
System 2+

5.)

European Assesment Document:	**EAD 090034-00-0404**
European Technical Assessment:	**ETA-21/0756**
Technical assessment body:	**ETA-DANMARK A/S**
Notified body:	**0672 - MPA - Materialprüfanstalt Universität Stuttgart**

6.) Declared Performance:

a) Mechanical resistance and stability (BWR 1) and safety and accessibility (BWR 4)

Essential characteristic	Performance
Wind load resistance	For information see annex 1
Resistance to vertical load of the whole assembled system	For information see annex 1
Pull-out resistance of fixings (from profiles)	Fm = 2.068 N / Fc = 1.905 N
Resistance to vertical loads of brackets	For information see annex 2
Resistance to horizontal load of brackets	For information see annex 3
Mechanical characteristics of subframe fixings	For information see annex 4 and annex 6

b) Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Euroclass A1 in accordance with EN 13501-1

c) Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dr. Jens Weber / Vice President
(Name and function)

Bad Laasphe, 03.09.2021
(Place and date of issue)

(Signature)

Wind load resistance

Profile	Max. load Q [Pa]	Maximum deflection under load [mm]	Maximum permanent deflection [mm]	Calculated values [Pa]
horizontal T-profile	10.265	51,1	17,5	6.646
vertical T-profile	7.674	29,7	6,7	6.015

Resistance to vertical load of the whole assembled system

Calculated values:

Assembled system	Sum of bracket resistance F_{3d} [N]	Shear resistance of:	
		subframe fixings [N]	skin element fixings [N]
Horizontal profiles with powerkey	**699**	21828	8229
Horizontal profiles without powerkey	**396**	21828	8229
Vertical profiles with powerkey	**1758**	10914	8229
Vertical profiles without powerkey	**828**	10914	8229

Resistance to vertical load:

Assembled system	R_V [N]	Q_w [N]	Q_{ad} [N]	Δdeflection		
				Initial [mm]	1 hour [mm]	2 hour [mm]
Horizontal profiles with powerkey	233	**1348**	**50**	*0,00*	1,78	0,06
Horizontal profiles without powerkey	132	**359**	**37**	*0,00*	2,15	0,04
Vertical profiles with powerkey	586	**1743**	**15**	*0,00*	1,83	0,01
Vertical profiles without powerkey	276	**689**	**139**	*0,00*	2,67	0,03

Vertical profiles:

Bracket	without powerkey				with powerkey			
	F_r	F_{1d}	F_{3d}	F_s	F_r	F_{1d}	F_{3d}	F_s
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
Mouse 40	1381	1494	3374	3046	-	-	-	-
Mouse 60	785	974	2607	2766	-	-	-	-
K1 80	1057	854	2204	2372	-	-	-	-
K1 100	937	843	2179	2180	-	-	-	-
K1 120	916	579	1558	1649	1018	611	1652	1770
K1 140	819	510	1380	1531	963	600	1548	1647
K1 160	722	441	1202	1413	908	590	1444	1523
K1 180	624	372	1023	1294	853	579	1339	1400
K1 200	527	303	845	1176	798	569	1235	1276
K1 220	430	234	667	1058	743	558	1131	1153
K1 240	413	219	624	985	739	532	1068	1150
K1 260	396	204	580	912	735	507	1006	1147
K1 280	379	188	537	840	730	481	943	1143
K1 300	362	173	493	767	726	456	881	1140
K1 320	346	158	450	694	722	430	818	1137
K1 340	329	143	406	621	671	387	760	1082
K1 360	312	127	363	549	619	345	702	1026
K1 380	295	112	319	476	568	302	644	971
K1 400	278	97	276	403	516	259	586	915

Horizontal profiles:

Bracket	without powerkey				with powerkey			
	F_r	F_{1d}	F_{3d}	F_s	F_r	F_{1d}	F_{3d}	F_s
	[N]	[N]	[N]	[N]	[N]	[N]	[N]	[N]
Mouse 40	-	-	-	-	-	-	-	-
Mouse 60	-	-	-	-	-	-	-	-
K1 80	160	124	313	456	-	-	-	-
K1 100	226	102	295	415	-	-	-	-
K1 120	206	94	271	370	236	100	276	477
K1 140	202	90	261	368	275	98	276	506
K1 160	198	85	251	366	314	97	277	534
K1 180	195	81	240	364	352	95	277	563
K1 200	191	76	230	362	391	94	278	591
K1 220	187	72	220	360	430	92	278	620
K1 240	179	69	210	354	429	91	276	620
K1 260	171	66	200	347	428	90	273	619
K1 280	163	63	191	341	427	88	271	619
K1 300	155	60	181	334	426	87	268	618
K1 320	147	56	171	328	425	86	266	618
K1 340	139	53	161	321	424	86	258	617
K1 360	131	50	152	315	423	85	250	616
K1 380	123	47	142	308	421	85	241	614
K1 400	115	44	132	302	420	84	233	613

F_r Load that causes a residual distortion on the bracket equal to L/500
F_{1d}/F_{3d} Loads that causes a displacement under load of 1 mm and 3 mm.
F_s Failure load (Defined as residual distortion = max(0,75 mm; L/150))

Vertical profiles:

Bracket	F_m [N]	F_t [N]
Mouse 40	2179	3049
Mouse 60	2309	3059
K1 80	3149	4625
K1 100	3149	4625
K1 120	3149	4625
K1 140	3149	4625
K1 160	3149	4625
K1 180	3149	4625
K1 200	3149	4625
K1 220	3149	4625
K1 240	3149	4625
K1 260	3149	4625
K1 280	3149	4625
K1 300	3149	4625
K1 320	3149	4625
K1 340	3149	4625
K1 360	3149	4625
K1 380	3149	4625
K1 400	3149	4625

Horizontal profiles:

Bracket	F_m [N]	F_t [N]
Mouse 40	-	-
Mouse 60	-	-
K1 80	2118	3231
K1 100	2118	3231
K1 120	2118	3231
K1 140	2118	3231
K1 160	2118	3231
K1 180	2118	3231
K1 200	2118	3231
K1 220	2118	3231
K1 240	2118	3231
K1 260	2118	3231
K1 280	2118	3231
K1 300	2118	3231
K1 320	2118	3231
K1 340	2118	3231
K1 360	2118	3231
K1 380	2118	3231
K1 400	2118	3231

F_m Load that causes a residual distortion on the bracket equal to 1 mm.
F_t Failure load (Defined as residual distortion equal to 3 mm)

The EJOT self-drilling screw JT4-LT-3-5,5x25 KD16 (stainless steel A2) is used to connect the skin element fixing to the subframe.

The screw is shown in the following figure.

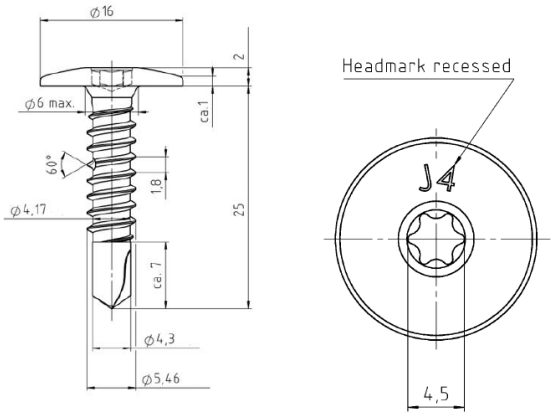


Figure 1: EJOT self-drilling screw JT4-LT-3-5,5x25 KD16

The EJOT self-drilling screws JT9-2/5-5,0xL Vario (stainless steel A4) with carbon steel drill tip) and JT6-2/5-5,0xL Vario (stainless steel A4) used to connect the subframe to the wall brackets.

The screws are shown in the following figure.

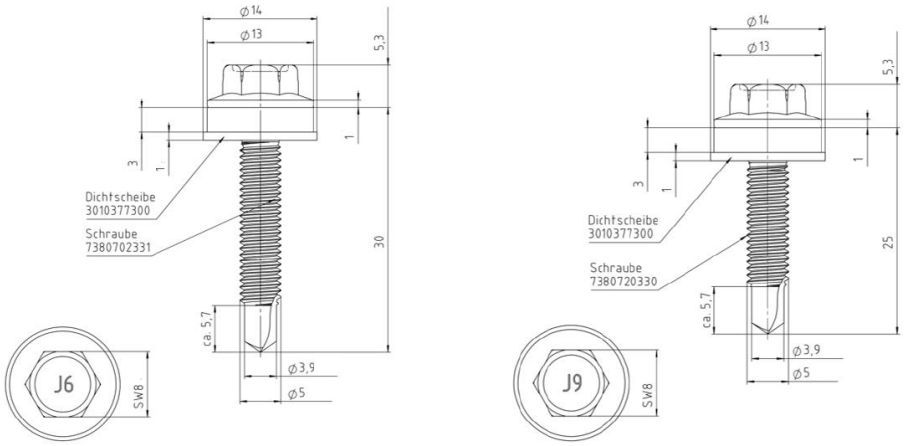
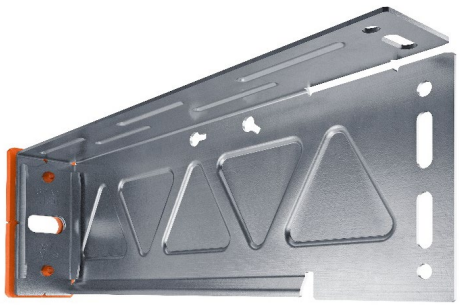


Figure 2: EJOT self-drilling screws JT6-2/2-5,0xL Vario and JT9-2/2-5,0xL Vario

The detailed characteristic shear and tensile strength of the screws are given in Annex 6.

Brackets and components

Geometry characteristics			
	Bracket - K1	**Powerkey - PK**	**Stressplate - SP**
Form			 **Thermostop - TS** 

Dimensions	**Width** **w** [mm]	**Height** **h** [mm]	**Length** **L** [mm]	**Thickness** **t** [mm]	**Cross section** **A** [mm^2]	**Weight** **m** [kg/pcs]	**Drawing** **-** [-]
Bracket	40	84	45 - 405	1,5	185,91	0,089 - 0,692	Figure 1.1 to 1.5
Stressplate	36,7	72	-	1,5	-	0,036	
Thermostop	44,5	88,5	-	5	-	0,016	
Powerkey	21	-	334	1,5	-	0,025	Figure 1.6

Material properties	**Symbol**	**Unit**	**Value**		
			Brackets, Stressplate, Powerkey		**Thermostop**
Type of material	-	[-]	Stainless steel A2 (1.4301)	Stainless steel A4 (1.4404)	PA 6 - I
Density	ρ	[kg/m^3]	7.900	7.980	1.100
Modulus of elasticity	E	[MPa]	200.000		790 - 840
Thermal expansion coefficient	α	[K^{-1}]	$16*10^{-6}$		-
Elastic limit	$R_{p0,2}$	[MPa]	230	240	-
Tensile strength	R_m	[MPa]	500 - 750	500 - 700	-
Elongation	A	[%]	35	55	42 - 50
Elongation	A_{50mm}	[%]		40	-
Brinell hardness	H	[HB]	≥ 215		-

Subframe and skin element fixings

Geometry characteristics		
	Subframe fixing JT6-2/5-5,0xL Vario & JT9-2/5-5,0xL Vario	**Skin element fixing** JT4-LT-3-5,5xL KD16
Form		

Dimensions	**Diameter** **Ø** [mm]	**Length** **L** [mm]	**Drawing** **-** [-]
JT6-2/5-5,0xL Vario	5	30	See Figure 2.1
JT9-2/5-5,0xL Vario	5	25	See Figure 2.2
JT4-LT-3-5,5xL KD16	5,5	25	See Figure 2.3

Material properties	**Symbol**	**Unit**	**Reference**	**Value**		
				JT6-2/5-5,0xL Vario	**JT9-2/5-5,0xL Vario**	**JT4-LT-3-5,5xL KD16**
Type of material	-	[-]	EN ISO 3506	Stainless steel A4 with carbon steel drill tip	Stainless steel A4	Stainless steel A2
Elastic limit	$R_{p0,2}$	[MPa]		210	210	210
Tensile strength	R_m	[MPa]		500	500	500
Elongation	A	[%]		0,6 · d	0,6 · d	0,6 · d
Shear load	-	[kN]	-	8,0	8,0	8,0

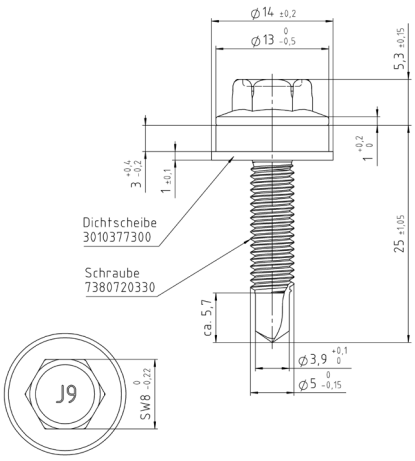


Figure 2.1: JT6-2/2-5,0xL Vario

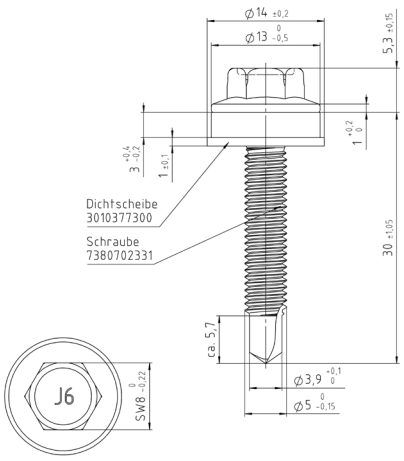


Figure 2.2: JT9-2/5-5,0xL Vario

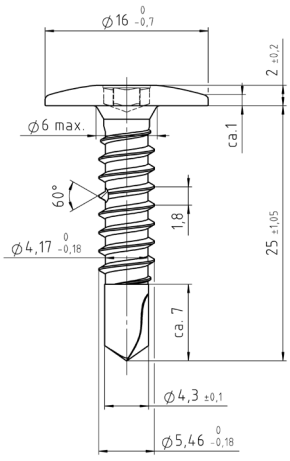


Figure 2.3: JT4-LT-3-5,5xL KD16

Subframe Profiles

Geometry characteristics					
Form	**L - Profile** without grooves 	**L - Profile** with grooves 	**T - Profile** without grooves 	**T - Profile** with grooves 	**T - Profile** with grooves and slot 
	Z - Profile with grooves 	**Ω - Profile** with grooves 	**C - Profile** with grooves 	**LB - Profile** 	**Y - Profile** with grooves 

Dimensions	Width [mm]	Height [mm]	Thickness t [mm]	Cross section A [mm^2]	Weight m [kg/m]	Inertia of profile section Ixx [cm^4]	Inertia of profile section Iyy [cm^4]	Drawing - [-]
L - Profile without grooves	40	60	2	196	0,529	7,52	2,78	Figure 3.1
L - Profile with grooves	40	60	2	184	0,497	7,09	2,62	Figure 3.2
T - Profile without grooves	100	60	2	317	0,855	9,71	15,38	Figure 3.3
T - Profile with grooves	120	60	2	355	0,958	9,26	26,92	Figure 3.4
T - Profile with grooves and slot	120	60	2	368	0,994	8,99	29,63	Figure 3.5
Z - Profile with grooves	40	27	2	184	0,497	2,43	4,74	Figure 3.6
Ω - Profile with grooves	120	27	2	364	0,982	4,41	35,23	Figure 3.7
C - Profile with grooves	20	66	2	224	0,604	12,31	1,08	Figure 3.8
LB - Profile	50	27	1,6	240	0,648	4,96	10,18	Figure 3.9
Y - Profile without grooves	110	87	2	468	1,264	21,62	35,03	Figure 3.10
Y - Profile with grooves	120	87	2	468	1,264	24,82	36,83	Figure 3.11

Material properties	Symbol	Unit	Value	Reference
Type of material	-	[-]	EN AW 6063 - T66	EN 1999-1-1
Density	ρ	[kg/m^3]	2.700	EN 1999-1-1
Modulus of elasticity	E	[MPa]	70.000	EN 1999-1-1
Thermal expansion coefficient	α	[K^{-1}]	$23{,}4*10^{-6}$	EN 1999-1-1
Elastic limit	$R_{p0,2}$	[MPa]	200	EN 1999-1-1 & EN 755-2
Tensile strength	R_m	[MPa]	245	EN 1999-1-1 & EN 755-2
Elongation	A	[%]	8	EN 1999-1-1 & EN 755-2
Elongation	A_{50mm}	[%]	6	EN 1999-1-1 & EN 755-2
Brinell hardness	H	[HB]	75	EN 1999-1-1