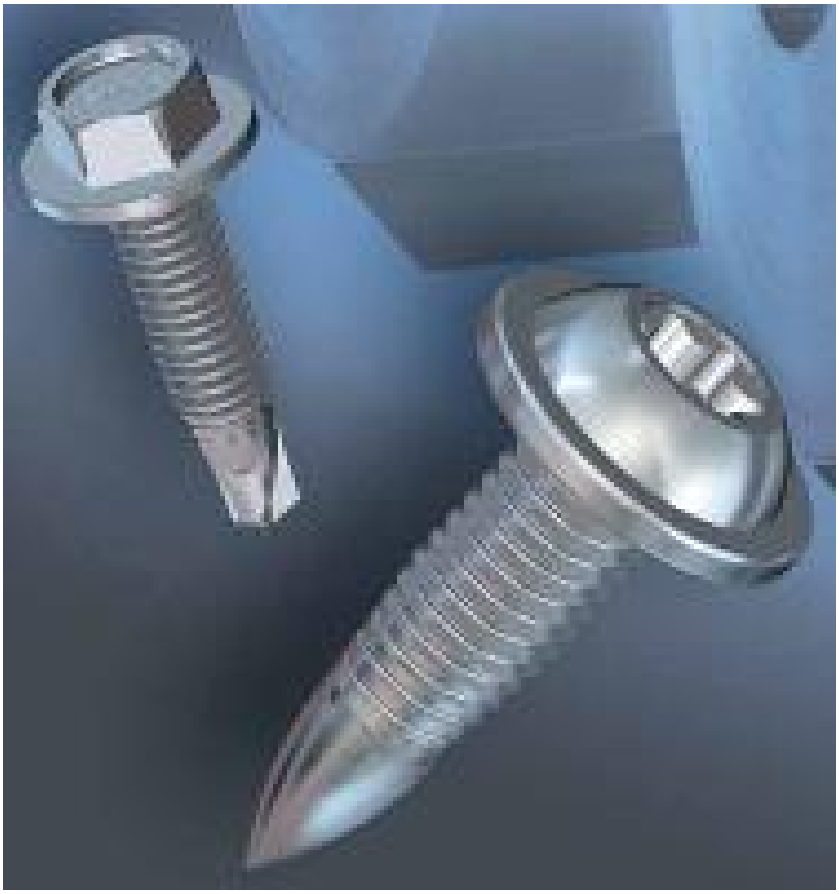
EJOT®

EJOT FDS®

The Flow-Drill Screw for High-Strength Sheet Joints

FDS®



Convincing facts about the EJOT FDS® joint

Removable and high-strength screw joint, without part preparations like punching or drilling

No problems regarding hole overlapping of clearance and pilot hole

No material waste while forming the through draught

No chips during thread forming

Several metric threads are engaged

High safety margin due to large distance between installation and stripping torque

High shearing strength and pull-out force

Assembly in different sheet surfaces is possible

High break loose torque and vibration resistance

Repeat assemblies possible with standard machine screws

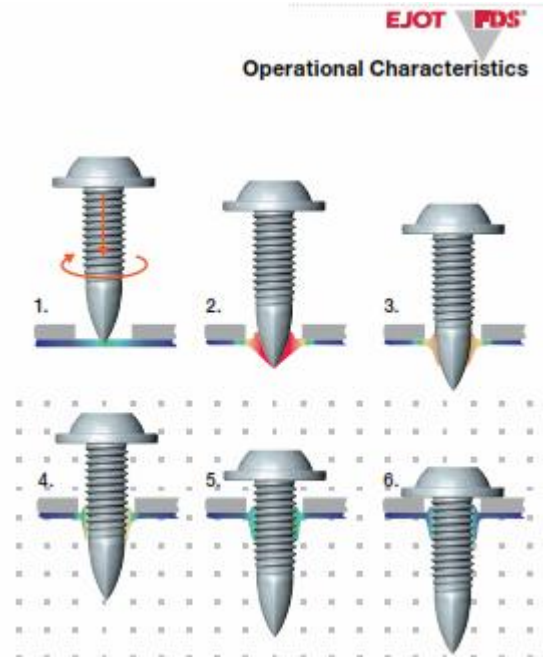
Earthing assemblies (according to DIN VDE 0700) are practical

Easy to disassemble and recyclable

Low overall joint costs

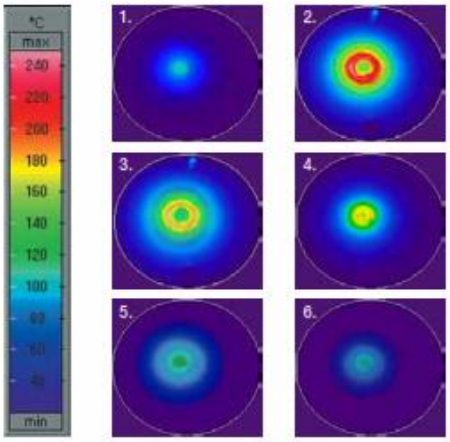
Stages of the FDS® assembly

1. Warming up of the sheet through end load and high rotation speed
2. Penetration into the material
3. Forming of the through draught
4. Chipless forming of female machine thread
5. Engagement of full threads
6. Tightening with the pre-set torque



Temperature pattern of a FDS® joint

1. Heating
2. Penetrating
3. Through draught forming
4. Thread forming
5. Engangement of full threads
6. Tightening



Fastening parameter

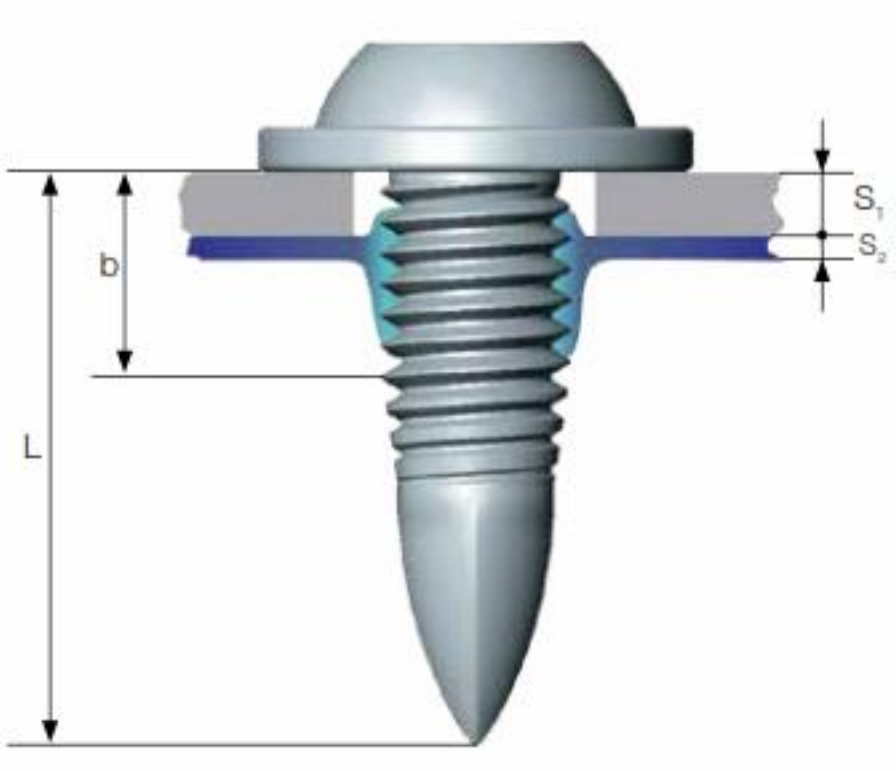
Material:	0,8 mm steel plate DC 04 (without pilot hole)
Screw:	EJOT FDS® M 3,5
Driver speed:	2300 rpm

Design Recommendations
In many applications the EJOT FDS® can be used with existing products.
The following notes are for the design of existing and new products.
The usable thread length b of EJOT FDS® screws is depending on the part‘s thickness S1 and the metal sheet thickness S2 .
It is given by:

b = S1 + 3 x S2 without prepunching (type Standard)
b = S1+ 2 x S2 with prepunching (type PKS and BS)

Example
S1= 4,50 mm, S2= 0,75 mm:

without prepunching
b = (4,50 + 3 x 0,75) mm = 6,75 mm
with prepunching
b = (4,50 + 2 x 0,75) mm = 6,00 mm

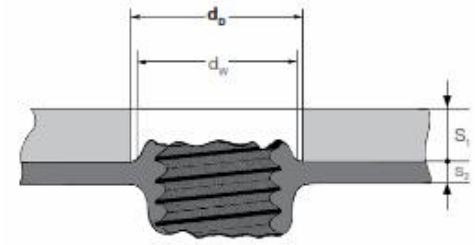


Usable thread length.

EJOT FDS®	M3			M3,5			M4			M5			M6		
screw	Standard	PKS	BS	Standard	PKS	BS	Standard	PKS	BS	Standard	PKS	BS	Standard	PKS	BS
Length L [mm]	Usable thread length b [mm]														
9 + 0,8	2,40	4,70													
10 + 0,8	3,40	5,70		2,40	4,90	4,60									
12 + 0,8	5,40	7,70		4,40	6,90	6,60	3,10	5,70	5,40						
14 + 0,8	7,40	9,70		6,40	8,90	8,60	5,10	7,70	7,40	2,90	6,20	6,10			
16 + 0,8	9,40	11,70		8,40	10,90	10,60	7,10	9,70	9,40	4,90	8,20	8,10	2,90	6,60	5,90
18 + 0,8	11,40	13,90		10,40	12,90	12,60	9,10	11,70	11,40	6,90	10,20	10,10	4,90	8,60	7,90
20 + 0,8				12,40	14,90	14,60	11,10	13,70	13,40	8,90	12,20	12,10	6,90	10,60	9,90
25 + 0,8							16,10	18,70	18,40	13,90	17,20	17,10	11,90	15,60	14,90
30 + 0,8										18,90	22,20	22,10	16,90	20,60	19,90
35 + 1,0													21,90	25,60	24,90
40 + 1,0													26,90	30,60	29,90
45 + 1,0													31,90	35,60	34,90
50 + 10													36,90	40,60	39,90

Recommended clearance hole d_D

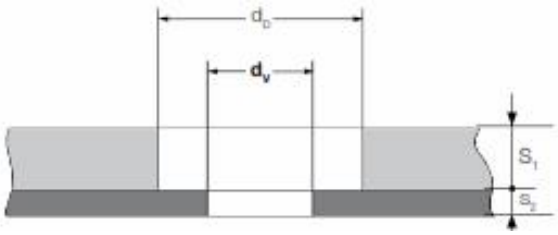
Flow-drilling with the EJOT FDS® Screw causes a small portion of the formed part to flow against the fastening direction and to create a bulge which as to be absorbed by the clearance hole of the component to be fastened. For this reason we recommend the following hole diameters.



FDS®	M3	M3,5	M4	M5	M6
d_D	3,6 - 4,0	4,3 - 4,8	5,1 - 5,7	6,7 - 7,4	8,2 - 9,1

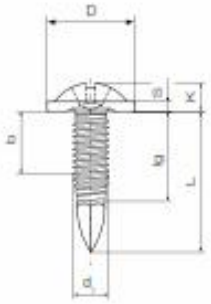
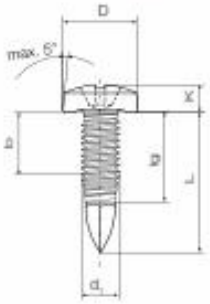
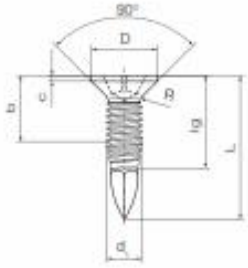
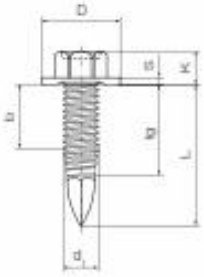
Recommended hole diameter dv for the PKS type

FDS®		M3	M3,5	M4	M5	M6
sheet thickness S_1 [mm]	0,5	1,0 - 1,4	1,2 - 1,7	1,5 - 2,0	1,8 - 2,5	-
	0,63	1,2 - 1,6	1,4 - 1,8	1,6 - 2,2	1,8 - 2,5	2,0 - 3,0
	0,75	1,6 - 1,8	1,6 - 2,0	1,8 - 2,5	2,0 - 2,8	2,2 - 3,2
	0,88	1,8 - 2,2	1,8 - 2,3	2,0 - 2,6	2,2 - 3,0	2,5 - 3,5
	1,00	-	1,8 - 2,4	2,2 - 2,8	2,6 - 3,4	2,8 - 3,8
	1,25	-	-	2,4 - 3,0	3,0 - 3,8	3,4 - 4,5
	1,50	-	-	-	3,4 - 4,2	3,8 - 5,0
	>1,50	-	-	-	4,2 - 4,6	5,2 - 5,6



EJOT FDS®

Designs

WN 2141	WN 2142	WN 2143	WN 2147
			

H-cross recess

Z-cross recess

TORX®

TORX PLUS® / AUTOSERT®

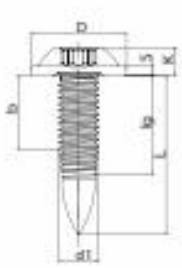
In case of manual assembly with TORX® it is recommended to use a TORXALIGN® bit, e.g. STICK FIT bits by TORX PLUS® drives.

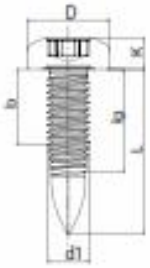
All cross recess and TORX® drives are also available as combi drives.

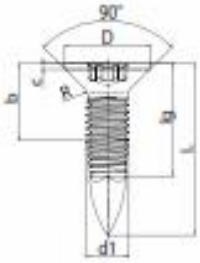
EJOT FDS®	Nominal-Ø			M 3	M 3,5	M 4	M 5	M 6
	External thread-Ø		d_1	3,0	3,5	4,0	5,0	6,0
WN 2141	Head-Ø		D	7,50	8,50	10,00	12,00	14,00
	Head height		K	2,40	2,50	3,20	4,00	4,60
	Washer thickness		s	0,80	0,90	1,10	1,30	1,50
	H-cross-recess	penetration depth	t min.	1,07	1,33	1,98	2,24	2,84
			t max.	1,70	1,96	2,61	2,90	3,50
	Z-cross-recess	penetration depth	t min.	1,08	1,40	2,01	2,27	2,91
			t max.	1,54	1,86	2,47	2,73	3,37
	Cross size H/Z			1	2	2	3	3
WN 2142	Head-Ø		D	6,00	7,00	8,00	10,00	12,00
	Head height		K	2,40	2,70	3,10	3,80	4,60
	H-cross-recess	penetration depth	t min.	1,70	1,74	2,04	2,77	3,03
			t max.	2,00	2,24	2,54	3,27	3,53
	Z-cross-recess	penetration depth	t min.	1,68	1,65	1,90	2,64	3,02
			t max.	1,93	2,11	2,36	3,10	3,48
	Cross size H/Z			1	2	2	2	3
WN 2143	Head-Ø		D	5,60	6,50	7,50	9,20	11,00
	Cyl. head height		$c_{max.}$	0,55	0,55	0,65	0,75	0,85
	Radius		$R_{max.}$	0,80	0,95	1,00	1,30	1,60
	H-cross-recess	penetration depth	t min.	1,50	1,40	1,90	2,10	2,80
			t max.	1,80	1,90	2,40	2,60	3,30
	Z-cross-recess	penetration depth	t min.	1,48	1,34	1,60	2,05	2,46
			t max.	1,73	1,80	2,06	2,51	2,92
	Cross size H/Z			1	2	2	2	3
WN 2147	Washer-Ø		D	7,50	8,30	9,00	11,00	13,00
	Head height		K	3,00	3,40	3,80	4,30	5,00
	Washer thickness		s	0,60	0,80	0,80	1,00	1,20
	Width across flats		A/F	5,00	5,50	5,50	7,00	8,00

EJOT FDS® Designs

WN 2151	WN 2152	WN 2154







All WN-specifications according to types:

Ordering Example:
Description of EJOT FDS® screw Ø 4 mm and length 20 mm

a) type Standard with Z-cross recess according to WN 2141:	**EJOT FDS® screw M4 x 20 WN2141-Z**
b) type PKS with TORX® recess according to WN 2152:	**EJOT FDS® screw M4 x 20 PKS WN2152**
c) type BS with hexagonal heat according to WN 2147:	**EJOT FDS® screw M4 x 20 BS WN2147**

EJOT FDS®	Nominal-Ø		M 3	M 3,5	M 4	M 5	M 6
	External thread-Ø	d_1	3,0	3,5	4,0	5,0	6,0
WN 2151	Head-Ø	D	7,50	8,50	10,00	12,00	14,00
	Head height	K	2,70	2,90	3,60	3,90	4,80
	Washer thickness	s	0,70	0,80	1,00	1,20	1,40
	TORX®		T10	T15	T20	T25	T30
		$A_{max.}$	2,80	3,35	3,95	4,50	5,60
	Penetration depth	t min.	1,00	1,20	1,40	1,60	2,00
		t max.	1,30	1,50	1,80	2,00	2,40
WN 2152	Head-Ø	D	6,00	7,00	8,00	10,00	12,00
	Head height	K	2,70	2,90	3,60	3,90	4,80
	TORX®		T10	T15	T20	T25	T30
		$A_{max.}$	2,80	3,35	3,95	4,50	5,60
	Penetration depth	t min.	1,00	1,20	1,40	1,60	2,00
		t max.	1,30	1,50	1,80	2,00	2,40
WN 2154	Head-Ø	D	5,60	6,50	7,50	9,20	11,00
	Cyl. Head height	$c_{max.}$	0,60	0,65	0,70	0,75	0,85
	TORX®		T10	T15	T20	T25	T30
		$A_{max.}$	2,80	3,35	3,95	4,50	5,60
	Penetration depth	t min.	0,75	0,85	1,10	1,15	1,40
		t max.	1,10	1,15	1,55	1,55	1,80