

Heavy Duty Anchor Hexagon Bolt



INFORMATION

The torque controlled Heavy Duty Anchor Hexagon Bolt is a zinc plated high performance anchor for use in cracked/non-cracked concrete and structural applications such as:

- Columns
- Guard rails
- Façades
- Staircases
- Silo installation
- Machines
- Cantilever beams

BASE MATERIAL

- Concrete C20/25 to C50/60
- Cracked Concrete
- Non-Cracked Concrete

FEATURES

- High Performance
- Wide Range Of Sizes
- Fast And Secure Installation
- Through Fixing
- Three way Expansion Sleeve
- Zinc Plated Min. 5µm
- Close Spacing And Edge Distance
- Reaction To Fire Class A1
- Fire Resistant Loading

APPROVALS

European Technical Assessment
Option 1 Cracked Concrete



ETA-07/0331
Fire Resistance



ETA-07/0331

RELATED PRODUCTS

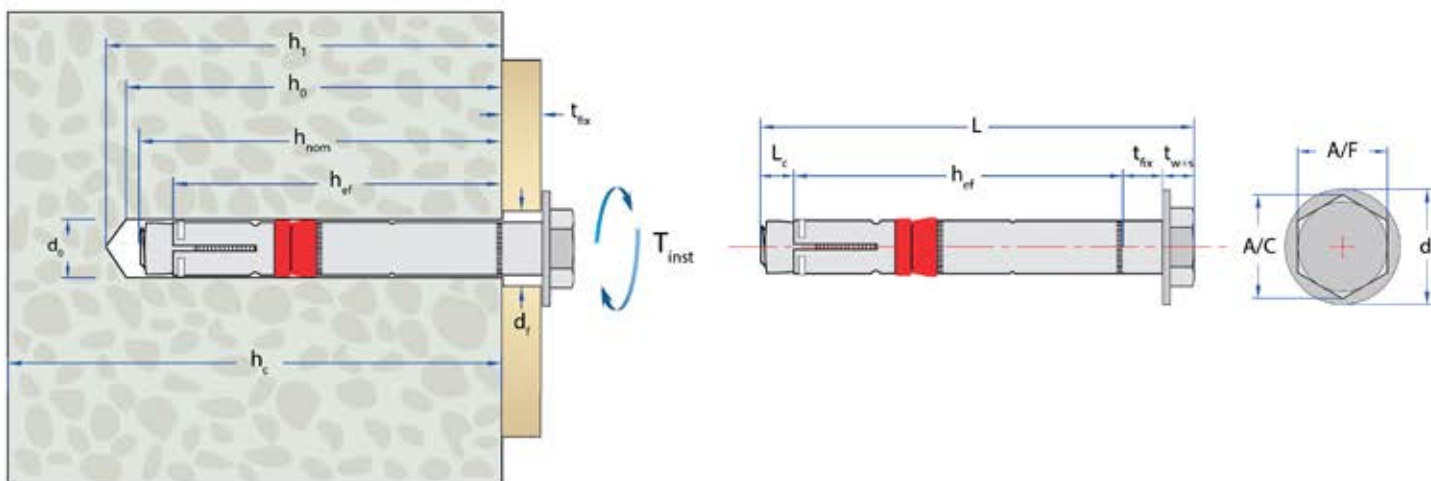


SDS+ Drill Bits



Hole Cleaning Pump

RANGE AND LOAD DATA



For combined loads, variations in structure thickness, reduced spacing and edge calculations download the free **Anchor Calculation Program** from www.jcpfixings.co.uk

Supplied By

FFT

Fasteners, Fixings & Tools

01234 333949

FAX- 01234 211069

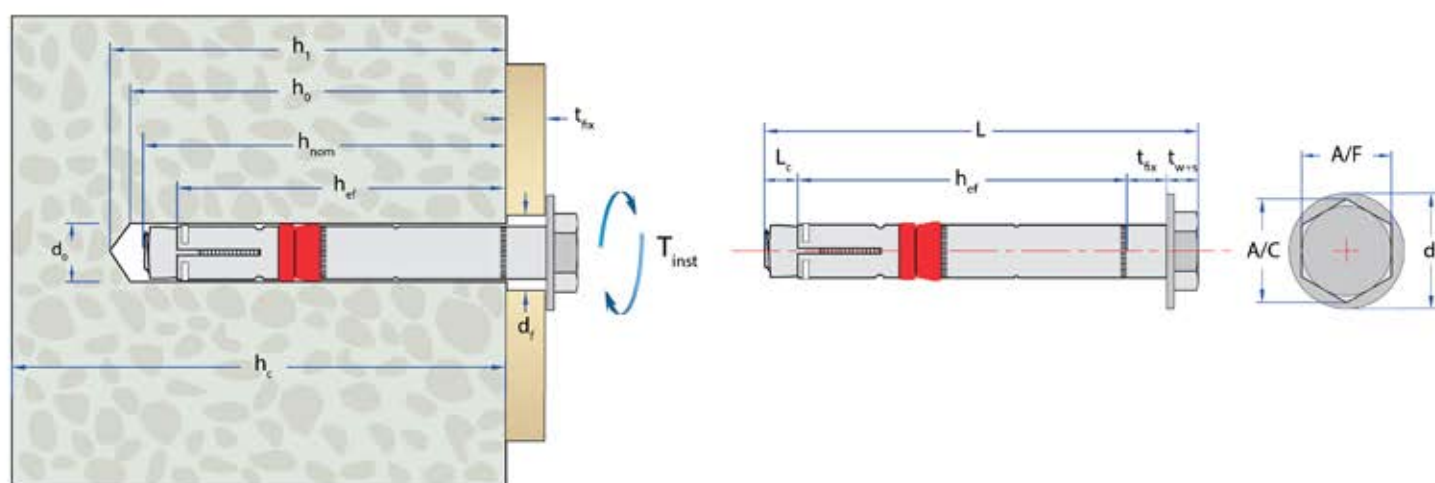
info@fasteners-ft.co.uk

www.fastenersfixingsandtools.co.uk



RANGE AND LOAD DATA

RANGE DATA													
Part Number	Size of Thread	Min. Structure Thickness (h_c)	Drill Hole Diameter (d_o)	Min Hole Depth (h_i)	Fixture Clearance Hole (d_i)	Cone Length (L_c)	Effective Embedment Depth (h_{ef})	Max Fixture Thickness (t_{fx})	Washer and Screw Thickness (t_{w+s})	Total Length (L)	Width Across Flats (A/F)	Washer Outer diameter (d_2)	Tightening Torque (T_{inst})
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm
JHD0610	M6	100	10	65	12	10	50	10	6.8	77	10	18	15
JHD0630								30		97			
JHD0650								50		117			
JHD0810	M8	120	12	80	14	11	60	10	8.8	90	13	20	30
JHD0830								30		110			
JHD0850								50		130			
JHD1015	M10	140	15	95	17	14	71	15	10.9	111	17	25	50
JHD1025								25		121			
JHD1045								45		141			
JHD1210	M12	160	18	105	20	16	80	10	13.8	120	19	30	80
JHD1220								20		130			
JHD1240								40		150			
JHD1270								70		180			
JHD1610	M16	200	24	130	26	22	100	10	18.8	151	24	40	160
JHD1620								20		161			
JHD1650								50		191			
JHD2030	M20	250	28	160	31	26	125	30	21.8	203	30	50	280
JHD2060								60		233			





NON-CRACKED CONCRETE

Performance Data (C20/25 non-cracked concrete)												
Size Of Thread	Effective Embedment Depth (h_{ef})	Minimum Concrete Thickness (h_{min})	Characteristic Resistance		Design Resistance		Approved Resistance		Design Spacing (s)		Design Edge Distance (c)	
			Tensile (N_{Rk})	Shear (V_{Rk})	Tensile (N_{Rd})	Shear (V_{Rd})	Tensile (N_{Ra})	Shear (V_{Ra})	Tensile	Shear	Tensile	Shear
-	mm	mm	kN	kN	kN	kN	kN	kN	mm	mm	mm	mm
M6	50	100	16.0	18.0	10.6	14.4	7.5	10.2	200	60	110	160
M8	60	120	20.0	30.0	13.3	24.0	9.5	17.1	200	100	130	240
M10	71	140	30.2	48.0	20.1	38.4	14.3	27.4	360	200	180	360
M12	80	160	36.1	72.2	24.0	48.1	17.1	34.3	400	240	200	410
M16	100	200	50.5	101	33.6	67.3	24.0	48.0	500	300	250	500
M20	125	250	70.6	141.1	47.0	94.0	33.5	67.1	630	380	320	610

CRACKED CONCRETE

Performance Data (C20/25 cracked concrete)												
Size Of Thread	Effective Embedment Depth (h_{ef})	Minimum Concrete Thickness (h_{min})	Characteristic Resistance		Design Resistance		Approved Resistance		Design Spacing (s)		Design Edge Distance (c)	
			Tensile (N_{Rk})	Shear (V_{Rk})	Tensile (N_{Rd})	Shear (V_{Rd})	Tensile (N_{Ra})	Shear (V_{Ra})	Tensile	Shear	Tensile	Shear
-	mm	mm	kN	kN	kN	kN	kN	kN	mm	mm	mm	mm
M6	50	100	5.0	18.0	3.3	14.4	2.3	10.2	50	140	50	230
M8	60	120	12.0	33.4	8.0	22.2	5.7	15.8	80	180	60	320
M10	71	140	16.0	43.0	10.6	28.6	7.5	20.4	110	220	70	380
M12	80	160	25.7	51.5	17.1	34.3	12.2	24.5	240	240	120	410
M16	100	200	36.0	72.0	24.0	48.0	17.1	34.2	300	300	150	500
M20	125	250	50.3	100.6	33.5	67.0	23.9	47.8	380	380	190	610

FIRE RESISTANCE DATA



Fire Resistance Data (C20/25 to C50/60 cracked or non-cracked concrete)*										
Size Of Thread	Effective Embedment Depth (h_{ef})	Minimum Concrete Thickness (h_{min})	Design Resistance				Approved Resistance			
			Tensile ($N_{Rd,N}$) or Shear ($V_{Rd,N}$) (kN)**				Tensile ($N_{Ra,N}$) or Shear ($V_{Ra,N}$) (kN)			
-	mm	mm	30min (R30)	60min (R60)	90min (R90)	120min (R120)	30min (R30)	60min (R60)	90min (R90)	120min (R120)
M6	50	100	1.0	0.8	0.6	0.4	0.71	0.57	0.42	0.28
M8	60	120	1.9	1.5	1.0	0.8	1.35	1.07	0.71	0.57
M10	71	140	4.3	3.2	2.1	1.5	3.07	2.28	1.50	1.07
M12	80	160	6.3	4.6	3.0	2.0	4.50	3.28	2.14	1.42
M16	100	200	11.6	8.6	5.0	3.1	8.28	6.14	3.57	2.21
M20	125	250	18.3	13.5	7.7	4.9	13.07	9.64	5.50	3.50

* The determination covers anchors with a fire attack from one side only. If the fire attack is from more than one side, the design method may be taken only, if the edge distance of the anchor is $c \geq 300$ mm and $\geq 2 h_{ef}$.

**For combined loads, use Anchor Calculation Program.





SUPPLEMENTARY DATA

Influence Of Concrete Strength (Cracked/Non-cracked Concrete)					
Concrete strength		C20/25	C30/37	C40/50	C50/60
Cylinder	N/mm ²	20	30	40	50
Cube	N/mm ²	25	37	50	60
Factor	-	1.0	1.22	1.41	1.55

Important Note:

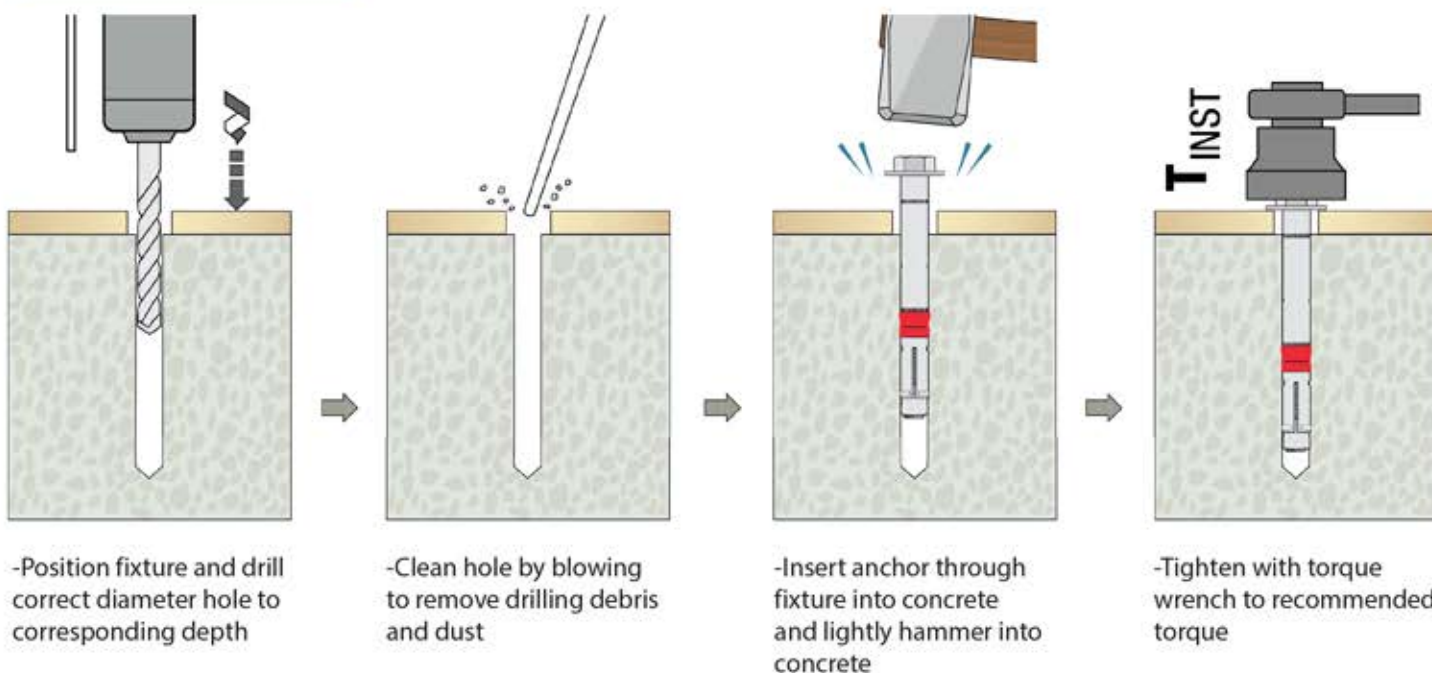
When using concrete factors ensure that loads do not exceed Steel Design Resistance.

Steel Failure						
Size Of Thread	Tensile Resistance			Shear Resistance		
	Characteristic Resistance (N _{Re,S})	Design Resistance (N _{Ed,S})*	Approved Resistance (N _{Rd,S})	Characteristic Resistance (V _{Re,S})	Design Resistance (V _{Ed,S} **)	Approved Resistance (V _{Rd,S})
	kN	kN	kN	kN	kN	kN
M6	16.0	10.6	7.5	18	14.4	10.2
M8	29.0	19.3	13.7	30	24.0	17.1
M10	46.0	30.6	21.8	48	38.4	27.4
M12	67.0	44.6	31.8	73	58.4	41.7
M16	126.0	84.0	60.0	126	100.8	72.0
M20	196.0	130.6	93.2	150	120.0	85.7

* A partial safety factor (γ_{MS}) equal to 1.5 is included.

** A partial safety factor (γ_{MS}) equal to 1.25 is included.

INSTALLATION INSTRUCTIONS





Declaration of Performance No. 0756-CPR-0215

Heavy Duty Anchor (Torque controlled expansion anchor made of zinc coated steel)
JCP Construction Products,
Unit 14 Teddington Business Park, Station Rd, Teddington, Middlesex TW11 9BQ
Telephone +44 (0)208 943 1800

Intended use or uses of the products according to EAD 330232-00-0601	
Generic type	Torque controlled expansion anchor
Base material	Cracked and Non-cracked concrete C20/25 to C50/60 acc. EN 206-2:2003
Batch Number	Marked on individual boxes
Material	Zinc plated carbon steel
Durability	Dry internal conditions
Loading	Static, quasi-static, fire and seismic
Fire Resistance	120mins
Fire Reaction	EAD 330232-00-0601
ETA 07/0331 issued by	
DIBt	
On the basis of	
ETAG 001	
Certificate of Conformity 0756-CPD-0215 issued by	
Technische Universität Darmstadt	
Under system	
1	

Declared performances according to EAD 330232-00-0601								
Essential Characteristics			Performance					
			M6	M8	M10	M12	M16	M20
Installation parameters								
d _o	Nominal diameter of drill bit	[mm]	10	12	15	18	24	28
d _f	Fixture clearance hole	[mm]	12	14	17	20	26	31
h _{ef}	Effective anchorage depth	[mm]	50	60	71	80	100	125
h ₁	Depth of drill hole to deepest point	[mm]	65	80	95	105	130	160
h _{min}	Minimum thickness of concrete member	[mm]	100	120	140	160	200	250
T _{inst}	Nominal torque moment	[mm]	15(10)	30(25)	50(55)	80(70)	160	280
			Figures (-) are for SLSK anchors					
S _{min}	Minimum spacing	[mm]	50	60	70	80	100	125
for C _z	Edge distance	[mm]	80	100	120	160	180	300
C _{min}	Minimum edged distance	[mm]	50	60	70	80	100	180
for S _z	Anchor spacing	[mm]	100	120	175	200	220	540
Tensile Steel failure								
N _{Rk,s}	Characteristic tensile steel failure	[kN]	16	29	46	67	126	196
γ _{M,s}	Partial safety factor	[-]	1.5					
Pull-out failure								
NR _{k,p,cr}	Characteristic tensile resistance in cracked concrete C20/25	[kN]	5	12	16	25	36	50
NR _{k,p,ucr}	Characteristic tensile resistance in non-cracked concrete C20/25	[kN]	18	20	30	35	50	72
γ _{M,p}	Partial safety factor (Includes γ ₂)	[-]	1.5					
Ψ _{cC30/37}	Increasing factor for concrete C30/37	[-]	1.22					
Ψ _{cC40/50}	Increasing factor for concrete C40/50	[-]	1.41					
Ψ _{cC50/60}	Increasing factor for concrete C50/60	[-]	1.55					
Splitting failure (The highest resistance of Case 1 and Case 2 may be used)								
Case 1								
N [*] _{Rk,sp}	Characteristic Resistance in C20/25 concrete	[kN]	9	12	20	30	40	(1)
S _{cr,sp}	Critical spacing (Splitting)	[mm]	150	180	213	240	300	375
C _{cr,sp}	Critical edge distance (Splitting)	[mm]	75	90	106.5	120	150	188
Case 2								
S _{cr,sp}	Critical spacing (Splitting)	[mm]	250	300	355	400	500	625
C _{cr,sp}	Critical edge distance (Splitting)	[mm]	125	150	177.5	200	250	313

Concrete cone failure									
h_{ef}	Effective anchorage depth	[mm]	46	60	70	85	100	115	
$S_{cr,N}$	Critical spacing	[mm]	138	180	210	255	300	345	
$C_{cr,N}$	Critical edge distance	[mm]	69	90	105	127.5	150	172.5	
$\gamma_{M,s}$	Partial safety factor	[-]	1.5						
Displacement under tensile loading									
N_{cr}	Service tensile loads in cracked concrete	[kN]	2.4	5.7	7.6	12.3	17.1	24.0	
$\delta N_{0,cr}$	Short term displacement under tensile loads	[mm]	0.5	0.5	0.5	0.7	0.8	0.9	
$\delta N_{\infty,cr}$	Long term displacement under tensile loads	[mm]	2.0	2.0	1.3	1.3	1.3	1.4	
$N_{u,cr}$	Service tensile loads in non-cracked concrete	[kN]	8.5	9.5	14.3	17.2	24.0	34.0	
$\delta N_{0,u,cr}$	Short term displacement under tensile loads	[mm]	0.8	1	1.1	1.1	1.1	0.3	
$\delta N_{\infty,u,cr}$	Long term displacement under tensile loads	[mm]	3.4	3.4	1.7	1.7	1.7	1.4	
Shear steel failure JHD									
$V_{Rk,s}$	Characteristic shear steel failure without lever arm	[kN]	16	25	36	63	91	122	
$M^0_{Rk,s}$	Characteristic shear steel failure with lever arm	[Nm]	12	30	60	105	266	519	
$\gamma_{m,sV}$	Partial safety factor	[-]	1.25						
Shear steel failure NHD and SLSK									
$V_{Rk,s}$	Characteristic shear steel failure without lever arm	[kN]	18	30	48	73	126	150	
$M^0_{Rk,s}$	Characteristic shear steel failure with lever arm	[Nm]	12	30	60	105	266	519	
$\gamma_{m,sV}$	Partial safety factor	[-]	1.25						
Concrete pryout failure									
k	Factor in equation 95.6) ETAG 001 Annex C §5.2.3.3	[-]	1.8	2.0					
$\gamma_{M,cp}$	Partial safety factor	[-]	1.5						
Shear concrete edge failure									
l_{ef}	Effective anchorage length	[mm]	50	60	71	80	100	125	
Displacement on shear load JHD									
V	Service shear load in cracked and non-cracked concrete	[kN]	9.1	14.0	20.7	35.1	52.1	77.0	
δV_0	Short term displacement under shear load	[mm]	2.5	2.1	2.7	3.0	5.1	4.3	
δV_{∞}	Long term displacement under shear load	[mm]	3.8	3.1	4.1	4.5	7.6	6.5	
Displacement on shear load NHD and SLSK									
V	Service shear load in cracked and non-cracked concrete	[kN]	10.1	17.1	27.5	41.5	72.0	77.0	
δV_0	Short term displacement under shear load	[mm]	2.9	2.5	3.6	3.5	7.0	4.3	
δV_{∞}	Long term displacement under shear load	[mm]	4.4	3.8	5.4	5.3	10.5	6.5	
Characteristic tensile fire resistance									
$N_{Rk,fi30}$	Fire resistance duration = 30 minutes	[kN]	1.0	1.9	4.3	6.3	8.8	15.9	
$N_{Rk,fi60}$	Fire resistance duration = 60 minutes	[kN]	0.8	1.5	3.2	4.6	8.6	13.5	
$N_{Rk,fi90}$	Fire resistance duration = 90 minutes	[kN]	0.6	1.0	2.1	3.0	5.0	7.7	
$N_{Rk,fi120}$	Fire resistance duration = 120 minutes	[kN]	0.4	0.8	1.5	2.0	3.1	4.9	
Characteristic shear fire resistance without lever arm									
$V_{Rk,fi30}$	Fire resistance duration = 30 minutes	[kN]	1.0	1.9	4.3	6.3	11.6	18.3	
$V_{Rk,fi60}$	Fire resistance duration = 60 minutes	[kN]	0.8	1.5	3.2	4.6	8.6	13.5	
$V_{Rk,fi90}$	Fire resistance duration = 90 minutes	[kN]	0.6	1.0	2.1	3.0	5.0	7.7	
$V_{Rk,fi120}$	Fire resistance duration = 120 minutes	[kN]	0.4	0.8	1.5	2.0	3.1	4.9	
Characteristic shear fire resistance with lever arm									
$V_{Rk,fi30}$	Fire resistance duration = 30 minutes	[kN]	0.8	2.0	5.6	9.7	24.8	42.4	
$V_{Rk,fi60}$	Fire resistance duration = 60 minutes	[kN]	0.6	1.5	4.1	7.2	18.3	29.8	
$V_{Rk,fi90}$	Fire resistance duration = 90 minutes	[kN]	0.4	1.0	2.7	4.7	11.9	17.1	
$V_{Rk,fi120}$	Fire resistance duration = 120 minutes	[kN]	0.3	0.8	1.9	3.1	6.6	10.7	

The previous performance data relates to the following product codes

d	Marking	t _{ix}	Product Code		
	d _o /L	[mm]	JHD	NHD	SLSK
M6	SZM6/10-10	10	JHD0610		SLSK10/10
	SZM6/10-25	25			SLSK10/25
	SZM6/10-30	30	JHD0630		
	SZM6/10-45	45			SLSK10/45
	SZM6/10-50	50	JHD0650		
M8	SZM8/12-10	10	JHD0810	NHD0810	SLSK12/10
	SZM8/12-25	25			SLSK12/25
	SZM8/12-30	30	JHD0830	NHD0830	
	SZM8/12-50	50	JHD0850	NHD0850	SLSK12/50
M10	SZM10/15-10	10			SLSK15/10
	SZM10/15-15	15	JHD1015	NHD1015	
	SZM10/15-25	25	JHD1025	NHD1025	SLSK15/25
	SZM10/15-45	45	JHD1045	NHD1045	
	SZM10/15-50	50			SLSK15/50
M12	SZM12/18-10	10	JHD1210	NHD1210	
	SZM12/18-20	20	JHD1220	NHD1220	SLSK18/20
	SZM12/18-40	40	JHD1240	NHD1240	SLSK18/40
	SZM12/18-70	70	JHD1270	NHD1270	
M16	SZM16/24-10	10	JHD1610		
	SZM16/24-20	20	JHD1620	NHD1620	
	SZM16/24-25	25	JHD1625		
	SZM16/24-50	50	JHD1650	NHD1650	
M20	SZM20/28-25	25	JHD2030		
	SZM20/28-50	50	JHD2060		

Amendments		
[1]	CPD changed to CPR	03/11/2017
[2]	ETAG changed to EAD	04/11/2017
[3]	CPD Range changed	05/11/2017
[4]	ETA changed	06/11/2017

The performances of the product identified by the above product codes are in conformity with the declared performance

This Declaration of performance is issued under the sole responsibility of JCP Construction products

Signed for and on behalf of the manufacturers

Name and function	Place and date of issue	Signature
Brian Deluce	Teddington	
Technical Manager	03/11/2017	

Certificate of constancy of performance

No. 1343-CPR-M 556-3/07.15

In compliance with Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011 (the Construction products Regulation or CPR) this certificate applies to the construction product

JCP Heavy Duty Anchor

Mechanical anchor for use in concrete

placed on the market by

Hexstone Ltd. T/A JCP Construction Products
Opal Way
Stone Business Park, Stone
Staffordshire ST 15 0SW
Great Britain

and produced in the manufacturing plant

Plant 2, Germany.

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in the European Technical Assessment

ETA-07/0331 of 27 March 2018

and

EAD 330232-00-0601

under system 1 for the performances set out in this certificate are applied and that the construction product fulfil all the prescribed requirements for these performances.

This certificate was first issued on 25/07/2018 and will remain valid as long as the ETA remains valid and the manufacturing conditions in the plant or the factory production control itself are not modified significantly, unless suspended or withdrawn by the product certification body.

Darmstadt, 25/07/2018



Dr.-Ing. P. Bender
Head of the notified certification body



Dipl.-Ing. F. Persichella
Technical responsibility



Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-07/0331
of 27 March 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

JCP Heavy Duty Anchor

Product family
to which the construction product belongs

Mechanical anchor for use in concrete

Manufacturer

Hexstone Ltd. T/A JCP Construction Products
Opal Way
Stone Business Park, Stone
Staffordshire ST 15 0SW .
GROSSBRITANNIEN

Manufacturing plant

Plant2, Germany

This European Technical Assessment
contains

20 pages including 3 annexes which form 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 330232-00-0601

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Specific Part

1 Technical description of the product

The JCP Heavy Duty Anchor is an anchor made of galvanised steel or made of stainless steel which is placed into a drilled hole and anchored by torque-controlled expansion. The following anchor types are covered:

- Anchor type NHD with threaded bolt,
- Anchor type JHD with hexagon head screw,
- Anchor type SLSK with countersunk washer and countersunk screw.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right 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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for static and quasi-static loading	See Annex C1 to C5
Characteristic resistance for seismic performance category C1 and C2	See Annex C6 to C7
Displacements under tension and shear loads	See Annex C9 and C10

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	See Annex C8

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

In accordance with the European Assessment Document EAD 330232-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

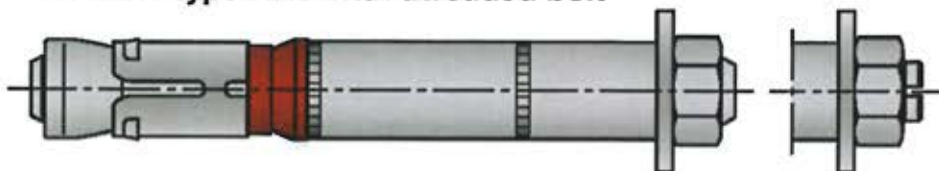
Issued in Berlin on 27 March 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Baderschneider

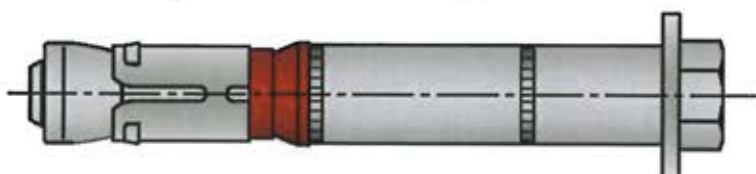
JCP Heavy Duty Anchor

Anchor type NHD with threaded bolt



NHD (M6-M24)
NHD (M8-M16) A4

Anchor type JHD with hexagon head screw



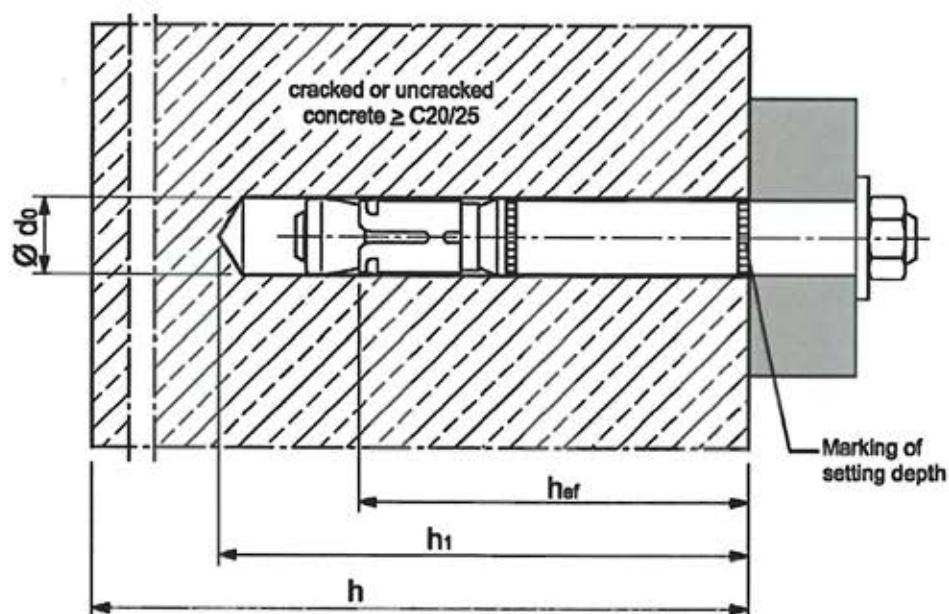
JHD (M6-M24)
JHD (M8-M16) A4

Anchor type SLSK with countersunk washer and countersunk screw



SLSK (M6-M12)
SLSK (M8-M12) A4

Installation condition

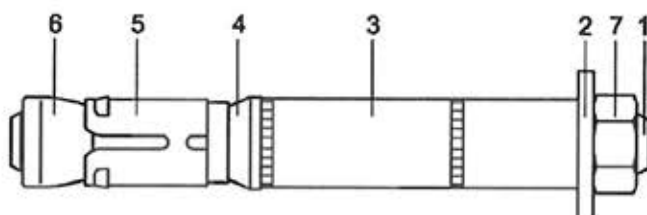


JCP Heavy Duty Anchor

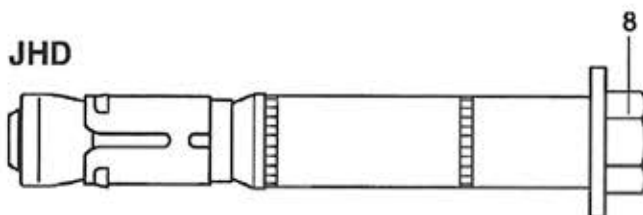
Product description
Product and installation situation

Annex A1

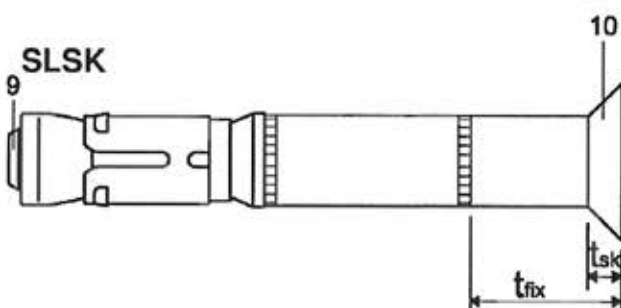
NHD



JHD



SLSK



Marking:

expansion sleeve:

- Identifying mark of manufacturing plant 
- additional marking of stainless steel A4 A4
- Anchor identity (alternatively on distance sleeve) SZ
- size of thread (alternatively M10 on distance sleeve)

Distance sleeve:

- Diameter 15
- max. thickness of fixture 25
- additional marking for countersunk version SK

marking on the washer of anchor size SZ 24/M16L L

Table A1: Designation of anchor parts and materials

Part	Designation	Materials galvanised $\geq 5 \mu\text{m}$, acc. to EN ISO 4042:1999	Stainless steel A4
1	Threaded bolt	Steel, Strength class 8.8, EN ISO 898-1:2013	Stainless steel, 1.4401, 1.4404 or 1.4571, EN 10088:2014
2	Washer	Steel, EN 10139:2016	Stainless steel, EN 10088:2014
3	Distance sleeve	Steel tube EN 10305-2:2016, EN 10305-3:2016;	Steel tube stainless steel, 1.4401, 1.4404 or 1.4571; EN 10217-7:2014, EN 10216-5:2013
4	Ring	Polyethylene	Polyethylene
5	Expansion sleeve	Steel, EN 10139:2016	Stainless steel, 1.4401, 1.4404 or 1.4571, EN 10088:2014
6	Threaded cone	Steel EN 10083-2:2006	Stainless steel, 1.4401, 1.4404 or 1.4571, EN 10088:2014
7	Hexagon nut	Steel, Strength class 8, EN ISO 898-2:2012	Stainless steel, strength class 70, EN ISO 3506-2:2009
8	Hexagon head screw	Steel, Strength class 8.8, EN ISO 898-1:2013	Stainless steel, strength class 70, EN ISO 3506-1:2009
9	Countersunk screw	Steel, Strength class 8.8, EN ISO 898-1:2013	Stainless steel, strength class 70, EN ISO 3506-1:2009
10	Countersunk washer	Steel, EN 10083-2:2006	Stainless steel, 1.4401, 1.4404 or 1.4571, EN 10088:2014, zinc plated

JCP Heavy Duty Anchor

Product description
Marking and materials

Annex A2

Specification of intended use

JCP Heavy Duty Anchor, steel zinc plated	10/M6	12/M8	15/M10	18/M12	24/M16	24/ M16L	28/M20	32/M24
Static or quasi-static action	✓							
Seismic action (NHD and JHD)	-	C1 + C2						
Seismic action (SLSK)	-	C1 + C2				-		
Fire exposure	R 30 ... R 120							
JCP Heavy Duty Anchor, stainless steel A4	12/M8	15/M10	18/M12	24/M16				
Static or quasi-static action	✓							
Seismic action (NHD and JHD)	C1 + C2							
Seismic action (SLSK)	C1 + C2			-				
Fire exposure	R30 ... R120							

Base materials:

- Cracked and uncracked concrete
- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000
- Strength classes C20/25 to C50/60 according to EN 206-1:2000

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc plated steel or stainless steel).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal conditions, if no particular aggressive conditions exist (stainless steel).

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used.)

Design:

- Anchorage are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorage under static or quasi-static actions, seismic actions and under fire exposure are designed in accordance with FprEN 1992-4:2016 and TR 055.

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.
- Anchor installation such that the effective anchorage depth is complied with. This compliance is ensured when the embedment mark of the anchor does no more exceed the concrete surface.
- Use as supplied by the manufacturer without replacing individual parts.
- Drilling of hole only by hammer drilling (use of vacuum drill bits is admissible)

JCP Heavy Duty Anchor

Annex B1

Supplied By

FFT

Fasteners, Fixings & Tools

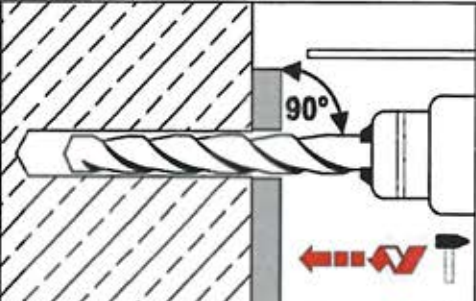
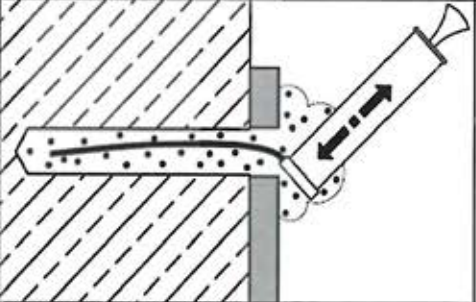
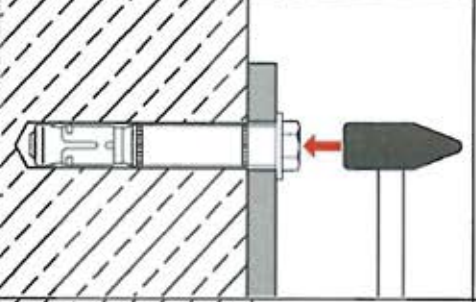
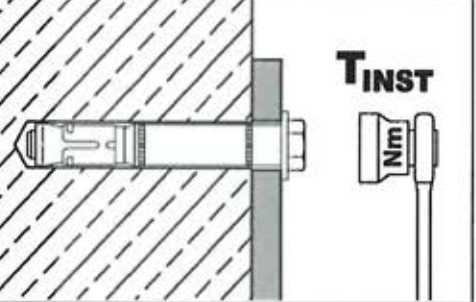
01234 333949

FAX- 01234 211069

info@fasteners-ft.co.uk

www.fastenersfixingsandtools.co.uk

Installation instructions

1		Drill hole perpendicular to concrete surface. If using a vacuum drill bit, proceed with step 3.
2		Blow out dust. Alternatively vacuum clean down to the bottom of the hole.
3		Drive in anchor.
4		Apply installation torque T_{inst} by using calibrated torque wrench.

JCP Heavy Duty Anchor

Intended use
Installation instructions

Annex B2

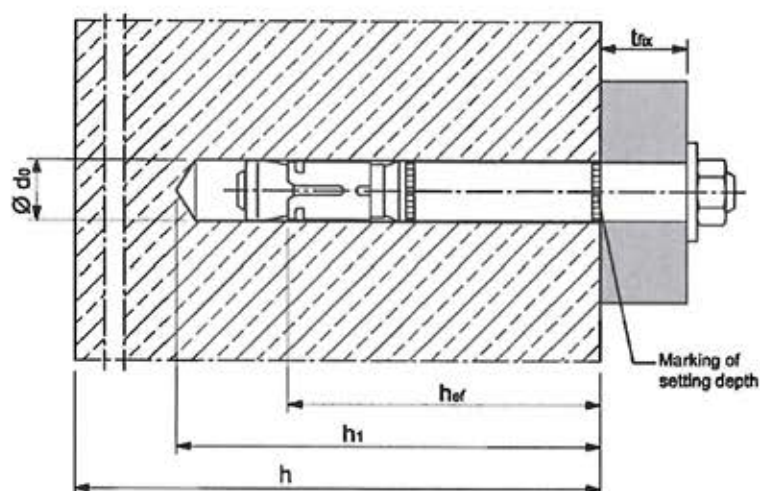
Table B1: Installation parameters, steel zinc plated

Anchor size		10/M6	12/M8	15/M10	18/M12	24/M16	24/M16L	28/M20	32/M24
Size of thread	[-]	M6	M8	M10	M12	M16	M16	M20	M24
Effective anchorage depth	h_{ef} [mm]	50	60	71	80	100	115	125	150
Nominal diameter of drill bit	$d_0 =$ [mm]	10	12	15	18	24	24	28	32
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	10,45	12,5	15,5	18,5	24,55	24,55	28,55	32,7
Depth of drill hole	$h_1 \geq$ [mm]	65	80	95	105	130	145	160	180
Diameter of clearance hole in the fixture	$d_f \leq$ [mm]	12	14	17	20	26	26	31	35
Thickness of countersunk washer SLSK	t_{sk} [mm]	4	5	6	7	-	-	-	-
Minimum thickness of fixture SLSK	$t_{fix \min}^{2)}$ [mm]	8	10	14	18	-	-	-	-
Installation torque	T_{inst} (NHD, JHD) [Nm]	15	30	50	80	160	160	280	280
	T_{inst} (SLSK) [Nm]	10	25	55	70	-	-	-	-
Minimum thickness of member	h_{min} [mm]	100	120	140	160	200	230	250	300
Minimum spacing ^{1) 3)} cracked concrete	s_{min} [mm]	50	50	60	70	100	100	125	150
	for $c \geq$ [mm]	50	80	120	140	180	180	300	300
Minimum edge distance ^{1) 3)} cracked concrete	c_{min} [mm]	50	55	60	70	100	100	180	150
	for $s \geq$ [mm]	50	100	120	160	220	220	540	300
Minimum spacing ^{1) 3)} uncracked concrete	s_{min} [mm]	50	60	60	70	100	100	125	150
	for $c \geq$ [mm]	80	100	120	140	180	180	300	300
Minimum edge distance ^{1) 3)} uncracked concrete	c_{min} [mm]	50	60	60	70	100	100	180	150
	for $s \geq$ [mm]	100	120	120	160	220	220	540	300

¹⁾ Intermediate values by linear interpolation

²⁾ Depending on the existing shear load, the thickness of the fixture may be reduced to the thickness of the countersunk washer t_{sk} (see Annex A2). It must be verified that the present shear load can be transferred completely into the distance sleeve (bearing of hole).

³⁾ For fire exposure from more than one side $c \geq 300$ mm or $c_{min} \geq 300$ mm applies.



JCP Heavy Duty Anchor

Intended use
Installation parameters, steel zinc plated

Annex B3

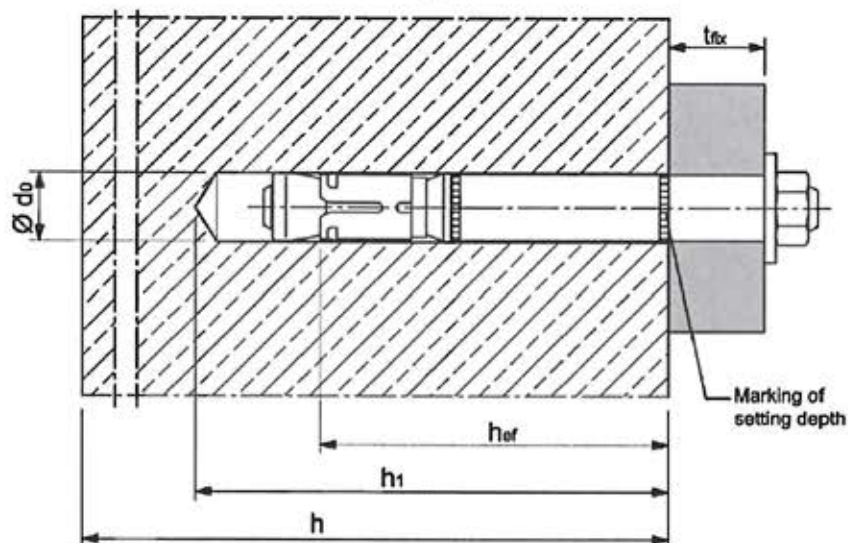
Table B2: Installation parameters, stainless steel A4

Anchor size			12/M8	15/M10	18/M12	24/M16
Size of thread		[-]	M8	M10	M12	M16
Effective anchorage depth	h_{ef}	[mm]	60	71	80	100
Nominal diameter of drill bit	$d_0 =$	[mm]	12	15	18	24
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	12,5	15,5	18,5	24,55
Depth of drill hole	$h_1 \geq$	[mm]	80	95	105	130
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	14	17	20	26
Thickness of countersunk washer SLSK	t_{sk}	[mm]	5	6	7	-
Minimum thickness of fixture SLSK	$t_{fix min}^{2)}$	[mm]	10	14	18	-
Installation torque	T_{inst} (NHD)	[Nm]	35	55	90	170
	T_{inst} (JHD)	[Nm]	30	50	80	170
	T_{inst} (SLSK))	[Nm]	17,5	42,5	50	-
Minimum thickness of member	h_{min}	[mm]	120	140	160	200
Minimum spacing ^{1) 3)}	s_{min}	[mm]	50	60	70	80
cracked concrete	for $c \geq$	[mm]	80	120	140	180
Minimum edge distance ^{1) 3)}	c_{min}	[mm]	50	60	70	80
cracked concrete	for $s \geq$	[mm]	80	120	160	200
Minimum spacing ^{1) 3)}	s_{min}	[mm]	50	60	70	80
uncracked concrete	for $c \geq$	[mm]	80	120	140	180
Minimum edge distance ^{1) 3)}	c_{min}	[mm]	50	85	70	180
uncracked concrete	for $s \geq$	[mm]	80	185	160	80

¹⁾ Intermediate values by linear interpolation

²⁾ Depending on the existing shear load, the thickness of the fixture may be reduced to the thickness of the countersunk washer t_{sk} (see Annex A2). It must be verified that the present shear load can be transferred completely into the distance sleeve (bearing of hole).

³⁾ For fire exposure from more than one side $c \geq 300$ mm or $c_{min} \geq 300$ mm applies.



JCP Heavy Duty Anchor

Intended use
Installation parameters, stainless steel A4

Annex B4

Table C1: Characteristic values for **tension load, cracked concrete,**
static or quasi-static action, **steel zinc plated**

Anchor size		10/M6	12/M8	15/M10	18/M12	24/M16	24/ M16L	28/M20	32/M24	
Installation safety factor	γ_{inst}	[-]		1,0						
Steel failure										
Characteristic resistance	$N_{Rk,s}$	[kN]	16	29	46	67	126	126	196	282
Partial safety factor	γ_{Ms}	[-]		1,5						
Pull-out failure										
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	5	12	16	1)	1)	1)	1)	1)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]		$\left(\frac{f_{ck}}{20}\right)^{0,5}$						
Concrete cone failure										
Effective anchorage depth	h_{ef}	[mm]	50	60	71	80	100	115	125	150
Factor $k_1 =$	$k_{cr,N}$	[-]		7,7						

1) Pull-out is not decisive

Table C2: Characteristic values for **tension load, cracked concrete,**
static or quasi-static action, **stainless steel A4**

Anchor size			12/M8	15/M10	18/M12	24/M16
Installation safety factor	γ_{inst}	[-]	1,0			
Steel failure						
NHD						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,5			
JHD and SLSK						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,87			
Pull-out failure						
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	9	16	1)	1)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$			
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	60	71	80	100
Factor $k_1 =$	$k_{cr,N}$	[-]	7,7			

1) Pull-out is not decisive

JCP Heavy Duty Anchor

Performance

Characteristic values for **tension load, cracked concrete,** static or quasi-static action

Annex C1

Table C3: Characteristic values for **tension load, uncracked concrete,**
static or quasi-static action, **steel zinc plated**

Anchor size			10/M6	12/M8	15/M10	18/M12	24/M16	24/ M16L	28/M20	32/M24	
Installation safety factor		γ_{inst}	[-]	1,0							
Steel failure											
Characteristic resistance		$N_{Rk,s}$	[kN]	16	29	46	67	126	126	196	282
Partial safety factor		γ_{Ms}	[-]	1,5							
Pull-out failure											
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	1)	20	1)	1)	1)	1)	1)	1)
Increasing factor for $N_{Rk,p}$		ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$							
Splitting failure (The higher resistance of case 1 and case 2 may be applied)											
Case 1											
Characteristic resistance in uncracked concrete C20/25		$N^0_{Rk,sp}$	[kN]	12	16	25	30	40	70	50	70
Edge distance		$c_{cr,sp}$	[mm]	1,5 h_{ef}							
Increasing factor for $N^0_{Rk,sp}$		ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$							
Case 2											
Characteristic resistance in uncracked concrete		$N^0_{Rk,sp}$	[kN]	$\min \{N_{Rk,p}; N^0_{Rk,c}\}$							
Edge distance		$c_{cr,sp}$	[mm]	2,5 h_{ef}				1,5 h_{ef}	2,5 h_{ef}	2 h_{ef}	
Concrete cone failure											
Effective Anchorage depth		h_{ef}	[mm]	50	60	71	80	100	115	125	150
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}							
Factor $k_1 =$		$k_{ucr,N}$	[-]	11,0							

¹⁾ Pull-out is not decisive

JCP Heavy Duty Anchor

Performance

Characteristic values for **tension load, uncracked concrete,** static or quasi-static action,
steel zinc plated

Annex C2

Table C4: Characteristic values for **tension load, uncracked concrete**, static or quasi-static action, **stainless steel A4**

Anchor size			12/M8	15/M10	18/M12	24/M16
Installation safety factor	γ_{inst}	[-]	1,0			
Steel failure						
NHD						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,5			
JHD and SLSK						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,87			
Pull-out failure						
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	16	25	35	1)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$			
Splitting failure						
Edge distance	$c_{cr,sp}$	[mm]	180	235	265	300
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	60	71	80	100
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}			
Factor $k_1 =$	$k_{ucr,N}$	[-]	11,0			

¹⁾ Pull-out is not decisive.

JCP Heavy Duty Anchor

Performance

Characteristic values for **tension loads, uncracked concrete**, static or quasi-static action, **stainless steel A4**

Annex C3

Table C5: Characteristic values of **shear load**, static or quasi-static action,
steel zinc plated

Anchor size			10/M6	12/M8	15/M10	18/M12	24/M16	24/ M16L	28/M20	32/M24
Steel failure without lever arm										
NHD										
Characteristic resistance	$V^0_{Rk,s}$	[kN]	16	25	36	63	91	91	122	200
Factor	k_7	[-]	1,0							
JHD and SLSK										
Characteristic resistance	$V^0_{Rk,s}$	[kN]	18	30	48	73	126	126	150	200
Factor	k_7	[-]	1,0							
Partial safety factor	γ_{Ms}	[-]	1,25							
Steel failure with lever arm										
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	12	30	60	105	266	266	519	898
Partial safety factor	γ_{Ms}	[-]	1,25							
Concrete pry-out failure										
Factor	k_8	[-]	1,8	2,0						
Concrete edge failure										
Effective length of anchor in shear loading	l_f	[mm]	50	60	71	80	100	115	125	150
Outside diameter of anchor	d_{nom}	[mm]	10	12	15	18	24	24	28	32

JCP Heavy Duty Anchor

Performance
Characteristic values for **shear load**, static or quasi-static action,
steel zinc plated

Annex C4

Table C6: Characteristic values for **shear load**, static or quasi-static action, **stainless steel A4**

Anchor size			12/M8	15/M10	18/M12	24/M16
Steel failure without lever arm						
Characteristic resistance	$V_{Rk,s}^0$	[kN]	24	37	62	92
NHD						
Factor	k_7	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,25			
JHD						
Factor	k_7	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,36			
SLSK						
Factor	k_7	[-]	0,8			-
Partial safety factor	γ_{Ms}	[-]	1,36			-
Steel failure with lever arm						
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	26	52	92	232
NHD						
Partial safety factor	γ_{Ms}	[-]	1,25			
JHD and SLSK						
Partial safety factor	γ_{Ms}	[-]	1,56			
Concrete pry-out failure						
Factor	k_8	[-]	2,0			
Concrete edge failure						
Effective length of anchor in shear loading	l_f	[mm]	60	71	80	100
Outside diameter of anchor	d_{nom}	[mm]	12	15	18	24

JCP Heavy Duty Anchor

Performance
Characteristic values for **shear load**, static or quasi-static action,
stainless steel A4

Annex C5

Table C7: Characteristic values for **seismic action, Category C1 and C2, steel zinc plated**

Anchor size			12/M8	15/M10	18/M12	24/M16	24/M16L	28/M20	32/M24
Tension load									
Installation safety factor		γ_{inst}	[-]	1,0					
Steel failure									
Characteristic tension resistance category C1	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	126	196	280
Characteristic tension resistance category C2	$N_{Rk,s,eq,C2}$	[kN]	29	46	67	126	126	196	280
Partial safety factor		γ_{Ms}	[-]	1,5					
Pull-out failure									
Characteristic tension resistance category C1	$N_{Rk,p,eq,C1}$	[kN]	12	16	25	36	44,4	50,3	63,3
Characteristic tension resistance category C2	$N_{Rk,p,eq,C2}$	[kN]	5,4	16,4	22,6	29,0	41,2	43,6	63,3
Shear load									
Steel failure without lever arm									
NHD									
Characteristic shear resistance category C1	$V_{Rk,s,eq,C1}$	[kN]	18,0	27,1	43,4	51,9	51,9	96,4	160,1
Characteristic shear resistance category C2	$V_{Rk,s,eq,C2}$	[kN]	12,7	20,5	31,5	50,1	50,1	67,1	108,1
JHD									
Characteristic shear resistance category C1	$V_{Rk,s,eq,C1}$	[kN]	18,0	27,1	43,4	51,9	51,9	96,4	160,1
Characteristic shear resistance category C2	$V_{Rk,s,eq,C2}$	[kN]	12,7	20,5	31,5	69,3	69,3	67,1	108,1
SLSK									
Characteristic shear resistance category C1	$V_{Rk,s,eq,C1}$	[kN]	25,2	36,5	50,4	-	-	-	-
Characteristic shear resistance category C2	$V_{Rk,s,eq,C2}$	[kN]	19,2	29,3	39,4	-	-	-	-
Partial safety factor		γ_{Ms}	[-]	1,25					

JCP Heavy Duty Anchor								Annex C6	
Performance Characteristic values for seismic action, steel zinc plated									

Table C8: Characteristic values for seismic action, Category C1 and C2, stainless steel A4

Anchor size			12/M8	15/M10	18/M12	24/M16
Tension load						
Installation safety factor		γ_{inst}	[-]	1,0		
Steel failure						
Characteristic tension resistance, category C1	$N_{Rk,s,eq,C1}$	[kN]	26	41	60	110
Characteristic tension resistance, category C2	$N_{Rk,s,eq,C2}$	[kN]	26	41	60	110
Partial safety factor NHD		γ_{Ms}	[-]	1,5		
Partial safety factor JHD and SLSK		γ_{Ms}	[-]	1,87		
Pull-out failure						
Characteristic tension resistance, category C1	$N_{Rk,p,eq,C1}$	[kN]	9	16	26	36
Characteristic tension resistance, category C2	$N_{Rk,p,eq,C2}$	[kN]	4,8	16,5	24,8	44,5
Shear load						
Steel failure without lever arm						
NHD						
Characteristic shear resistance, category C1	$V_{Rk,s,eq,C1}$	[kN]	9,6	13,3	25,4	75,4
Characteristic shear resistance, category C2	$V_{Rk,s,eq,C2}$	[kN]	9,7	14,0	18,0	32,2
Partial safety factor		γ_{Ms}	[-]	1,25		
JHD						
Characteristic shear resistance, category C1	$V_{Rk,s,eq,C1}$	[kN]	9,6	13,3	25,4	75,4
Characteristic shear resistance, category C2	$V_{Rk,s,eq,C2}$	[kN]	9,7	14,0	18,0	32,2
Partial safety factor		γ_{Ms}	[-]	1,36		
SLSK						
Characteristic shear resistance, category C1	$V_{Rk,s,eq,C1}$	[kN]	11,5	23,3	31,6	-
Characteristic shear resistance, category C2	$V_{Rk,s,eq,C2}$	[kN]	10,8	17,4	15,4	-
Partial safety factor		γ_{Ms}	[-]	1,36		

JCP Heavy Duty Anchor

Performance

Characteristic values for seismic action, stainless steel A4

Annex C7

Table C9: Characteristic values under **fire exposure** in cracked and uncracked concrete C20/25 to C50/60

Anchor size			10/M6	12/M8	15/M10	18/M12	24/M16	24/ M16L	28/M20	32/M24
Tension load										
Steel failure										
Steel zinc plated										
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	1,0	1,9	4,3	6,3	11,6	18,3	26,3
	R60			0,8	1,5	3,2	4,6	8,6	13,5	19,5
	R90			0,6	1,0	2,1	3,0	5,0	7,7	12,6
	R120			0,4	0,8	1,5	2,0	3,1	4,9	9,2
Stainless steel A4										
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	-	6,1	10,2	15,7	29,2	-	-
	R60			-	4,4	7,3	11,1	20,6	-	-
	R90			-	2,6	4,3	6,4	12,0	-	-
	R120			-	1,8	2,8	4,1	7,7	-	-
Shear load										
Steel failure without lever arm										
Steel zinc plated										
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	1,0	1,9	4,3	6,3	11,6	18,3	26,3
	R60			0,8	1,5	3,2	4,6	8,6	13,5	19,5
	R90			0,6	1,0	2,1	3,0	5,0	7,7	12,6
	R120			0,4	0,8	1,5	2,0	3,1	4,9	9,2
Stainless steel A4										
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	-	14,3	22,7	32,8	61,0	-	-
	R60			-	11,1	17,6	25,5	47,5	-	-
	R90			-	7,9	12,6	18,3	34,0	-	-
	R120			-	6,3	10,0	14,6	27,2	-	-
Steel failure with lever arm										
Steel zinc plated										
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,8	2,0	5,6	9,7	24,8	42,4	83,6
	R60			0,6	1,5	4,1	7,2	18,3	29,8	61,9
	R90			0,4	1,0	2,7	4,7	11,9	17,1	40,1
	R120			0,3	0,8	1,9	3,1	6,6	10,7	29,2
Stainless steel A4										
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	-	6,2	13,2	24,4	61,8	-	-
	R60			-	4,5	9,4	17,2	43,6	-	-
	R90			-	2,7	5,6	10,0	25,3	-	-
	R120			-	1,8	3,6	6,4	16,2	-	-

If pull-out is not decisive in equation D.4 and D.5, FprEN 1992-4:2016 $N_{Rk,p}$ must be replaced by $N^0_{Rk,c}$.

JCP Heavy Duty Anchor

Performance
Characteristic values under **fire exposure**

Annex C8

Table C10: Displacements under tension and shear load, **steel zinc plated**

Anchor size			10/ M6	12/ M8	15/ M10	18/ M12	24/ M16	24 /M16L	28/ M20	32/ M24
Tension load										
Tension load in cracked concrete	N	[kN]	2,4	5,7	7,6	12,3	17,1	21,1	24	26,2
Displacement	δ_{N0}	[mm]	0,5	0,5	0,5	0,7	0,8	0,7	0,9	1,4
	$\delta_{N\infty}$	[mm]	2,0	2,0	1,3	1,3	1,3	1,3	1,4	1,9
Tension load in uncracked concrete	N	[kN]	8,5	9,5	14,3	17,2	24	29,6	34	43
Displacement	δ_{N0}	[mm]	0,8	1,0	1,1			1,3	0,3	0,7
	$\delta_{N\infty}$	[mm]	3,4			1,7		2,3	1,4	0,7
Seismic action C2										
Displacement for DLS	$\delta_{N,eq}$ (DLS)	[mm]	-	3,3	3,0	5,0	3,0	3,0	4,0	5,3
Displacement for ULS	$\delta_{N,eq}$ (ULS)	[mm]	-	12,2	11,3	16,0	9,2	9,2	13,8	12,4
Shear load										
NHD										
Shear load in cracked and uncracked concrete	V	[kN]	9,1	14	20,7	35,1	52,1	52,1	77	86,6
Displacement	δ_{V0}	[mm]	2,5	2,1	2,7	3,0	5,1	5,1	4,3	10,5
	$\delta_{V\infty}$	[mm]	3,8	3,1	4,1	4,5	7,6	7,6	6,5	15,8
Seismic action C2										
Displacement for DLS	$\delta_{V,eq}$ (DLS)	[mm]	-	2,3	3,1	3,0	2,6	2,6	1,6	6,1
Displacement for ULS	$\delta_{V,eq}$ (ULS)	[mm]	-	4,8	6,4	6,1	6,6	6,6	4,8	9,5
JHD										
Shear load in cracked and uncracked concrete	V	[kN]	10,1	17,1	27,5	41,5	72	72	77	86,6
Displacement	δ_{V0}	[mm]	2,9	2,5	3,6	3,5	7,0	7,0	4,3	10,5
	$\delta_{V\infty}$	[mm]	4,4	3,8	5,4	5,3	10,5	10,5	6,5	15,8
Seismic action C2										
Displacement for DLS	$\delta_{V,eq}$ (DLS)	[mm]	-	2,3	3,1	3,0	3,3	3,3	1,6	6,1
Displacement for ULS	$\delta_{V,eq}$ (ULS)	[mm]	-	4,8	6,4	6,1	8,2	8,2	4,8	9,5
SLSK										
Shear load in cracked and uncracked concrete	V	[kN]	10,1	17,1	27,5	41,5	-	-	-	-
Displacement	δ_{V0}	[mm]	2,9	2,5	3,6	3,5	-	-	-	-
	$\delta_{V\infty}$	[mm]	4,4	3,8	5,4	5,3	-	-	-	-
Seismic action C2										
Displacement for DLS	$\delta_{V,eq}$ (DLS)	[mm]	-	3,1	3,9	3,9	-	-	-	-
Displacement for ULS	$\delta_{V,eq}$ (ULS)	[mm]	-	10,2	11,8	13,0	-	-	-	-

JCP Heavy Duty Anchor

Performance
Displacements under tension and shear load, **steel zinc plated**

Annex C9

Table C11: Displacements under tension and shear load, **stainless steel A4**

Anchor size			12/M8	15/M10	18/M12	24/M16
Tension load						
Tension load in cracked concrete	N	[kN]	4,3	7,6	12,1	17,0
Displacement	δ_{N0}	[mm]	0,5	0,5	1,3	0,5
	$\delta_{N\infty}$	[mm]	1,2	1,6	1,8	1,6
Tension load in uncracked concrete	N	[kN]	7,6	11,9	16,7	24,1
Displacement	δ_{N0}	[mm]	0,2	0,3	1,2	1,5
	$\delta_{N\infty}$	[mm]	1,1	1,1	1,1	1,1
Seismic action C2						
Displacement for DLS	$\delta_{N,eq (DLS)}$	[mm]	4,7	4,5	4,3	4,9
Displacement for ULS	$\delta_{N,eq (ULS)}$	[mm]	13,3	12,7	9,7	10,1
Shear load						
Shear load in cracked concrete	V	[kN]	13,9	21,1	34,7	50,8
Displacement	δ_{V0}	[mm]	3,4	4,9	4,8	6,7
	$\delta_{V\infty}$	[mm]	5,1	7,4	7,1	10,1
Seismic action C2						
NHD, JHD						
Displacement for DLS	$\delta_{V,eq (DLS)}$	[mm]	2,8	3,1	2,6	3,3
Displacement for ULS	$\delta_{V,eq (ULS)}$	[mm]	5,6	5,8	5,0	6,9
SLSK						
Displacement for DLS	$\delta_{V,eq (DLS)}$	[mm]	2,5	2,8	2,9	-
Displacement for ULS	$\delta_{V,eq (ULS)}$	[mm]	5,8	5,9	6,9	-

JCP Heavy Duty Anchor

Annex C10

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