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Throughbolt S.S. A4-316

Specification

ETA 07/0332
Option 7 Non-Cracked Concrete

Product Information

A Grade A4-316 Stainless Steel, torque controlled through fixing suitable for use in non-cracked concrete range between C20/25 & C50/60.

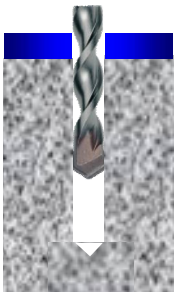
Features

Through Fixing
Medium to heavy duty loads
Torque controlled expansion
Supplied pre-assembled for rapid installation

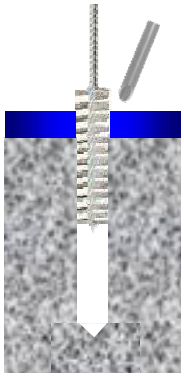
Range Data

				Max. Fix. Thickness		Min Embedment Depth		Minimum Hole Depth	
Part Number	Anchor Diam & Length	Hole Diam	Fixture Clearance Hole	Standard Embedment	Reduced Embedment	Standard Embedment	Reduced Embedment	Standard Embedment	Reduced Embedment
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
TSS06040	6x40	6	7	-	5	-	27	-	35
TSS06065	6x67			10	20	49	39	55	45
TSS08050	8x50	8	9	-	5	-	35	-	45
TSS08075	8x75			10	19	56	47	65	55
TSS08095	8x95			30	39				
TSS08120	8x120			55	64				
TSS10060	10x60	10	12	-	10	-	40	-	50
TSS10080	10x85			10	16	62	56	70	65
TSS10100	10x105			30	36				
TSS10125	10x125			50	56				
TSS10175	10x175			100	106				
TSS12085	12x95	12	14	-	14	81	66	90	75
TSS12100	12x105			10	25				
TSS12115	12x115			20	35				
TSS12145	12x145			50	65				
TSS12200	12x200			105	120				
TSS16110	16x115	16	18	-	14	99	83	110	95
TSS16125	16x130			10	26				
TSS16150	16x150			30	46				
TSS16175	16x180			60	76				
TSS20170	20x180	20	22	35	57	121	99	130	110
TSS20220	20x240			95	117				

Installation Instructions

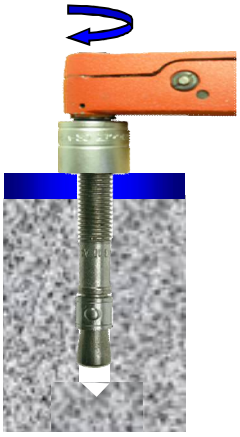


Position fixture and drill correct diameter hole to correct depth



Clean hole by brushing and blowing to remove all dust and drilling debris

Insert assembled anchor through fixture into concrete



Tighten with torque wrench to recommended torque

Throughbolt S.S. A4-316

Standard Embedment

Performance Data (20/25 Non-Cracked Concrete)											
Thread Diam	Minimum Structure Thickness	Characteristic Resistance		Design Resistance		Recommended Resistance		Design Spacing	Design Edge Distance		Tight. Torque
mm	mm	kN		kN		kN		mm	mm		Nm
		Tensile	Shear	Tensile	Shear	Tensile	Shear	Tensile & Shear	Tensile	Shear	
6(1)	100	7.5	7.0	4.8	5.6	3.6	3.9	35	35	65	6
8(1)	100	12.0	12.0	7.9	9.6	5.7	6.8	85	85	105	15
10	100	16.0	16.7	10.6	11.1	7.4	8.0	130	115	120	25
12	135	25.0	27.0	16.6	21.5	11.9	15.4	175	155	195	50
16	170	36.0	50.0	24.0	39.9	17.1	28.6	240	195	325	100
20	200	50.5	86.0	33.5	61.4	23.9	43.9	300	275	445	160

Shear Loads towards a free edge are for single anchors where Spacing ≥ 3 x Edge Distance

Reduced Embedment

Performance Data (20/25 Non-Cracked Concrete)											
Thread Diam	Minimum Structure Thickness	Characteristic Resistance		Design Resistance		Recommended Resistance		Design Spacing	Design Edge Distance		Tight. Torque
mm	mm	kN		kN		kN		mm	mm		Nm
		Tensile	Shear	Tensile	Shear	Tensile	Shear	Tensile & Shear	Tensile	Shear	
6(1)	80	6.0	8.3	3.8	5.5	2.7	3.9	35	55	65	6
8(1)	80	9.0	10.4	5.9	6.9	4.3	4.3	75	85	85	15
10	100	12.0	13.7	7.9	9.1	5.7	6.5	95	95	95	25
12	105	17.8	17.8	11.9	11.9	8.5	8.5	150	145	120	50
16	130	25.8	51.7	17.2	34.4	12.3	24.5	195	160	330	100
20	160	34.7	69.5	23.1	46.3	16.5	33.0	235	200	385	160

Shear Loads towards a free edge are for single anchors where Spacing ≥ 3 x Edge Distance

(1) use restricted to anchorages of indeterminate structural components

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

Influence of concrete strength

Concrete strength		C20/25	C25/30	C30/37	C40/50	C45/55	C50/60
Cylinder	N/mm^2	20	25	30	40	45	50
Cube	N/mm^2	25	30	37	50	55	60
Factor		1.0	1.1	1.22	1.41	1.48	1.55

JCP Construction Products, Unit 14 Teddington Business Park, Station Rd, Teddington, Middlesex TW11 9BQ

Tel:- 020 8943 1800 Web:- www.jcpfixings.co.uk

Declaration of Performance No. 0756-CPR-0216

Throughbolt (Torque controlled expansion anchor made of stainless 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	Non-cracked concrete C20/25 to C50/60 acc. EN 206-2:2003
Batch Number	Marked on individual boxes
Material	Stainless steel, 1.4401, 1.4404. 1.4571, 1.4578, 1.4362 to EN 10088
Durability	Dry internal conditions Internal and external atmospheric exposure including industrial and marine environment, or exposure in permenantly damp internal conditions, if no particularly aggressive conditions exist.
Loading	Static, quasi-static
ETA 07/0332 issued by	DIBt
On the basis of	EAD 330232-00-0601
Certificate of Conformity 1343-CPR-M 556-1/07.15 issued by	MPA 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]	6	8	10	12	16	20	
d_f	Fixture clearance hole	[mm]	7	9	12	14	18	22	
h_{ef}	Effective anchorage depth	[mm]	40	44	48	65	80	100	
h_1	Depth of drill hole to deepest point	[mm]	55	65	70	90	110	130	
h_{min}	Minimum thickness of concrete member	[mm]	100	100	100	130	160	200	
T_{inst}	Nominal torque moment	[mm]	6	15	25	50	100	160	
Non-Cracked concrete									
S_{min}	Minimum spacing	[mm]	35	35	45	60	80	100	
for C≥	Edge distance	[mm]	40	65	70	100	120	150	
C_{min}	Minimum edged distance	[mm]	35	45	55	70	80	100	
for S≥	Anchor spacing	[mm]	60	110	80	100	140	180	
Tensile Steel failure mode									
$N_{Rk,s}$	Characteristic tensile steel failure	[kN]	10	18	30	44	88	134	
$\gamma M,s$	Partial safety factor	[-]	1.50					1.68	
Pull Out and Splitting for standard thickness of concrete member (The highest resistance of Case 1 and Case 2 may be used)									
Case 1									
N^0Rk,sp	Characteristic Resistance in C20/25 non-cracked concrete	[kN]	6	9	12	20	30	40	
$S_{cr,sp}$	Critical spacing (Splitting)	[mm]	120	132	144	195	240	300	
$C_{cr,sp}$	Critical edge distance (Splitting)	[mm]	60	66	72	98	120	150	
Case 2									
N^0Rk,sp	Characteristic Resistance in C20/25 concrete	[kN]	7.5	12	16	25	(1)	(1)	
$S_{cr,sp}$	Critical spacing (Splitting)	[mm]	160	220	240	340	410	560	
$C_{cr,sp}$	Critical edge distance (Splitting)	[mm]	80	110	120	170	205	280	
Concrete cone failure									
h_{ef}	Effective anchorage depth	[mm]	40	44	48	65	80	100	
$S_{cr,N}$	Critical spacing	[mm]	120	132	144	195	240	300	
$C_{cr,N}$	Critical edge distance	[mm]	60	66	72	97.5	120	150	
Yc	Concrete strength increasing factor	[-]	$(f_{ck.cube} / 25)^{\wedge 0.5}$						

Displacement under tensile loading									
Nu_{cr}	Service tensile loads in uncracked concrete	[kN]	3.6	5.7	7.6	11.9	17.2	24.0	
$\delta N0,u_{cr}$	Short term displacement under tensile loads	[mm]	0.7	0.9	0.5	0.6	0.9	2.1	
$\delta N\infty,_{ucr}$	Long term displacement under tensile loads	[mm]	0.8					4.2	
Shear steel failure									
$V,_{Rk,s}$	Characteristic shear steel failure without lever arm	[kN]	7	12	19	27	50	86	
$M^0_{Rk,s}$	Characteristic shear steel failure with lever arm	[Nm]	10	24	49	85	199	454	
$\gamma m,sV$	Partial safety factor	[-]	1.25						
Concrete pryout failure									
k	Factor in equation 95.6) ETAG 001 Annex C §5.2.3.3	[-]	1.0	1.0	1.0	2.0	2.0	2.0	
$\gamma M,cp$	Partial safety factor	[-]	1.5						
Shear concrete edge failure									
l_{ef}	Effective anchorage length	[mm]	40	44	48	65	80	100	
Displacement on shear load									
V	Service shear load in cracked and non-cracked concrete	[kN]	4.0	6.9	10.9	15.4	28.6	43.7	
δ_{v0}	Short term displacement under shear load	[mm]	1.1	2.0	1.2	2.0	2.2	2.1	
$\delta V\infty$	Long term displacement under shear load	[mm]	1.7	3.0	1.8	3.0	3.3	3.2	

(1) Not decisive

The previous performance data relates to the following product codes

d	Marking d_0/L	L [mm]	t_{fix} [mm]	Product Code
6	B M6/10 A4	67	10	TSS06065
8	B M8/10 A4	75	10	TSS08075
	B M8/30 A4	95	30	TSS08095
	B M8/55 A4	120	55	TSS08120
10	B M10/10 A4	85	10	TSS10080
	B M10/30 A4	105	30	TSS10100
	B M10/50 A4	125	50	TSS10125
	B M10/100 A4	175	100	TSS10175
12	B M12/10 A4	105	10	TSS12100
	B M12/20 A4	115	20	TSS12115
	B M12/50 A4	145	50	TSS12145
	B M12/105 A4	200	105	TSS12200
16	B M16/10 A4	130	10	TSS16125
	B M16/30 A4	150	30	TSS16150
	B M16/60 A74	180	60	TSS16175
20	B M20/35 A4	180	35	TSS20170
	B M20/95 A4	240	95	TSS20220

Ammendments	
(1) ETAG changed to EAD	03/11/2017
(2) CPD changed to CPR	03/11/2017
(3) Increase in concrete strength added	03/11/2017

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	

Deutsches Institut für Bautechnik

Member of EOTA
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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-07/0332 of 30 January 2015

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 Throughbolt
Product family to which the construction product belongs	Torque controlled expansion anchor for use in non-cracked concrete
Manufacturer	JCP Construction Products Unit 14 Teddington Business Park Station Road TEDDINGTON, MIDDLESEX TW11 9BQ GROSSBRITANNIEN
Manufacturing plant	Plant2, Germany
This European Technical Assessment contains	16 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	Guideline for European technical approval of "Metal anchors for use in concrete", ETAG 001 Part 2: "Torque controlled expansion anchors", April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific Part

1 Technical description of the product

The JCP Throughbolt in the range of M6, M8, M10, M12, M16 and M20 is an anchor made of electroplated, hot dipped galvanised steel, stainless steel or high corrosions resistant steel which is placed into a drilled hole and anchored by torque-controlled expansion.

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	See Annex C 1 to C 3
Displacements under tension and shear loads	See Annex C 4

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance determined (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Not applicable.

3.4 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not applicable.

3.6 Energy economy and heat retention (BWR 6)

Not applicable.

3.7 Sustainable use of natural resources (BWR 7)

The sustainable use of natural resources was not investigated.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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

According to Decision of the Commission of 24 June 1996 (96/582/EC) (OJ L 254 of 08.10.96 p. 62-65), the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Metal anchors for use in concrete (heavy-duty type)	For fixing and/or supporting concrete structural elements or heavy units such as cladding and suspended ceilings	—	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 at Deutsches Institut für Bautechnik.

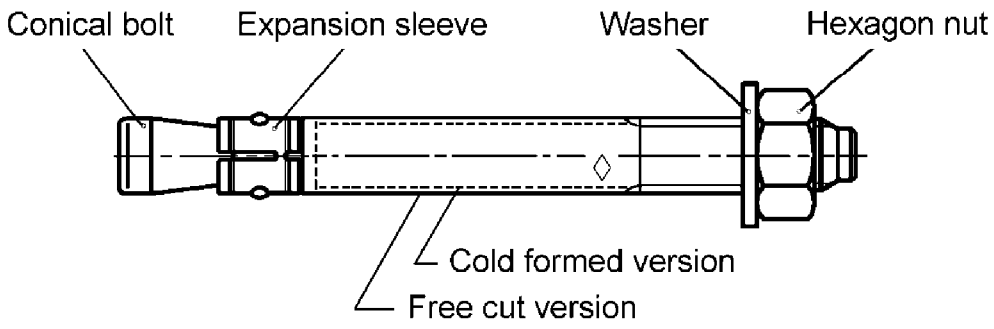
Issued in Berlin on 30 January 2015 by Deutsches Institut für Bautechnik

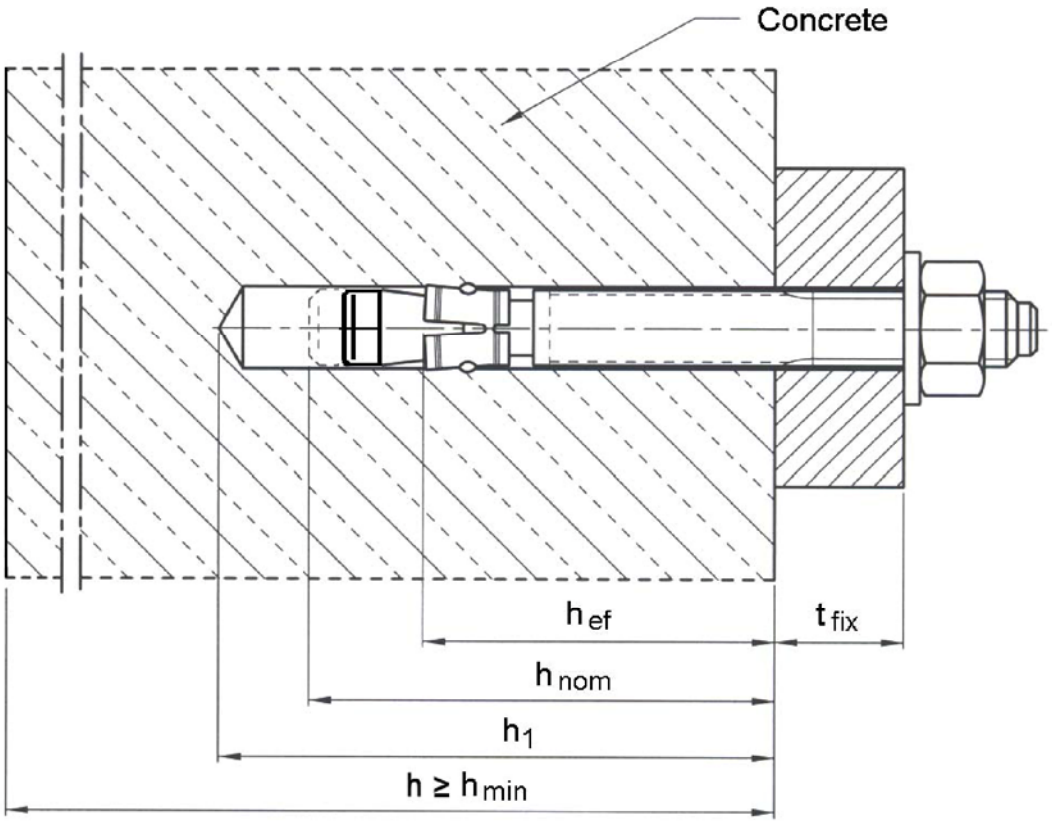
Andreas Kummerow
p.p. Head of Department

beglaubigt:
Baderschneider

Deutsches Institut für Bautechnik

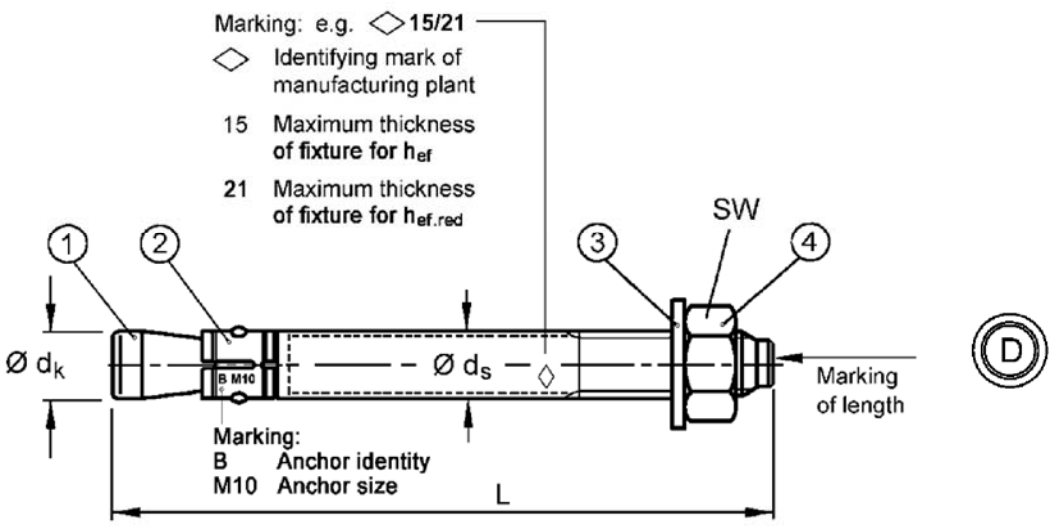
JCP Throughbolt





JCP Throughbolt	
Product description Installation situation	**Annex A1**

Deutsches Institut für Bautechnik DIBt



Marking of length	A	B	C	D	E	F	G	H	I	J	K	L	M
Length of anchor min ≥	38,1	50,8	63,5	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5
Length of anchor max <	50,8	63,5	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5	203,2

Marking of length	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Length of anchor min ≥	203,2	215,9	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2
Length of anchor max <	215,9	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2	483,0

Dimensions in mm

Table A1: Dimensions, steel zinc plated

Anchor size	Ø d_k	Ø d_s	Anchor length L		Wrench size [SW]
			Standard anchorage depth	Reduced anchorage depth	
Steel electroplated and hot-dip galvanised					
M6	6	6 / 5,3 [1)]	t_{fix} + 57,4	$t_{fix\ hef,red}$ + 47,4	10
M8	8	8 / 7,1 [1)]	t_{fix} + 66,4	$t_{fix\ hef,red}$ + 57,4	13
M10	10	10 / 8,9 [1)]	t_{fix} + 74,0	$t_{fix\ hef,red}$ + 68,0	17
M12	12	12 / 10,7 [1)]	t_{fix} + 97,3	$t_{fix\ hef,red}$ + 82,3	19
M16	16	16 / 14,5 [1)]	t_{fix} + 121,0	$t_{fix\ hef,red}$ + 103,0	24
M20	20	20 / 18,2 [1)]	t_{fix} + 142,7	$t_{fix\ hef,red}$ + 120,7	30

[1)] cold formed version

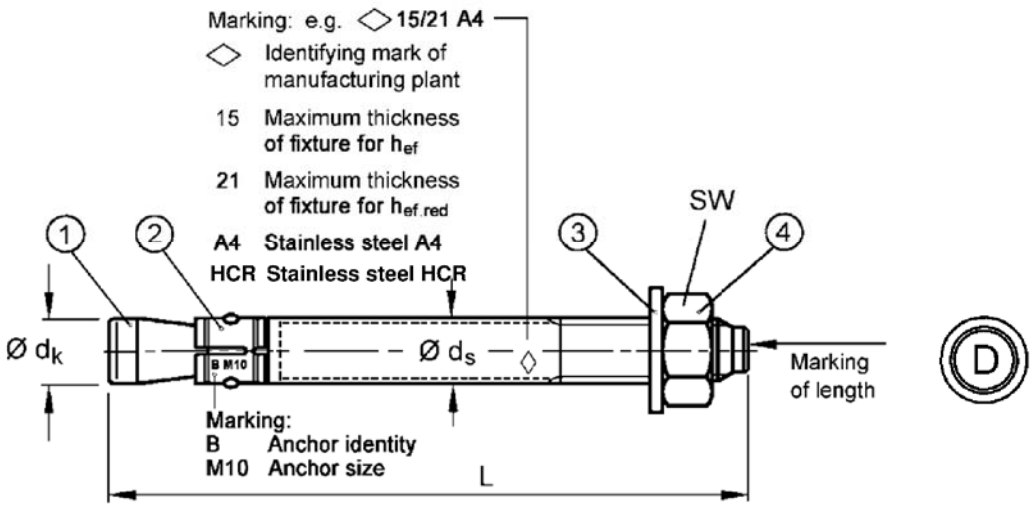
Table A2: Material properties, steel zinc plated

Part	Designation	Material	
		Steel, electroplated ≥ 5 µm acc. to EN ISO 4042:1999	Steel, hot-dip galvanised ≥ 40 µm, acc. to EN ISO 1461:2009
1	Conical bolt	Cold formed or machined steel	Cold formed or machined steel
2	Expansion sleeve	Steel, acc. to EN 10088:2005, material No. 1.4301 or 1.4303	Steel, acc. to EN 10088:2005, material No. 1.4301 or 1.4303
3	Washer	Steel	Steel
4	Hexagon nut	Property class 8 acc. to EN ISO 898-2:2012	Property class 8 acc. to EN ISO 898-2:2012

JCP Throughbolt

Product description
Anchor dimensions, marking and materials, **steel zinc plated**

Annex A2



Marking of length	A	B	C	D	E	F	G	H	I	J	K	L	M
Length of anchor min ≥	38,1	50,8	63,5	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5
Length of anchor max <	50,8	63,5	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5	203,2

Marking of length	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Length of anchor min ≥	203,2	215,9	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2
Length of anchor max <	215,9	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2	483,0

Dimensions in mm

Table A3: Dimensions, stainless steel A4/HCR

Anchor size	Ø d_k	Ø d_s	Anchor length L		Wrench size [SW]
			Standard anchorage depth	Reduced anchorage depth	
Stainless steel A4/HCR					
M6	6	6 / 5,3 [1)]	t_{fix} + 57,4	$t_{fix\ hef,red}$ + 47,4	10
M8	8	8 / 7,1 [1)]	t_{fix} + 66,4	$t_{fix\ hef,red}$ + 57,4	13
M10	10	10 / 8,9 [1)]	t_{fix} + 74,0	$t_{fix\ hef,red}$ + 68,0	17
M12	12	12 / 10,7 [1)]	t_{fix} + 96,5	$t_{fix\ hef,red}$ + 81,5	19
M16	16	16 / 14,5 [1)]	t_{fix} + 117,8	$t_{fix\ hef,red}$ + 101,8	24
M20	19,7	19,7 / 18,2 [1)]	t_{fix} + 142,7	$t_{fix\ hef,red}$ + 120,7	30

[1)] cold formed version

Table A4: Designations and Materials, stainless steel A4/HCR

Part	Designation	Stainless steel A4	High corrosion resistant steel HCR
1	Conical bolt	Stainless steel 1.4401, 1.4404, 1.4571, 1.4578, 1.4362, EN 10088:2005, coated	High corrosion resistant steel 1.4529, 1.4565, EN 10088:2005, coated
2	Expansion sleeve	Stainless steel 1.4401, 1.4571, 1.4362, EN 10088:2005	
3	Washer	Stainless steel 1.4401, 1.4571, 1.4362, EN 10088:2005	High corrosion resistant steel 1.4529, 1.4565, EN 10088:2005
4	Hexagon nut	ISO 3506:2009, A4-70, stainless steel 1.4401, 1.4571, 1.4362, EN 10088:2005, coated	ISO 3506:2009, strength class 70, high corrosion resistant steel 1.4529, 1.4565, EN 10088:2005, coated

JCP Throughbolt

Product description
Anchor dimensions, marking and materials, **stainless steel A4/HCR**

Annex A3

Deutsches Institut für Bautechnik DIBt

Specifications of intended use

JCP Throughbolt			M6	M8	M10	M12	M16	M20
Materials	Steel zinc plated	electroplated	✓	✓	✓	✓	✓	✓
		hot-dip galvanized	-	✓	✓	✓	✓	✓
	Stainless steel	A4	✓	✓	✓	✓	✓	✓
	High corrosion resistant steel	HCR	✓	✓	✓	✓	✓	✓
Static or quasi-static action			✓					
Reduced anchorage depth			✓					
Non-cracked concrete			✓					

Base materials:

- 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, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist
  (stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions
  (high corrosion resistant 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:

- Anchorages 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.).
- Anchorages under static or quasi-static actions are designed in accordance with:
  - ETAG 001, Annex C, design method A, Edition August 2010 or
  - CEN/TS 1992-4:2009, design method A

Installation:

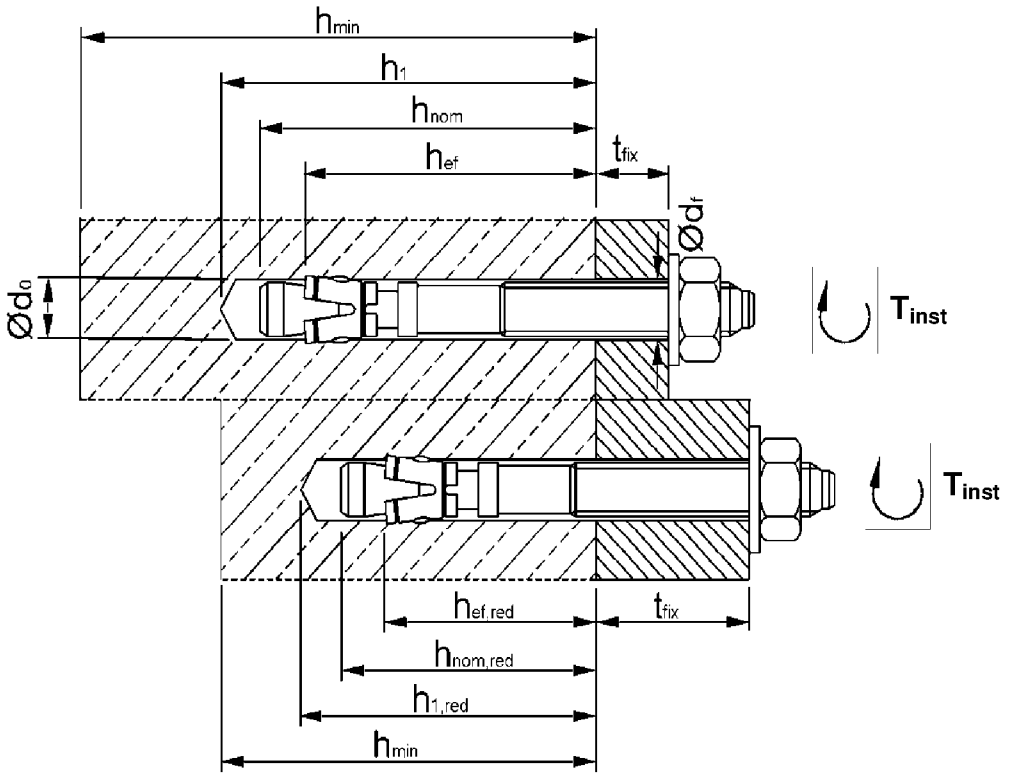
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill 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, if the thickness of fixture is not greater than the maximum thickness of fixture marked on the anchor in accordance with Annex A1 and A2 and the hexagon nut is placed at the end of the conical bolt as delivered by the manufacturer.

JCP Throughbolt	Annex B1
Intended use Specifications	

Deutsches Institut für Bautechnik DIBt

Table B1: Installation data, steel zinc plated

Anchor size			M6	M8	M10	M12	M16	M20
Nominal drill hole diameter	d_0 =	[mm]	6	8	10	12	16	20
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40	8,45	10,45	12,5	16,5	20,55
Installation torque (electroplated)	T_{inst} =	[Nm]	8	15	30	50	100	200
Installation torque (hot-dip galvanised)	T_{inst} =	[Nm]	-	15	30	40	90	120
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	12	14	18	22
Standard anchorage depth								
Depth of drill hole	$h_1 \geq$	[mm]	55	65	70	90	110	130
Embedment depth	$h_{nom} \geq$	[mm]	49	56	62	82	102	121
Effective anchorage depth	$h_{ef} \geq$	[mm]	40	44	48	65	82	100
Reduced anchorage depth								
Depth of drill hole	$h_{1,red} \geq$	[mm]	45	55	65	75	95	110
Embedment depth	$h_{nom,red} \geq$	[mm]	39	47	56	67	84	99
Effective anchorage depth	$h_{ef,red} \geq$	[mm]	30	35	42	50	64	78



JCP Throughbolt

Intended use
Installation data, **steel zinc plated**

Annex B2

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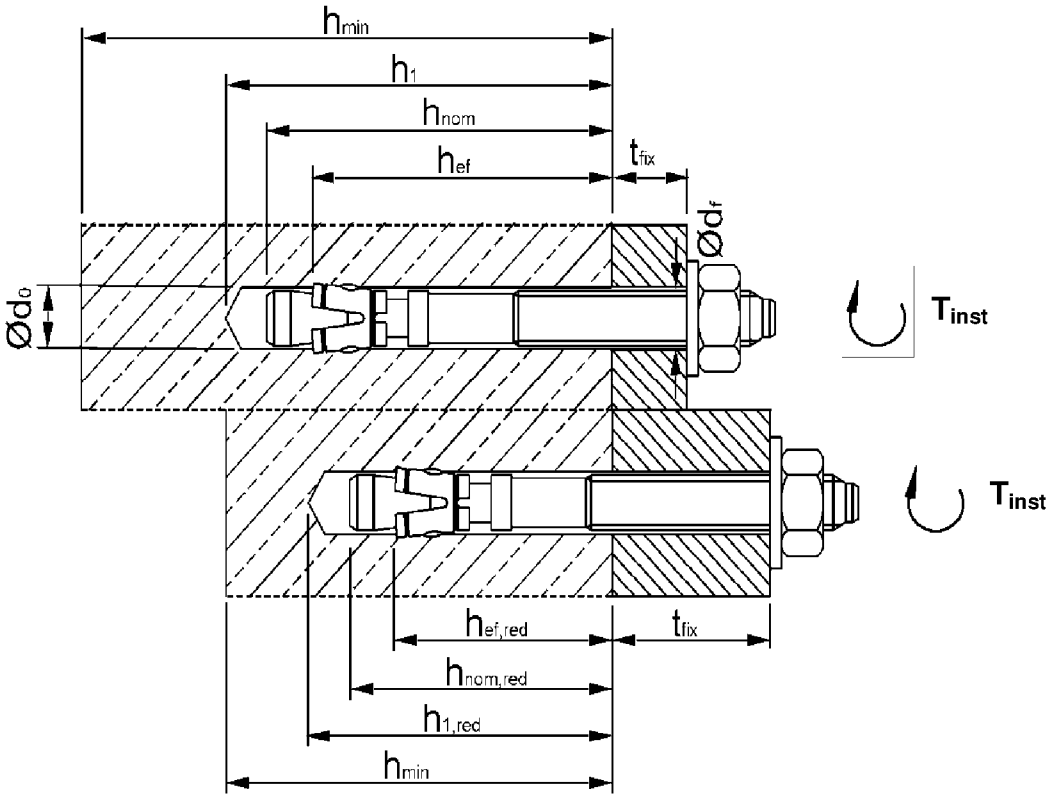
Table B2: Installation data, stainless steel A4/HCR

Anchor size			M6	M8	M10	M12	M16	M20
Nominal drill hole diameter	d_0 =	[mm]	6	8	10	12	16	20
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,40	8,45	10,45	12,5	16,5	20,55
Installation torque	T_{inst} =	[Nm]	6	15	25	50	100	160
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	12	14	18	22
Standard anchorage depth								
Depth of drill hole	$h_1 \geq$	[mm]	55	65	70	90	110	130
Embedment depth	$h_{nom} \geq$	[mm]	49	56	62	81	99	121
Effective anchorage depth	$h_{ef} \geq$	[mm]	40	44	48	65	80	100
Reduced anchorage depth								
Depth of drill hole	$h_{1,red} \geq$	[mm]	45	55	65	75	95	110
Embedment depth	$h_{nom,red} \geq$	[mm]	39	47	56	66	83	99
Effective anchorage depth	$h_{ef,red} \geq$	[mm]	30	35	42	50	64	78



JCP Throughbolt

Intended use
Installation data, **stainless steel A4/HCR**

Annex B3

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Table B3: Minimum spacings and edge distances, steel zinc plated

Anchor size			M6	M8	M10	M12	M16	M20
Standard anchorage depth h_{ef}								
Minimum member thickness	h_{min}	[mm]	100	100	100	130	170	200
Minimum spacing	s_{min}	[mm]	35	40	55	75	90	105
Minimum edge distance	c_{min}	[mm]	40	45	65	90	105	125
Reduced anchorage depth $h_{ef,red}$								
Minimum member thickness	h_{min}	[mm]	80	80	100	100	130	160
Minimum spacing	s_{min}	[mm]	35	40	55	100	100	140
Minimum edge distance	c_{min}	[mm]	40	45	65	100	100	140

Table B4: Minimum spacings and edge distances, stainless steel A4/HCR

Anchor size			M6	M8	M10	M12	M16	M20
Standard anchorage depth h_{ef}								
Minimum member thickness	h_{min}	[mm]	100	100	100	130	160	200
Minimum spacing	s_{min}	[mm]	35	35	45	60	80	100
	for $c \geq$	[mm]	40	65	70	100	120	150
Minimum edge distance	c_{min}	[mm]	35	45	55	70	80	100
	for $s \geq$	[mm]	60	110	80	100	140	180
Reduced anchorage depth $h_{ef,red}$								
Minimum member thickness	h_{min}	[mm]	80	80	100	100	130	160
Minimum spacing	s_{min}	[mm]	35	60	55	100	110	140
Minimum edge distance	c_{min}	[mm]	40	60	65	100	110	140

Intermediate values by linear interpolation.

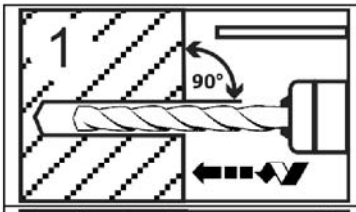
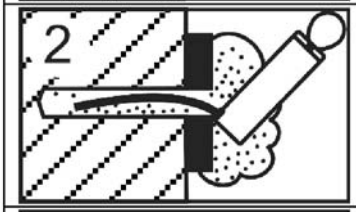
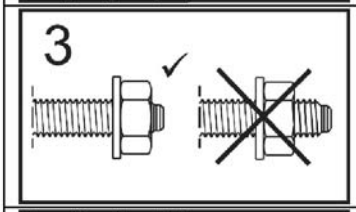
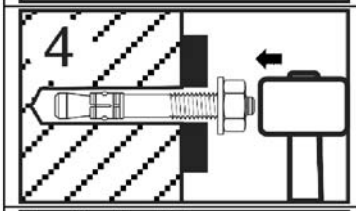
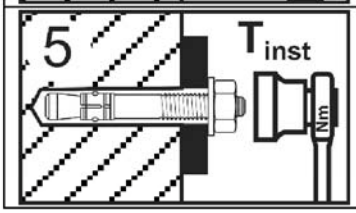
JCP Throughbolt

Intended use
Minimum spacings and edge distances

Annex B4

Deutsches Institut für Bautechnik DIBt

Installation instructions

	Drill hole perpendicular to concrete surface, positioning of the drill holes without damaging the reinforcement. 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.
	Blow out dust.
	Check position of nut.
	Drive in anchor, such that h_{ef} or $h_{ef,red}$ is met. This is ensured, if the thickness of fixture is not greater than the maximum thickness of fixture marked on the anchor in accordance with Annex A2 and A3.
	Apply installation torque T_{inst} by using calibrated torque wrench.

JCP Throughbolt

Intended use
Installation instructions

Annex B5

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Table C1: Characteristic values for **tension loads, steel zinc plated**

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Steel failure								
Characteristic resistance	$N_{Rk,s}$	[kN]	8,7	15,3	26	35	65	107
Partial safety factor	γ_{Ms}	[-]	1,5				1,6	
Pull-out								
Standard anchorage depth h_{ef}								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	9	12	16	1)	1)	1)
Reduced anchorage depth $h_{ef,red}$								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	6 2)	1) 2)	1)	1)	1)	1)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$					
Splitting								
Standard anchorage depth h_{ef}								
Spacing	$s_{cr,sp}$	[mm]	160	220	240	330	410	500
Edge distance	$c_{cr,sp}$	[mm]	80	110	120	165	205	250
Reduced anchorage depth $h_{ef,red}$								
Spacing	$s_{cr,sp}$	[mm]	180	210	230	240	320	400
Edge distance	$c_{cr,sp}$	[mm]	90	105	115	120	160	200
Concrete cone failure								
Standard anchorage depth h_{ef}								
Effective anchorage depth	$h_{ef} \geq$	[mm]	40	44	48	65	82	100
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
Reduced anchorage depth $h_{ef,red}$								
Effective anchorage depth	$h_{ef,red} \geq$	[mm]	30 2)	35 2)	42	50	64	78
Spacing	$s_{cr,N}$	[mm]	3 $h_{ef,red}$					
Edge distance	$c_{cr,N}$	[mm]	1,5 $h_{ef,red}$					
Factor according to CEN/TS 1992-4	k_{ucr}	[-]	10,1					

1) Pullout failure is not decisive
2) Use restricted to anchorages of indeterminate structural components

JCP Throughbolt

Performance
Characteristic values for **tension loads, steel zinc plated**

Annex C1

Deutsches Institut für Bautechnik DIBt

Table C2: Characteristic values for **tension loads, stainless steel A4/HCR**

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Steel failure								
Characteristic resistance	$N_{Rk,s}$	[kN]	10	18	30	44	88	134
Partial safety factor	γ_{Ms}	[-]	1,50					1,68
Pull-out								
Standard anchorage depth h_{ef}								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	7,5	12	16	25	1)	1)
Reduced anchorage depth $h_{ef,red}$								
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	6 2)	9 2)	12	1)	1)	1)
Splitting For the proof against splitting $N^0_{Rk,c}$ has to be replaced by $N^0_{Rk,sp}$.								
Standard anchorage depth h_{ef}								
The higher one of the decisive resistances of Case 1 and Case 2 is applicable.								
Case 1								
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	6	9	12	20	30	40
Spacing	$s_{cr,sp}$	[mm]	3 h_{ef}					
Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}					
Case 2								
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	7,5	12	16	25	1)	1)
Spacing	$s_{cr,sp}$	[mm]	160	220	240	340	410	560
Edge distance	$c_{cr,sp}$	[mm]	80	110	120	170	205	280
Reduced anchorage depth $h_{ef,red}$								
Characteristic resistance in non-cracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	6 2)	9 2)	12	1)	1)	1)
Spacing	$s_{cr,sp}$	[mm]	180	210	230	300	320	400
Edge distance	$c_{cr,sp}$	[mm]	90	105	115	150	160	200
Increasing factor for $N_{Rk,p}$ and $N^0_{Rk,sp}$	ψ_c	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$					
Concrete cone failure								
Standard anchorage depth								
Effective anchorage depth	h_{ef}	[mm]	40	44	48	65	80	100
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
Reduced anchorage depth								
Effective anchorage depth	$h_{ef,red}$	[mm]	30 2)	35 2)	42	50	64	78
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
Factor according to CEN/TS 1992-4	k_{ucr}	[-]	10,1					

1) Pullout failure is not decisive.
2) Use restricted to anchorages of indeterminate structural components.

JCP Throughbolt

Performance
Characteristic values for **tension loads, stainless steel A4/HCR**

Annex C2

Deutsches Institut für Bautechnik DIBt

Table C3: Characteristic values for **shear loads, steel zinc plated**

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Steel failure without lever arm								
Characteristic shear resistance	$V_{Rk,s}$	[kN]	5	11	17	25	44	69
Factor for ductility	k_2	[-]	1,0					
Steel failure with lever arm								
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	9	23	45	78	186	363
Partial safety factor for $V_{Rk,s}$ and $M^0_{Rk,s}$	γ_{Ms}	[-]	1,25				1,33	
Concrete pry-out failure								
Factor k acc. ETAG 001, Annex C or k_3 acc. CEN/TS 1992-4 for h_{ef}	$k_{(3)}$	[-]	1,0	1,0	1,0	2,0	2,0	2,0
Factor k acc. ETAG 001, Annex C or k_3 acc. CEN/TS 1992-4 for $h_{ef,red}$	$k_{(3)}$	[-]	1,0 [1)]	1,0 [1)]	1,0	1,0	2,0	2,0
Concrete edge failure								
Effective length of anchor in shear loading for h_{ef}	l_f	[mm]	40	44	48	65	82	100
Effective length of anchor in shear loading for $h_{ef,red}$	$l_{f,red}$	[mm]	30 [1)]	35 [1)]	42	50	64	78
Outside diameter of anchor	d_{nom}	[mm]	6	8	10	12	16	20

[1)] Use restricted to anchorages of indeterminate structural components

Table C4: Characteristic values for **shear loads, stainless steel A4/HCR**

Anchor Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Steel failure without lever arm								
Characteristic shear resistance	$V_{Rk,s}$	[kN]	7	12	19	27	50	86
Factor for ductility	k_2	[-]	1,0					
Steel failure with lever arm								
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	10	24	49	85	199	454
Partial safety factor for $V_{Rk,s}$ and $M^0_{Rk,s}$	γ_{Ms}	[-]	1,25					1,4
Concrete pry-out failure								
Factor k acc. ETAG 001, Annex C or k_3 acc. CEN/TS 1992-4 for h_{ef}	$k_{(3)}$	[-]	1,0	1,0	1,0	2,0	2,0	2,0
Factor k acc. ETAG 001, Annex C or k_3 acc. CEN/TS 1992-4 for $h_{ef,red}$	$k_{(3)}$	[-]	1,0 [1)]	1,0 [1)]	1,0	1,0	2,0	2,0
Concrete edge failure								
Effective length of anchor in shear loading with h_{ef}	l_f	[mm]	40	44	48	65	80	100
Effective length of anchor in shear loading with $h_{ef,red}$	$l_{f,red}$	[mm]	30 [1)]	35 [1)]	42	50	64	78
Outside diameter of anchor	d_{nom}	[mm]	6	8	10	12	16	20

[1)] Use restricted to anchorages of indeterminate structural components

JCP Throughbolt

Performance
Characteristic values for **shear loads**

Annex C3

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Table C5: Displacements under **tension loads, steel zinc plated**

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Standard anchorage depth								
Tension load	N	[kN]	4,3	5,8	7,6	11,9	16,7	23,8
Displacement	δ_{N0}	[mm]	0,4	0,5				
	$\delta_{N\infty}$	[mm]	0,7	2,3				
Reduced anchorage depth								
Tension load	N	[kN]	2,9	5,0	6,5	8,5	12,3	16,6
Displacement	δ_{N0}	[mm]	0,3	0,4				
	$\delta_{N\infty}$	[mm]	0,6	1,8				

Table C6: Displacements under **tension loads, stainless steel A4/HCR**

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Standard anchorage depth								
Tension load	N	[kN]	3,6	5,7	7,6	11,9	17,2	24,0
Displacement	δ_{N0}	[mm]	0,7	0,9	0,5	0,6	0,9	2,1
	$\delta_{N\infty}$	[mm]	1,8					4,2
Reduced anchorage depth								
Tension load	N	[kN]	2,9	4,3	5,7	8,5	12,3	16,6
Displacement	δ_{N0}	[mm]	0,4	0,7	0,4	0,4	0,6	1,5
	$\delta_{N\infty}$	[mm]	1,3					2,9

Table C7: Displacements under **shear loads, steel zinc plated**

Anchor size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Shear load	V	[kN]	2,9	6,3	9,7	14,3	23,6	37,0
Displacement	δ_{V0}	[mm]	1,2	1,5	1,6	2,6	3,1	4,4
	$\delta_{V\infty}$	[mm]	2,4	2,2	2,4	3,9	4,6	6,6

Table C8: Displacements under **shear loads, stainless steel A4/HCR**

Anchor Size			**M6**	**M8**	**M10**	**M12**	**M16**	**M20**
Shear load	V	[kN]	4,0	6,9	10,9	15,4	28,6	43,7
Displacement	δ_{V0}	[mm]	1,1	2,0	1,2	2,0	2,2	2,1
	$\delta_{V\infty}$	[mm]	1,7	3,0	1,8	3,0	3,3	3,2

JCP Throughbolt

Performance
Displacements

Annex C4