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European Technical Assessment

ETA 21/0899 of 16/06/2022

English translation prepared by IETcc – original versión in Spanish lenguaje

General Part

Technical Assessment Body issuing the European Technical Assessment:

Instituto de Ciencias de la Construcción Eduardo Torroja (IETcc)

Trade name of the construction product:

RECENSE short anchor bolt PAC

Product family to which the construction product belongs:

Cast-in anchor bolts of ribbed reinforcing steel of sizes M16, M20, M24, M30, M39 for use in cracked and non-cracked concrete.

Manufacturer:

Industrial Recense S.L.
Parque empresarial de A Pontenova.
Parcelas 33 – 39. 27720
A Pontenova (Lugo). Spain
website: www.recense.com

Manufacturing plant :

Industrial Recense S.L.
Parque empresarial de A Pontenova.
Parcelas 33 – 39. 27720
A Pontenova (Lugo).Spain

This European Technical Assessment contains:

12 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 on:

EAD 330924-00-0601 “Cast-in anchor bolts of ribbed reinforcing steel”, January 2018

This ETA is a corrigendum of:

ETA 21/0899 version 1 issued on the 04/05/2022

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25, section 3, of Regulation (EU) No. 305/2011.

SPECIFIC PART

1. Technical description of the product

The RECENSE anchor bolt PAC consists of ribbed reinforcing steel of the diameters 16, 20, 25, 32 and 40 mm, two hexagon nuts and two washers. One of the ends of the bolt is provided with an anchor head and the other end with a thread of the sizes M16, M20, M24, M30, M39 and M39. The anchor bolt is imbedded in concrete up to the threaded length.

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 characteristics n. 1 to 12	Performances
Characteristics values for tension loading under static and quasi-static actions	See Annex C1
Characteristics values for shear loading under static and quasi-static actions	See Annex C2
Displacements under tension and shear load for static and quasi-static actions	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristics n.13 to 14.	Performances
13. Reaction to fire	Meets the requirements for class A1
14. Resistance to fire	No performance assessed

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

The applicable European legal act for the system of assessment and verification of constancy of performance is (see Annex V of Regulation (UE) No. 305/2011): 96/582/CE.
The system to be applied is: 1.

5. Technical details necessary for the implementation of the AVCP system, as provided 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 the Instituto de Ciencias de la Construcción Eduardo Torroja.



Instituto de Ciencias de la Construcción Eduardo Torroja
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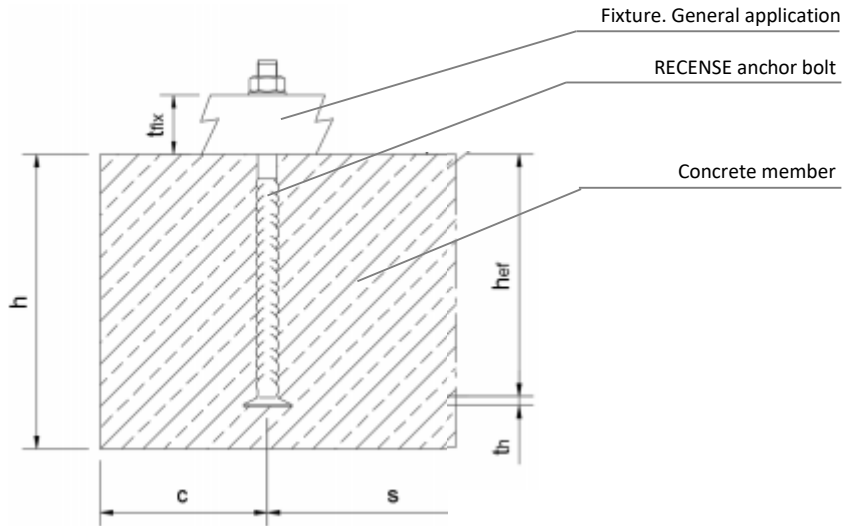


Madrid on 16th June 2022

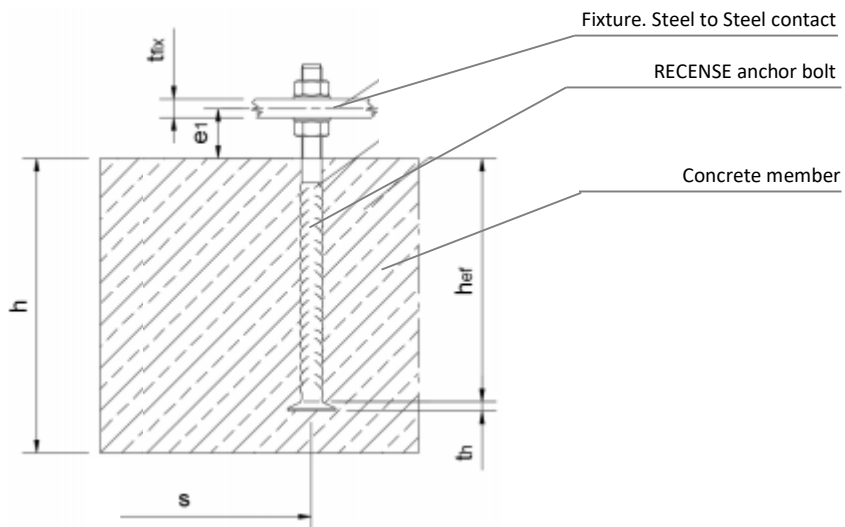
Director IETcc-CSIC



(A) General installation



(B) Steel to Steel contact



RECENSE short anchor bolt PAC

Product description

Installed condition

Annex A1

Anchor bolt

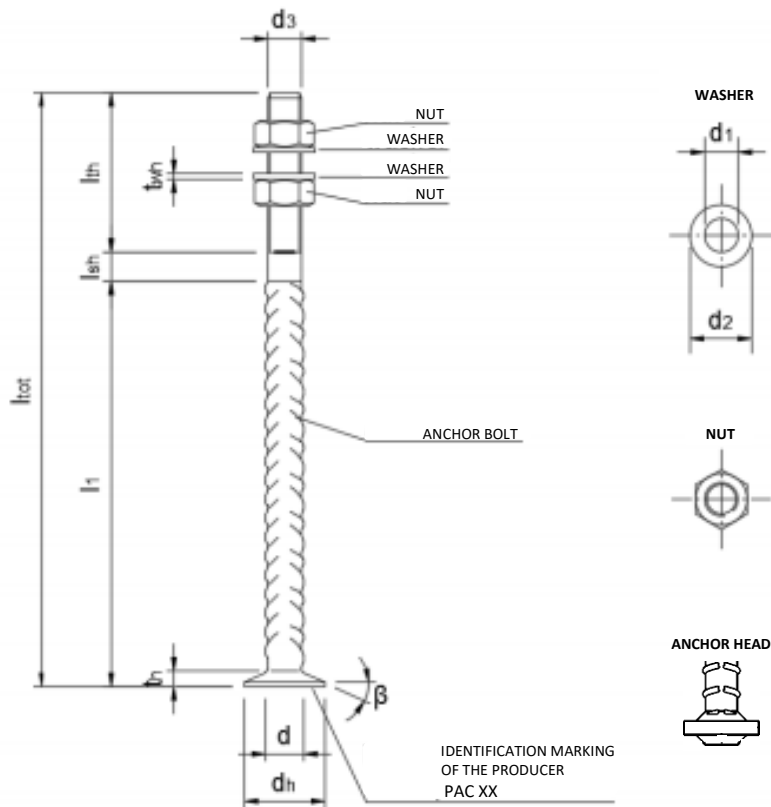


Table A1: Dimensions

COMPONENT PAC	ANCHOR BOLT							WHASER			NUT
	d	d _h	d ₃	l _{th}	t _h	l _{tot}	l ₁	d ₂	d ₁	t _{wh}	¹⁾
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	≤ (mm)	(mm)	(mm)	(mm)	(-)
16	16	38	16	100	12	285	185	38	18	5	M-16
20	20	46	20	110	13	355	245	45	22	6	M-20
24	25	55	24	120	16	436	316	55	26	6	M-24
30	32	70	30	140	18	508	368	65	32	8	M-30
39	40	90	39	170	25	710	540	90	42	10	M-39

¹⁾ Dimensions according to EN ISO 4032:2012

RECENSE short anchor bolt PAC

Product description

Identification

Annex A2

English translation prepared by IETcc

Table A2: Specifications, materials

ANCHOR BOLT	Reinforcement Steel rebar B500SD according to EN 1992-1-1:2004 + AC:2010, Annex C
WASHER	S355J2
HEX NUT	Hexagonal nut, strength class 8.8, according to EN ISO 4032:2012 and EN ISO 898-2:2012

RECENSE short anchor bolt PAC

Product description

Materials

Annex A3

Specifications of intended use

Anchorage subject to:

- Static or quasi-static loads.
- Tension loads, shear loads or combination of tension and shear loads.

Anchoring base materials:

- Reinforced concrete according to EN 206: 2000.
- Strength class: C20/25 to C50/60 according to EN 206: 2000.
- Cracked and uncracked concrete.

Use conditions (environmental conditions):

- The anchor can only be used in dry internal conditions.
- For anchor, that are planned to be installed with a concrete cover, the EN 1992-1-1:2004 + AC:2010, section 4 applies.

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorage and concrete structures.
- Verifiable calculation notes and drawings are prepared taking into account the loads to be anchored. The position of the anchors is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.). The design drawings shall indicate the position of the anchorages, including the reinforcement required for anchoring.
- Anchorages under static and quasi static actions are designed in accordance with:
 - CEN/TS 1992-4:2009, Part 1 and 2 (Design of fastenings for use in concrete).

Minimum reinforcement:

A reinforcement has to be present to resist the splitting forces.
See CEN/TS 1992-4-2:2009, section 6.2.6.

RECENSE short anchor bolt PAC

Intended use

Specifications

Annex B1

Installation

- Installation of anchors is carried out by appropriately qualified workers under supervision of the person responsible for technical matters on site.
- Use of anchor bolts as supplied by the manufacturer, without any manipulation or exchanging of components.
- Installation of anchor bolts in accordance with manufacturer's specifications given in Annex B3 and Annex B4.
- Anchors have to be fixed on the formwork so that no movement of the anchors will occur during the time of laying the reinforcement and of placing and compacting the concrete.
- Concrete around anchors and especially under the heads of anchors has to be compacted properly.
- Area of the thread has to be protected against penetration of concrete, water and oil.
- Maximum setting torques given in Table B1 and Annex B4 must not be exceeded.

Table B1: Installation parameters

Short anchor bolt PAC			16	20	24	30	39
Embedment depth (EAD Table2.1/3)	h_{ef}	(mm)	168	227	290	340	505
Thread length	l_{th}	(mm)	100	110	120	140	170
Minimum thickness of concrete member (EAD Table2.1/5)	h_{min}	(mm)	$h_{min} = h_{ef} + k + c_{nom}^{(1)}$				
Maximum installation torque (EAD Table2.1/6)	T_{inst}	(Nm)	96	187,69	324,92	646,15	1464

⁽¹⁾ Concrete cover according to EN 1992-1-1:2004/AC:2010

RECNSE short anchor bolt PAC

Intended use

Specifications, installation parameters

Annex B2

Installation instructions

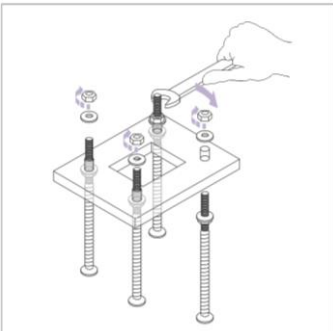
Components



Anchor bolt PAC, consisting of:

1. Headed bolt.
 2. For general installation: 1 x hexagon nut, Surface untreated.
1 x washer, Surface untreated.
- For Steel to Steel contact: 2 x hexagon nut, Surface untreated.
2 x washer, Surface untreated.

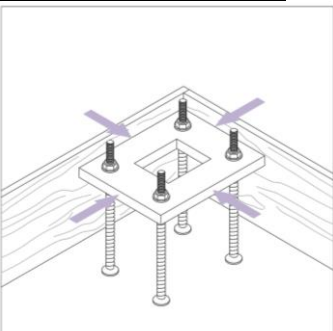
Positioning



Depending on the further usage anchor bolts have to be fixed at the formwork precisely:

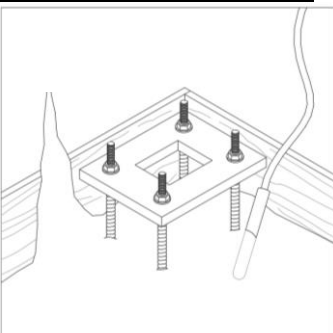
1. Prepare suitable template of Steel or Wood.
→ Check the stability |
2. Fix anchor bolts at template by using nuts and washers.
3. Verify template with anchor bolts finally.

Fixing at the formwork



1. Position template with anchor bolts at formwork.
2. Fix template with anchor bolts at formwork.
→ Mind exact levelling |

Pouring and compacting



1. Fill in concrete carefully, mind fixed anchors |
2. Compact concrete properly, avoid contact between vibrating device and anchor bolts.
→ Don't move or damage anchor bolts |

RECENSE short anchor bolt PAC

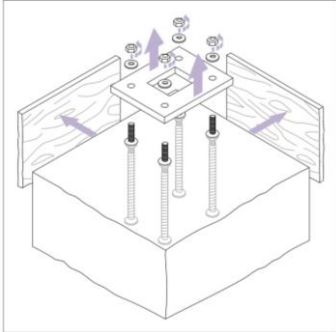
Intended use

Installation instructions

Annex B3

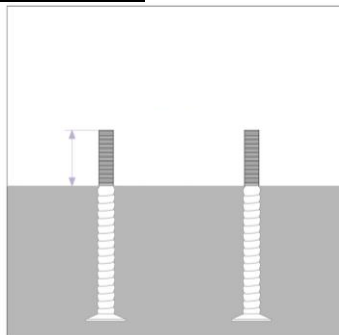
Installation instructions

Removal of formwork



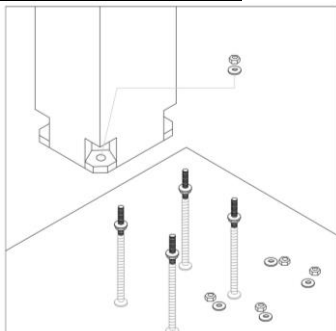
1. Remove formwork and accessories.
2. Remove upper nuts and washers.
3. Remove template.
4. Remove lower nuts and washers.

Verification



1. Check threads of anchor bolts regarding dirt/contamination. Clean them if necessary |
2. Check overlapping of threaded area according to specifications.
3. Check positioning of anchor bolts according to specifications.

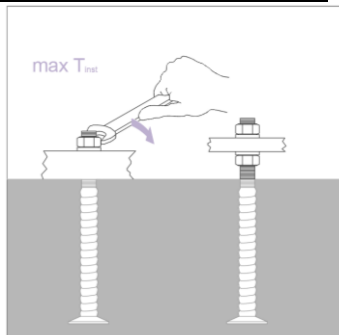
Mounting of fixture



1. Ensure, that concrete has reached its design strength.
2. Check nuts and washers regarding dirt/contamination. Clean them if necessary |
3. Mount fixture.
→ Consider maximum setting torques given below |
→ Note additional information regarding the fixture |

General installation: Fixture with direct contact to the concrete.
Steel to Steel contact: Distance between fixture and Surface of concrete.

Maximum setting torques



Maximum setting torques T_{inst}
for RECENSE anchor bolts PAC

16 (Nm)	20 (Nm)	24 (Nm)	30 (Nm)	39 (Nm)
96	187,69	324,92	646,15	1464

RECENSE perno de anclaje corto PAC

Intended use

Installation instructions

Anexo B4

Table C1: Characteristic resistances values for tension load for static and quasi-static loads

Short anchor bolt PAC		16	20	24	30	39
Resistance to steel failure						
Characteristic resistance (EAD Table2.1/1)	$N_{Rk,s}$ (kN)	84,52	134,20	193,60	308,55	505,02
Partial safety factor ⁽¹⁾	γ_{Ms} (-)	1,4				
Resistance to pull-out failure						
Characteristic resistance In uncracked concrete C20/25 (EAD Table2.1/2)	$N_{Rk,p}$ (kN)	195,93	283,02	395,84	639,28	1072,07
Characteristic resistance In cracked concrete C20/25 (EAD Table2.1/2)	$N_{Rk,p}$ (kN)	139,95	202,16	282,74	456,63	765,76
Partial safety factor ⁽¹⁾	γ_{Mp} (-)	1,5				
Resistance to concrete cone failure						
Effective embedment depth (EAD Table2.1/3)	h_{ef} (mm)	168	227	290	340	505
Factor to take into account the influence of the load transfer mechanism (EAD Table2.1/3)	K_{ucr} (-)	9.1				
	K_{cr} (-)	6.5				
Characteristic spacing (EAD Table2.1/3)	$S_{cr,N}$ (mm)	504	681	870	1020	1515
Characteristic edge distance (EAD Table2.1/3)	$C_{cr,N}$ (mm)	252	340,5	435	510	757,5
Partial safety factor ⁽¹⁾	γ_{Mc} (-)	1,5				
Edge distance to prevent splitting failure						
A reinforcement has to be present to resist the splitting forces and limits the crack width to $w_k \leq 0,3$ mm See CEN/TS 1992-4: 2009, section 6.2.6.2 (EAD Table2.1/4-5)						

⁽¹⁾ In absence of other national regulations

RECENSE short anchor bolt PAC

Performances

Characteristics resistances under tension load for static and quasi-static loads

Annex C1

Table C2: Characteristics resistances under shear load for static and quasi-static loads

Short anchor bolt PAC			16	20	24	30	39
Resistance to steel failure							
Characteristic resistance (EAD Table2.1/8)	$V_{Rk,s}$	(kN)	42,9	67,1	96,8	154,3	268,4
Verification factor of group fastenings under shear load without lever arm according to CEN/TS 1992-4-2:2009, art. 6.3.3.1 (EAD Table2.1/8)	K_2	(-)	1,0				
Partial safety factor ⁽¹⁾	γ_{Ms}	(-)	1,4				
Steel failure under shear load with lever arm							
Characteristics bending resistance (EAD Table2.1/8)	$M_{Rk,s}^0$	(Nm)	181,6	353,3	617,4	1233,3	2850,2
Partial safety factor ⁽¹⁾	γ_{Mp}	(-)	1,5				
Resistance to pry-out failure							
Application factor according to CEN/TS 1992-4-2:2009, equation (32) (EAD Table2.1/10)	K_3	(-)	2,0				
Partial safety factor ⁽¹⁾	γ_{Mc}	(-)	1,5				
Concrete edge failure							
Effective embedment depth under shear load (EAD Table2.1/9)	l_f	(mm)	128	160	192	240	312
Effective outer diameter (EAD Table2.1/9)	d_{nom}	(mm)	16	20	24	30	39
Partial safety factor ⁽¹⁾	γ_{Mc}	(-)	1,5				

⁽¹⁾ In absence of other national regulations

Combined tension and shear loads							
Application factor according to CEN/TS 1992-4-2:2009, equation (49) (EAD Table2.1/12)	K_7	(-)	2/3				

RECENSE short anchor bolt PAC

Performances

Characteristic resistances under shear load for static or quasi-static loads
Combined tensile and shear loads

Annex C2