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Series: TECHNICAL APPROVALS

ITB TECHNICAL APPROVAL AT-15-9326/2014

Pursuant to the Regulation of the Minister of Infrastructure of 8 November 2004 on technical approvals and organizational units authorized to issue them (Journal of Laws No. 249, item 2497), as a result of approval procedures carried out at the Building Research Institute in Warsaw, upon the request of:

RAWLPLUG S.A.

ul. Kwidzyńska 6, 51-416 Wrocław

it is hereby certified that the products named below:

Steel expansion anchors

R-XPT-HD

are suitable for use in the construction industry within the scope and in compliance with the rules defined in the Annex constituting an integral part of the ITB Technical Approval.

Validity date:

26 June 2019

[*stamp:*]
DIRECTOR
pp.
Deputy Director
for Cooperation with the Economy
/illegible signature/
Marek Kaproń

Annex:

General and Technical Provisions

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BUILDING RESEARCH INSTITUTE *

Warsaw, 26 June 2014

ANNEX

GENERAL AND TECHNICAL PROVISIONS

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1. SUBJECT OF APPROVAL

The subject of this Technical Approval are the R-XPT-HD expansion anchors produced by RAWLPLUG S.A.

The R-XPT-HD expansion anchors consist of a partially threaded steel cone point rod, expansion ring, nut and washer (Figure 1).

The dimensions of the R-XPT-HD expansion anchors, shown in Figure 1, are specified in Table 1. The anchors are made of common carbon steel and hot dip galvanized with a zinc coating of at least 40 µm.

Tightening of the R-XPT-HD expansion anchor nut results in the outward movement of the threaded cone point shaft, opening of the cut through expansion ring parts, and a fixed anchoring. The installation with the use of an expansion anchor is shown in the Figure 2.

The required technical properties of the R-XPT-HD expansion anchors are specified in section 3.

2. INTENDED USE, SCOPE AND CONDITIONS OF USE

The R-XPT-HD expansion anchors are intended to be used for making anchorages of statically loaded construction elements in reinforced or unreinforced and plain concrete C20/25 at minimum as per PN-EN 206:2014. The anchorages may only be made in a non-cracked concrete.

Due to environmental corrosion aggressiveness, the R-XPT-HD expansion anchors have to be used according to the requirements of standards: PN-EN ISO 2081:2011, PN-EN 12944-2:2001 and PN-EN ISO 9223:2012.

The design resistances of the anchorages made with the R-XPT-HD specified in Tables 2 and 3.

The position of the anchors in the substrate should be compliant with the recommendations specified in Figure 3 and Table 4.

In order to drill holes in concrete a hammer drill-driver should be used. The hole should be drilled perpendicularly to the concrete surface. The anchor should offer a possibility to be inserted into the hole drilled in the substrate by means of light hammer taps. The anchor installation should be carried out with the use of a torque wrench. Ensure that the nut washer is strongly pressed to the fixture after the anchor is expanded.

The installation parameters of the R-XPT-HD expansion anchors are specified in Figure 4 and Table 5.

The R-XPT-HD expansion anchors should be used in accordance with a technical design prepared subject to Polish standards and building regulations, provisions of this Technical Approval, and the Manufacturer's instructions for use, concerning conditions of making connections with the use of the anchors.

3. TECHNICAL PROPERTIES. REQUIREMENTS

3.1. Materials

The R-XPT-HD expansion anchors should be made of common carbon steel with yield point not lower than 300 MPa and tensile resistance not lower than 430 MPa. The mechanical property grade of steel in the anchors should not be lower than 6.8 as per PN-EN ISO 898-1:2013. The anchors should hot dip galvanized with a zinc coating of at least 55 µm, compliant with the requirements of PN-EN ISO 1461:2011.

3.2. Expansion anchors

3.2.1. Shape and dimensions. The shape and dimensions of the R-XPT-HD expansion anchor components should be as per Figure 1 and Table 1.

3.2.2. Characteristic resistances of the anchorages. The characteristic resistances of the anchorages with R-XPT-HD should not be lower than the values specified in Tables 6 and 7.

4. PACKAGING, STORAGE AND TRANSPORT

The R-XPT-HD expansion anchors should be delivered in sets, in packaging branded by the Manufacturer, and stored and transported in a manner which ensures the consistency of their technical properties. Each packaging should come with a label containing at least the following data:

- the name of the product,
- the name and address of the Manufacturer,
- the number of the ITB Technical Approval AT-15-9326/2014,

- the number and issue date of the national declaration of conformity,
- the name of the certification body which was involved in the assessment of conformity,
- the type of raw material,
- the basic conditions of use and storage,
- the construction mark.

The method of product marking with the construction mark should be compatible with the Regulation of the Minister of Infrastructure of 11 August 2004 on the method of declaring the conformity of construction products and the method of marking them with a construction mark (Journal of Laws No. 198/2004, item. 2041, as amended).

5. ASSESMENT OF CONFORMITY

5.1. General conditions

Pursuant to Article 4, Article 5 paragraph 1 point 3, and Article 8 paragraph 1 of the Act of 16 April 2004 on construction products (Journal of Laws No. 92/2004, item 881, as amended), the products referred to in this Technical Approval may be placed on the market and used in construction works to the extent of their performance properties and intended use, if the Manufacturer has made an assessment of conformity with the ITB Technical Approval AT-15-9326/2014, and marked the products with a construction mark in accordance with applicable regulations.

Pursuant to the Regulation of the Minister of Infrastructure of 11 August 2004 on the method of declaring the conformity of construction products and the method of marking them with a construction mark (Journal of Laws No. 198/2004, item. 2041, as amended), the assessment of conformity of the products referred to in the ITB Technical Approval AT-15-9326/2014 shall be made by the Manufacturer, using system 1.

In the case of conformity assessment system 1, the Manufacturer may issue a national declaration of conformity with the ITB Technical Approval AT-15-9326/2014, if the accredited certification body has issued a certificate of conformity of the product based on:

a) tasks of the Manufacturer:

- factory production control,
- further testing of finished products (samples) taken at the factory, conducted by the Manufacturer, in accordance with the established test schedule including tests specified in point 5.4.3,

b) tasks of the accredited certification body:

- initial type-testing,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control.

5.2. Initial type-testing

The initial type-testing is an examination confirming the required technical and performance properties, conducted before launching the product onto the market.

The initial type-testing of the R-XPT-HD expansion anchors includes the design resistances of the anchor fixtures and the thickness of the anchor zinc coating.

The tests which in the approval procedure formed the basis to determine the technical and performance properties of the products are the initial type-testing in the assessment of conformity.

5.3. Factory production control

The factory production control includes:

1) specifications and checking components and materials,
2) control and testing in the manufacturing process and testing of finished products (see 5.4.2), conducted by the Manufacturer in accordance with the established test schedule and the rules and procedures specified in the documentation of the factory production control, adjusted to the technologies of production, and aimed at obtaining products of required properties.

The production control should ensure that the products comply with the ITB Technical Approval AT-15-9326/2014. The results of the production control should be systematically recorded. The records should confirm that the products meet the conformity assessment criteria. Each product or product batch and related production details must be fully identifiable and reproducible.

5.4. Finished product testing

5.4.1. Testing program. Testing program includes:

a) current testing,
b) further testing.

5.4.2. Current testing. Current testing includes checking:

a) shape and dimensions,

b) zinc coating thickness.

5.4.3. Further testing. Further testing includes checking characteristic resistances of the anchor fixtures.

5.5. Frequency of tests

Testing should be carried out in accordance with the established test schedule, but not less frequently than for every product batch. The size of the product batch should be specified in the documentation of factory production control.

Further testing should be carried out not less frequently than once every three years.

5.6. Test methods

5.6.1. Checking shape and dimensions. The shape and dimensions of the anchors should be checked with measuring instruments that ensure required measurement accuracy.

5.6.2. Checking zinc coating thickness. The thickness of the anchor zinc coating should be checked as per PN-EN ISO 2178:1998.

5.6.3. Checking characteristic resistances of the anchor fixtures.

The characteristic resistances of anchor fixtures should be checked on the anchors embedded in the substrates specified in Tables 6 and 7. The force measurement should be taken using a device with a range adapted to the expected value of breaking force, allowing a continuous and slow increase of the force until breaking. The measurement error should not exceed 3% within the entire measuring range.

5.7. Taking samples for testing

Test samples should be taken at random, as per PN-EN-03010:1983.

5.8. Evaluation of test results

The manufactured products should be considered compliant with the requirements of this ITB Technical Approval, if all test results are positive.

6. FORMAL AND LEGAL ARRANGEMENTS

6.1. The ITB Technical Approval AT-15-9326/2014 is a document confirming the suitability of the R-XPT-HD expansion anchors for use in the construction industry to the extent resulting from the provisions of the Approval.

Pursuant to Article 4, Article 5 paragraph 1 point 3, and Article 8 paragraph 1 of the Act of 16 April 2004 on construction products (Journal of Laws No. 92/2004, item 881, as amended), the products referred to in this Technical Approval may be placed on the market and used in construction works to the extent of their performance properties and intended use, if the Manufacturer has made an assessment of conformity with the ITB Technical Approval AT-15-9326/2014, and marked the products with a construction mark in accordance with applicable regulations.

6.2. The ITB Technical Approval does not infringe the rights resulting from the regulations on the protection of industrial property, in particular the Act of 30 June 2000 — Industrial Property Law (unified text: Journal of Laws of 2013, item 1410, as amended). All persons who make use of this ITB Technical Approval are obliged to ensure these rights.

6.3. While issuing this Technical Approval, the ITB does not accept any liability for any infringement of exclusive and acquired rights.

6.4. The ITB Technical Approval does not release the Manufacturer from the liability for the proper product quality, and the building contractors from the liability for their proper application.

6.5. The published brochures, advertisements and other documents related to the marketing and use in construction of the R-XPT-HD expansion anchor should include information about the issued ITB Technical Approval AT-15-9326/2014 for these products.

7. VALIDITY DATE

The ITB Technical Approval AT-15-9326/2014 is valid until 26 June 2019.

The validity of the ITB Technical Approval may be extended for further periods, if the Applicant or its formal successor submits the relevant request to the Building Research Institute not later than 3 months before the expiry date of this document.

E n d

ADDITIONAL INFORMATION

Related standards

PN-EN 206:2014	*Concrete. Part 1: Requirements, properties, production and conformity*
PN-EN ISO 2081:2011	*Metallic and other inorganic coatings. Electroplated coatings of zinc with supplementary treatments on iron or steel*
PN-EN ISO12944-2:2001	*Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments*
PN-EN ISO 9223:2012	*Corrosion of metals and alloys. Corrosivity of atmospheres. Classification, determination and estimation*
PN-EN ISO 898-1:2013	*Mechanical properties of fasteners made of carbon steel and alloy steel. Bolts, screws and studs*
PN-EN ISO 1461:2011	*Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods*
PN-EN ISO 2178:1998	*Non-magnetic coatings on magnetic substrates. Measurement of coating thickness. Magnetic method*
PN-EN-03010:1983	*Statistical quality control. Random sampling*

Tests and assessment

LOK00-02328/13/R46OSK. Test report and additional information concerning the R-XPT-HD steel expansion anchors. Building Structures on Mining Areas Department of the Building Research Institute (ITB), Katowice 2014.

FIGURES AND TABLES

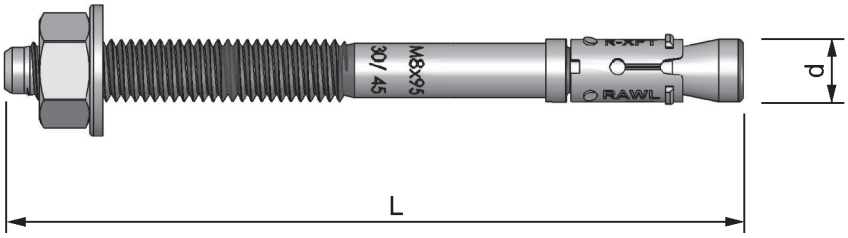


Figure 1 R-XPT-HD expansion anchor

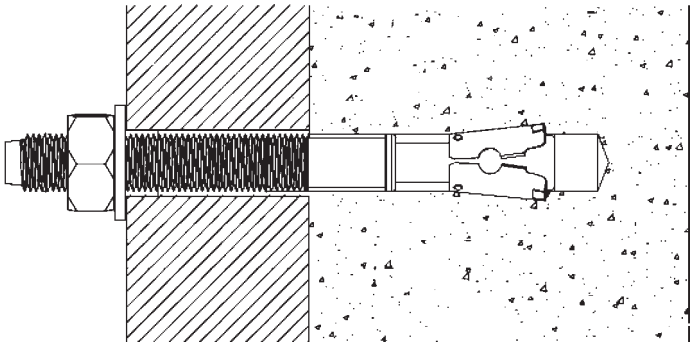
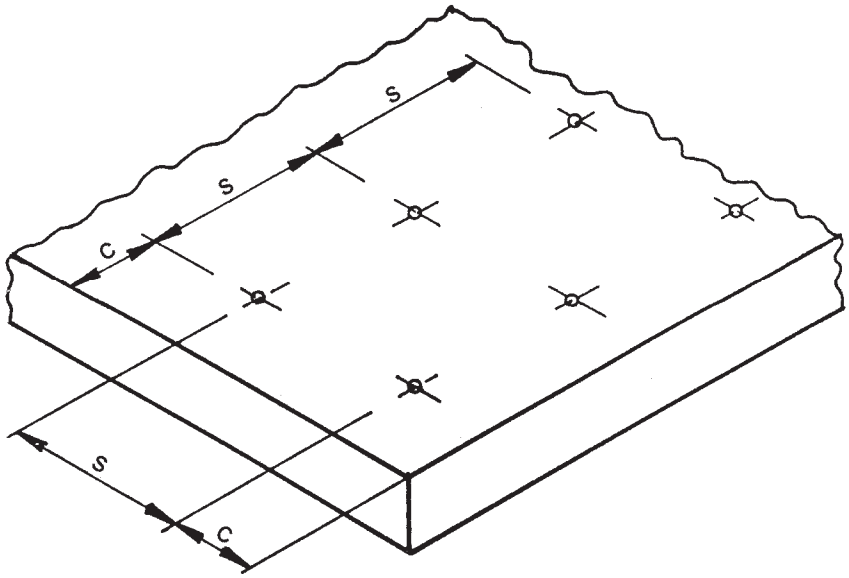


Figure 2 Anchorage with the use of R-XPT-HD



s - axial spacing of anchors

c - edge distance of anchor

Figure 3 Position data of expansion anchors in substrate

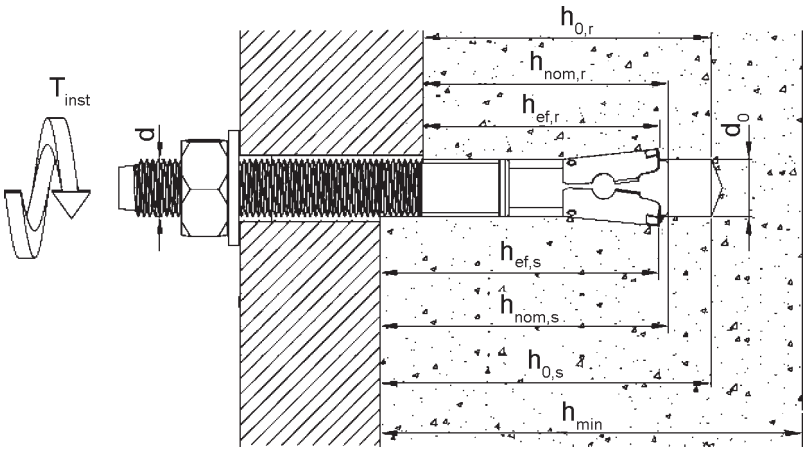


Figure 4 Installation data of R-XPT-HD expansion anchors

Table 1

R-XPT-HD expansion anchor dimensions

No.	Thread size	Product code	d, mm	L, mm
1	*2*	*3*	*4*	*5*
1	M6	R-XPT-HD- 0650/10	6	50
		R-XPT-HD-06085/25		85
		R-XPT-HD-06100/40		100
2	M8	R-XPT-HD-08050/5	8	50
		R-XPT-HD-08060/10		60
		R-XPT-HD-08065/15		65
		R-XPT-HD-08075/10		75
		R-XPT-HD-08080/15		80
		R-XPT-HD-08095/30		95
		R-XPT-HD-08115/50		115
		R-XPT-HD-08140/75		140
3	M10	R-XPT-HD-10065/5	10	65
		R-XPT-HD-10080/10		80
		R-XPT-HD-10095/25		95
		R-XPT-HD-10115/45		115
		R-XPT-HD-10130/60		130
		R-XPT-HD-10140/70		140
4	M12	R-XPT-HD-12080/5	12	80
		R-XPT-HD-12100/5		100
		R-XPT-HD-12120/25		120
		R-XPT-HD-12125/30		125
		R-XPT-HD-12135/40		135
		R-XPT-HD-12150/55		150
		R-XPT-HD-12180/85		180
		R-XPT-HD-12220/125		220
5	M16	R-XPT-HD-16100/5	16	100
		R-XPT-HD-16105/10		105
		R-XPT-HD-16125/5		125
		R-XPT-HD-16140/20		140
		R-XPT-HD-16150/30		150
		R-XPT-HD-16180/60		180
		R-XPT-HD-16220/100		220
6	M20	R-XPT-HD-20125/5	20	125
		R-XPT-HD-20160/20		160
		R-XPT-HD-20200/60		200
7	M24	R-XPT-HD-24260/100	24	260

Table 2

Design loads of R-XPT-HD expansion anchor to tension loads(1)

No.	Thread size	Effective embedment depth hef, mm(1), (2)	Design loads kN
1	***2***	*3*	*4*
1	M6	42	2.72
		22	**1.18**
2	M8	47	3.86
		32	2.40
3	M10	49	5.00
		39	3.52
4	M12	68	8.00
		48	5.11
5	M16	85	10.95
		65	7.68
6	M20	99	13.90
		79	11.13
7	M24	112	16.62
		97	14.03

(1) - substrate made of C20/25 concrete as per PN-EN 206:2014
(2) - standard embedment depth $h_{ef,s}$ (upper value)
and reduced embedment depth $h_{ef,r}$ (lower value)

Table 3

Design loads of R-XPT-HD expansion anchor to shear(1)

No.	Thread size	Effective embedment depth hef, mm(1), (2)	Design loads kN
1	*2*	*3*	*4*
1	M6	42	4.40
		22	4.40
2	M8	47	8.08
		32	8.08
3	M10	49	12.80
		39	12.80

(cont.) Table 3

No.	Thread size	Effective embedment depth hef, mm[(1),(2)]	Design loads kN
1	*2*	*3*	*4*
4	M12	68	18.64
		48	18.64
5	M16	85	34.40
		65	34.40
6	M20	99	53.92
		79	53.92
7	M24	112	77.68
		97	77.68

(1) - substrate made of C20/25 concrete as per PN-EN 206:2014
(2) - standard embedment depth $h_{ef,s}$ (upper value)
and reduced embedment depth $h_{ef,r}$ (lower value)

Table 4

Position parameters of R-XPT-HD expansion anchors in substrate

No.	Thread size	Minimum axial spacing of anchors s_{min}, mm[(1)]	Minimum edge distance of anchor c_{min}, mm
1	*2*	*3*	*4*
1	M6	45	50
		40	45
2	M8	50	40
		45	40
3	M10	55	50
		55	65
4	M12	75	65
		100	100
5	M16	90	80
		100	100
6	M20	140	100
		125	125
7	M24	180	200
		160	160

(1) - standard spacing $s_{min,s}$ (upper value) and reduced spacing $s_{min,r}$ (lower value)

(2) - standard edge distance $c_{min,s}$ (upper value) and reduced edge distance $c_{min,r}$ (lower value)

Table 5

Installation data of R-XPT-HD expansion anchors

No.	Thread size	Minimum hole diameter d_o equal to drill diameter d_{cut}, mm	Minimum hole depth h_o, mm[1]	Anchor installation depth h_{nom}, mm[2]	Tightening torque T_{min}, Nm
1	*2*	*3*	*4*	*5*	*6*
1	M6	6	55	50	5
			35	30	
2	M8	8	60	55	15
			45	40	
3	M10	10	65	59	30
			55	49	
4	M12	12	85	80	50
			65	60	
5	M16	16	105	100	100
			85	80	
6	M20	20	125	119	200
			105	99	
7	M24	24	140	135	300
			125	120	

(1) - standard depth $h_{o,s}$ (upper value) and reduced depth $h_{o,r}$ (lower value)
(2) - standard depth $h_{nom,s}$ (upper value) and reduced depth $h_{nom,r}$ (lower value)

Table 6

Characteristic resistance of R-XPT-HD expansion anchor to tension loads[1]

No.	Thread size	Effective embedment depth h_{ef}, mm[1), (2)]	Characteristic loads kN
1	*2*	*3*	*4*
1	M6	42	6.85
		22	2.98
2	M8	47	9.72
		32	6.05
3	M10	49	12.61
		39	8.87

(cont.) Table 6

No.	Thread size	Effective embedment depth h_{ef}, mm[(1), (2)]	Characteristic loads kN
1	*2*	*3*	*4*
4	M12	68	20.17
		48	12.87
5	M16	85	27.59
		65	19.36
6	M20	99	35.02
		79	28.05
7	M24	112	41.89
		97	35.36

(1) - substrate made of C20/25 concrete as per PN-EN 206:2014
(2) - standard embedment depth $h_{ef,s}$ (upper value)
and reduced embedment depth $h_{ef,r}$ (lower value)

Table 7

Characteristic resistances of R-XPT-HD expansion anchors to shear loads

No.	Thread size	Effective embedment depth h_{ef}, mm[(1), (2)]	Characteristic loads kN
1	*2*	*3*	*4*
1	M6	42	5.50
		22	5.50
2	M8	47	10.10
		32	10.10
3	M10	49	16.00
		39	16.00
4	M12	68	23.30
		48	23.30
5	M16	85	43.00
		65	43.00
6	M20	99	67.40
		79	67.40
7	M24	112	97.10
		97	97.10

(1) - substrate made of C20/25 concrete as per PN-EN 206:2014
(2) - standard embedment depth $h_{ef,s}$ (upper value)
and reduced embedment depth $h_{ef,r}$ (lower value)