

**BUILDING RESEARCH INSTITUTE**  
POLAND, 00-611 Warszawa, Filtrowa 1, www.itb.pl

# **NATIONAL TECHNICAL ASSESSMENT**

## **ITB-KOT-2021/1944 revision 1**

This National Technical Assessment has been issued in accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Journal of Laws of 2016, item 1968) by the Building Research Institute in Warsaw, as requested by:

**RAWLPLUG S.A.**  
**address: Kwidzyńska 6, 51-416 Wrocław**

National Technical Assessment ITB-KOT-2021/1944 revision 1 confirms that the following construction products have been positively assessed for performance characteristics, assuming that they are used as intended:

**R-XPTII-A4 steel expansion anchors**

This National Technical Assessment expires on:

**30 September 2026**

Warsaw, 30 September 2021

Building Research Institute

Filtrowa 1, 00-611 Warsaw

phone no.: 22 825 04 71;

tax identification number: 525 000 93 58;

National Court Register (KRS) number: 0000158785

## 1. TECHNICAL DESCRIPTION OF THE PRODUCT

The subject of this National Technical Assessment is the R-XPTII-A4 series of steel anchors, types R-XPTII-A4-06, R-XPTII-A4-20 and R-XPTII-A4-24, manufactured by RAWLPLUG S.A., based at Kwidzyńska 6, 51-416 Wrocław, at their manufacturing plant in Poland.

The design of the R-XPTII-A4 anchor assembly comprises a partially threaded shank, terminated with a truncated cone-shaped tip, an expansion sleeve, a hexagonal nut, and a washer.

The steel sleeve expands as the steel expansion piece is screwed in, pressing the sleeve against the walls of the hole in the substrate.

The R-XPTII-A4-06 anchors are made entirely of grade A4-70 stainless steel, its chemical composition and mechanical properties conforming with the PN-EN ISO 3506-1:2009 standard, while the R-XPTII-A4-20 and R-XPTII-A4-24 anchors are made entirely of the A4-50 stainless steel, and their chemical composition and mechanical properties conform with the PN-EN ISO 3506-1:2009 standard.

The shape and dimensions of the anchors covered by this National Technical Assessment have been provided in Appendix A. The dimensional tolerances of the steel expansion pieces correspond to the medium accuracy class (*m*) as per the PN-EN 22768-1:1999 standard, while those of the threads conform with the provisions of the PN-ISO 965-2:2001 standard.

## 2. INTENDED USE OF THE PRODUCT

The R-XPTII-A4 steel expansion anchors are intended for fixing structural components operating under static load in substrates made of conventional, non-cracked, reinforced or non-reinforced concrete of class C20/25÷C50/60 as per PN-EN 206+A2:2021.

When to be applied in an aggressive corrosive environment, the steel expansion anchors covered by this National Technical Assessment should be used in accordance with the requirements contained in Appendix A to the PN-EN 1993-1-4:2007 standard.

Appendix C hereto provides the pull-out and shear strength characteristics of the anchors in question, while the installation parameters and spacing of these anchors are specified in Appendix B.

In order to determine the design strength parameters of the R-XPTII-A4 expansion anchors, the strength characteristics provided in Appendix C should be divided by partial safety factors with the following values: 2.52 for pull-out and 1.25 for shear strength.

The expansion anchor is set by introducing it into a hole driven in the substrate. The hole is to be driven perpendicularly to the substrate and cleaned of dust. One should be able to introduce the anchor into the hole by tapping it gently with a hammer. Tightening the nut causes the shank to move out of the hole and the slit sections of the sleeve to expand, thus producing durable anchorage. Installation should be performed using a torque wrench. Make sure that, following the expansion effect, the washer under the nut is tightly pressed against the element being fixed.

The R-XPTII-A4 expansion anchors should be used in accordance with the technical design prepared by considering the relevant Polish construction standards and regulations, and the provisions of this National Technical Assessment, as well as in accordance with the manufacturer's instructions on the conditions of fixing using the anchors in question.

### **3. PERFORMANCE CHARACTERISTICS OF THE PRODUCT AND METHODS USED FOR THEIR ASSESSMENT**

#### **3.1. Performance characteristics of the product**

**3.1.1. Strength characteristics of the attachments secured by the anchors.** The pull-out and shear strength characteristics of the anchors in question have been specified in Appendix C.

**3.1.2. Durability of the anchors.** The anchors are made of the A4 steel as per PN-EN ISO3506-1:2009 which ensures their durability matching the range of values stated in item 2.

#### **3.2. Methods used for the assessment of performance characteristics**

**3.2.1. Strength characteristics of the attachments secured by the anchors.** The strength characteristics of the attachments secured by the anchors in question are tested using anchors embedded in substrates as per item 2. The relevant forces are to be measured by means of an instrument characterised by an operating range matching the expected value of the breaking force, enabling continuous and steady force raising until rupture.

### **4. PACKAGING, TRANSPORT, STORAGE, AND LABELLING OF THE PRODUCT**

The anchors covered by this National Technical Assessment should be delivered in sets, in the manufacturer's original packaging, and they should be stored and transported in a manner which ensures that their technical properties remain unchanged.

The manner in which the products are to be marked as intended for construction applications should comply with the provisions of the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method of declaring performance of construction products and the method of marking them as construction products (Journal of Laws of 2016, item 1966, as amended).

The construction product marking should comprise the following information:

- last two digits of the year in which the construction product marking was first affixed to the construction product,
- name and address of the manufacturer's registered office or an identification mark making it possible to explicitly identify the manufacturer's name and registered office,
- name and designation of the construction product type,
- number and year of issue of the National Technical Assessment according to which the relevant performance characteristics are declared (ITB-KOT-2021/1944 revision 1),
- number of the national declaration of performance,
- level or class of the performance declared,
- name of the certification body which participated in the assessment and verification of the constancy of performance of the construction product,
- address of the manufacturer's website, if the national declaration of performance has been rendered available on it.

A product safety data sheet and/or information about the hazardous substances the construction product contains, as referred to in Article 31 or 33 of Regulation (EC) no. 1907/2006 of the European

Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency, should be supplied along with the relevant national declaration of performance or rendered available, as appropriate.

Furthermore, the marking of a construction product being a hazardous mixture as per the REACH Regulation should comply with the requirements specified in Regulation (EC) no. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) no. 1907/2006.

## **5. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE**

### **5.1. National system of assessment and verification of constancy of performance**

In accordance with the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the method of declaring performance of construction products and the method of marking them as construction products (Journal of Laws of 2016, item 1966, as amended), system 1 should be applied for purposes of assessment and verification of constancy of performance.

### **5.2. Type testing**

The performance characteristics, as assessed in item 3, represent the product type test as long as the relevant raw materials, ingredients, the manufacturing line or the manufacturing plant remain unaltered.

### **5.3. Factory production control**

The manufacturer should have deployed a factory production control system at the manufacturing plant in advance. All the system's elements, as well as the requirements and provisions applicable to it, as adopted by the manufacturer, should be documented in a systematic manner in the form of rules and procedures, including records of the tests performed. The factory production control system should be adapted to the production technology in use, and ensure that the declared performance of the product is maintained in series production.

The factory production control system comprises specification and testing of raw materials and components, in-process production control and testing as well as control inspections (as per item 5.4), performed by the manufacturer in accordance with the assumed testing plan as well as the principles and procedures set forth in the factory production control documentation.

Results of production control should be recorded on a systematic basis. The records in question should confirm that products comply with the relevant criteria of assessment and verification of the constancy of performance. Individual products or product batches and the related manufacturing details must be fully traceable.

### **5.4. Control inspections**

**5.4.1. Testing schedule.** The testing schedule comprises the following:

- a) in-progress testing,
- b) periodical testing.

**5.4.2. In-progress testing.** In-progress testing comprises verification of shape and dimension.

**5.4.3. Periodical testing.** Periodical testing comprises verification of load bearing capacities characteristic of attachments secured by the anchors.

### **5.5. Testing frequency.**

In-progress tests should be conducted in accordance with a pre-set testing schedule, but not less frequently than as defined for testing of each product batch. The product batch size should be defined in the factory production inspection documentation.

Periodical tests should be conducted at least every 3 years.

## **6. INSTRUCTION**

**6.1.** National Technical Assessment ITB-KOT-2021/1944 revision 1 represents a positive assessment of the performance of those essential characteristics of the R-XPTII-A4 steel expansion anchors which, as per the intended use resulting from the provisions of this Assessment, affect the conformity of the construction works where the product is to be used with basic requirements.

**6.2.** National Technical Assessment ITB-KOT-2021/1944 revision 1 is not a document of authorisation to mark any construction product with the construction product marking.

In accordance with the act of 16 April 2004 on construction products (Journal of Laws of 2021, item 1213, as amended), the products covered by this National Technical Assessment can be traded or rendered available at the given national market provided that the manufacturer has assessed and verified the constancy of their performance, issued a domestic declaration of conformity with National Technical Assessment ITB-KOT-2021/1944 revision 1, and marked the products with the construction product marking in accordance with the applicable regulations.

**6.3.** National Technical Assessment ITB-KOT-2021/1944 revision 1 does not infringe any rights arising from the regulations on industrial property protection, and particularly of the Industrial Property Law of 30 June 2000 (Journal of Laws of 2021, item 324). The obligation to ensure that the said rights are not infringed lies with the party using this National Technical Assessment issued by the Building Research Institute (ITB).

**6.4.** By issuing the National Technical Assessment, ITB assumes no responsibility for any potential infringement of exclusive and acquired rights.

**6.5.** The National Technical Assessment does not release the manufacturer of the relevant products from any responsibility for their proper quality, and the contractors of construction works from any responsibility for the proper use thereof.

**6.6.** The validity of the National Technical Assessment may be extended for subsequent periods, not longer than 5 years.

## **7. LIST OF DOCUMENTS REFERRED TO IN THE PROCEEDINGS**

### **7.1. General reports, test reports, assessments, classifications**

- 1) Test report of 19 Aug 2021, RAWLPLUG Laboratory, Wrocław 2021.
- 2) LOK00-02328/16/R80NZK. Test report. Zakład Konstrukcji Budowlanych i Geotechniki ITB (Department of Structures and Building Products of the Building Research Institute), Katowice 2016.

### **7.2. Related standards and documents**

PN-EN 206+A2:2021	<i>Concrete. Requirements, properties, production and conformity</i>
PN-EN 22768-1:1999	<i>General tolerances. Tolerances for linear and angular dimensions without individual tolerance indications</i>
PN-ISO 965-2:2001	<i>ISO general purpose metric screw threads. Tolerances. Part 2: Limits of sizes for general purpose external and internal screw threads. Medium quality</i>
PN-EN ISO 898-2:2012	<i>Mechanical properties of fasteners made of carbon steel and alloy steel. Part 2: Nuts with specified property classes. Coarse thread and fine pitch thread</i>
PN-EN ISO 9223:2012	<i>Corrosion of metals and alloys. Corrosivity of atmospheres. Classification, determination and estimation</i>
PN-EN ISO 12944-2:2018	<i>Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments</i>
AT-15-7370/2016	<i>R-XPTII-A4 steel expansion anchors</i>

## **APPENDICES**

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## Appendix A.

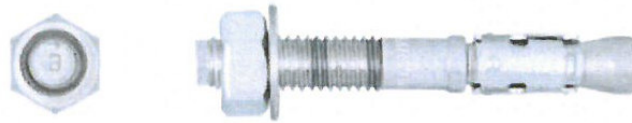
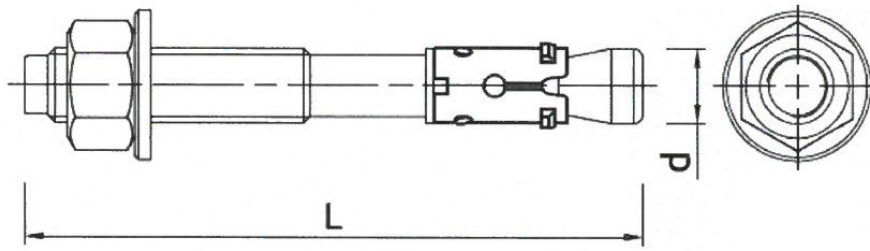


Figure A1. R-XPTII-A4 expansion anchor

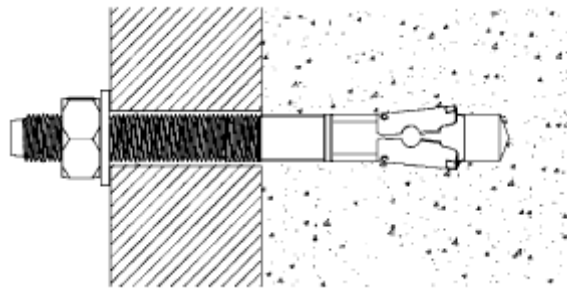


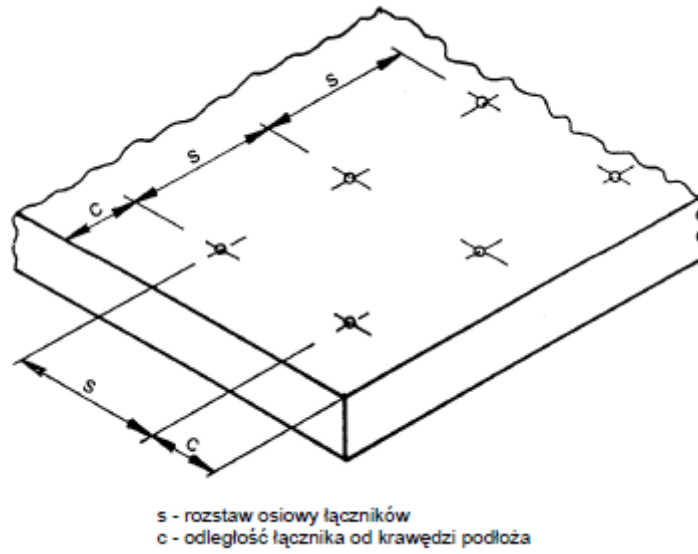
Figure A2. Fixing with the R-XPTII-A4 expansion anchors

Table A1. Dimensions of the R-XPTII-A4 steel expansion anchors

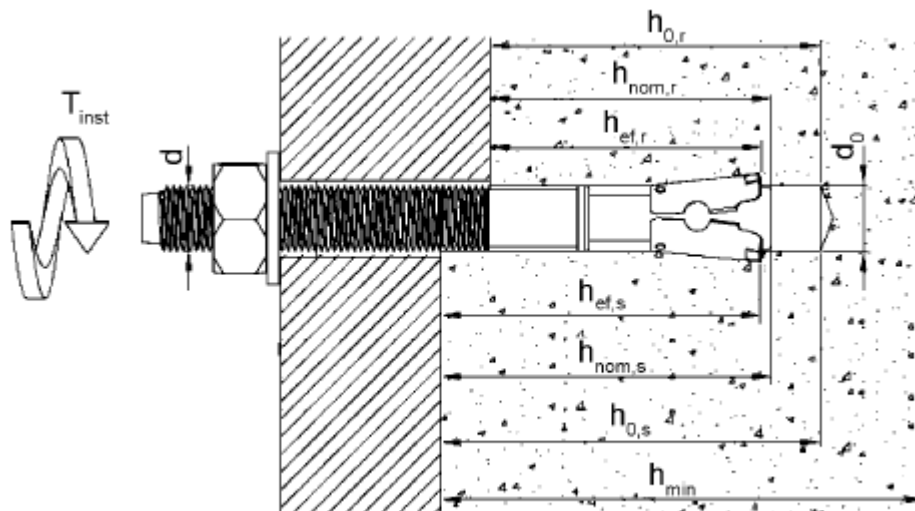
Item	Anchor type	Thread type	Anchor designation	Dimensions [mm]	
				Length, L	Diameter, d
1	2	3	4	5	6
1	R-XPTII-A4-06	M6	R-XPTII-A4-06050/10	50	6
			R-XPTII-A4-06070/15	70	
			R-XPTII-A4-06085/25	85	
2	R-XPTII-A4-20	M20	R-XPTII-A4-20125/5	125	20
			R-XPTII-A4-20160/20	160	
			R-XPTII-A4-20200/60	200	
			R-XPTII-A4-20300/160	300	
3	R-XPTII-A4-24	M24	R-XPTII-A4-24260/100	260	24



## Appendix B.



**Figure B1.** Spacing of the R-XPTII-A4 expansion anchors in the substrate



**Figure B2.** Installation parameters of the R-XPTII-A4 expansion anchors

**Table B1.** Parameters of spacing of the R-XPTII-A4 expansion anchors in the substrate

Item	Anchor type	Minimum axial spacing of anchors $s_{min}$ [mm]	Minimum anchor to substrate edge distance $c_{min}$ [mm]
1	2	3	4
1	R-XPTII-A4-06	45 <sup>(1)</sup>	50 <sup>(3)</sup>
		40 <sup>(2)</sup>	45 <sup>(4)</sup>
2	R-XPTII-A4-20	170 <sup>(1)</sup>	160 <sup>(3)</sup>
		160 <sup>(2)</sup>	125 <sup>(4)</sup>
3	R-XPTII-A4-24	180 <sup>(1)</sup>	200 <sup>(3)</sup>
		190 <sup>(2)</sup>	160 <sup>(4)</sup>
<sup>(1)</sup> standard spacing $s_{min,s}$ (upper value) <sup>(2)</sup> reduced spacing $s_{min,r}$ (lower value) <sup>(3)</sup> standard distance $c_{min,s}$ (upper value) <sup>(4)</sup> reduced distance $c_{min,r}$ (lower value)			

**Table B2.** Installation parameters of the R-XPTII-A4 expansion anchors

Item	Anchor type	Minimum hole diameter $d_o$ equal to drill bit diameter $d_{cut}$ [mm]	Minimum hole depth $h_o$ [mm] <sup>(1)</sup>	Anchor embedment depth $h_{nom}$ [mm] <sup>(2)</sup>	Effective anchoring depth $h_{ef}$ [mm] <sup>(2)</sup>	Minimum substrate thickness $h_{min}$ [mm]	Tightening torque $T_{inst}$ [Nm]
1	2	3	4	5	6	7	
1	R-XPTII-A4-06	6	55 <sup>(1)</sup>	50 <sup>(3)</sup>	42 <sup>(5)</sup>	100	5
			40 <sup>(2)</sup>	30 <sup>(4)</sup>	22 <sup>(6)</sup>		
2	R-XPTII-A4-20	20	140 <sup>(1)</sup>	120 <sup>(3)</sup>	105 <sup>(5)</sup>	210	15
			120 <sup>(2)</sup>	100 <sup>(4)</sup>	85 <sup>(6)</sup>		
3	R-XPTII-A4-24	24	155 <sup>(1)</sup>	135 <sup>(3)</sup>	112 <sup>(5)</sup>	230	230
			140 <sup>(2)</sup>	120 <sup>(4)</sup>	97 <sup>(6)</sup>		
<sup>(1)</sup> standard depth $h_{o,s}$ (upper value) <sup>(2)</sup> reduced depth $h_{o,r}$ (lower value) <sup>(3)</sup> standard depth $h_{nom,s}$ (upper value) <sup>(4)</sup> reduced depth $h_{nom,r}$ (lower value) <sup>(5)</sup> standard anchoring depth $h_{ef,s}$ (upper value) <sup>(6)</sup> reduced anchoring depth $h_{ef,r}$ (lower value)							

## Appendix C.

**Table C1.** Pull-out and shear strength characteristics of the R-XPTII-A4 anchors

Item	Anchor type	Substrate type	Effective anchoring depth $h_{ef}$ [mm] <sup>(2)</sup>	Strength characteristics [kN]		
				pull-out strength $N_{Rk}$	shear strength $V_{Rk}$	
1	2	3	4	5	6	
1	R-XPTII-A4-06	Conventional non-cracked concrete of class C20/25 <sup>(1)</sup> For concrete of class higher than C20/25, the values of characteristic pull-out strength $N_{Rk}$ provided in column 5 should be multiplied by the following increase factors $\Psi_c$ :	42 <sup>(2)</sup>	7.5	7.5	
			22 <sup>(3)</sup>	1.5	1.5	
2	R-XPTII-A4-20	concrete class	105 <sup>(2)</sup>	20.0	40.0	
			85 <sup>(3)</sup>	12.0	24.0	
3	R-XPTII-A4-24	$\Psi_c$	112 <sup>(2)</sup>	25.0	50.0	
		C30/37				1.22
		C40/50	1.41			
		C50/60	1.55	97 <sup>(3)</sup>	16.0	32.0

<sup>(1)</sup> as per standard PN-EN 206+A2:2021  
<sup>(2)</sup> standard anchoring depth  $h_{ef,s}$  (upper value)  
<sup>(3)</sup> reduced anchoring depth  $h_{ef,r}$  (lower value)