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Series: TECHNICAL APPROVALS -/-

* ITB TECHNICAL APPROVAL * AT-15-7205/2006

Pursuant to the Ordinance by the Minister of Infrastructure of 8 November 2004 on Technical Approvals and Organizational Bodies Authorized to Issue Such Approvals (Journal of Laws 'Dziennik Ustaw' No. 249, item 2497), following the approval procedure conducted in the Building Research Institute in Warsaw according to the application made by a company:

CHEMFIX PRODUCTS LIMITED

Mill Street East, Dewsbury, West Yorkshire WF12 9BQ, Great Britain

it is hereby certified that the products named below: -/

-- BONDED ANCHORS --
CHEMFIX ARCTIC

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

DIRECTOR
of the Building Research Institute

-- illegible signature --

doc. dr inż. Stanisław Wierzbicki

Expiry date: -/
21 December 2011. -/-

Enclosure: -/
General and Technical Provisions -/

(Round official seal with the emblem of the Republic of Poland and the following inscription)
*** BUILDING RESEARCH INSTITUTE ***

Warsaw, 21 December 2006

-- E N C L O S U R E --

* GENERAL AND TECHNICAL PROVISIONS *

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* GENERAL AND TECHNICAL PROVISIONS *

1. SUBJECT OF THE APPROVAL DOCUMENT -/

The subject of this Technical Approval are bonded anchors CHEMFIX PESF ARCTIC manufactured by the company: CHEMFIX PRODUCTS LIMITED.

The CHEMFIX PESF ARCTIC bonded anchors are supplied as units consisting of threaded steel rods (Figures 1) and cartridges with styrene free polyester resin mortar. Dimensions of the threaded steel rods are specified in Table 1. They are made either of ordinary carbon steel, galvanized with a zinc coating of the thickness at least 5 µm, or of stainless steel. -/-

The steel rods of CHEMFIX PESF ARCTIC bonded anchors are inserted into a hole in base material filled with resin mortar. After curing of the mortar, the anchorage becomes durable (Figure 2).-/-

2. INTENDED USE, SCOPE AND CONDITIONS OF APPLICATION -/

The CHEMFIX PESF ARCTIC bonded anchors are used for the anchorage of building construction elements subject to static loading in non-cracked concrete of the class not lower than C20/25 according to PN-EN 206-1:2003[1]. -/-

In view of the aggressive corrosion of the environment, the CHEMFIX PESF ARCTIC bonded anchors made of ordinary carbon steel and galvanized shall be applied in compliance with the standards: PN-EN 12944-2:2001 and PN-EN 10152:1997; the anchors made of stainless steel shall be applied in compliance with requirements laid down in the standard PN-71/H-86020 for corrosion resisting steel (stainless steel) and acid resisting steel of the grade: H17N13M2T. -/-

The CHEMFIX PESF ARCTIC bonded anchors may be applied at the installation temperature within the range -18°C ÷ +25°C. Maximum installation and curing times for resin mortars depending on ambient temperature are specified in Table 2.-/-

Values of the design resistance for anchorages made using CHEMFIX PESF ARCTIC bonded anchors are given in Table 3; spacing and edge distance parameters of the bonded anchors in the base material are given at Figure 3 and in Table 4; installation parameters for the bonded anchors are given at Figure 4 and in Table 5. -/-

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[1] TRANSLATOR'S REMARK: 'PN' is the Polish abbreviation for 'Polish Standard'. -/-

The steel rod shall be installed centrically in a hole and the installation operation should end immediately once the required anchorage depth in the base material is achieved. Resin mortar should appear at the top surface of the base material. If no such excess mortar appears after the installation of an anchor, the anchor shall be removed from the hole and reinstalled after filling another portion of the mortar into the hole. -/-

The quality of bonded anchor fastenings shall be checked for at least 3% of anchors of the same size embedded in the base material, with at least two anchors of each size. The test can be regarded as positive provided that the displacement of the anchor in relation to the base material does not exceed 0,2 mm under the load equal to 1,3-times the value of the design resistance. If the tested anchorage does not meet the check requirements, the resistance of 25% of the embedded anchors should be checked (no less however than 5 pieces). If the results are negative, all embedded anchors must be tested. -/-

The CHEMFIX PESF ARCTIC bonded anchors shall be installed in accordance with the design, taking into consideration the rules laid down in the Polish standards and building regulations, requirements set forth in this Technical Approval and the Manufacturer's information concerning the conditions for installation of the above mentioned bonded anchor fastenings. -/-.

3. TECHNICAL PROPERTIES. REQUIREMENTS -/

3.1. Materials -/

The threaded steel rods of the CHEMFIX PESF ARCTIC bonded anchors shall be made either of ordinary carbon steel of strength class 5.8 according to PN-EN ISO 898-1:1999 coated with a zinc layer of the thickness at least 5 μm fulfilling the requirements of PN-EN 10152:1997, or of stainless steel A4-70 according to PN-EN ISO 3506-1:2000. -/-

The styrene free polyester resin mortar manufactured by the English company CHEMFIX PRODUCTS LIMITED shall be delivered in two part cartridges containing resin and a hardener. -/-

3.2. CHEMFIX PESF ARCTIC Bonded Anchors -/

3.2.1. Shape and dimensions. The shape and dimensions of the bonded anchors shall be consistent with Figure 1 and Table 1.The test method is described in section 5.6.1.

3.2.2. Characteristic resistance of anchorages made using bonded anchors. The characteristic resistance of anchorages made using bonded anchors must not be lower than the values specified in Table 6. The test method is described in section 5.6.3. -/-

4. PACKAGING, STORAGE AND TRANSPORT -/

The CHEMFIX PESF ARCTIC anchors shall be delivered in the Manufacturer's company packaging. They shall be stored and transported in a manner ensuring that their properties will remain unchanged. The information to be attached to the packaging shall include at least the following data: -/

- name of the product, -/
- name and address of the Manufacturer, -/
- number of the ITB Technical Approval AT-15-7205/2006,-/
- number and date of issue of the national declaration of conformity[2], -/
- name of the certification body engaged in the attestation of conformity, -/
- type of raw materials, -/
- basic conditions of application and storage, -/
- building (B) mark[3]. -/-

The form of the building (B) marking shall comply with the Ordinance by the Minister of Infrastructure dated 11 August 2004 on Declaration of Conformity of Construction Products and their Marking with the Building (B) Mark (Journal of Laws 'Dziennik Ustaw' No. 198/2004, item 2041). -/-

5. ATTESTATION OF CONFORMITY -/

5.1 System of Attestation of Conformity -/

Pursuant to article 4, article 5 item 1 subitem 3 and article 8 item 1 of the Act of 16 April 2004 on Construction Products (Journal of Laws 'Dziennik Ustaw' No. 92/2004, item 881), the products referred to in this Technical Approval may be marketed and applied in execution of construction works within the scope corresponding with their performances and intended use, provided that the Manufacturer has made the attestation of conformity, issued a national declaration of conformity with the ITB Technical Approval AT-15-7205/2006 and marked the products with the building (B) mark in accordance with the applicable regulations. -/-

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[2] TRANSLATOR'S REMARK : translation of the Polish term "krajowa deklaracja zgodności". -/-
[3] TRANSLATOR'S REMARK : translation of the Polish term "znak budowlany". -/-

By virtue of the Ordinance by the Minister of Infrastructure dated 11 August 2004 on Declaration of Conformity of Construction Products and their Marking with the Building (B) Mark (Journal of Laws 'Dziennik Ustaw' No. 198/2004, item 2041), the attestation of conformity for the product covered by the ITB Technical Approval AT-15-7205/2006 shall be made by the Manufacturer (or its authorised representative established within the territory of the Republic of Poland), applying the system 1. -/-

In case of the attestation of conformity according to the system 1, the Manufacturer can issue the national declaration of conformity with the ITB Technical Approval AT-15-7205/2006 provided that the approved certification body has issued the certificate of conformity of the product based on: -/

a) tasks for the Manufacturer: -/
   – factory production control, -/
   – control testing of final products (samples) taken at the factory by the Manufacturer in accordance with a prescribed test plan, -/
b) tasks for the approved body: -/
   – initial type-testing, -/
   – initial inspection of factory and factory production control, -/
   – continuous surveillance, assessment and approval of factory production control. -/-

5.2. Initial Type-Testing -/

The initial type-testing includes the tests to confirm required technical and performance properties and is to be made before the product is introduced on the market and to the application. -/-

The initial type-testing of CHEMFIX PESF ARCTIC bonded anchors includes design resistance of anchorages performed using the said anchors and the thickness of zinc coating of the threaded steel rods made of ordinary carbon steel. -/-

The tests used as a basis for determination of technical and performance properties of the product in the approval procedure constitute the initial type-testing in the attestation of conformity. -/-

5.3. Factory Production Control -/

The factory production control includes: -/

1) specification and control of components and materials, -/
2) control and tests during the production process and testing of final products (section 5.4) to be conducted by the Manufacturer in accordance with a prescribed test plan and in compliance with policies and procedures set forth in the documentation of the

factory production control, adapted to the production technology and intended to obtain products of required properties. -/-

The production control shall ascertain the conformity of the product with the ITB Technical Approval AT-15-7205/2006. Results of the factory production control shall be systematically recorded. The records shall confirm that the products meet the criteria of the attestation of conformity. Each batch of the products shall be clearly identified in the test records. -/-

5.4. Control Testing of Final Products -/

The control testing of final products includes checks of the shape, dimensions and thickness of a zinc coating of the threaded steel rods made of ordinary carbon steel. -/-

5.5. Frequency of Control Testing of Final Products -/

The control testing of final products shall be performed in accordance with a prescribed test plan, at least on each batch of the products. The size of product batches shall be specified in the documentation of the factory production control. -/-

5.6. Methods of Testing -/

5.6.1 Verification of the shape and dimensions of the bonded anchors. The shape and dimensions of the bonded anchors shall be checked using measuring devices ensuring the accuracy of measurements to 0,01 mm. -/-

5.6.2. Verification of the thickness of a zinc coating of the threaded steel rods. The thickness of a zinc coating of the threaded steel rods shall be checked according to PN-EN ISO 2178:1998.-/-

5.6.3. Verification of the characteristic resistance of anchorages made using bonded anchors. The characteristic resistance of the above mentioned anchorages shall be checked on anchors embedded in the base materials specified in Table 6. The measurement of forces shall be performed using a device with the range adjusted to the expected value of ultimate force enabling continuous and slow increase of the force until failure. The measurement error shall not exceed 3% in the whole measurement range. -/-

5.7. Taking of Samples for Testing -/

Test samples shall be taken according to the standard: PN-83/N-03010.-/-

5.8. Assessment of Test Results -/

The manufactured CHEMFIX PESF ARCTIC bonded anchors shall be deemed in conformity with the requirements of this ITB Technical Approval, if the results from all tests according to section 5.4 are positive. -/-

6. FORMAL AND LEGAL PROVISIONS -/

6.1. The ITB Technical Approval AT-15-7205/2006 is the document certifying the fitness of the CHEMFIX PESF ARCTIC bonded anchors for use in the construction industry within the scope resulting from the provisions herein contained. -/-

Pursuant to article 4, article 5 item 1 subitem 3 and article 8 item 1 of the Act of 16 April 2004 r. on Construction Products (Journal of Laws 'Dziennik Ustaw' No. 92/2004, item 881), the products referred to in this Technical Approval may be marketed and applied in execution of construction works within the scope corresponding with their performances and intended use, provided that the Manufacturer has made the attestation of conformity, issued a domestic declaration of conformity with the ITB Technical Approval AT-15-7205/2006 and marked the products with the building (B) mark in accordance with the applicable regulations. -/-

6.2. This ITB Technical Approval does not infringe any rights laid down by the provisions on protection of industrial property, and in particular the Ordinance by the Marshal of the Sejm (Parliament) of the Republic of Poland of 13 June 2003 on Promulgation of Unified Text of the Act of 30 June 2000 – Industrial Property Law (Journal of Laws 'Dziennik Ustaw' No. 119, item 1117). The users of this Technical Approval shall be obliged to secure such rights.

6.3. When issuing this Technical Approval the Building Research Institute shall assume no responsibility for a possible breach of any exclusive or acquired rights. -/-

6.4. This ITB Technical Approval shall not release the Manufacturer from its responsibility for appropriate quality of the products or the contractors of construction works from appropriate application thereof. -/-

6.5. The contents of any published booklets and advertisements or other documents related to marketing the CHEMFIX PESF ARCTIC bonded anchors and their application in the construction industry shall include information about the ITB Technical Approval AT-15-7205/2006 granted to these products. -/-

7. TERMIN WAŻNOŚCI

The ITB Technical Approval AT-15-7205/2006 shall be valid to 21 December 2001. -/-

The validity of the ITB Technical Approval may be extended for subsequent periods, provided that the party applying for the Approval or its legal successor files with the Research Building Institute a relevant application not later than 3 months prior to the expiry date hereof. -/-

-- T h e E n d --

* ADDITIONAL INFORMATION *

Reference Standards -/

PN-EN 206-1:2003	*Concrete. Part 1: Specification, performance, production and conformity. -/-*
PN-EN ISO 12944-2:2001	*Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Part 2: Classification of environments*.
PN-EN 10152:1997	*Low carbon steel. Electrolytically zinc coated cold rolled steel flat products. -/-*
PN-71/H-86020	*Corrosion resisting steel (stainless steel) and acid resisting steel. Grades. -/-*
PN-EN ISO 898-1:2001	*Mechanical properties of fasteners made of carbon steel and alloy steel. Bolts, screws and studs. -/-*
PN-EN ISO 3506-1:2000	*Mechanical properties of corrosion-resistant stainless-steel fasteners. Bolts, screws and studs. -/-*
PN-EN ISO 2178:1998	*Non-magnetic coatings on magnetic substrates. Measurement of coating thickness. Magnetic method*. -/-
PN-83/N-03010	*Statistic quality control. Random selection of product samples. -/-*

Tests and Assessments -/-

LOK-678/A/06. The test report and technical assessment concerning the threaded steel anchors from M8 to M20 fastened to concrete base material using a mortar: PE STYRENE FREE LOW TEMP. Zakład Elementów Konstrukcji Budowlanych Oddziału Śląskiego ITB / Department of Building Construction Elements of the Silesian Branch of the Building Research Institute/, Katowice 2006. -/-

FIGURES and TABLES

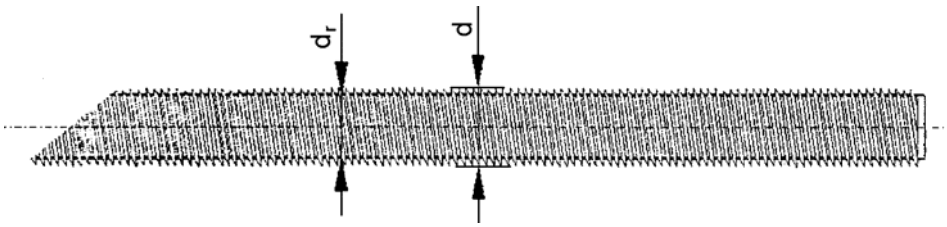


Figure 1. Threaded steel rod of CHEMFIX PESF ARCTIC bonded anchor

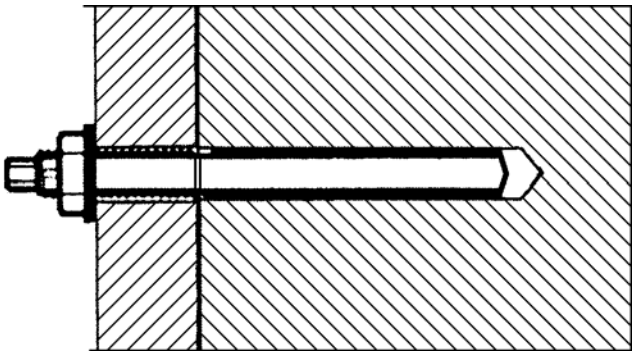
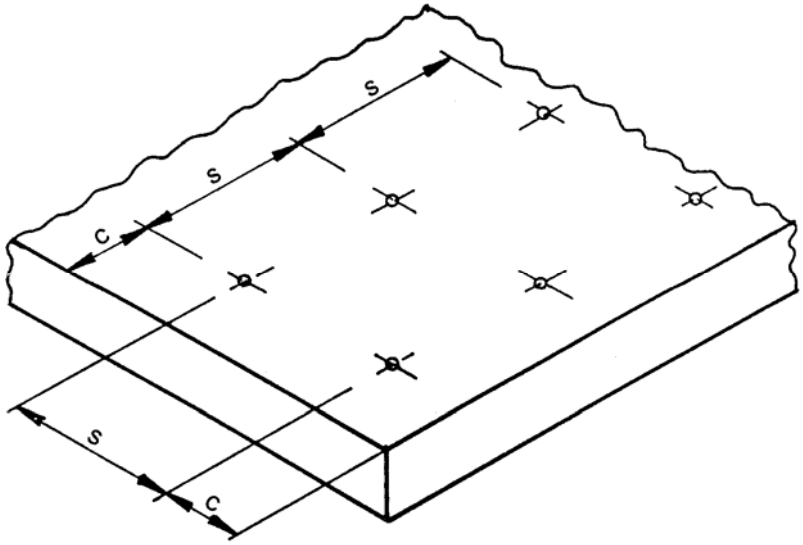


Figure 2. Anchorage made using CHEMFIX PESF ARCTIC bonded anchor



s - axial spacing of anchors
c - edge distance

Figure 3. Spacing and edge distance parameters of bonded anchors in base material

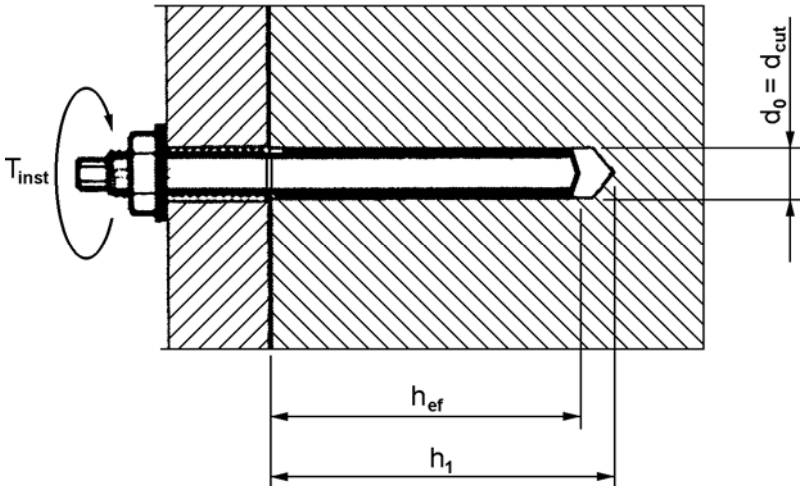


Figure 4. Installation parameters of CHEMFIX PESF ARCTIC bonded anchors

Table 1

Dimensions of threaded steel rods of CHEMFIX PESF ARCTIC bonded anchors

Item	Marking of anchor thread	d, mm	d_r, mm
1	*2*	*3*	*4*
1	M8	8	6,6
2	M10	10	8,2
3	M12	12	9,9
4	M16	16	13,5
5	M20	20	16,9

Table 2

Maximum installation and curing times for resin mortar used in CHEMFIX PESF ARCTIC bonded anchors

Item	Type of resin mortar	Installation time, minutes						Curing time, minutes					
		Ambient temperature, °C						Ambient temperature, °C					
		-18	-10	-5	5	15	25	-18	-10	-5	5	15	25
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1	Styrene free polyester	100	75	50	12	6	3	360	180	90	50	35	30

Table 3

Values of the design resistance for anchorages made using CHEMFIX PESF ARCTIC bonded anchors under pullout force acting at any angle in relation to the anchor axis

Item	Marking of anchor thread	Minimum, effective anchorage depth h_{ef} [1)], mm	Design resistance [2)], kN
1	*2*	*3*	*4*
1	M8	80	7,9
2	M10	90	13,1
3	M12	110	19,9
4	M16	125	26,1
5	M20	170	36,3

1) values of h_{ef} according to Table 5

2) concrete class: C20/25 according to PN-EN 206-1:2003

Table 4

Spacing and edge distance parameters of CHEMFIX PESF ARCTIC bonded anchors in base material

Item	Parameter	Marking of anchor thread				
		M8	M10	M12	M16	M20
1	*2*	*3*	*4*	*5*	*6*	*7*
1	Minimum axial spacing of anchors $s_{cr,N}$, mm	100	130	150	170	210
2	Minimum edge distance of anchor $c_{cr,N}$, mm under tension	80	90	110	130	150
3	Minimum edge distance of anchor $c_{cr,N}$, mm under shear	100	130	150	170	190

Table 5

Installation parameters of CHEMFIX PESF ARCTIC bonded anchors

Item	Parameter	Marking of anchor thread				
		M8	M10	M12	M16	M20
1	*2*	*3*	*4*	*5*	*6*	*7*
1	Hole diameter d_0 equal to cutting diameter of drill bit d_{cut}, mm	10	12	14	18	24
2	Minimum effective anchorage depth h_{ef}, mm	80	90	110	125	170
3	Minimum depth of hole to its deepest point h_1, mm	85	95	115	130	175
4	Maximum torque moment for nut T_{inst}, Nm	11	22	38	95	170

Table 6

Values of the characteristic resistance of anchorages made using CHEMFIX PESF ARCTIC bonded anchors in case of pullout from the base material by axis force

Item	Marking of anchor thread	Minimum, effective anchorage depth h_{ef} [1)], mm	Characteristic resistance [2)], kN
1	*2*	*3*	*4*
1	M8	80	19,9
2	M10	90	33,0
3	M12	110	50,2
4	M16	125	65,7
5	M20	170	91,4

1) values of h_{ef} according to Table 5
2) concrete class: C20/25 according to PN-EN 206-1:2003

(End of the document)

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