



# AIT TEST AND CERTIFICATION



**BOSSONG S.p.A.**

**AIT TEST AND CERTIFICATION**

**CHEMICAL ANCHOR BCR EPOXY 21**



**AIT**  
Asian Institute of Technology



# AIT TEST AND CERTIFICATION



## EPOXY 21 APPLICATIONS



According to data and features in the European Technical Approvals (ETA) you have at your disposal one of the best chemical anchors in the European market with double approval. The product is homologated for being used with a wide range of threaded rods (from M8 to M30) and rebar (diameter from 8mm to 32mm). You can use it in wet concrete and flooded hole without doubling the curing time. Option 7 from M8 to M30 for non-cracked concrete and Option 1 for installation in cracked concrete with rods from M12 to M24. It is certified for fixing with variable anchorage depths. This means that the project engineer has with this product a considerable flexibility in the design phase. ETA for post installed rebar connections in accordance with Eurocode 2 and TR023 with maximum allowed depth of 2500 mm, certified installation with both drill and core-drill (dry/wet). Certified service temperatures are in the ranges  $-40^{\circ}\text{C}/+40^{\circ}\text{C}$  ( $T^{\circ}$  max long period =  $24^{\circ}\text{C}$ ) and  $-40^{\circ}\text{C}/+80^{\circ}\text{C}$  ( $T^{\circ}$  max long period =  $50^{\circ}\text{C}$ ).


**Seismic qualification according to European Guide Line EOTA ETAG-001 Annex E-C2**



# AIT TEST AND CERTIFICATION



**FIXING IN SEISMIC**



**SEISMIC**

ETAG 001 CONCRETE

Option 7  
M8 - M30

Option 1  
M12 - M24


Rebar  
Ø 8 - Ø 32

Class 5.8 - 8.8  
Inox A4 70 - 80

NON CRACKED

Option 7

Option 1



**CALCULATION SOFTWARE**



**FIXING IN SEISMIC**

**FIRE RESISTANCE**

**REBAR DESIGN**



ETAG 001 CONCRETE

2500 mm

**DIAMANT CORE DRILL**



ACCREDITÉ PAR INP



**UNDER WATER**

**FLOODED HOLE**



ETAG 001 CONCRETE

+60°C

+40°C

-40°C

+80°C

-40°C



ETAG 001 CONCRETE

MIN 60 mm

MAX 600 mm



**FIRE RESISTANCE**



EC2 (EN 1992-1-1:2004)  
Project according to Eurocode 2



**WET CONCRETE**



**ISTITUTO GIORDANO**  
Qualità al Plurale.

**ANCORAGGI DIELETRICI INSULATED FASTENERS**



Test di valutazione della elettrostaticità, res. superficiale e volumica  
Rapporto > Test report Nr. 247896

**CONSOLIDAMENTO**



**STRENGTHENING**



# AIT TEST AND CERTIFICATION



## A.I.T. CERTIFICATION

Bossong is pleased to report that our BCR EPOXY 21 resin has been tested at the AIT institute by the Structural Engineering laboratory.

The Asian Institute of Technology promotes technological change and sustainable development in the Asia-Pacific region through higher education, research and dissemination. Founded in Bangkok in 1959, AIT has become a leading regional post-graduate institution and actively collaborates with public and private sector partners throughout the region and with some of the world's best universities.

Specifically, the tests that have been carried out are the so-called pull-out tests, both on threaded rods and on reinforced bars (rebar).

The pull-out test is nothing more than a test in which after having installed the chemical anchor inside the concrete element, this is put in traction until it comes to the breaking of the concrete element or to the extraction of the bar.

The pull-out test can be performed with two different test set-ups. In fact, during the test the concrete element can be confined or non-confined.

When a confined test is carried out, breakage by concrete cone is prevented, and therefore it is possible to observe the pull-out of the anchor or the failure of the steel element. Generally, this type of set-up is used when you want to obtain the product's adhesion value.

In the case of a non-confined test, on the other hand, the concrete element may break into a concrete cone.

In the case of reduced setting depth and high adhesion values of the product, it is in fact generally found that the typical failure is precisely that of concrete cone.

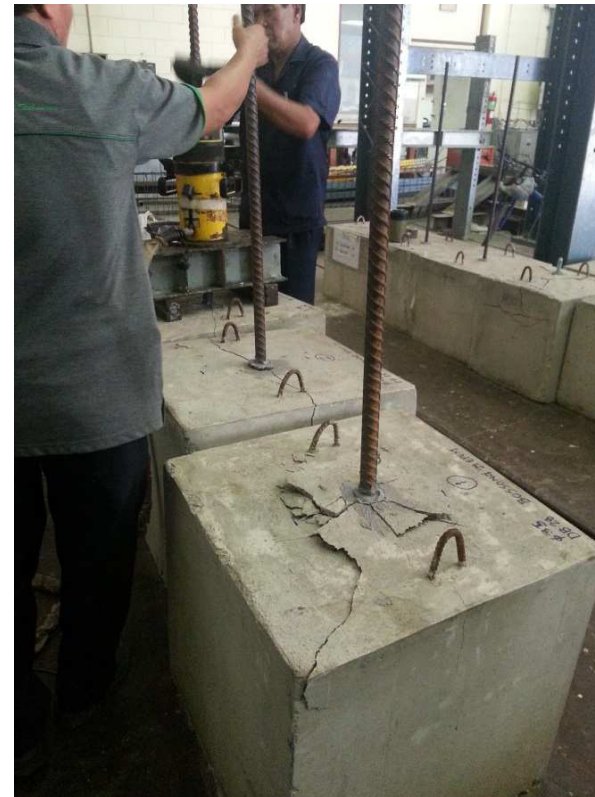




# AIT TEST AND CERTIFICATION



## LABORATORY TEST



*Non-confined test set-up for the pull-out test*



# AIT TEST AND CERTIFICATION



## LABORATORY TEST



*Concrete failure*



# AIT TEST AND CERTIFICATION



Doc. No. S0152A-18

## AIT

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**STRUCTURAL ENGINEERING LABORATORY  
STRUCTURAL ENGINEERING FIELD OF STUDY  
SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) specimens of " Stud M12 " bonded with " BCR470 EPOXY 21 " in concrete blocks having a size of 400 x 400 x 400 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.



**DATE OF TEST:** February 28, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	M12	14.0	120.0	300	5,630	-The anchor stud failure occurred when applied the maximum load.
2	M12	14.0	120.0	300	5,440	-The failure occurred due to concrete breakout when applied the maximum load.
3	M12	14.0	120.0	300	5,930	-The failure occurred due to concrete breakout when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:   
MR. SAMWAI SORNSRIDA  
TECHNICIAN

CHECKED & APPROVED BY:   
  
DR. ANAWAT CHOTESUWAT  
SENIOR LABORATORY SUPERVISOR  
March 21, 2018

*Test with Stud M12*

Doc. No. S0152B-18

## AIT

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**STRUCTURAL ENGINEERING LABORATORY  
STRUCTURAL ENGINEERING FIELD OF STUDY  
SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) specimens of " Stud M16 " bonded with " BCR470 EPOXY 21 " in concrete blocks having a size of 400 x 400 x 400 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.



**DATE OF TEST:** February 28, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	M16	18.0	120.0	300	6,670	-The failure occurred due to concrete breakout when applied the maximum load.
2	M16	18.0	125.0	300	5,240	-The anchor stud slipped from the concrete block when applied the maximum load.
3	M16	18.0	120.0	300	5,640	-The anchor stud slipped from the concrete block when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:   
MR. SAMWAI SORNSRIDA  
TECHNICIAN

CHECKED & APPROVED BY:   
  
DR. ANAWAT CHOTESUWAT  
SENIOR LABORATORY SUPERVISOR  
March 21, 2018

*Test with Stud M16*



# AIT TEST AND CERTIFICATION



Doc. No. S0152C-18

## AIT

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**STRUCTURAL ENGINEERING LABORATORY**  
**STRUCTURAL ENGINEERING FIELD OF STUDY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) specimens of " Stud M20 " bonded with " BCR470 EPOXY 21 " in concrete blocks having a size of 500 x 500 x 500 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.


**DATE OF TEST:** February 28, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	M20	24.0	180.0	300	12,170	-The failure occurred due to concrete breakout when applied the maximum load.
2	M20	24.0	180.0	300	10,200	-The failure occurred due to concrete breakout when applied the maximum load.
3	M20	24.0	180.0	300	15,630	-The failure occurred due to concrete breakout when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:  MR. SAMWAI SORNSRIDA  
TECHNICIAN

CHECKED & APPROVED BY:  DR. ANAWAT CHOTESUWAN  
SENIOR LABORATORY SUPERVISOR  
March 21, 2018

*Test with Stud M20*

Doc. No. S0152D-18

## AIT

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**STRUCTURAL ENGINEERING LABORATORY**  
**STRUCTURAL ENGINEERING FIELD OF STUDY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) specimens of " Stud M24 " bonded with " BCR470 EPOXY 21 " in concrete blocks having a size of 500 x 500 x 500 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.


**DATE OF TEST:** February 28, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	M24	28.0	240.0	300	17,770	-The failure occurred due to concrete breakout when applied the maximum load.
2	M24	28.0	240.0	300	19,610	-The failure occurred due to concrete breakout when applied the maximum load.
3	M24	28.0	200.0	300	18,540	-The failure occurred due to concrete breakout when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:  MR. SAMWAI SORNSRIDA  
TECHNICIAN

CHECKED & APPROVED BY:  DR. ANAWAT CHOTESUWAN  
SENIOR LABORATORY SUPERVISOR  
March 21, 2018

*Test with Stud M24*





# AIT TEST AND CERTIFICATION



Doc. No. S0152E-18

## AIT

**Asian Institute of Technology**  
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**STRUCTURAL ENGINEERING LABORATORY**  
**STRUCTURAL ENGINEERING FIELD OF STUDY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) " SKY DB12 SD40 " deformed bar bonded with " BCR470 EPOXY 21 " in concrete block having a size of 400 x 400 x 400 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.



**DATE OF TEST:** February 23, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	SKY DB12 SD40	16	125	300	7,130	-The failure occurred due to concrete breakout when applied the maximum load.
2	SKY DB12 SD40	16	120	300	6,400	-The deformed bar slipped from the concrete block when applied the maximum load.
3	SKY DB12 SD40	16	125	300	4,120	-The deformed bar slipped from the concrete block when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:   
 MR. SAMWAI SORNSRIRDA  
 TECHNICIAN

CHECKED & APPROVED BY:   
  
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 SENIOR LABORATORY SUPERVISOR  
 March 21, 2018

Test with SKY DB12 SD40

Doc. No. S0152F-18

## AIT

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**STRUCTURAL ENGINEERING LABORATORY**  
**STRUCTURAL ENGINEERING FIELD OF STUDY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) " SKY DB16 SD40 " deformed bar bonded with " BCR470 EPOXY 21 " in concrete block having a size of 500 x 500 x 500 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.



**DATE OF TEST:** February 23, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	SKY DB16 SD40	20	155	300	11,530	-The failure occurred due to concrete breakout when applied the maximum load.
2	SKY DB16 SD40	20	150	300	11,070	-The failure occurred due to concrete breakout when applied the maximum load.
3	SKY DB16 SD40	20	150	300	10,860	-The failure occurred due to concrete breakout when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:   
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 March 21, 2018

Test with SKY DB16 SD40



# AIT TEST AND CERTIFICATION



Doc. No. S0152G-18

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**STRUCTURAL ENGINEERING LABORATORY**  
**STRUCTURAL ENGINEERING FIELD OF STUDY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) " SKY DB20 SD40 " deformed bar bonded with " BCR470 EPOXY 21 " in concrete block having a size of 500 x 500 x 500 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.



**DATE OF TEST:** February 23, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	SKY DB20 SD40	25	200	300	16,080	-The failure occurred due to concrete breakout when applied the maximum load.
2	SKY DB20 SD40	25	200	300	16,320	-The failure occurred due to concrete breakout when applied the maximum load.
3	SKY DB20 SD40	25	200	300	17,020	-The failure occurred due to concrete breakout when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:   
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 TECHNICIAN

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 March 21, 2018

Test with SKY DB20 SD40

Doc. No. S0152H-18

## AIT

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**STRUCTURAL ENGINEERING LABORATORY**  
**STRUCTURAL ENGINEERING FIELD OF STUDY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) " SKY DB25 SD40 " deformed bar bonded with " BCR470 EPOXY 21 " in concrete block having a size of 600 x 600 x 600 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.



**DATE OF TEST:** February 23, 2018

**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	SKY DB25 SD40	32	250	300	25,980	-The failure occurred due to concrete breakout when applied the maximum load.
2	SKY DB25 SD40	32	250	300	28,490	-The failure occurred due to concrete breakout when applied the maximum load.
3	SKY DB25 SD40	32	260	300	27,610	-The failure occurred due to concrete breakout when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

TESTED BY:   
 MR. SAMWAI SORNSRIDA  
 TECHNICIAN

CHECKED & APPROVED BY:   
  
 DR. ANAWAT CHOTESUWAN  
 SENIOR LABORATORY SUPERVISOR  
 March 21, 2018

Test with SKY DB25 SD40



# AIT TEST AND CERTIFICATION



Doc. No. S01521-18

## AIT

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**STRUCTURAL ENGINEERING LABORATORY**  
**STRUCTURAL ENGINEERING FIELD OF STUDY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**TYPE OF TEST:** PULL-OUT TEST IN AXIAL TENSION

**TEST SPECIMEN:** Three (3) " SSS DB28 SD50 " deformed bar bonded with " BCR470 EPOXY 21 " in concrete block having a size of 600 x 600 x 600 mm. were tested.


**CLIENT:** POWER CUT (THAILAND) CO., LTD.


**DATE OF TEST:** February 23, 2018


**TEST RESULTS:**

Specimen No.	Type of Specimen	Diameter of Drill hole (mm.)	Depth of Drill hole (mm.)	Span Length (mm.)	Maximum Load (kg.)	Mode of Failure
1	SSS DB28 SD50	35	310	300	31,710	-The failure occurred due to concrete breakout when applied the maximum load.
2	SSS DB28 SD50	35	280	300	27,360	-The failure occurred due to concrete breakout when applied the maximum load.
3	SSS DB28 SD50	35	270	300	26,040	-The failure occurred due to concrete breakout when applied the maximum load.

**Note :** This report certifies the adequacy and representative character of the test sample(s) only.

**TESTED BY:**   
**MR. SAMWAI BORNSTRIDA**  
TECHNICIAN

**CHECKED & APPROVED BY:**   
**DR. ANAWAT CHOTESAWAN**  
SENIOR LABORATORY SUPERVISOR  
March 21, 2018



*Test with SSS DB28 SD50*



# AIT TEST AND CERTIFICATION



## THANK YOU FOR YOUR ATTENTION

### **BOSSONG REPRESENTATIVE OFFICE FOR ASEAN**

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