



DEXTRA MANUFACTURING CO., LTD.
5th Floor Lumpini II Building
247 Sarasin Road
Lumpini, Phatumwam,
Bangkok 10330
Thailand

BARTEC AND ROLLTEC MECHANICAL ANCHORAGE SYSTEMS

CSI Section:
03 21 00 Reinforcing Steel

1.0 RECOGNITION

The Bartec and Rolltec mechanical anchorage systems recognized in this report have been evaluated for use as mechanical anchorage in concrete for reinforcing bars in tension. The structural properties of the Bartec and Rolltec mechanical anchorage systems comply with the intent of the provisions of the following codes and regulations:

- 2021, 2018, 2015, 2012, and 2009 International Building Code® (IBC)
- 2021, 2018, 2015, 2012, and 2009 International Residential Code® (IRC)
- 2019 California Building Code (CBC) – attached Supplement
- 2019 California Residential Code (CRC) – attached Supplement
- 2020 City of Los Angeles Building Code (LABC) – attached Supplement
- 2020 City of Los Angeles Residential Code (LARC) – attached Supplement
- 2013 Abu Dhabi International Building Code (ADIBC) – attached Supplement

2.0 LIMITATIONS

Use of the Bartec and Rolltec mechanical anchorage systems recognized in this report is subject to the following limitations:

2.1 The Bartec and Rolltec mechanical anchorage systems shall be installed in accordance with the applicable code, the manufacturer's installation instructions, and this report. In the event of a conflict, the more restrictive governs.

2.2 The use of headed and mechanical anchored deformed reinforcement for lap splices is outside the scope of this report.

2.3 Anchorage system calculations and installation details shall be designed in conformance with the IBC and ACI 318 by the registered design professional and approved by the building official.

2.4 For structures regulated by ACI 318-19 or ACI 318-14 Chapter 18 (ACI 318-11 or ACI 318-08 Chapter 21), as required by 2021, 2018, 2015, 2012, and 2009 IBC Section 1905.1, where the Bartec and Rolltec mechanical anchorage systems are designed to resist earthquake-induced flexure, axial force, or both, in special moment frames, special structural walls, and all components of special structural walls including coupling beams and wall piers, mill certificates shall be submitted to the building official as evidence that the steel reinforcing bars comply with Section 20.2.2.5 of ACI 318-19 or ACI 318-14 and Section 21.1.5.2 of ACI 318-11 or ACI 318-08.

2.5 Special inspections shall be provided in accordance with Section 3.4 of this report.

2.6 Minimum concrete cover shall be in accordance with Section 20.5.1 of ACI 318-19 or 20.6.1 of ACI 318-14, or Section 7.7 of ACI 318-11 or ACI 318-08, as applicable, and IBC Section 721. Concrete cover shall be measured from the outer surface of the anchor plate of the Bartec and Rolltec mechanical anchorage systems.

2.7 For use in foundation walls, minimum concrete cover and spacing between bars or sleeves shall be provided in accordance with Section 1808.8.2 of the IBC. Concrete cover and spacing shall be measured from the outer surface of the anchor plate of the Bartec and Rolltec mechanical anchorage systems.

2.8 The Bartec and Rolltec mechanical anchorage systems recognized in this report are produced in Bangkok, Thailand.

3.0 PRODUCT USE

3.1 The Bartec and Rolltec mechanical anchorage system are Class HA headed deformed bars complying with Section 25.4.4 or 25.4.5 of ACI 318-19 or ACI 318-14 and Section 12.6 of ACI 318-11 for use as mechanical anchorage to develop steel reinforcing bars in tension in normal-weight concrete as an alternative to standard hooks or development lengths of straight deformed reinforcing bars in reinforced concrete.

3.2 Design: The design and use of the Bartec and Rolltec mechanical anchorage systems shall comply with ACI 318

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11.

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19 or ACI 318-14 Sections 25.4.1.2 and 25.4.4 or ACI 318-11 or ACI 318-08 Sections 12.6.1 through 12.6.3.

3.3 Installation: The Bartec and Rolltec mechanical anchorage systems shall be installed in accordance with the IBC, ACI 318, this evaluation report, and the manufacturer's installation instructions. Where conflicts occur the more restrictive shall govern.

The two components of the Bartec and Rolltec mechanical anchorage systems are joined in the field. The threaded anchor plates are screwed onto the threaded ends of the reinforcing bars. The threads of the anchor plates shall fully engage the threads of the reinforcing bars without being recessed.

3.4 Special Inspection: Special inspection of the headed bars shall be provided at the jobsite as required by Section 1705 of the 2021, 2018, 2015, or 2012 IBC or Section 1704 of the 2009 IBC, as applicable. The special inspector is responsible for verifying identification of the headed deformed reinforcing bars and plates, grade and size of reinforcing bars, proper joining of reinforcing bars with the anchor plate heads as well as placement of the headed bars.

4.0 PRODUCT DESCRIPTION

4.1 Product information: The Bartec and Rolltec mechanical anchorage systems consist of two general components: deformed steel reinforcing bars and a round steel anchor plates. The ends of the reinforcing bars for the Bartec anchorage system are cold-formed threaded with metric threads. The ends of the reinforcing bars for the Rolltec anchorage system are peeled roll threaded with metric threads. The ends of the reinforcing bars match the internal threads of the round anchor plates. The Bartec and Rolltec mechanical anchorage systems are Class HA headed deformed bars complying with the requirements ASTM A970 and Section 25.4.4 or 25.4.5 of ACI 318-19 or ACI 318-14 and Section 12.6 of ACI 318-11, and consist of No. 4 through No. 11 size reinforcing steel bars with Bartec or Rolltec anchor plates. Dimensions and illustrations are shown in Tables 1 and 2 and Figure 1 of this report.

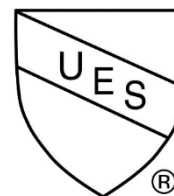
4.2 Material information

4.2.1 End anchor plates: The Rolltec and Bartec end anchor plates are circular steel head plates. The anchor plates are manufactured from GB/T699 or GB/T8162 Grade 45, with minimum specified yield and tensile strengths of 45 ksi (315 MPa) and 85 ksi (590 MPa), respectively.

4.2.2 Steel Reinforcing Bars: The deformed steel reinforcing bars shall be uncoated, deformed reinforcing bars complying with ASTM A615 Grade 60 or ASTM A706 Grade 60 applicable for Bartec and Rolltec mechanical anchorage, and deformed reinforcing bars complying with ASTM A615 Grade 80 or ASTM A706 Grade 80 applicable for Rolltec mechanical anchorage only.

5.0 IDENTIFICATION

The Bartec and Rolltec mechanical anchorage systems are packaged with a label bearing the manufacturer's name (Dextra Manufacturing Co., Ltd.), address, model, size, the IAPMO Uniform ES Mark of Conformity and the Uniform Evaluation Report Number (ER-789). Each Dextra anchor plate is permanently marked with the model designation (see Tables 1 and 2), size, work order number, a letter "T" indicating conformance to ASTM A970-06 and a letter "H" indicating conformance to ASTM A970 class HA specification. The Mark of Conformity may be used as shown below:



IAPMO UES ER-789

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with IAPMO UES Evaluation Criteria for Headed and Mechanically Anchored Deformed Reinforcement Bars in Tension (EC 006-2018), approved June 2018.

6.2 Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on the Bartec and Rolltec mechanical anchorage systems for reinforcing bars in tension to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in Section 2.8 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org



TABLE 1 – Dimensions of Rolltec Mechanical Anchorage System

| ANCHOR PLATE MODEL DESIGNATION | REINFORCING STEEL | | | ANCHOR PLATE | | THREAD DIMENSIONS ¹ |
|--------------------------------|-------------------|---------------------------------|---|-----------------------------------|---|--------------------------------|
| | Nominal Size | Equivalent Metric Diameter (mm) | Nominal Cross-Sectional Area, A _b (inches ²) | Nominal Outside Diameter (inches) | Net Bearing Area, A _{brg} (inches ²) | |
| REASC12 | #4 | 12 | 0.20 | 1 3/16 | 0.9 | M 13 x 1.5 |
| REASC15 | #5 | 15 | 0.31 | 1 1/2 | 1.4 | M 16 x 2.0 |
| REASC19 | #6 | 19 | 0.44 | 1 3/4 | 2.0 | M 20 x 2.5 |
| REASC#7 | #7 | - | 0.60 | 2 | 2.5 | M 22 x 2.5 |
| REASC24 | #8 | 24 | 0.79 | 2 3/8 | 3.6 | M 25 x 2.5 |
| REASC28 | #9 | 28 | 1.00 | 2 9/16 | 4.1 | M 29 x 3.0 |
| REASC32 | #10 | 32 | 1.27 | 2 15/16 | 5.5 | M 33 x 3.0 |
| REASC35 | #11 | 35 | 1.56 | 3 3/8 | 7.2 | M 36 x 3.0 |

For SI: 1 inch = 25.4 mm, 1 inch² = 645 mm²

¹ The two values after the “M” are the nominal diameter in mm and the thread spacing in mm.

TABLE 2 – Dimensions of Bartec Mechanical Anchorage System

| ANCHOR PLATE MODEL DESIGNATION | REINFORCING STEEL | | | ANCHOR PLATE | | THREAD DIMENSIONS ¹ |
|--------------------------------|-------------------|---------------------------------|---|-----------------------------------|---|--------------------------------|
| | Nominal Size | Equivalent Metric diameter (mm) | Nominal Cross-Sectional Area, A _b (inches ²) | Nominal Outside Diameter (inches) | Net Bearing Area, A _{brg} (inches ²) | |
| BFEAS12 | #4 | 12 | 0.20 | 1 3/16 | 0.86 | M14 x 2.0 |
| BFEAS16 | #5 | 16 | 0.31 | 1 1/2 | 1.27 | M20 x 2.5 |
| BFEAS#6 | #6 | - | 0.44 | 1 3/4 | 1.76 | M24 x 3.0 |
| BFEAS22 | #7 | 22 | 0.60 | 2 1/16 | 2.40 | M27 x 3.0 |
| BFEAS25 | #8 | 25 | 0.79 | 2 3/8 | 3.29 | M30 x 3.5 |
| BFEAS28 | #9 | 28 / 30 | 1.00 | 2 3/4 | 4.64 | M33 x 3.5 |
| BFEAS#10 | #10 | 32 | 1.27 | 2 15/16 | 5.27 | M36 x 3.0 |
| BFEAS #11 | #11 | 34 | 1.56 | 3 3/8 | 6.94 | M39 x 4.0 |

For SI: 1 inch = 25.4 mm, 1 inch² = 645 mm²

¹ The two values after the “M” are the nominal diameter in mm and the thread spacing in mm.

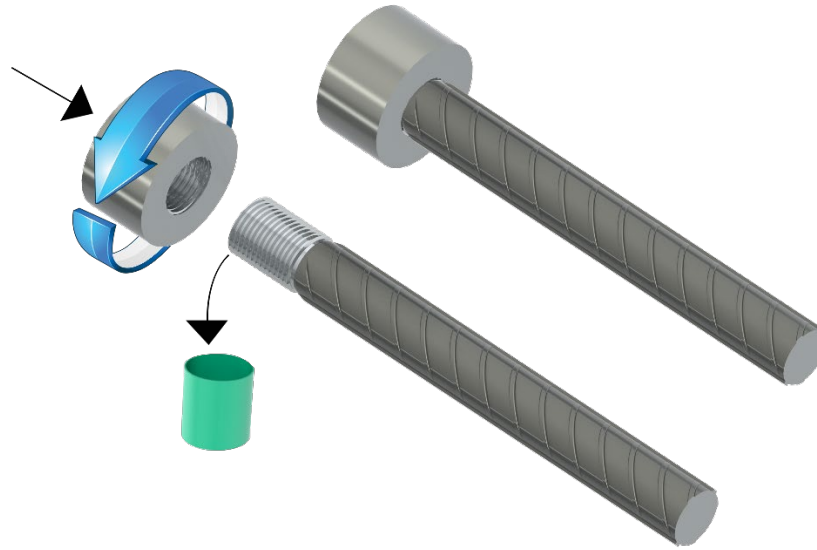


FIGURE 1— Illustration of Bartec and Rolltec Mechanical Anchorage Systems (Illustration applies to both products)



CALIFORNIA BUILDING CODE SUPPLEMENT

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247 Sarasin Road
Lumpini, Phatumwam,
Bangkok 10330
Thailand

BARTEC AND ROLLTEC MECHANICAL ANCHORAGE SYSTEM

CSI Section:

03 21 00 Reinforced Steel

1.0 RECOGNITION

The Bartec and Rolltec mechanical anchorage systems described in ER-789 and this CBC and CRC supplemental report have been evaluated for use as mechanical anchorage in concrete. The Bartec and Rolltec mechanical anchorage systems have been evaluated for structural performance properties, subject to the requirements in ER-789 and this CBC and CRC supplemental report. The Bartec and Rolltec mechanical anchorage systems were evaluated for compliance with the following codes and regulations:

- 2019 California Building Code (CBC)
- 2019 California Residential Code (CRC)

2.0 LIMITATIONS

Use of the Bartec and Rolltec mechanical anchorage systems recognized in this supplement is subject to the following limitations in addition to the limitations shown in ER-789:

2.1 Calculations and specifications verifying compliance with the Bartec and Rolltec mechanical anchorage systems shall be submitted to plan check engineer at the time of permit application. The Bartec and Rolltec mechanical anchorage system calculations shall be prepared by a Civil or Structural Engineer registered in the State of California.

2.2 Periodic special inspection shall be provided by the Registered Deputy Inspector in accordance with Section 1705 of the CBC during installations of the Bartec and Rolltec mechanical anchorage systems.

2.3 The use of headed and mechanically anchored deformed reinforcement for lap splices is outside the scope of this report.

2.4 The Bartec and Rolltec mechanical anchorage systems shall be installed in accordance with the CBC or CRC, as applicable, manufacturer's installation instructions, and this supplement. A copy of the manufacturer's installation instructions shall be available on site for all Registered Deputy Inspectors. Where conflicts occur, the more restrictive shall govern.

2.5 The Bartec and Rolltec mechanical anchorage systems described in this supplement shall include the unique heat code identification, and the letter "H" to indicate that the product has been produced to the ASTM A970 Annex A1 specification. Products prepared by officially licensed fabricators, may have additional unique identifiers that correspond to the fabricators.

2.6 For use in foundation walls, minimum concrete cover and spacing between bars or sleeves shall be provided in accordance with Section 1808.8.2 of the CBC. Concrete cover and spacing shall be measured from the outer surface of the Bartec and Rolltec mechanical anchorage system.

3.0 CONCLUSIONS

3.1 CBC

The Bartec and Rolltec mechanical anchorage system described in ER-789, complies with CBC Chapter 19, given the design and installation is in accordance with the 2021, 2018, 2015, 2012, and 2009 International Building Code[®] (IBC) or 2021, 2018, 2015, 2012, and 2009 International Residential Code[®] (IRC). Additional requirements of CBC Chapters 16, 17, and 18 apply.

3.2 OSHPD

The applicable OSHPD Sections of the CBC are beyond the scope of this report.

3.3 DSA

The applicable DSA Sections of the CBC are beyond the scope of this report.

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CITY OF LOS ANGELES SUPPLEMENT

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Thailand

BARTEC AND ROLLTEC MECHANICAL ANCHORAGE SYSTEMS

CSI Section:

03 21 00 Reinforced Steel

1.0 RECOGNITION

The Bartec and Rolltec mechanical anchorage systems described in ER-789 and this LABC and LARC supplemental report have been evaluated for use as mechanical anchorage in concrete. The Bartec and Rolltec mechanical anchorage systems have been evaluated for structural performance properties, subject to the requirements in ER-789 and this LABC and LARC supplemental report. The Bartec and Rolltec mechanical anchorage systems were evaluated for compliance with the following codes and regulations:

- 2020 City of Los Angeles Building Code (LABC)
- 2020 City of Los Angeles Residential Code (LARC)

2.0 LIMITATIONS

Use of the Bartec and Rolltec mechanical anchorage systems recognized in this supplement is subject to the following limitations in addition to the limitations shown in ER-789:

2.1 Calculations and specifications verifying compliance with the Bartec and Rolltec mechanical anchorage systems shall be submitted to the plan check engineer at the time of permit application. The Bartec and Rolltec mechanical anchorage system calculations shall be prepared by a Civil or Structural Engineer registered in the State of California.

2.2 Continuous special inspections shall be provided by The Registered Deputy Inspector in accordance with Section 1705 of the LABC during installations of the Bartec and Rolltec mechanical anchorage systems. The Registered Deputy Inspector shall verify the following: hardware and equipment; cleaning and condition of the bars in accordance with the specifications and the applicable code; and the

installation procedures comply with the specifications and the manufacturer's published installation instructions.

2.3 The use of headed and mechanical anchored deformed reinforcement for lap splices is outside the scope of this report.

2.4 The Bartec and Rolltec mechanical anchorage systems shall be installed in accordance with the LABC or LARC, as applicable, manufacturer's installation instructions, and this supplement. A copy of the manufacturer's installation instructions shall be available on site for all Registered Deputy Inspectors. Where conflicts occur, the more restrictive shall govern.

2.5 The Bartec and Rolltec mechanical anchorage systems listed in this supplement shall include the unique heat code identification, and the letter "H" to indicate that the product has been produced to the ASTM A970 Annex A1 specification. Products prepared by officially licensed fabricators, may have additional unique identifiers that corresponds to the fabricator.

2.6 For use in foundation walls, minimum concrete cover and spacing between bars or sleeves shall be provided in accordance with Section 1808.8.2 of the LABC. Concrete cover and spacing shall be measured from the outer surface of the Bartec and Rolltec mechanical anchorage system.

2.7 The fabricator of the steel for the Bartec and Rolltec mechanical anchorage systems shall be required to maintain a detailed procedure for material control and suitable procedures and records attesting that the specified material has been furnished. The applicable ASTM designation or coating, as applicable, shall be included in each packaging assembly prior to shipment from the fabricator's plant. The fabricator's identification mark designation shall be established and on record prior to fabrication. Steel that is not identifiable from marking and test records shall be tested to determine conformity to this report. The fabricator shall furnish an affidavit of compliance and test data shall be provided upon request.

2.8 The Bartec and Rolltec mechanical anchorage systems shall be selected at the jobsite by the Registered Deputy Inspector or by the building inspector and shall be tested by an approved testing agency in accordance with Section 1703 of the LABC. The test shall be conducted on each different rebar size and the frequency of tests shall be as follows: one out of the first ten splices; one out of the next ninety splices; one out of the next one hundred splices. The splice shall develop in tension or compression, as required, at least 125



percent of the specified yield strength of the bar as per Section 25.5.7.1 of ACI 318-14. For Type 2 splices, the splice shall develop at least 100 percent of the specified tensile strength of the steel reinforcing bar.

For Type 2 splices only, if failure of the tested splice should occur prior to obtaining the 125-percent of the specified yield strength and the 100-percent of the specified tensile strength, then 25-percent of all couplers shall be tested for both specified yield strength and specified tensile strength. If failure of the tested Type 2 splice occurs with testing of the 25-percent requirement, as stated above, then all couplers shall be rejected.

2.9 Splice locations shall be noted on the plans approved by the building official.

3.0 CONCLUSIONS

The Bartec and Rolltec mechanical anchorage systems described in ER-789, complies with LABC Chapter 19, given the design and installation is in accordance with the 2021, 2018, 2015, 2012, and 2009 International Building Code® (IBC) or 2021, 2018, 2015, 2012, and 2009 International Residential Code® (IRC). Additional requirements of the LABC Chapters 16 and 17 apply.

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ABU DHABI SUPPLEMENT

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Lumpini, Phatumwam,

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Thailand

BARTEC AND ROLLTEC MECHANICAL ANCHORAGE SYSTEMS

CSI Section:

03 21 00 Reinforced Steel

1.0 RECOGNITION

The Bartec and Rolltec mechanical anchorage systems described in ER-789 and this Abu Dhabi supplemental report have been evaluated for use as mechanical anchorage in concrete. The Bartec and Rolltec mechanical anchorage systems have been evaluated for structural performance properties, subject to the requirements in ER-789 and this Abu Dhabi supplemental report. The Bartec and Rolltec mechanical anchorage systems were evaluated for compliance with the following codes and regulations:

- 2013 Abu Dhabi International Building Code (ADIBC)

2.0 LIMITATIONS

Use of the Bartec and Rolltec mechanical anchorage systems recognized in this supplement is subject to the following limitations in addition to the limitations shown in ER-789:

2.1 The Bartec and Rolltec mechanical anchorage system described in ER-789, complies with Chapter 19 of the 2013 ADIBC, given the design and installation is in accordance with the 2009 International Building Code® (IBC).

2.2 The specified compressive strength of concrete, f'_c shall not be less than 24 MPa (3480 psi), when used in special moment frames and special structural walls in accordance with Section 21.1.4.2 of Appendix L in the 2013 ADIBC.

2.3 For structures regulated by Chapter 21 of ACI 318-08, as required by Section 21.1.5.2 of Appendix L in the 2013 ADIBC, where the Bartec and Rolltec mechanical anchorage systems are designed to resist earthquake-induced flexure and axial forces in frame members, structural walls, and coupling beams, mill certificates complying with ASTM

A706M or BS EN4449 Class C, ASTM A615M Grades 280 and 420 or BS EN 4449 Class A or B reinforcement shall be submitted to the building official as evidence that the steel reinforcing bars are compliant.

2.4 Special inspection of the headed bars shall be provided at the jobsite as required by Sections 1704.4 and 1709.1 of the 2013 ADIBC. The special inspector is responsible for verifying identification of the headed deformed reinforcing bars and plates, grade and size of reinforcing bars, proper joining of reinforcing bars with the anchor plate heads as well as placement of the headed bars.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org