

DIVISION: 03 00 00—CONCRETE
Section: 03 21 00—Reinforcing Steel

REPORT HOLDER:

DEXTRA MANUFACTURING CO., LTD.

EVALUATION SUBJECT:

ROLLTEC MECHANICAL ANCHORAGE

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021*, 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

*For evaluation for compliance with the anticipated requirements of the 2021 IBC.

Properties evaluated:

- Structural

2.0 USES

The Rolltec mechanical anchorage system is a mechanical device complying with the requirements of Sections 25.4.4 and 25.4.5 of ACI 318-19 and ACI 318-14 under the 2021, 2018 and 2015 IBC, as applicable, and Section 12.6 of ACI 318-11 under the 2012 IBC (ACI 318-08 under the 2009 IBC), as Class HA headed deformed bars for use as mechanical anchorage to develop steel reinforcement bars in tension as an alternative to standard hooks or development lengths of straight deformed steel reinforcement bars in reinforced, normal-weight concrete.

Related sections in the codes that permit or require mechanical anchorage of reinforcing bars are ACI 318-19 and ACI 318-14 Sections 25.4.1.1, 25.4.1.2, 7.7.3.6, 7.7.3.8.3, 9.7.3.8.3, 9.7.3.6, 9.9.4.4, 9.9.4.5, 9.9.4.6, 13.2.8.4, 16.5.6.5, 18.3.2, 18.4.2.1, 18.8.5.2, and ACI 318 (-11 and -08) Sections 12.1.1, 12.10.6, 12.11.2, 12.11.3, 12.11.4, 12.12.1, as applicable.

3.0 DESCRIPTION

3.1 General:

The Rolltec mechanical anchorage system consists of Class HA headed deformed bars complying with ASTM A970, which consists of a No. 4 (13 mm) through No. 11 (35 mm) reinforcing steel bars with a Rolltec small size round end

anchor plate at the end of the bar. The small size round end anchor plate has a net headed bearing area of the anchor head exceeding four times the nominal cross-sectional area of the bar. The end of the Rolltec reinforcing bars is cold-formed and threaded with metric threads to mate with the internal threads of the round end anchors. Dimensions and illustrations are provided in Table 1 and Figure 1.

3.2 Material:

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

3.2.2 Steel Reinforcing Bars: The deformed steel reinforcing bars (rebar) comply with ASTM A615 or ASTM A706, Grade 60 or 80, as applicable in accordance with ACI 318.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The structural design and use of the Rolltec mechanical anchorage system must comply with ACI 318-19 and ACI 318-14 Sections 25.4.1.2 and 25.4.4, or ACI 318-11 and ACI 318-08 Sections 12.6.1 through 12.6.3.

4.2 Installation:

4.2.1 General: The Rolltec mechanical anchorage system must be installed in accordance with Dextra manufacturing's installation instructions and this evaluation report.

The end anchor plates are threaded onto the end of the Rolltec steel reinforcing bars with the threads of the end anchor plate fully engaging the threads of the steel reinforcing bars. The end of the steel reinforcing bar must not be recessed in the end anchor plate.

4.2.2 Minimum Anchorage Length: The minimum anchorage length, l_{dt} , of headed bars must be determined as indicated in ACI 318-19 and ACI 318-14 Section 25.4.4.2 or ACI 318-11 and ACI 318-08 Section 12.6.2, as applicable. Anchorage length is defined as the distance from the critical section to the concrete bearing face of the anchor plates. Critical section is defined as that location in the concrete member where the maximum steel bar stress is required.

4.2.3 Termination of Headed Deformed Bars: The headed deformed steel reinforcing bars extending from members, such as but not limited to beams, corbels or brackets, and terminating in an adjacent member, must be extended to the far face of the confined region of the adjacent members.

4.3 Special Inspection:

Special inspection is required in accordance with 2021, 2018, 2015 and 2012 IBC Section 1705 and 2009 IBC Section 1704, as applicable. In addition to verifying placement of the mechanical anchorage system as required by this evaluation report, duties of the special inspector include inspection of field preparation of components, assembly of the anchor plates on the steel bars, and labeling of the products as noted in this evaluation report.

5.0 CONDITIONS OF USE

The Rolltec mechanical anchorage system described in this report complies with, or is a suitable alternative to what is specified in, the code indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1 The system must be installed in accordance with the IBC, the manufacturer's instructions and this report. In the case of conflict between the manufacturer's published instructions and this report, this report governs.
- 5.2 Anchorage system calculations and installation details for each project must be submitted to the code official for approval and must be prepared by a registered design professional when required by the statutes of the jurisdiction where the system is installed.
- 5.3 Under the 2021, 2018 and 2015 IBC (Chapter 18 of ACI 318-19 and ACI 318-14): For use as reinforcement resisting earthquake-induced moment, 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 of the deformed bars of the mechanical anchorage systems must be submitted to the code official as evidence that the steel reinforcing bars comply with ACI 318-19 and ACI 318-14 Section 20.2.2.5, as applicable.
- 5.4 Under the 2012 IBC (Chapter 21 of ACI 318-11): For use as reinforcement resisting 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 of the deformed bars of the mechanical anchorage systems must be submitted to the code official as evidence that the steel reinforcing bars comply with ACI 318-11 Section 21.1.5.2.
- 5.5 Under the 2009 IBC (Chapter 21 of ACI 318-08): For use as reinforcement resisting earthquake-induced flexural and axial forces in frame members, special structural walls and coupling beams, mill certificates of

the deformed bars of the mechanical anchorage systems must be submitted to the code official as evidence that the steel reinforcing bars comply with ACI 318-08 Section 21.1.5.2.

- 5.6 Special inspection must be provided in accordance with Section 4.3 of this report.
- 5.7 Minimum concrete cover must be in accordance with Section 20.5.1.3.1 and 25.4.4.1 of ACI 318-19, Section 20.6.1.3.1 and 25.4.4.1 of ACI 318-14 or Section 7.7 and 12.6.1 of ACI 318-11 and ACI 318-08, as applicable, and must be measured to the outer surface of the anchor plate of the anchorage system and steel reinforcement bar.
- 5.8 The use of headed deformed bars as an alternative to tension lap splices under the 2021, 2018, 2015, 2012 and 2009 IBC is outside the scope of this report.
- 5.9 Use of headed deformed bars must comply with ACI 318-19 and ACI 318-14 Section 20.2.2.5 (ACI 318-11 and ACI 318-08 Section 21.1.5.2) when used to resist earthquake-induced moment, axial force, or both, in special seismic systems and anchor reinforcement in Seismic Design Categories (SDC) C, D, E, and F.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Headed Deformed Bars (AC308), dated January 2013 (editorially revised April 2020).

7.0 IDENTIFICATION

- 7.1 Each Rolltec end anchor plate is stamped with the model designation of "REASC", the letter D (i.e., Dextra Manufacturing) and a work order number. The packaging of the end anchor plates has a label bearing the company name and address of Dextra Manufacturing, the model designation and the evaluation report number (ESR-4530). Bundles of the Rolltec steel reinforcing bars are labeled with a tag bearing the Dextra Manufacturing company name, the product designation (Rolltec), the rebar size, and the evaluation report number (ESR-4530).
- 7.2 The report holder's contact information is the following:

DEXTRA MANUFACTURING CO., LTD.
5th FLOOR LUMPINI II BUILDING
247 SARASIN ROAD
LUMPINI, PHATHUMWAN, BANGKOK 10330
THAILAND
www.dextragroup.com
thailand@dextragroup.com

TABLE 1—ROLLTEC MECHANICAL ANCHORAGE SYSTEM

ANCHOR PLATE MODEL DESIGNATION	REINFORCING STEEL		ANCHOR PLATE		THREAD DIMENSIONS*
	Nominal Size	Nominal Cross-Sectional Area, A_b (inches ²)	Nominal Outside Diameter (inches)	Net Bearing Area, A_{brg} (inches ²)	
REASC12	#4	0.20	1 3/16	0.9	M 13 x 1.5
REASC15	#5	0.31	1 1/2	1.4	M 16 x 2.0
REASC19	#6	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	0.79	2 3/8	3.6	M 25 x 2.5
REASC28	#9	1.00	2 9/16	4.1	M 29 x 3.0
REASC32	#10	1.27	2 15/16	5.5	M 33 x 3.0
REASC35	#11	1.56	3 3/8	7.2	M 36 x 3.0

For SI: 1 inch = 25.4 mm, 1 inch² = 645.16 mm²

* In the thread dimensions, the value of M is the nominal diameter in millimeters and the other value is the thread spacing in millimeters

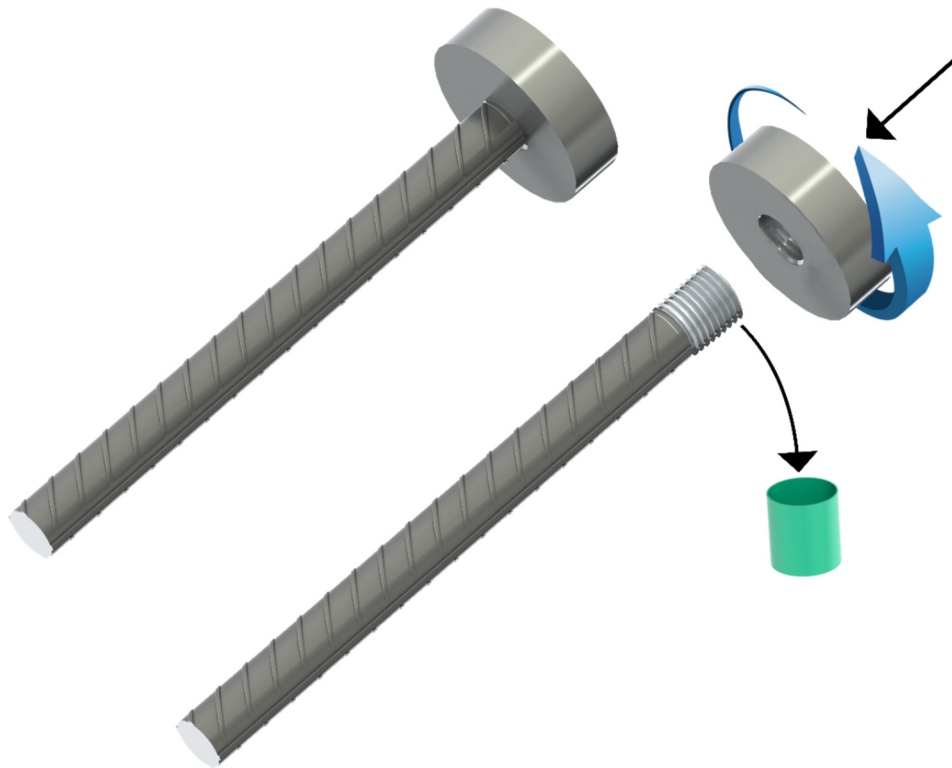


FIGURE 1—ROLLTEC MECHANICAL ANCHORAGE SYSTEM