



## WILLIAMS FORM ENGINEERING CORPORATION

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## GRADE 60 ALL-THREAD REBAR AND MECHANICAL COUPLER

CSI Division: 03 00 00 - CONCRETE  
CSI Sections: 03 20 00 – Concrete Reinforcement  
03 21 00 – Reinforcing Steel

### 1.0 SCOPE OF EVALUATION

#### 1.1 Compliance with the following codes & regulations:

- 2012 International Building Code (IBC)
- 2012 International Residential Code (IRC)
- 2009 International Building Code (IBC)
- 2009 International Residential Code (IRC)
- 2006 International Building Code (IBC)
- 2006 International Residential Code (IRC)

#### 1.2 Evaluated in accordance with:

- ICC ES AC133 approved May 2014

#### 1.3 Properties assessed:

- Structural

### 2.0 PRODUCT USE

Williams Grade 60 All-Thread Rebar systems are used as reinforcing steel and mechanical splices in concrete. The bars comply with IBC Section 1903.1 and ACI 318 3.5.3. The mechanical couplings comply with ACI 318 12.14.3.

### 3.0 PRODUCT DESCRIPTION

Williams Grade 60 All-Thread Steel Rebar is a continuously threaded, bendable alternative to traditional Grade 60 No. 4 through No. 8 steel reinforcing bars (rebar), details are given in Table 2 and Figure 2 of this report. Williams Grade 60 All-Thread Rebar shall be field spliced with the R52 Stop-Type all-thread rebar coupling, which is capable of developing at least 100 percent of the bar's tensile capacity and 125 percent of the bar's yield strength. The couplings comply as Type 1 and Type 2 mechanical splices in accordance with ACI 318 21.1.6.1. Table 1 and Figure 1 of this report describe the all-thread rebar coupling dimensions.

**3.1 Material Information:** The Williams Grade 60 All-Thread Rebar and fasteners are produced from medium-quality carbon steels. The bar strengths, cross-sectional area, and deformation requirements of Williams Grade 60 All-Thread Rebar comply with the requirements of ASTM A615. The Grade 60 All-Thread Rebar is available as either uncoated or epoxy coated in accordance with ASTM A775 or ASTM A934 or Hot Dip Galvanized in accordance with ASTM A767

**3.2 Material Specifications:** The Williams Grade 60 All-Thread Rebar is produced to comply with the strength and chemistry requirements of ASTM A615. The R52 Stop-Type all-thread rebar couplings and associated fasteners are formed from C12L14 or C1215 Steel conforming to ASTM A108.

### 4.0 DESIGN AND INSTALLATION

General design and installation shall be in accordance with the codes listed in Section 1.1 of this report, ACI 318, and the manufacturers' installation instructions.

Williams Grade 60 All-Thread Rebar may either be factory cut to ordered lengths or field cut as necessary. In either case, no special end preparation is required to assemble fasteners. Hand tools shall be used to tighten connectors and end nuts for quality assurance. For splices, the bars shall be threaded onto the couplings until the bar end reaches the stop point.

### 5.0 LIMITATIONS

The Williams Grade 60 Rebar and R52 Stop-Type All-Thread Rebar coupling described in this report comply with or are suitable alternatives to what is specified in those codes listed in Section 1.0 of this report, subject to the following limitations:

**5.1** Splice locations shall comply with the applicable code requirements and be noted on the plans approved by the building official.

**5.2** Special inspection shall be provided at the job site as required by IBC Section 1704 as applicable. In addition to verifying the placement of reinforcing bar splices, the inspector shall verify field preparation of components (including field preparation of reinforcing bar ends) and assembly of the components resulting in spliced reinforcing bars.

**5.3** The minimum concrete cover shall be in accordance with the applicable code and shall be measured from the outer surface of the coupling.

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. This document shall only be reproduced in its entirety.

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5.4 Under the 2012 IBC, for structures regulated by Chapter 21 of ACI 318-11 (as referenced by Section 1905.1 of the 2012 IBC), to splice deformed reinforcing bars 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, with the mechanical connector systems, mill certificates of reinforcing bars shall be submitted to the special inspector and building official as evidence that the steel reinforcing bars comply with Section 21.1.5.2 of ACI 318-11.

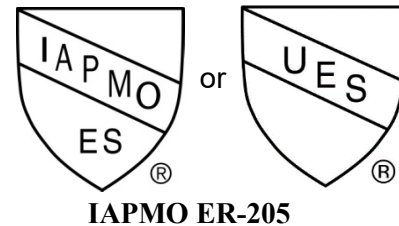
5.5 Under the 2009 IBC, for structures regulated by Chapter 21 of ACI 318-08 (as referenced by Section 1908.1 of the 2009 IBC), to splice deformed reinforcing bars resisting earthquake-induced flexural and axial forces in frame members, structural walls and coupling beams, with the mechanical connector systems, mill certificates of reinforcing bars shall be submitted to the special inspector and building official as evidence that the steel reinforcing bars comply with Section 21.1.5.2 of ACI 318-08.

## 6.0 SUBSTANTIATING DATA

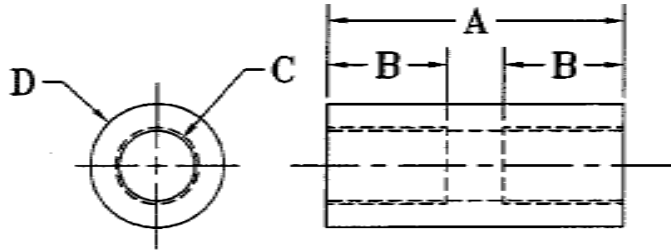
Testing and analysis data in accordance with ICC-ES Acceptance Criteria for Mechanical Connector Systems for Steel Reinforcing Bars, AC133 approved May 2014. Test reports are from laboratories in compliance with ISO/IEC 17025.

## 7.0 IDENTIFICATION

A label shall be affixed on at least one of the following: product, packaging, installation instructions, or descriptive literature. The label shall include the company name or trademark, model number, the name of the inspection agency (when applicable), and the Evaluation Report Number (ER-205) to identify the products recognized in this report. A die-stamp label may also substitute for the label. Either IAPMO Uniform ES Mark of Conformity, below, may also be used:



For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email at [info@uniform-es.org](mailto:info@uniform-es.org)



**FIGURE 1: Gr. 60 All-Thread Rebar Coupling**

Bar Size	A in.	B in.	C		D in.
			Drill in.	TAP	
No. 4	2.125	0.875	0.531	#4 GR 60 ATR(RH)	0.937
No. 5	2.375	1.000	0.656	#5 GR 60 ATR(RH)	1.062
No. 6	2.750	1.125	0.0178	#6 GR 60 ATR(RH)	1.250
No. 7	3.250	1.250	0.844	#7 GR 60 ATR(RH)	1.375
No. 8	3.875	1.375	0.959	#8 GR 60 ATR(RH)	1.625

Bar size	Nominal Threaded Size in. (mm) <TPI>*	Minimum Net Area Thru Threads in <sup>2</sup> (mm <sup>2</sup> )	Approx. Thread Major Diameter, in. (mm)	Minimum Specification	Fu Kip	Fy Kip
No. 4	<sup>1</sup> / <sub>2</sub> (13) <7>	0.2 (129)	<sup>5</sup> / <sub>8</sub> (15.9)	ASTM A615 Gr. 60	18	12
No. 5	<sup>5</sup> / <sub>8</sub> (15) <7>	0.32 (206)	<sup>3</sup> / <sub>4</sub> (19.1)	ASTM A615 Gr. 60	28.8	19.2
No. 6	<sup>3</sup> / <sub>4</sub> (20) <5>	0.44 (300)	<sup>7</sup> / <sub>8</sub> (22.2)	ASTM A615 Gr. 60	39.6	26.4
No. 7	<sup>7</sup> / <sub>8</sub> (22) <5>	0.6 (387)	1 (25.4)	ASTM A615 Gr. 60	54	36
No. 8	1 (25) <3.5>	0.79 (500)	<sup>1</sup> / <sub>8</sub> (28.6)	ASTM A615 Gr. 60	71.1	47.4

For SI: 1 inch = 25.4 mm; 1 kip=1,000 lb. = 4448 N



### CALIFORNIA AND FLORIDA SUPPLEMENT

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This supplement is issued to indicate that the William’s Form Engineering Grade 60 All-Thread Rebar and R52 Stop-Type all-thread rebar coupling described in the master report, comply with the codes listed in Section 1.1 of this supplement when designed and installed in accordance with the master evaluation report.

Evaluation to the high-velocity hurricane zone provisions in Section 1409 of the FBC, Building and Chapter 44 of the FBC, Residential is outside the scope of this report.

Verification shall be provided that a quality assurance agency audits the manufacturer's quality assurance program and audits the production quality of products, in accordance with Section (5)(d) of Florida Rule 61G20-3.008. The quality assurance agency shall be approved by the Commission (or the building official when the report holder does not possess approval by the Commission).

#### 1.0 COMPLIANCE WITH THE FOLLOWING CODES

- 2013 California Building Code (CBC)
- 2014 Florida Building Code – Building (FBC-B)
- 2014 Florida Building Code – Residential (FBC-R)

#### 2.0 EVIDENCE SUBMITTED

Testing and analysis data in accordance with ICC-ES Acceptance Criteria for Mechanical Connector Systems for Steel Reinforcing Bars, (AC133). Test reports are from laboratories accredited in accordance with ISO/IEC 17025.

Products Tested
No. 4 Bar System
No. 5 Bar System
No. 6 Bar System
No. 7 Bar System
No. 8 Bar System

This supplement expires concurrently with ER-205.

For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email at [info@uniform-es.org](mailto:info@uniform-es.org)