

# ICC-ES Evaluation Report

ESR-4213

Reissued March 2024


This report also contains:

Subject to renewal March 2025

- CBC Supplement.
- FBC Supplement
- LABC Supplement

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<p><b>DIVISION: 03 00 00—</b> <b>CONCRETE</b></p> <p><b>Section: 03 21 00—</b> <b>Reinforcement Bars</b></p>	<p><b>REPORT HOLDER:</b> <b>TECH DEVELOPMENT,</b> <b>LLC.</b></p>	<p><b>EVALUATION SUBJECT:</b> <b>PS=Ø® STEEL</b> <b>REINFORCEMENT</b> <b>SPLICE SYSTEM FOR</b> <b>STEEL REINFORCING</b> <b>BARS</b></p>	
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2021, 2018, 2015 and 2012 [International Building Code® \(IBC\)](#)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see [ESR-4213 LABC Supplement](#).

**Properties evaluated:**

- Structural

## 2.0 USES

The PS=Ø® Steel Reinforcement Splice System, produced by Tech Development, LLC., is used as a mechanical splice for deformed reinforcing steel bars in reinforced concrete construction. The PS=Ø® Steel Reinforcement Splice System splicing sleeve complies with the mechanical splice requirements of Section 25.5.7 of ACI 318-19 referenced in 2021 IBC or ACI 318-14 referenced in the 2018 and 2015 IBC (2012 IBC Section 12.14.3.2 of ACI 318-11) (ACI 318 as referenced in Section 1901.2 of the IBC) for use as tension and compression mechanical connections of deformed steel reinforcing bars. The PS=Ø® Steel Reinforcement Splice System connectors are used with BASF MasterFlow® 885, High precision, non-shrink metallic aggregate grout with extended working time, to splice No. 6 ASTM A615 Grade 60 or No. 6 ASTM A706 grade 60 deformed reinforcing steel bars.

The PS=Ø® Steel Reinforcement Splice System complies with the Type 2 mechanical splice requirements of Section 18.2.7.1 of ACI 318-19 for the 2021 IBC or ACI 318-14 for the 2018 and 2015 IBC, and Section 21.1.6.1 of ACI 318-11 for the 2012 IBC, and is for use where Type 1 or Type 2 mechanical splices are specified by the IBC and ACI 318. The PS=Ø® Steel Reinforcement Splice System Connector is used with MasterFlow® 885 to splice No. 6 Grade 60 deformed steel reinforcing bars complying with ASTM A615 or ASTM A706, forming the MasterFlow® 885, which complies with the performance requirements in Sections 25.5.7.1 and 18.2.7.1 of ACI 318-19 under the 2021 IBC or ACI 318-14 under the 2018 and 2015 IBC, for Type 1 and Type 2 splices, respectively (Sections 12.14.3.2 and 21.1.6.1 of ACI 318-11 for Type 1 and Type 2 splices, respectively, under the 2012 IBC).

## 3.0 DESCRIPTION

### 3.1 The PS=Ø® Steel Reinforcement Splice System Connector:

The PS=Ø® Steel Reinforcement Splice System consists of a straight steel cylinder for grouting in one end of a reinforcing steel bar; the other end is a female tapered thread to engage a male matching righthanded

tapered threaded end of the other reinforcing steel bar to be connected to the other reinforcing steel bar. The coupler is a ductile iron casting manufactured in accordance with ASTM A536-84(2014) Grade 65-45-12 [Tensile Strength and minimum yield of 65,000 and 45,000 psi (310 and 448 MPa), respectively] and is used to splice two No. 6, Grade 60, deformed steel reinforcing bars. The PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System connector configuration, dimensions and required reinforcing steel bar embedment length, are provided in [Figure 1](#) (PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System drawing).

### 3.2 MasterFlow<sup>®</sup> 885:

The MasterFlow<sup>®</sup> 885 (BASF Mortar is not provided by Tech Development, LLC.) is a high early strength, pre-drymixed, cement grout manufactured by BASF. The mortar is packaged in 55-pound (25-kg) moisture resistant bags. The BASF mortar is to be used with a PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System splice sleeve connector. The material shelf life is 12 months when stored in a cool, dry environment.

### 3.3 Reinforcing Steel Bars:

The reinforcing steel bars must be No. 6 uncoated deformed bars complying with ASTM A615 Grade 60 or ASTM A706 Grade 60, for use with the PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

The PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System must be designed and installed in accordance with the IBC and this evaluation report. PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System comply with Type 1 and Type 2 mechanical splice requirements of IBC. The splice locations must be detailed on the plans approved by the Engineer of Record (EOR) and the code official. All required spacing and concrete protection (cover) described in IBC Table 721.1 (1) and ACI 318 must be measured from the outside of the splice system.

### 4.2 Installation:

#### 4.2.1 PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System:

##### 4.2.1.1 Preparation and Installation:

All reinforcing steel bars must be clean and free from loose rust, oil, dust and other foreign materials. All foreign materials and water must be removed from the sleeves. The reinforcing steel bar must be initially hand tightened and then wrench tightened to 130 ft-lbs of torque. The PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System sleeve or coupler must be prepared and installed in accordance with the applicable code, the approved construction documents and the recommendations noted in the PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System installation manual. Sleeves must be prepared by installations of de-bonding tape and steel pipes that produce openings through the slab form to the grout ports of the coupler in accordance with Tech Development, LLC's installation instructions. The prepared sleeve must be installed on the threaded reinforcing steel bar in the first casting. The second reinforcing steel bar must be installed into the coupler fully to the end of the coupler through the cylindrical opening.

**4.2.1.2 Grouting:** Estimated 28 to 56 days, as directed by the Engineer of Record (EOR), after the adjacent slab (slab #2 in [Figure 2](#)) is cast, sleeves must be grouted with the BASF mortar, which is mixed with clean water in accordance with the grout manufacturers recommendations. Grout must be the proportion so that a stable splice strength can be attained by achieving the minimum strength of not less than 8,000 psi (55.2 MPa) as determined by testing specimens made according to ASTM C109. The grout must be poured or pumped into the inlet opening in the slab (the opening nearest the construction joint between slab #1 and slab #2 in [Figure 2](#)) until the grout flows freely from the outlet opening, furthest way from the joint. After a slight grout outflow is observed, pouring or pumping should stop to prevent leakage from the outflow opening. All spaces within the sleeve must be fully filled with the approved grout. The excess grout must be removed from the slab.

**4.2.1.3 Grouting Mixing:** The BASF MasterFlow<sup>®</sup> 885 grout is mixed in accordance with the BASF instructions. The grout is packaged in 55-pounds (25-kg) bags. Each 55-pound (25-kg) bag of dry grout is slowly blended in with approximately 9.2-lbs (4.17 kg) or 1.11 gallons (4.20 L) of potable water and thoroughly stirred with a mechanical mixer. The correct amount of water to be added to the grout is predetermined by field testing the flow of trial batches of grout mixed with a 2-inch diameter (51 mm), 4-inch (102 mm) tall cylinder with the Tech Development, LLC. flow template. The grout must flow to a diameter of no greater than 10 inches on the flow template, grout mix cannot be re-tempered.

#### 4.2.2 Grout Testing:

Measurement of consistency of the grout is necessary in order to determine and maintain the proper amount of mixing water to assure a smooth, pumpable grout matrix. Consistency flow test must be run by using a flow table to test the flow of batches of grout mixture in accordance with manufactures instructions. Grout strength must be determined by testing of 2-inch (51 mm) cube specimens in accordance with ASTM C109 and ASTM C942. The grout cubes must be kept in a curing box for 24 hours. During the following day, the grout cubes must be stripped from the curing box and be submerged in a container with water, which must be kept under the same condition as the job site until compressive strength testing.

#### 4.3 Special Inspection:

Special inspection is required in accordance with Section 1705 of the 2021, 2018, 2015 and 2012 IBC. In addition to verifying installation of steel reinforcing bar splices in accordance with this report, the special inspector must verify the grade and size of reinforcing steel bars; reinforcing steel bar embedment; coupler identification; grout identification; field preparation of components; grout mixing, grouting, curing and testing; and assembly of the components resulting in spliced reinforcing steel bars.

### 5.0 CONDITIONS OF USE:

PS= $\emptyset$ <sup>®</sup> Splice System 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 conditions:

- 5.1 The PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System is limited for use with No. 6 deformed steel reinforcing bars only.
- 5.2 The splices must be identified and installed in accordance with the applicable code, the manufacturer's instructions and this report. In the event of conflict between this report and the manufacturer's instructions, this report governs.
- 5.3 Special inspection must be provided in accordance with Section 4.3 of this report.
- 5.4 The minimum concrete cover must be in accordance with the IBC and must be measured from the outer surface of the coupler.
- 5.5 Splice locations must comply with applicable IBC requirements and be noted on plans approved by the code official.
- 5.6 Under the 2021, 2018 and 2015 IBC, for structures regulated by Chapter 18 of ACI 318-19 or ACI 318-14 (as required by 2021, 2018 and 2015 IBC Section 1905.1), to splice uncoated, 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 PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System, mill certificates of reinforcing bars must be submitted to the code official as evidence that the steel reinforcing bars comply with Section 20.2.2.5 of ACI 318-19 (under the 2021 IBC) or ACI 318-14 (under the 2018 and 2015 IBC).
- 5.7 Under the 2012 IBC, for structures regulated by Chapter 21 of ACI 318-11 (as required by 2012 IBC Section 1905.1), to splice uncoated, 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 PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System, mill certificates of reinforcing bars must be submitted to the code official as evidence that the steel reinforcing bars comply with ACI 318-11 Section 21.1.5.2.
- 5.8 The PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System must be used with BASF Masterflow<sup>®</sup> 885 Mortar, in accordance with the approved quality documentation.
- 5.9 The use PS= $\emptyset$ <sup>®</sup> Steel Reinforcement Splice System in fire-resistance-rated construction, is outside the scope of this evaluation report.

### 6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Mechanical Connector Systems for Steel Reinforcing Bars \(AC133\)](#), dated October 2020 (Editorially revised August 2022).

## 7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4213) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 Each coupler is marked with the company logo (PS=Ø<sup>®</sup>), the sleeve model and size, the lot number, and “Type 2” indicating a Type 2 mechanical splice. The PS=Ø<sup>®</sup> Steel Reinforcement Splice System is used for No. 6 steel reinforcing bars only. Each container of sleeves is identified with a product label which, at a minimum, includes the report holder’s name (Tech Development, LLC.) and address, the product model and size. Each bag of BASF MasterFlow<sup>®</sup> 885 Mortar is marked as BASF MasterFlow<sup>®</sup> 885 with mixing instructions. Additionally, a lot number is printed on each bag of BASF MasterFlow<sup>®</sup> 885 which identifies the production date and manufacturing facility.
- 7.3 The report holder’s contact information is the following:

**TECH DEVELOPMENT, LLC.**  
**192 WEST NINTH STREET**  
**ST. PAUL, MNNESOTA 55102**  
**(800) 355-8414**  
[contact@techsalesps0.com](mailto:contact@techsalesps0.com)



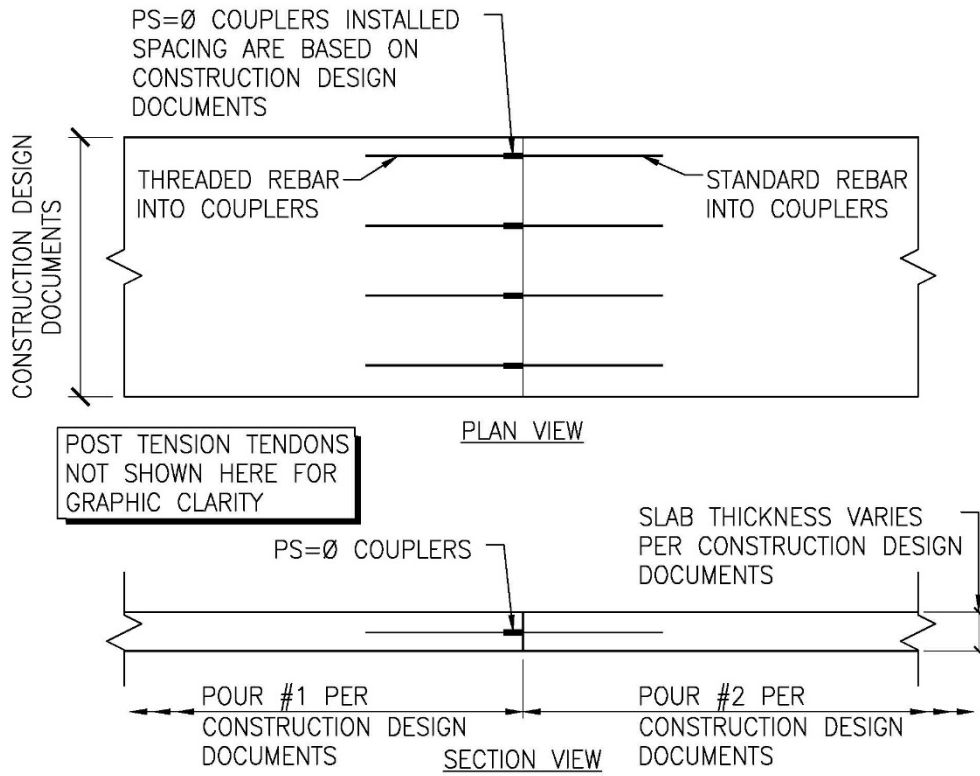


FIGURE 2—SCHEMATIC CAST-IN-PLACE CONCRETE FLOOR/ROOF SLAB LAYOUT

DIVISION: 03 00 00—CONCRETE  
Section: 03 21 00—Reinforcement Bars

**REPORT HOLDER:**

TECH DEVELOPMENT, LLC.

**EVALUATION SUBJECT:**

PS=Ø® STEEL REINFORCEMENT SPLICE SYSTEM FOR STEEL REINFORCING BARS

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that PS=Ø® Steel Reinforcement Splice System, described in ICC-ES evaluation report [ESR-4213](#), has also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

**Applicable code editions:**

- 2023 *City of Los Angeles Building Code* (LABC)

**2.0 CONCLUSIONS**

The PS=Ø® Steel Reinforcement Splice System, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4213](#), complies with the LABC Chapter 19, and is subject to the conditions of use described in this supplement.

**3.0 CONDITIONS OF USE**

The PS=Ø® Steel Reinforcement Splice System described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4213](#).
- The design, installation, conditions of use and identification are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-4213](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Continuous special inspection by Deputy Inspectors shall be provided during installation of splices.
- The mechanical coupler system assembly shall be produced in the shop of an approved City of Los Angeles fabricator, in accordance with LABC Section 202 definition for “Fabricated Item” and LABC Section 96.203.

This supplement expires concurrently with the evaluation report, reissued March 2024.

DIVISION: 03 00 00—CONCRETE  
Section: 03 21 00—Reinforcement Bars

**REPORT HOLDER:**

TECH DEVELOPMENT, LLC.

**EVALUATION SUBJECT:**

PS=Ø® STEEL REINFORCEMENT SPLICE SYSTEM FOR STEEL REINFORCING BARS

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the PS=Ø® Steel Reinforcement Splice System, described in ICC-ES evaluation report ESR-4213, has also been evaluated for compliance with the code noted below.

**Applicable code edition(s):**

- 2022 California Building Code (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

**2.0 CONCLUSIONS****2.1 CBC:**

The PS=Ø® Steel Reinforcement Splice System, described in Sections 2.0 through 7.0 of the evaluation report ESR-4213, complies with CBC Chapter 19, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16, 17 and 19, as applicable.

**2.1.1 OSHPD:**

The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

**2.1.2 DSA:**

The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

This supplement expires concurrently with the evaluation report, reissued March 2024.



**DIVISION: 03 00 00—CONCRETE**  
**Section: 03 21 00—Reinforcement Bars**

**REPORT HOLDER:**

TECH DEVELOPMENT, LLC.

**EVALUATION SUBJECT:**

PS=Ø® STEEL REINFORCEMENT SPLICE SYSTEM FOR STEEL REINFORCING BARS

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that PS=Ø® Steel Reinforcement Splice System, described in ICC-ES evaluation report ESR-4213, has been evaluated for compliance with the code noted below.

**Applicable code edition:**

2017 *Florida Building Code—Building* (FBC)

**2.0 CONCLUSIONS**

The PS=Ø® Steel Reinforcement Splice System, described in Sections 2.0 through 8.0 of the evaluation report ESR-4213, complies with the *Florida Building Code—Building*, provided the design and installation are in accordance with the 2015 *International Building Code*® provisions noted in the evaluation report.

Use of the PS=Ø® Steel Reinforcement Splice System for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* has not been evaluated and is outside the scope of this supplemental report.

For products falling under Florida Rule 9N-3, verification that the report holder's quality-assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued March 2024.