

ICC-ES Evaluation Report

ESR-4275

Issued February 2020

Revised July 2021

This report is subject to renewal February 2022.

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

DIVISION: 04 00 00—MASONRY
Section: 04 05 19—Masonry Anchorage and Reinforcing

REPORT HOLDER:

HY-TEN, INC.

EVALUATION SUBJECT:

HT.S, HT.P, and HT.LT MECHANICAL SPLICE SYSTEMS

1.0 EVALUATION SCOPE

Compliance with the following codes:

2021, 2018, 2015, 2012 and 2009 *International Building Code®* (IBC).

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see [ESR-4275 LABC supplement](#).

Property evaluated:

Structural

2.0 USES

The HT.S, HT.P, and HT.LT mechanical splice systems are used as tension and compression mechanical splices of deformed steel reinforcing bars in reinforced concrete and fully-grouted reinforced concrete masonry construction.

The HT.S, HT.P, and HT.LT mechanical splice systems installed in concrete and fully-grouted reinforced concrete masonry comply with Section 25.5.7.1 of ACI 318-19 as referenced in Section 1901.2 of the 2021 IBC, and Section 6.1.6.1.3 of TMS 402-16 as referenced in Section 2101.2 of the 2021 IBC, respectively, for use as tension and compression mechanical connections of ASTM A615 Grade 60 or ASTM A706 Grade 60 deformed steel reinforcing bars sizes No. 5 through No. 14. The HT.S splice system can also be used with ASTM A615 Grade 60 or ASTM A706 Grade 60 deformed steel reinforcing bar size No. 4.

These systems, when used to splice ASTM A615 Grade 60 and ASTM A706 Grade 60 bars, comply with the Type 1 and Type 2 mechanical splice requirements of Section 18.2.7.1 of ACI 318-19 for the 2021 IBC for concrete applications, and Section 2108.3 of the IBC for concrete

masonry applications. **Exception:** Splice systems with No. 14 reinforcing bars must be limited to use as Type 1 splices.

The HT.S, HT.P, and HT.LT mechanical splice systems with No. 4 through No. 11 reinforcing bars may be used in Type 2HS splices, in which are Type 2 splices intended for use with reinforcing bars conforming to ACI 318-19 Section 20.2.1.3(b).

For other applicable Code editions and section references, see Table 4.

3.0 DESCRIPTION

3.1 General:

The HT.S splice system consists of various components that are assembled together to form a completed splice. Each splice consists of four general components: two reinforcing bars, a proprietary steel coupling sleeve with internal threads, and a proprietary externally threaded steel stud. Dimensions for this splice system are shown in Figure 1 and Table 1.

The HT.P splice system consists of various components that are assembled together to form a completed splice. Each splice consists of five general components: two reinforcing bars, a proprietary steel coupling sleeve with internal threads, and two proprietary externally taper-threaded steel studs. Dimensions for this splice system are shown in Figure 2 and Table 2.

The HT.LT splice system consists of various components that are assembled together to form a completed splice. Each splice consists of six general components: two reinforcing bars, a proprietary steel coupling sleeve with internal threads (straight threads on one side, taper-threads on the other), a proprietary externally taper-threaded steel stud, a proprietary externally straight-threaded steel stud, and a steel locknut. Dimensions for this splice system are shown in Figure 3 and Table 3.

3.2 Materials:

3.2.1 Couplers: The couplers are manufactured from steel conforming to JIS G4051 S45c with a minimum specified yield strength of 49.8 ksi (343 Mpa).

3.2.2 Threaded Studs and Locknuts: the threaded studs and locknuts are manufactured from steel conforming to JIS G4051 S45c with a minimum specified yield strength of 49.8 ksi (343 Mpa).

3.2.3 Steel Reinforcing Bars: The deformed steel reinforcing bars comply with ASTM A615, Grade 60 or ASTM A706 Grade 60.

4.0 INSTALLATION

4.1 HT.S Splice System:

One end of each reinforcing bar is cut square in a factory. Also in the factory, the steel coupling sleeve is welded to the end of one of the bars and the threaded steel stud is welded to the end of the other bar. Final assembly of the splice takes place in the field by threading the steel stud/bar assembly into the coupling sleeve/bar assembly and tightening with a pipe wrench until the bars no longer rotate.

The HT.S proprietary steel coupling sleeve can be welded to structural steel shapes or plates. A registered design professional shall design the weld in accordance with the requirements of the American Welding Society (AWS) standards.

4.2 HT.P Splice System:

One end of each reinforcing bar is cut square in a factory. Also in the factory, each threaded steel stud is welded to an end of one of the bars. Final assembly of the splice takes place in the field by threading each steel stud/bar assembly into the coupling sleeve and tightening with a pipe wrench until the bars with the studs no longer rotate.

4.3 HT.LT Splice System:

One end of each reinforcing bar is cut square in a factory. Also in the factory, the straight threaded steel stud is welded to the end of one of the bars and the taper-threaded steel stud is welded to the end of the other bar. Assembly of the splice takes place in the field by threading the taper-threaded stud/bar assembly into the coupling sleeve and tightening with a pipe wrench until the stud/bar assembly no longer rotates relative to the sleeve. Final assembly of the splice occurs by threading the straight-threaded stud/bar assembly into the coupling sleeve and tightening the locknut against the coupling sleeve until the locknut no longer rotates.

4.4 Special Inspection:

Special inspection is required in accordance with Section 1705 of the IBC (Section 1704 of the 2009 IBC). In addition to verifying placement of reinforcing bar splices in accordance with this report, the special inspector must verify reinforcing bar embedment; coupler and rebar identification; field preparation of components, including field preparation of reinforcing bar ends; and assembly of the components resulting in spliced reinforcing bars.

5.0 CONDITIONS OF USE

The HT.S, HT.P, and HT.LT mechanical splice systems described in this report comply with, or are a suitable alternative to, what is specified in the codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The splice system must be installed in accordance with the applicable code, 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 The location of splices installed in concrete must comply with applicable ACI 318 requirements, as modified by the IBC, and be noted on plans approved by the code official.
- 5.3 The location of splices installed in concrete masonry must comply with requirements of Section 2108.3 of the IBC and applicable TMS 402 requirements, as modified by the IBC, and be noted on plans approved by the code official.
- 5.4 Under the 2021, 2018 and 2015 IBC, as applicable, for structures regulated by Chapter 18 of ACI 318-19 and

318-14 (as required by 2021, 2018 and 2015 IBC Section 1905.1, as applicable), to splice deformed longitudinal reinforcing bars 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, with the HT.S, HT.P, and HT.LT mechanical splice systems, mill certificates of reinforcing bars must be submitted to the code official as evidence that the steel reinforcing bars comply with ACI 318-19 and 318-14 Section 20.2.2.5.

- 5.5 Under the 2012 IBC, for structures regulated by Chapter 21 of ACI 318-11 (as required by 2012 IBC Section 1905.1), 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 HT.S, HT.P, and HT.LT mechanical splice systems, 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.
- 5.6 Under the 2009 IBC, for structures regulated by Chapter 21 of ACI 318-08 (as required by 2009 IBC Section 1908.1), to splice deformed reinforcing bars resisting earthquake-induced flexure and axial forces in frame members, structural walls and coupling beams, with the HT.S, HT.P, and HT.LT mechanical splice systems, mill certificates of reinforcing bars must be submitted to the code official as evidence that the steel reinforcing bars comply with ACI 318-08 Section 21.1.5.2.
- 5.7 For splice systems installed in concrete masonry, mill certificates of reinforcing bars must be submitted to the code official as evidence that the steel reinforcing bars comply with TMS 602 (-16, -14, -11, and -08) Article 2.4, as required by Section 2103.4 of the IBC (Section 2103.14 of the 2012 IBC and 2103.13 of the 2009 IBC).
- 5.8 Special inspection must be provided in accordance with Section 4.4 of this report.
- 5.9 For splice systems installed in concrete, the minimum concrete cover and spacing between spliced bars must be in accordance with the ACI 318 requirements, as modified by the IBC when applicable, and must be measured from the outer surface of the coupler.
- 5.10 For splice systems installed in concrete masonry, minimum grout space requirements shall comply with the TMS 402 (IBC), as applicable per Table 4, and must be measured from the outer surface of the coupler.
- 5.11 Evaluation of the capacity of the HT.S proprietary steel coupling sleeve welded to structural steel shapes or plates, is outside the scope of this report.
- 5.12 The evaluation of corrosion resistance of the mechanical splice is outside the scope of this evaluation and must be considered by the registered design professional performing the design.
- 5.13 The splice system components are fabricated under a quality control system with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Mechanical Splice Systems for Steel Reinforcing Bars (AC133), dated October 2020.

7.0 IDENTIFICATION

- 7.1 Each bundle of reinforcing bar/stud assemblies must be identified with a label showing the company name (HY-TEN, Inc.), the coupler reference (HT.S, HT.P, or HT.LT), the reinforcing bar size, the intended splice type (1, 2 or 2HS, as applicable) and the ICC-ES evaluation report number (ESR-4275). Each box of loose couplers must be identified with the company name (HY-TEN, Inc.), the coupler reference (HT.S#, HT.P#, or HT.LT#), the intended splice Type (1, 2 or 2HS, as applicable), and the ICC-ES evaluation report

number (ESR-4275). Each coupler and stud component is marked with the cast number.

- 7.2 The report holder's contact information is the following:

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19052 HARVILL AVENUE
PERRIS, CALIFORNIA 92570
(951) 514-9188
www.hy-tenusa.com
rkw@hy-ten.co.uk

TABLE 1—HT.S COUPLER DIMENSIONS¹

Coupler Ref	Bar Size Designation	Couplers Dimensions (inch)				
		A	B	C	D	E
HT.S.4	# 4	½	½	1 ½	¾	1 ⅝
HT.S.5	# 5	¾	⅝	1 ⅝	1	1 ¼
HT.S.6	# 6	¾	¾	1 ¾	1	1 ⅝
HT.S.7	# 7	⅞	⅞	1 ⅞	1 ⅝	1 ⅞
HT.S.8	# 8	1	1	2 ⅞	1 ⅝	2
HT.S.9	# 9	1 ⅛	1 ⅜	2 ⅝	1 ½	2 ⅞
HT.S.10	# 10	1 ¼	1 ¼	2 ½	1 ⅝	2 ½
HT.S.11	# 11	1 ⅝	1 ⅝	2 ¾	2 ¾	2 ⅝
HT.S.14	# 14	1 ⅝	1 ¾	3	2 ⅞	3 ⅝

1. For SI, 1 inch = 25.4 mm

TABLE 2—HT.P COUPLER DIMENSIONS¹

Coupler Ref	Bar Size Designation	Couplers Dimensions (inch)					
		A	B1	B2	C	D	E
HT.P.5	# 5	¾	½	⅝	1 ⅝	1 ¼	1
HT.P.6	# 6	⅞	¾	⅞	1 ¾	1 ½	1 ⅝
HT.P.7	# 7	1	¾	⅞	2	1 ¾	1 ¼
HT.P.8	# 8	1 ⅛	1	1 ⅛	2 ⅞	2	1 ⅝
HT.P.9	# 9	1 ¼	1	1 ⅞	2 ⅝	2 ⅞	1 ⅝
HT.P.10	# 10	1 ⅝	1 ⅞	1 ¼	2 ¾	2 ⅝	1 ¾
HT.P.11	# 11	1 ½	1 ⅞	1 ¼	2 ¾	2 ⅝	2
HT.P.14	# 14	1 ¾	1 ⅝	1 ¾	3 ⅞	3 ¼	2 ⅝

1. For SI, 1 inch = 25.4 mm

TABLE 3—HT.LT COUPLER DIMENSIONS¹

Coupler Ref	Bar Size Designation	Couplers Dimensions (inch)												Travel Range	
		A	B	C	D	E	F	G	H	I	L1 (Min)	L1 (Max)	L2 (Min)		L2 (Max)
HT.LT.5	# 5	¾	3 ¼	4 ⅛	⅝	1 ⅛	2 ⅝	⅝	1 ⅝	1	⅝	2	3 ⅞	5 ¼	1 ⅜
HT.LT.6	# 6	¾	3 ¼	4 ⅛	⅝	1 ⅛	2 ⅝	⅝	1 ⅝	1	⅝	2	3 ⅞	5 ¼	1 ⅜
HT.LT.7	# 7	⅞	3 ⅞	4 ⅞	⅝	1 ⅜	3 ¼	¾	1 ¾	1	¾	1 ½	4 ⅝	6 ⅜	1 ¾
HT.LT.8	# 8	1	4	5 ⅛	⅝	1 ½	3 ⅞	¾	2	1 ⅛	¾	2 ½	4 ¾	6 ⅝	1 ¾
HT.LT.9	# 9	1 ⅛	4 ¼	5 ⅜	⅝	1 ¾	3 ⅝	⅞	2 ⅛	1 ⅜	⅞	2 ⅝	5 ⅛	6 ⅞	1 ¾
HT.LT.10	# 10	1 ¼	4 ⅝	5 ½	⅝	1 ⅞	3 ¾	1	2 ¼	1 ½	1	2 ¾	5 ⅝	7 ⅛	1 ¾
HT.LT.11	# 11	1 ⅜	4 ⅝	5 ⅞	⅝	2	4	1 ⅛	2 ⅜	1 ⅝	1 ⅛	2 ⅞	5 ⅝	7 ⅜	1 ¾
HT.LT.14	# 14	1 ¾	5 ¼	6 ⅝	⅝	2 ½	4 ⅝	1 ¼	2 ⅝	2	2 ¼	3 ⅛	6 ½	8 ¼	1 ¾

1. For SI, 1 inch = 25.4 mm

TABLE 4—APPLICABLE SECTION REFERENCES

	2021 IBC	2018 IBC	2015 IBC	2012 IBC	2009 IBC
CONCRETE	ACI 318-019	ACI 318-014		ACI 318-11	ACI 318-08
Required Compression/ Tension strength	Section 25.5.7.1			Section 12.14.3.2	Section 12.14.3.2
Type 1 and 2 Splices	Section 18.2.7.1			Section 21.1.6.1	Section 21.1.6.1
Type 2HS Splices	20.2.1.3(b)	n/a	n/a	n/a	n/a
MASONRY	TMS 402-16		TMS 402-13/ACI 530-13/ ASCE 5-13	TMS 402-11/ACI 530-11/ ASCE 5-11	TMS 402-08/ACI 530-08/ ASCE 5-08
Required Compression/ Tension strength	Section 6.1.6.1.3		Sections 8.1.6.7.3 and 9.3.3.4	Sections 3.3.3.4 and 8.3.3.4	Sections 3.3.3.4 and A8.3.3.4
Grout Spacing Requirements	Section 3.2.1		Section 3.2.1	Section 1.20.1	Section 1.19.1

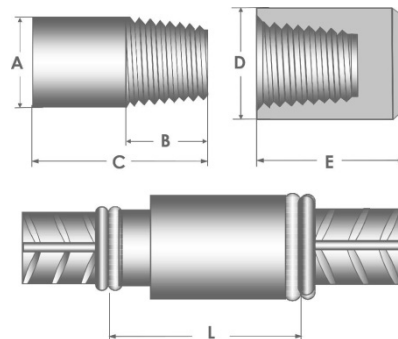
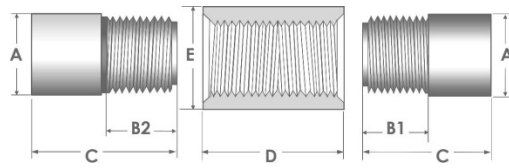
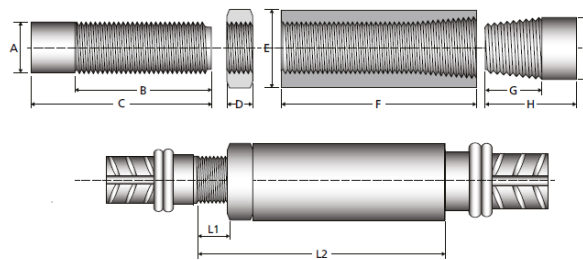


FIGURE 1—HT.S COUPLER DIMENSIONS

**FIGURE 2—HT.P COUPLER DIMENSIONS****FIGURE 3—HT.LT COUPLER DIMENSIONS**

ICC-ES Evaluation Report

ESR-4275 LABC Supplement

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REPORT HOLDER:

HY-TEN, INC.

EVALUATION SUBJECT:

HT.S, HT.P, AND HT.LT MECHANICAL SPLICE SYSTEMS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the HT.S, HT.P, and HT.LT mechanical splice systems, described in ICC-ES evaluation report [ESR-4275](#), have 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:

2020 *City of Los Angeles Building Code* (LABC)

2.0 CONCLUSIONS

The HT.S, HT.P, and HT.LT mechanical splice systems, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4275](#), comply with the LABC Chapter 19 and 21 and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The HT.S, HT.P, and HT.LT mechanical splice systems described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4275](#).
- The design, installation, conditions of use and identification are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-4275](#).
- 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.

This supplement expires concurrently with the evaluation report, reissued February 2020 and revised July 2021.