



NMB SPLICE SLEEVE CERTIFICATIONS AND TEST RESULTS

Sy² + Associates Evaluation Report using PH Rebar



CERTIFICATION

This is to certify that **SY² + Associates, Inc.**, a structural engineering consultancy firm, undertook the structural evaluation of the **NMB Splice-Sleeve System** in behalf of **Makati Development Corporation**.

This is to certify, further, that the undersigned supervised the said evaluation.

Based on the test results submitted by Splice Sleeve Japan, the material strength properties of NMB Splice-Sleeve System for both Type 1 and Type 2 mechanical coupler systems are in compliance with all the applicable provisions of the local code (the National Structural Code of the Philippines (NSCP), 2010 Edition), as well as the internationally-accepted structural codes and standards (International Building Code (IBC), 2012 Edition). The NMB Splice Sleeve grout-filled System tests conducted were all using locally sourced Reinforcement Steel Bars in the Philippines.

Moreover, the said grout-filled mechanical connection can also be used as an alternative connection for precast components in lieu of standard tension splices for cast in place construction.

It is therefore, the professional judgement and opinion of the undersigned that the use of the NMB Splice-Sleeve System, as mechanical coupling system, is structurally adequate and acceptable.

This certification is being issued upon the request of the Owners for whatever legal purpose it may serve.

By:


JOSE A. SY
Civil-Structural Engineer
Reg. No. 22404

July 2016

ICC ESR-3141
 ICC ESR-3143
 ICC ESR-5645

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ESR-3141
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DIVISION: 03 00 00—CONCRETE
 SECTION: 03 21 00—REINFORCING STEEL

REPORT HOLDER:
SPLICE SLEEVE JAPAN, LTD.

3-1 NINONBASHI
 NARIZAO-CHO, 103-0015
 CHUO-KU TOKYO

EVALUATION SUBJECT:
**NMB SPLICE SLEEVE® UX (SA), NMB SLIM-SLEEVE™ AND NMB SPLICE SLEEVE®
 UX (SA) SCS590 SYSTEMS FOR CONNECTING STEEL REINFORCING BARS**

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ICC-ES Evaluation Report

ICC-ES-3433
 Issued February 1, 2014
 This report is subject to renewal February 1, 2015.

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DIVISION: 03 00 00—CONCRETE
 SECTION: 03 21 00—REINFORCING STEEL

REPORT HOLDER:
 SPLICE SLEEVE NORTH AMERICA, INC.
 3677 WEST 316 MILE ROAD, SUITE 295
 LIVONIA, MICHIGAN 48150
 (734) 839-6420
www.splicesleeve.com

EVALUATION SUBJECT:
NMB SPLICE-SLEEVE® TYPE U-X, SNX11 AND A11W SYSTEMS FOR CONNECTING STEEL REINFORCING BARS

1.0 EVALUATION SCOPE
 Compliance with the following codes:
 2012 and 2006 International Building Code® (IBC)
 Properties evaluated:
 STRUCTURAL

2.0 USES
 The Splice Sleeve North America, Inc. (SSNA), NMB Splice-Sleeve Type U-X, SNX11 and A11W systems are used as mechanical splices of deformed steel reinforcing bars in reinforced concrete construction. The NMB Splice-Sleeve Type U-X, SNX11 and A11W systems comply with Section 12.14.3.2 of ACI 318-11 for the 2012 IBC (ACI 318-08 for the 2006 IBC) (ACI 318-05 referenced in Section 1903.2 of the IBC) for use as tension and compression mechanical connections of deformed steel reinforcing bars. The NMB Splice-Sleeve Type U-X, SNX11 and A11W connectors are used with SCS-Maxilar to splice ASTM A615 Grade 60, or ASTM A706 Grade 60, deformed bars, forming NMB Splice-Sleeve Type U-X, SNX11 and A11W systems, respectively. The NMB Splice-Sleeve Type U-X, SNX11 and A11W systems also comply with the Type 2 mechanical splice requirements of Section 21.1.1.1 of ACI 318-11 for the 2012 IBC (ACI 318-08 for the 2006 IBC), and are for use where Type 1 or Type 2 mechanical splices are specified by the IBC and ACI 318.

3.0 DESCRIPTION
3.1 NMB Splice-Sleeve Type U-X Connectors:
 The Type U-X NMB Splice-Sleeve connectors consist of half-straight and half-lapped steel cylinders, with multiple internal ridges. The Type U-X NMB Splice-Sleeve connectors have two unequal inside-diameter and unequal outside-diameter ends (wide end and narrow end), and are used to splice two unequal, equal-diameter, deformed steel reinforcing bars. The midsection of the interior of the sleeve is provided with a rebar stop that establishes the proper embedment length of the reinforcing bars. As an optional feature, the sleeves are also available with a set screw located on the side of the narrow end of the sleeve. The set screw temporarily attaches the sleeve to the rebar inserted in the narrow end of the sleeve prior to the installation of the grout.

The Type U-X sleeves are cast castings conforming to a proprietary specification, which is based on ASTM A568-04 (2009), with a Grade of 85-60-08 (minimum yield and tensile strengths of 60,000 and 85,000 psi (414 and 588 MPa), respectively) for all sleeve sizes greater than No. 8, and a Grade of 65-45-12 (minimum yield and tensile strengths of 40,000 and 65,000 psi (276 and 448 MPa), respectively) for 5U-X and 6U-X sleeves. The NMB Splice-Sleeve Type U-X connector configuration, dimensions, and the required rebar embedment lengths are provided in Figure 1 and Table 1.

3.2 NMB Splice-Sleeve SNX11 Connector:
 The NMB Splice-Sleeve SNX11 connector consists of a straight steel cylinder with multiple internal ridges, and is used to splice uncoupled, No. 11 deformed steel reinforcing bars. The midsection of the interior of the sleeve is provided with a rebar stop which establishes the proper embedment length of the reinforcing bars. As an optional feature, the sleeve is also available with a set screw located on the side of the narrow end of the sleeve. The set screw is used to provide temporary attachment of the sleeve to the rebar inserted in the narrow end of the sleeve prior to the installation of the grout. The sleeve is an iron casting conforming to a proprietary specification, which is based on ASTM A568-04 (2009), with a Grade of 85-60-08 (minimum yield and tensile strengths of 60,000 and 85,000 psi (414 and 588 MPa), respectively). The NMB Splice-Sleeve SNX11 connector configuration, dimensions, and the required rebar embedment lengths are provided in Figure 2 and Table 2.

3.3 NMB Splice-Sleeve A11W Connector:
 The A11W NMB Splice-Sleeve connector consists of a straight steel cylinder with multiple internal ridges. The A11W NMB Splice-Sleeve connector has two unequal inside-diameter ends, and is used to splice uncoupled, No. 11 deformed steel reinforcing bars. The midsection of the interior of the sleeve is provided with a rebar stop that

Internal ridges. The Type U-X NMB Splice-Sleeve connectors have two unequal inside-diameter and unequal outside-diameter ends (wide end and narrow end), and are used to splice two unequal, equal-diameter, deformed steel reinforcing bars. The midsection of the interior of the sleeve is provided with a rebar stop that establishes the proper embedment length of the reinforcing bars. As an optional feature, the sleeves are also available with a set screw located on the side of the narrow end of the sleeve. The set screw temporarily attaches the sleeve to the rebar inserted in the narrow end of the sleeve prior to the installation of the grout.

The NMB Splice-Sleeve Type U-X, SNX11 and A11W systems are used as mechanical splices of deformed steel reinforcing bars in reinforced concrete construction. The NMB Splice-Sleeve Type U-X, SNX11 and A11W systems comply with Section 12.14.3.2 of ACI 318-11 for the 2012 IBC (ACI 318-08 for the 2006 IBC) (ACI 318-05 referenced in Section 1903.2 of the IBC) for use as tension and compression mechanical connections of deformed steel reinforcing bars. The NMB Splice-Sleeve Type U-X, SNX11 and A11W connectors are used with SCS-Maxilar to splice ASTM A615 Grade 60, or ASTM A706 Grade 60, deformed bars, forming NMB Splice-Sleeve Type U-X, SNX11 and A11W systems, respectively. The NMB Splice-Sleeve Type U-X, SNX11 and A11W systems also comply with the Type 2 mechanical splice requirements of Section 21.1.1.1 of ACI 318-11 for the 2012 IBC (ACI 318-08 for the 2006 IBC), and are for use where Type 1 or Type 2 mechanical splices are specified by the IBC and ACI 318.

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ICC-ES Evaluation Report

ICC-ES-5645
 Released August 1, 2008
 This report is subject to renewal in one year.

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DIVISION: 03 00 00—CONCRETE
 SECTION: 03210—Reinforcing Steel

NMB SPLICE-SLEEVE
SPLICE SLEEVE NORTH AMERICA, INC.
 3677 WEST 316 MILE ROAD, SUITE 108
 LIVONIA, MICHIGAN 48150

1.0 SUBJECT
NMB Splice-Sleeve™

2.0 DESCRIPTION
2.1 General:
 The NMB Splice-Sleeve are used as mechanical splices of deformed rebar in concrete construction. The three types of sleeves available are Type U-X, Type U and Type S-X. The sleeves are used with SS rebar as couched in Section 2.2.1.

2.2 Materials:
2.2.1 NMB Splice-Sleeve Type U-X Sleeves: The Type U-X NMB Splice-Sleeve consist of straight steel cylinders, with two to seven internal ridges spaced between 1.50 inch (38 mm) and 1.187 inch (30 mm) on center depending on sleeve model. The midsection of the interior of the sleeve is provided with a rebar stop which establishes the proper embedment length of the reinforcing bars. As an optional feature, the sleeves are available with a set screw located on the side of the narrow end of the sleeve. The set screw is used to provide temporary attachment of the sleeve to the rebar inserted in the narrow end of the sleeve prior to the installation of the grout. The sleeve material complies with ASTM A 568 Grade 85-60-08. The Type U-X sleeve are furnished in sizes set forth in Table 1. The Type U-X sleeves comply as tension or compression splices for deformed reinforcing bars as specified in Section 12.14.3.2 of the IBC and Section 21.2.1.1 of ACI 318-08. The sleeve also comply with the Type 2 mechanical splice requirements of Section 1903.2.1.1 of the IBC and Section 21.2.1.1 of ACI 318-08.

2.2.2 Reinforcing Steel Bars: The reinforcing steel bars that are couched bars according to ASTM A 615 Grade 60 or ASTM A 706.

2.2.3 NMB Splice-Sleeve Type U Sleeves: The Type U NMB Splice-Sleeve consist of double-tapered flange-shaped steel cylinders with annular grooves in the inner wall spaced 0.187 inch (4.8 mm) throughout the sleeve. The material complies with ASTM A 568 Grade 85-60-08, with minimum yield and tensile strengths of 60,000 and 85,000 pounds per square inch (414 and 588 MPa), respectively. The sleeves are furnished in sizes set forth in Table 2. The Type U sleeves comply as a tension or compression splice for deformed reinforcing bars as specified in Section 12.14.3.1 of the IBC and Section 21.2.1.1 of ACI 318-08. The sleeves also comply with the Type 2 mechanical splice requirements of Section 1903.2.1.1 of the IBC and Section 21.2.1.1 of ACI 318-08.

2.2.4 NMB Splice-Sleeve Type S-X Sleeves: The Type S-X NMB Splice-Sleeve consist of straight steel cylinders, with two to seven internal ridges spaced between 1.50 inch (38 mm) and 1.187 inch (30 mm) on center depending on sleeve model. The midsection of the interior of the sleeve is provided with a rebar stop which establishes the proper embedment length of the reinforcing bars. As an optional feature, the sleeves are available with a set screw located on the side of the narrow end of the sleeve. The set screw is used to provide temporary attachment of the sleeve to the rebar inserted in the narrow end of the sleeve prior to the installation of the grout. The sleeve material complies with ASTM A 568 Grade 85-60-08. The Type S-X sleeve are furnished in sizes set forth in Table 3. The Type S-X sleeves comply as a tension or compression splices for deformed reinforcing bars as specified in Section 12.14.3.1 of the IBC and Section 21.2.1.1 of ACI 318-08. The sleeve also comply with the Type 2 mechanical splice requirements of Section 1903.2.1.1 of the IBC and Section 21.2.1.1 of ACI 318-08.

2.2.5 SS Rebar: SS Rebar is a non-ribbed, high-strength, double-ribbed, plain, non-deformed by SAEF Connector Chemicals of America, packaged in 85-pound (38 kg) bags. The material has a steel strength of 16 bars when stored in 8-cord dry environment.

2.2.6 Reinforcing Steel Bars: The reinforcing steel bars that are couched bars according to ASTM A 615 Grade 60 or ASTM A 706.

*Revised June 2011

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Fatigue Behavior of Welded and Mechanical Splice in Rebar

NMB Splice Sleeve





**SPLICE SLEEVE JAPAN, LTD.
AC133 Testing of SSJ UX(SA) Grouted Splice Sleeves**

Tokyo, Japan

WJE
Report



Final Report
July 30, 2013
WJE No. 2010.3433.A