The NMB SPLICE-SLEEVE® is an efficient coupler for splicing reinforcing bars which uses a cylindrical-shaped steel sleeve filled with a Portland-cement based non-shrink high-early-strength grout. Reinforcing bars to be spliced are inserted into the sleeve to meet approximately at the center of the sleeve. The interior of the sleeve is then filled with SS MORTAR® grout. The resulting splices will develop tensile and compressive strengths in excess of the specified minimum for ASTM Grade 60 bars conforming to the ACI Building Code Requirements.

The NMB SPLICE-SLEEVE® is a proven method for connecting precast reinforced concrete structural members. At the precast plant, the sleeves are embedded precast element on one end of the main reinforcing bars to be connected. The bars protrude from the other end of the precast member. At the building site, the precast members are joined by inserting the protruding bars from the end of one precast member into the sleeves of the adjacent member. The sleeves are then grouted, in effect making the reinforcing bars continuous through the connection. This is called “Emulation” and the NMB is categorized as an emulative connection for precast systems. (Refer to ACI 550.1R-09 for more information).

Patented Worldwide
The **NMB SPLICE-SLEEVE®** is particularly appropriate for use in joining vertical precast concrete structural elements (columns and shearwalls). This is because the sleeve can be embedded completely in the precast elements at the manufacturing yard and when the elements are joined in the erection process, there is no need to make a closure pour or to perform other cosmetic patching after the bars are joined. This is sometimes referred to as a “blind” connection. When used in cast-in-place situations, the **NMB SPLICE-SLEEVE** performs the same function as other mechanical rebar splicing devices, basically that of extending the rebar length.

**APPLICATIONS**

**NMB SPLICE-SLEEVES** have been used in a number of different applications both in cast-in-place and precast concrete structures.

**Precast Concrete Connections:**
- Column-to-column • Column-to-beam • Column-to-foundation
- Beam-to-beam • Shear wall to shear wall • Shear wall to foundation
- Elevator and stair cores • Airport control towers • Bridge piers and piers caps • Caissons • Large diameter hollow columns

**Cast-in-place Concrete Structures:**
- Connections of prefabricated column reinforcing cages
- Connections of new bars to old in vertical and horizontal rehabilitation work
- Stress relief joints in post-tensioned cast-in-place floor slabs
**NMB SPLICE-SLEEVES** are installed and held firmly in place in the forms during concrete pouring by means of a Sleeve Setter featuring a fast-acting cam operated locking device.

The **NMB SPLICE-SLEEVE** has an integral Rebar Stop in the mid-portion which assures the specified embedment of the rebar into the sleeve and an optional setscrew to hold the bar in the narrow end.

The uniform exterior dimension of the sleeve permits use of stirrups or hoops of the same size throughout the length of the sleeve.

No special treatment such as threading of rebar ends is required.

**NMB SPLICE-SLEEVES** can connect bars of the same size or any size smaller than the sleeve size.

The **NMB** can be epoxy coated and used to connect epoxy coated bars without removing the coating.
ERECTION

During erection, precast concrete elements are set into position where dowel bars are projecting either from foundation or lower precast concrete elements. NMB SPLICE-SLEEVES embedded in the upper precast elements receive those dowel bars. The wide (field) ends of the sleeves are designed to provide tolerances of ±5/16" (±8mm) for #5-6 sleeves, up to ±1/2" (±12.5mm) for the larger sleeves to accommodate bar misalignment. The new A11W allows ±3/5" (±15mm). If needed, Upsizing to a bigger sleeve size can gain additional tolerance. The precast elements are temporarily braced while the grout cures in the sleeves.

GROUTING

For PRE-GROUT applications, the SS MORTAR grout is simply poured into the sleeve and consolidated before the next precast member is set in position.

For POST-GROUT applications, the grout is pumped into the sleeve by means of a hand-operated pump. With the Post-Grout system, grouting operations can be performed anytime after bracing and do not interfere with erection progress.

Economy of crane and erection crew time can be improved because:

Any size bar can be spliced with equal ease and in the same amount of time.

Any number of bars can be mated simultaneously.

Combinations of different sized bars can be readily spliced.

In total, NMB SPLICE-SLEEVE contributes to speed of construction.
NMB SPLICE-SLEEVE

Steel Specification: The material properties of NMB SPLICE-SLEEVE conform to manufacturer's specification based on ASTM A536-85.

Grout Specification: The grout used in the NMB must be “SS Mortar”. Minimum grout strength will be 6,500-psi for Type 1 (125%Fy) performance and 9,500-psi for Type 2 (150%Fy) performance.

Dimensions:

<table>
<thead>
<tr>
<th>Sleeve No.</th>
<th>Bar Dia.</th>
<th>Bar Size</th>
<th>Sleeve Length (L)</th>
<th>Narrow End Diameter</th>
<th>Max. Dia. (B)</th>
<th>Wide End Diameter</th>
<th>Recommended Rebar Embedment Length</th>
<th>SS Mortar lbs. per Sleeve</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(ASTM</td>
<td>(C)</td>
<td>(C')</td>
<td>inch</td>
<td>inch</td>
<td>Minimum</td>
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</table>

![Diagram of NMB SPLICE-SLEEVE](image)
How to specify NMB SPLICE-SLEEVES:

SPECIFIC: Show sleeve size and grouting system.


GENERIC: Mechanical rebar splices by means of grout-filled steel sleeves with frusto-conical geometry into which a non-shrink, high-strength grout is introduced using a low pressure pump, the splice to meet the TYPE 1 or 2 requirements of ACI 318.

AASHTO:
The NMB SPLICE-SLEEVE exceeds the requirements (min. 125%Fy) of the AASHTO, Standard Specification for Highway Bridges, Division I- Design, Section 8.32.2. This article sets down requirements for fatigue design of mechanical connections. The NMB is listed generically as the “Grout-filled sleeve (without threaded ends), with or without epoxy coated rebar”, which gains the 18-ksi stress category (highest) under 5 million cycle testing per NCHRP 10-35 methodology.

APPROVAL AND RECOGNITION

• New York City Board of Standards and Appeals, Calendar No. 329-89-SM
• City of Los Angeles, Departments of Building and Safety, Research Report: RR25385
• Various U.S. State Department of Transportation
• Building Center of Japan, Ministry of Construction
• Housing Development Board, Singapore
• Ministry of Works and Development, New Zealand