Grouted Bar Couplers, Item SPV.0060.xx.

**A Description**

This special provision describes furnishing and installing grouted bar couplers at the interface of the cast-in-place concrete pier footings and the precast concrete pier columns, and at the interface of the precast concrete pier columns to the precast concrete pier caps.

**B Materials**

**B.1 Submittals**

Submit an independent test report confirming the compliance of the coupler, for each supplied coupler size, with the following requirements:

* Develop 100 percent of the specified ultimate tensile strength (Fu) of the attached Grade 60 reinforcing bar. This equates to 90 ksi bar stress for an ASTM A615 bar.
* The amount of time to achieve a minimum of 100 percent of the specified yield strength of the attached reinforcing bars which corresponds to the expected ambient temperature at installation. This value shall be used to develop the assembly plan timing. This data shall be the result of lab testing as performed by an approved testing laboratory.

Submit the specification requirements for the grout including required strength gain to develop the specified minimum yield strength of the connected reinforcing bar.

**B.2 Material Requirements**

Use grouted splice couplers to join cast-in-place concrete pier footings to precast concrete pier columns and precast concrete pier columns to the precast concrete pier caps as shown on the plans.

Provide couplers that use cementitious grout placed inside a steel casting.

Threaded connections may be used for the portions of the coupler that are placed within the precast element if the strength of the coupler meets or exceeds the requirements of this specification.

The following grouted bar couplers are acceptable for use provided that the requirements of this specification are met.

NMB Splice Sleeve

Splice Sleeve North America, Inc.

192 Technology Drive, Suite J,

Irvine, California 92618-2409

Dayton Superior Sleeve-Lock Grout Sleeve

Dayton Superior

Corporate Headquarters

7777 Washington Village Dr., Ste. 130

Dayton, OH 45459

Erico Lenton Interlok

ERICO United States

34600 Solon Road

Solon, Ohio 44139

Or approved equal

Use grouted bar couplers that are epoxy coated and can join epoxy coated reinforcing steel without removal of the epoxy coating on the spliced bar. Any exposed areas of reinforcing steel bars or grouted bar coupler sleeves where the epoxy coating has been damaged shall be touched up per the manufacturer requirements and conforming to standard spec 505.

Use grouted bar couplers that can provide 100 percent of the specified minimum tensile strength of the connecting Grade 60 reinforcing bar. This equates to 90 ksi for reinforcing conforming to ASTM A615.

Supply grout for the inside of the couplers from the coupler manufacturer. The grout must match the certified test report for the coupler. Do not substitute any other grout in the couplers unless additional certified test reports are submitted for the grout/coupler system.

**C Construction**

**C.1 Quality Assurance**

The performance of grouted splice couplers is related to the embedment length of the bars and the compressive strength of the grout. The following requirements for grouted splice couplers shall be met:

* The length of rebar anchor dowel must meet the minimum embedment specified in the manufacturer’s manual.
* The reinforcing extensions between the precast elements must be within the manufacturers recommended tolerances.
* Grout mixing, water to grout ratio, mixing time, and shelf life of the grout must conform with the manufacturers written instructions.
* All sleeves must be completely filled with grout.
* Make four sets of three - 2 inch grout cubes utilizing heavy brass molds with cover plates for testing according to AASHTO T 106. Cure the specimens according to AASHTO T 106. Test one set of cubes for compressive strength at a minimum of 24 hours (or to determine when to release bracing) and 28-days. Store extra sets for longer term testing, if necessary. Tests shall be in accordance to ASTM C109 and C942.
* Protect all sleeves from any vibration, shock, or other excessive movement until temporary bracing is removed.
* The temperature of the sleeve at the time of grouting and during curing must exceed 50°F.

**C.2 General Procedure for Making Connection using Grouted Bar Couplers**

Use personnel that are familiar with installation and grouting of splice couplers that have completed at least two successful projects in the last two years. Provide documentation proving these requirements have been met. Training of new personnel within three months of installation by a manufacturer’s technical representative is an acceptable substitution for this experience.

Remove and clean all debris from the joints prior to application of non-shrink grout.

Keep bonding surfaces free from laitance, dirt, dust, paint, grease, oil, or any contaminants other than water.

All joint surfaces must be Saturated Surface Dry (SSD) prior to connecting the precast elements.

Use heaters to maintain a minimum temperature of 50°F for the grouted bar couplers. Monitor the temperature of the covered sleeves until the temporary bracing is removed.

Follow the recommendations of the manufacturer for the installation and grouting of the

couplers. The general procedures are as follows:

* Determine the thickness of shims to provide the specified elevation within tolerance.
* Prepare, mix and apply the non-shrink grout according to the supplier’s recommendations.
* Place non-shrink grout on the interface between the cast-in-place concrete pier footings and the precast concrete pier columns and at the interface of the precast concrete pier columns to the precast concrete pier caps. Crown the thickness of the grout toward the center of the joint so that the grout can be displaced outward as the precast element is lowered onto the joint. Take precautions to prevent the non-shrink grout from entering the coupler above (e.g. grout dams or seals).
* Set the precast element in place. Engage all couplers in the joint. Allow the non-shrink grout to seep out of the joint.
* Trowel off excess non-shrink grout to form a neat joint once the precast element is set, plumbed, and aligned. Pack grout into any voids around the joint perimeter.
* Flush out the coupler with clean potable water.
* Mix the coupler grout according to the manufacturer’s recommendations for methods and proportions of mix and water.
* Make four sets of three 2-inch cube specimens for testing, as described in section C.1
* A minimum temperature of 50°F must be maintained in the grouted bar coupler during placing and curing until the full compressive strength of the grout is achieved, per the manufacturer requirements.
* Pump the coupler grout into the coupler that is cast into the precast element. Start from the lower port. Pump until the grout is flowing freely from the upper port.
* Cap the upper port first and then remove the nozzle to cap the lower port. Proceed to the next coupler in a defined sequence.
* Cure the joint according to the non-shrink grout manufacturer’s recommendations.

**D Measurement**

The department will measure Grouted Bar Couplers as each individual unit acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid items:

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| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.xx | Grouted Bar Couplers  | Each |

Payment for Grouted Bar Couplers is full compensation for furnishing and installing grouted bar couplers and supplying all materials including grout; and for making and testing grout cube specimens.