SECTION 03 21 19 – CONCRETE REINFORCEMENT SPLICING SYSTEMS

****** Delete this preamble before printing ******

Copyrighted material; limited license is granted to specifiers and design professionals for use in connection with public or private construction projects. Use for any other purpose by written consent of Dayton Superior Corporation only.

This document is intended as a stand-alone specification in CSI 3-Part format ("MasterFormat") or as a resource for supplementing a broader-scope specification for traffic coatings.

Specifier should enable "Hidden Text" feature while editing and disable feature before printing. Hidden text displays in blue and gives guidance to the specifier ("Editor's Notes").

Bold text in brackets [**sample**] *indicates a choice to be made; refer to editor's notes for guidance.*

Metric units are in red font and in parentheses (sample)*; these may be retained or deleted.*

For specification questions, email: Specifications@DaytonSuperior.com

For technical assistance, contact Dayton Superior Technical Services: (866) 329-8724

www.DaytonSuperior.com

****** Delete this preamble before printing ******

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanically locked splicing systems for concrete reinforcing bars.
2. Threaded splicing systems for concrete reinforcing bars.
3. Dowel bar connector systems.
4. Grouted sleeve splicing systems for concrete reinforcing bars.
5. Mechanical end anchors for reinforcing bars.
6. Splicing systems accessories.

1.2 RELATED SECTIONS

A. The following Section(s) contain work related to the work of this Section:

1. Section 03 20 00 – Concrete Reinforcing: General requirements for reinforcing.
2. Section 03 30 00 – Cast-in-Place Concrete: General requirements for mixing, placing, and finishing cast-in-place concrete.

1.3 REFERENCES

A. American Concrete Institute (ACI)

1. ACI 318: Building Code Requirements for Structural Concrete.

B. U. S. Army Corps of Engineers (USACE)

1. CW03210: Civil Works Construction Guide Specifications for Steel Bars, Welded Wire Fabric and Accessories for Concrete Reinforcement.

C. International Code Council Evaluation Service (ICC-ES)

1.1 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

B. Review scope of Work expected. Require representatives of each entity directly concerned with concrete slab work to attend, including the following:

1. Contractor’s superintendent.
2. Concrete reinforcing installer.
3. Splicing system manufacturer's representative.
4. A/E’s and/or Owner's representative (at their option).

C. Review the following, at a minimum:

1. Schedule
2. Extent of Work.
3. Materials to be installed.
4. Procedures to be used for mechanical splicing.
5. Material storage and staging.
6. Scaffolding.
7. Safety issues.
8. Cleanup and disposal of waste materials.

1.2 ACTION SUBMITTALS

A. General: Submit the following for approval. Do not proceed with work involving any action submittal until approval is obtained.

B. Product Data: Technical data sheets for each product used. Include material physical characteristics, storage and installation instructions, precautions and safety data, cleanup, and maintenance information.

1.3 INFORMATIONAL SUBMITTALS

A. General: Submit the following to the Owner for the Owner's information and records. If acceptable, and unless otherwise indicated, Informational Submittals will not be acted upon or returned.

B. Safety Data Sheets (SDS) for all non-metal products used.

C. Qualification Data: For Installer.

D. LEED Submittals:
1. Product Data for LEED v4 EQ Credit: Low-Emitting Materials: For products of this Section containing volatile organic compounds (VOC), including liquid materials with zero VOC content.
2. Statement of percentage of steel that is comprised of pre-consumer and post-consumer recycled steel.

E. American Steel: Certification from steel fabrication manufacturer that all steel has been sourced from the United States.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company regularly engaged in the manufacturing of the products specified in this section, with at least 10 years' successful history manufacturing materials specified herein.

B. Use splicing systems that comply with State of _____ Department of Transportation (__DOT) [**and are listed in the __DOT list of acceptable products**].

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original factory packaging, bearing identification of product, manufacturer, batch number, and expiration date, if applicable.

1. Furnish Safety Data Sheets to the project superintendent for each applicable product.

B. Store products in a location protected from damage, construction activity, precipitation and direct sunlight, in strict accordance with the manufacturer's recommendations.

1. Do not allow liquid products to freeze.
2. Use products within published shelf life.

C. Condition products prior to use if necessary, in accordance with the manufacturer's recommendations.

D. Handle all products with appropriate precautions and care as stated on the Safety Data Sheet.

E. Store bagged powder products in a dry place, off the ground, and protected from weather.

1.6 PROJECT CONDITIONS

A. Do not use grout products under conditions of precipitation or freezing weather. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

B. Protect adjacent work from contamination due to mixing, handling, and application of grout materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Dayton Superior Corporation; 1125 Byers Road, Miamisburg, Ohio 45342; Tel: (877) 266-7732; Website: www.DaytonSuperior.com

B. Requests for substitutions will be considered in accordance with provisions of Section [**01 25 00**] [**01 60 00**].

C. Substitutions: Not permitted.

2.2 REINFORCEMENT SPLICING SYSTEMS, GENERAL

A. Reinforcing Bar and Dowel Splicers: Reinforcing bar splicing system designed to develop minimum [**1.25 F_y**] [**1.5 F_y**] of the reinforcing bars in both tension and compression, conforming to ACI 318. Splicing system shall be listed by the International Code Council (ICC).

B. Provide manufacturer’s specialty couplers for specific applications, including:

1. Straight bar-to-bar coupling
2. End anchors
3. Edge-of form coupling
4. Column connectors

2.3 REINFORCING BAR SPLICING SYSTEMS

A. Mechanically Locked Sleeves: Steel sleeves with internal gripping rails and external shear bolts, designed to positively engage the unaltered ends of butted reinforcing bars.

1. Product: Dayton Superior “Bar Lock" [**“Bar Lock XL”**] System.
   a. Size: Corresponding to each bar diameter.

B. Taper-Threaded Couplers: Steel couplers with slightly tapered internal threads, using bars with matching external threads, specially tapered and threaded using manufacturer's proprietary threading equipment.

1. Product: Dayton Superior "Taper-Lock" [**"Taper-Lock XL"**] System.

C. Grouted Sleeves: One-piece cast steel cylinder with internal ribs and external filling ports, designed to be filled with specialized grout after reinforcing bars have been inserted.

1. Product: Dayton Superior D410 "Sleeve-Lock Grout Sleeve."
2. Grout: Dayton Superior D490 "Sleeve-Lock Grout."
   a. Minimum Compressive Strength: 7,000 psi (48.3 MPa) in 1 day; 10,000 psi (69.0 MPa) in 7 days; 12,000 psi (75.8) in 28 days
   b. Minimum Flexural Strength: 1,000 (6.9 MPa) in 7 days; 1,500 psi (10.3 MPa) in 28 days.

D. Dowel Bar Splicers: Integral forged bar end, female-threaded, with nailing flange on one bar and integral matching male threads on the other bar. Provide specially forged bar ends, such that the cut male threads do not diminish the original bar cross section dimension.

1. Product: Dayton Superior; "DBDI" System.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all areas involved in work to establish extent of work, access, and need for protection of surrounding construction.

3.2 PREPARATION

A. Remove loose material by hand or mechanically, in accordance with standard practice.

B. Ensure that air, material, and surface temperature is at least 40 degrees F (5 degrees C) and rising prior to beginning application of water-based grout materials.
1. For hot- and cold-weather conditions, comply with recommendations of ACI 305 and 306, respectively.

3.3 INSTALLATION

A. General: Follow all manufacturer's recommendations and written instructions when installing mechanical splicing systems.

B. For specialty couplers and differing site conditions, follow manufacturer's written instructions or seek manufacturer's technical guidance.

C. Mechanically Locked Sleeves:

1. During installation, ensure no damage or misalignment occurs to gripping rails; discard sleeve if damage occurs.
2. Insert first reinforcing bar completely, until it contacts internal divider.
3. Holding bar in position, hand-tighten all bolts.
4. Repeat above procedure for second bar.
5. In random, alternating order, tighten all bolts to 50% of the specified torque.
6. In random, alternating order, tighten all bolts to 75% of the specified torque
7. In random, alternating order, drive each bolt until head shears off.

D. Taper Threaded Couplers:

1. Attach coupler to stationary bar by rotating the coupler.
2. Screw coupler on hand tight.
3. Using a pipe wrench, rotate couple further 1/4 turn.
4. Attach free bar to coupler by rotating the bar.
5. Screw bar hand tight.
6. Using a pipe wrench rotate bar further 1/4 turn.
7. Ensure all connections are tightened to manufacturer's specified torque.

E. Grout Sleeve Couplers:
1. Mixing Procedure for Grout:
    a. Mix powdered grout material with water in quantity recommended by manufacturer, adjusted for site conditions, to achieve consistency necessary to completely fill grout sleeves.
    b. Thoroughly combine, using power mixer, for minimum five (5) minutes.
    c. Mix only the quantity that can be applied within the pot life of the material.
    d. Mix at least enough at one time to fully fill a whole number of grout sleeves.
2. Attach sleeve to precast or tilt-up panel form in line with reinforcing bar.
3. Secure sleeve from outside of form through pre-drilled hole, using manufacturer's specialty coupling and tightening nut; do not remove coupling until ready to install panel onto in-place construction, to prevent contamination of sleeve interior.
4. Attach filling port extension tubes to extend to, or above the finished panel surface, capping to prevent concrete from entering tube.
5. Attach manufacturer's resilient rebar seal plug to loose rebar, before inserting bar into open end of grout sleeve.
6. Set cured panel to in-place construction, ensuring that in-place extended rebar ends insert properly into open end of all grout sleeves.
    a. For loose rebar applications, or if sleeve does not contact adjacent construction, provide seal plug on field rebar before inserting.
7. Remove grout port plugs and pump grout into lower port tube (for vertical applications), until grout exudes out of upper/opposite port.

F. Dowel Bar Couplers:

1. Attach flanged, internally threaded end of dowel bar coupler to inside of formwork, using nails or screws.
2. Splice open end of dowel bar to internal reinforcing steel.
3. After concrete has set up, thread externally threaded dowel bar into internally threaded dowel bar; hand tighten.
4. Using a pipe wrench, rotate bar further 1/4 turn.
5. Splice open end of dowel bar to internal reinforcing steel.

3.4 FIELD QUALITY CONTROL

A. Grout Sampling and Testing: For each batch of grout mixed, take, at minimum, the following quantity of 2" cube samples for laboratory testing:

1. 3 to test before removing brace (+/- 24 hours).
2. 3 to test at 28 days.
3. 3 to hold in reserve.

3.5 CLEANING

A. Remove all debris and excess materials from the job site and dispose of in accordance with all applicable regulations for waste disposal.

END OF SECTION 03 21 19