

SP-097034
(New)



Iowa Department of Transportation

SPECIAL PROVISIONS

FOR

BITUMEN SET CONCRETE PAVERS

**Greene County
STP-E-3800(601)--8V-37**

**Effective Date
July 19, 2011**

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS AND GENERAL SUPPLEMENTAL SPECIFICATIONS.

PART 1 – GENERAL.

1.01 SUMMARY.

- A.** Section Includes:
1. Concrete pavers and joint sand
 2. Bitumen setting bed
 3. Asphalt tack coat
 4. Cleaning and sealing

1.02 REFERENCES.

- A.** American Society for Testing Materials (ASTM)
1. C33 – Specification for Concrete Aggregates.
 2. C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 3. C140 – Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 4. C144 – Standard Specification for Aggregate for Masonry Mortar.
 5. C920 – Specification for Elastomeric Joint Sealants.
 6. C979 – Standard Specification for Pigments for Integrally Colored Concrete.
 7. D977 – Standard Specification for Emulsified Asphalt.
 8. C1645 – Standard Test Method for Freeze-Thaw and De-Icing Salt Durability of Solid Concrete Interlocking Paving Units.
 9. D3381 – Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.
- B.** Interlocking Concrete Pavement Institute (ICPI):
1. ICPI Tech Spec Technical Bulletins

1.03 SUBMITTALS.

- A.** Manufacturer's drawings and details: Indicate perimeter conditions, relationship to adjoining materials and assemblies, expansion and control joints, concrete paver layout, [patterns, color arrangement, installation and setting] details.
- B.** Neoprene modified asphalt adhesive product catalog sheets with specifications.
- C.** Bituminous setting bed: Asphalt cement mix design to be used in the bituminous setting bed conforming to ASTM D3381.
- D.** Sieve analysis per C136 for sand mixed with bitumen and sand for joints between concrete pavers.
- E.** Concrete Pavers:
1. Two representative full-size samples of each paver type, thickness, color, finish that indicates the range of color variation and texture expected in the finished installation. Color(s) selected by Engineer and Owner from manufacturer's available colors.
 2. Accepted samples become the standard of acceptance for the work.
 3. Test results from an independent testing laboratory for compliance of concrete pavers with ASTM C936.
 4. Manufacturer's certification of concrete pavers by ICPI as having met applicable ASTM standards.

5. Manufacturer's catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.

F. Paver Installation Subcontractor:

1. A copy of Subcontractor's current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification Program.
2. Job references from projects of a similar size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and e-mail address.

1.04 QUALITY ASSURANCE.

A. Paving Subcontractor Qualifications:

1. Utilize an installer having successfully completed concrete paver installation similar in design, material, and extent indicated on this project.
2. Utilize an installer holding a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.

B. Mock-Ups:

1. Install a 7 foot by 7 foot paver area.
2. Use this area to determine surcharge of the bitumen-sand layer and adhesive, joint sizes, lines, laying pattern(s), color(s) and texture of the job.
3. This area will be used as the standard by which the work will be judged.
4. Subject to acceptance by owner, mock-up may be retained as part of finished work.
5. If mock-up is not retained, remove and properly dispose of mock-up.

1.05 DELIVERY, STORAGE AND HANDLING.

- A.** Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

- B.** Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers packaging with identification labels intact.

1. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.
2. Deliver concrete pavers to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by forklift or clamp lift.
3. Unload pavers at job site in such a manner that no damage occurs to the product.

- C.** Storage and Protection: Store materials protected such that they are kept free from mud, dirt, and other foreign materials. [Store concrete paver cleaners and sealers per manufacturer's instructions].

1. Cover joint sand with waterproof covering if needed to prevent exposure to rainfall or removal by wind. Secure the covering in place.

1.06 PROJECT/SITE CONDITIONS.

A. Environmental Requirements:

1. Do not install bitumen setting bed or pavers during heavy rain or snowfall.
2. Do not install bitumen setting bed and pavers over frozen base materials.

3. Do not install frozen bitumen setting bed materials.
4. Do not install concrete pavers on frozen bitumen setting bed materials.

1.07 MAINTENANCE.

- A. Extra Materials: Provide an additional 100 pavers of each color group for use by owner for maintenance and repair.
- B. Pavers shall be from the same production run as installed materials.

PART 2 PRODUCTS.

2.01 INTERLOCKING CONCRETE PAVERS.

- A. Manufacturer:
 1. Willow Creek Concrete Products
Contact: Jeremy Laska
(507)331-3198
(507)331-9601 Fax
 2. Hanover Architectural Products
Contact: Rick Masemer
(717)637-0500
 3. Unilock
Contact: Brad Punke
(630)892-9191, ext. 253
(847)489-0382 (mobile)
 4. Borgert Products
Contact: Karen McKinnie
(320)363-4671
(515)720-7169
- B. Interlocking Concrete Paver Units, Including the Following:
 1. Paver Type: Brickstone – Traditional Finish 4 inches by 8 inches by 3 1/8 inches
 - a. Material Standard: Comply with material standard set forth in ASTM C936.
 - b. Color and Finish: To be determined at time of shop drawing submittal.
 - c. Color Pigment Material Standard: Comply with ASTM C979.
 - d. Average Compressive Strength (ASTM C140): 8000 psi with no individual unit under 7200 psi.
 - e. Average Water Absorption (ASTM C140): 5% with no unit greater than 7%.
 - f. Freeze/Thaw Resistance (ASTM C1645): Resistant to 50 freeze/thaw while immersed in a 3% saline solution. Freeze-thaw testing requirements shall be waived for applications not exposed to freezing conditions.

2.02 PRODUCT SUBSTITUTIONS.

- A. Substitutions: No substitutions permitted.

2.03 BITUMEN SETTING BED MATERIALS.

- A. Primer for Base: Anionic asphalt emulsion SS-1h, per ASTM D977.
- B. Sand for Asphalt Bed
 - 1. Clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
 - 2. Do not use limestone screenings, stone dust, or sand in the bedding material that does not conform to the grading requirements.
 - 3. Graded according to ASTM C136.
 - 4. Bedding Sand Material Requirements: Conform to the grading requirements of ASTM C33 with modifications as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand
ASTM C33

<u>Sieve Size</u>	<u>Percent Passing</u>
No. 4	100
No. 8	85 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10
No. 200	2 to 10

- C. Asphalt Cement: Heated to 300°F, 7% asphalt mixed with 93% sand in batches 145 pounds asphalt to 1855 pounds sand. Exact proportions to be determined by the contractor.
- D. Neoprene modified asphalt adhesive: Karnak 230 2% neo-asphalt paving block adhesive.

2.04 JOINT MATERIALS.

- A. Joint Sand: Grading for conforming to ASTM C144.
- B. Sealant and Backer Materials: Section 4136 of the Standard Specifications.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Acceptance of Site Verification of Conditions:
 - 1. General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of interlocking concrete pavers:
 - a. Verify that concrete base materials, thickness, surface tolerances and elevations conform to specified requirements.
 - b. Verify location of 2 inch diameter weep holes at spacing shown on plans. Verify holes filled with washed pea gravel. Provide temporary plugs for holes to prevent ingress of sand-asphalt setting bed or neoprene adhesive during construction. Remove plugs when paving adjacent to drain holes.

- c. Verify that concrete surfaces to receive the bitumen bedding material are free of dust, oil, grease, paint, wax, curing compounds, primer, sealers, form release agents, from cracks over 3/16 inch in width, or any deleterious substances and debris which may prevent or reduce bonding.
- d. Conduct moisture tests to verify that concrete surfaces are cured, free from hydrostatic pressure and having a moisture content of less than 5%.
- e. Verify location, type, and elevations of edge restraints, [concrete collars around] utility structures, and drainage inlets.
- f. Do not proceed with installation of bedding sand and interlocking concrete pavers until base conditions are corrected by the General Contractor or designated subcontractor.

3.02 PREPARATION.

- A. Verify base is dry, certified by General Contractor as meeting material, installation and grade specifications.
- B. Verify that base is clean, dry, and ready to accept tack coat, bitumen setting bed, pavers, and imposed loads.

3.03 INSTALLATION.

- A. Concrete Base Preparation.
 - 1. Fill any cracks under 3/16 inches wide with mortar.
 - 2. Sweep the surface clean.
- B. Asphalt Primer.
 - 1. Emulsified: Apply at a rate of 0.9 to 1.3 gal/100 square feet.
 - 2. Cutback: Apply at a rate of 1.2 to 1.5 gal/100 square feet.
- C. Once applied the tack coat should not be disturbed and should be allowed to cure or break before covering with the setting bed material.
- D. Bituminous Setting Bed.
 - 1. Place in panels between 3/4 inches high screed rails spaced approximately 12 feet. Rake and screed smooth with strike board.
 - 2. Use screed rails to achieve a level setting bed conforming to elevations and slope shown on the drawings. After one panel is complete, advance screed rails to the next position in readiness for screeding adjacent panels with strike board. Fill depressions left from removed screed rails and smooth to height consistent with panel.
 - 3. Place an area in size that will remain at least 270°F during compaction.
 - 4. Compact the setting bed with a powered roller compactor to an even, nominal thickness of 3/4 inch after compaction.
 - 5. Re-heat, fill, and compact low areas with setting bed materials to conform to slope and elevation shown on the drawings.
 - 6. Re-heat, remove, level, and compact setting bed in high areas to conform to slope and elevation shown on the drawings.
 - 7. Irregularities or evenness in the grade of the concrete base surface may be corrected with setting bed materials only with approval of the Engineer.

E. Neoprene Modified Asphalt Adhesive.

1. Apply to cold asphalt setting bed with notched trowel with serrations not exceeding 1/16 inch. Do not apply pavers to adhesive until dry skin forms on surface of adhesive.

F. Concrete Pavers.

1. Free from dust, dirt, and stains. Do not use soiled, cracked, or broken units.
2. Place paving units firmly onto adhesive with joints not to exceed 1/8 inch or as recommended in manufacturer's literature. Maintain straight pattern lines, joint lines and coursing per the drawings.
3. Cut pavers to fit edges with a masonry saw. No cut paver shall be smaller than 1/3 of a whole unit if exposed to vehicular traffic. Firmly place all edge units on adhesive.

G. Joint Filler and Sealant.

1. Extend control and structural joints through full depth of paving units. Do not extend joints through bituminous bedding materials from joints in concrete base that control shrinkage cracking.
2. Install joints at all building facades or other vertical surfaces.
3. Install pre-molded joint filler as units are set in bituminous bed. Maintain top of filler 3/8 inch below exposed faces of paving units for insertion of sealant.
4. Install joint sealant per manufacturer's recommendations.

H. Joint Sand.

1. After the pavers, joint filler, and sealant are installed, spread dry joint sand and fill joints between the slabs.
2. Sweep surface clean.

3.04 FIELD QUALITY CONTROL.

- A. The final surface tolerance from grade elevations shall not deviate more than 3/8 inch under a 10 foot straight edge.
- B. Check final surface elevations for conformance to drawings.
- C. The surface elevation of pavers shall be 1/8 inch to 1/4 inch above adjacent drainage inlets, concrete collars or channels.
- D. Lippage: No greater than 1/8 inch difference in height between adjacent pavers.

3.05 JOINT SAND STABILIZATION.

- A. Apply joint sand stabilization materials between concrete pavers in accordance with the manufacturer's written recommendations.

3.06 PROTECTION.

- A. After work in this section is complete, the General Contractor shall be responsible for protecting work from damage due to subsequent construction activity on this site.