SECTION 32 1400

COMPOSITE DRIVEWAY PAVERS

Note: This guide specification for U.S. Applications describes construction of the Aspire Paver System on a bedding sand over a compacted aggregate base for vehicular applications. The text must be edited to suit specific project requirements. This Section includes the term "Architect." Edit this term as necessary to identify the design professional in the General Conditions of the Contract.

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Aspire Paver System (manually installed).
   2. Bedding and Joint Sand.
   3. Edge Restraints.

B. Related Sections:
   1. Section: [ ]-Curbs and Drains.
   2. Section: [ ]-Aggregate Base.
   3. Section: [ ]-Cement Treated Base.
   4. Section: [ ]-Asphalt Treated Base.
   5. Section: [ ]-Pavements, Asphalt and Concrete.
   6. Section: [ ]-Geotextiles.

Note: Pavements subject to vehicles should be designed in consultation with a qualified civil engineer, in accordance with established pavement design procedures.

2. REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile, Section 8 and 9, Freezing and Thawing.
   2. ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   3. ASTM C 140, Section 6 and 7, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
   4. ASTM C 1028 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces
   5. ASTM D 698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft^3 (600 kN-m/m^3).
   6. ASTM D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3).
   7. ASTM D 2940, Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.

B. Underwriters Laboratory (UL)
   1. UL 94, Section 7, Horizontal Flammability

1.03 SUBMITTALS

A. In accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Drawings and details: Indicate perimeter conditions, relationship to adjoining materials and assemblies, expansion and control joints, paver and grid layout, patterns, color arrangement, installation and setting details.

C. Sieve analysis per ASTM C 136 for grading of bedding and joint sand.

D. Aspire Paver System:
   1. A 16"x16" grid of pavers representing full-size samples of each paver size and color. Color(s) selected by [Architect] [Engineer] [Landscape Architect] [Owner] from manufacturer's available colors.

2. Accepted samples become the standard of acceptance for the work.
3. Aspire Pavers' certification of pavers meeting applicable ASTM standards.
4. Aspire Pavers' catalog product data, installation instructions, and safety data sheet (SDS) for the safe handling of the specified materials and products.

E. Paver Installation Subcontractor:
1. Verification of receiving installation training from Aspire Pavers.
2. Job references from projects of a similar size and complexity. Provide Owner/ Client/General Contractor names, postal address, phone, fax, and email address.

1.04 QUALITY ASSURANCE

A. Paver Subcontractor Qualifications:
1. Utilize an installer having successfully completed paver installation similar in design, material, and extent indicated on this project.
2. Utilize an installer who has received installation training from Aspire Pavers.

B. Regulatory Requirements and Approvals: [Specify applicable licensing, bonding or other requirements of regulatory agencies].

C. Mock-Ups:
1. Install a 4 ft x 4 ft (1.22 x 1.22 m) paver area.
2. Use this area to determine surcharge of the bedding sand layer, 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.

1.05 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirement Section.

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

C. 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 pavers to the site in plastic wrapped packaging capable of transfer by forklift.
3. Unload pavers at job site in such a manner that no damage occurs to the product.

D. Storage and Protection: Store materials protected such that they are kept free from mud, dirt, and other foreign materials.
1. Cover bedding sand and 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 sand or pavers during heavy rain or snowfall.
2. Do not install sand and pavers over frozen base materials.
3. Do not install frozen sand or saturated sand.
4. Do not install pavers on frozen or saturated sand.

1.07 MAINTENANCE

A. Extra Materials: Provide [Specify area] [Specify percentage.] additional material 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 COMPOSITE DRIVEWAY PAVER SYSTEM
A. Manufacturer: Aspire by Brava, 915 E. Tyler Street, Washington, IA 52303
1. Contact: (844) 290-4196, aspirepavers.com
B. Aspire Driveway Paver System:
1. Paver Type: Aspire Standard Pavers
a. Material Standard: Comply with material standards set forth by Aspire Pavers
b. Color: 13 colors available: Boardwalk, Olive, Redwood, and Waterwheel
c. Paver Thickness: 1.9" (48.26 mm), with Grid is 2.4" (60.96 mm)
d. Paver Sizes: 16" x 16" (406 mm x 406 mm), 8" x 8" (203 mm x 203 mm), 4" x 8" (60mm x 203 mm), 4" x 4" (102 mm) x 102 mm).
e. Grid Size: 16" x 16" (406 mm x 406 mm).
f. Assembly Size: 16" x 16" x 1.75" thick (406 mm x 406 mm x 44.45mm)..
g. Compressive Strength (ASTM C140-09 Section 7): Peak compressive strength > 3500 psi.
h. Flexural Modulus (ASTM C140-09): <3800 psi (SD: 380 psi).
i. Water Absorption (ASTM C67 Section 8): <5%
j. Freeze/Thaw Resistance (ASTM C67 – Section 9): Pass: no sign of cracking or deterioration.
k. Coefficient of Friction (ASTM C1028-07): 0.83 Dry, 0.47 Wet
l. Coefficient of Friction (ASTM D2394-Section 33): 0.52 Dry, 0.73 Wet.
m. Fire Classification (ASTM E108-007): Class A

2.02 PRODUCT SUBSTITUTIONS
A. Substitutions: No substitutions permitted.

2.03 BEDDING AND JOINT SAND
A. Provide bedding and joint sand as follows:
1. Washed, 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 for the bedding sand material that does not conform to the grading requirements of ASTM C 33.
3. Do not use mason sand or sand conforming to ASTM C 144 for the bedding sand.
4. Where composite pavers are subject to vehicular traffic, utilize sands that are as hard as practically available.

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5. Sieve according to ASTM C 136.
6. Bedding Sand Material Requirements: Conform to the grading requirements of ASTM C 33 with modifications as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand

ASTM C 33 Sieve Size	Percent Passing
3/8 in.(9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10
No. 200 (0.075 mm)	0 to 1

Note: Coarser sand than that specified in Table 2 below may be used for joint sand including C 33 material as shown in Table 1. Use material where the largest sieve size easily enters the smallest joints. For example, if the smallest paver joints are 2 mm wide, use sand 2 mm and smaller in particle size. If C 33 sand is used for joint sand, extra effort may be required in sweeping material and compacting the pavers in order to completely fill the joints.

7. Joint Sand Material Requirements: Conform to the grading requirements of ASTM C 144 as shown with modifications in Table 2 below:

Table 2
Grading Requirements for Joint Sand

ASTM C 144 Natural Sand Sieve Size	ASTM C 144 Manufactured Sand % Passing	% Passing
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 100
No. 50 (0.300 mm)	10 to 35	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075 mm)	0 to 1	0 to 10

Note: Specify specific components of a system, manufactured unit or type of equipment. See ICPI Tech Spec 3, Edge Restraints for Interlocking Concrete Pavements *for guidance on selection and design of edge restraints.*

2.04 EDGE RESTRAINTS

A. Provide edge restraints installed around the perimeter of all composite paving unit areas as follows:
   1. Manufacturer: [Specify manufacturer].
   2. Material: [Plastic] [Concrete] [Aluminum] [Steel] [Pre-cast concrete] [Cut stone] [Concrete].
   3. Material Standard: [Specify material standard].

2.05 ACCESSORIES

A. Provide accessory materials as follows:
   1. Geotextile Fabric:
      a. Material Type and Description: [Specify material type and description].
      b. Material Standard: [Specify material standard].
      c. Manufacturer: [Acceptable to interlocking concrete paver manufacturer] [Specify manufacturer].

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS
A. [Specify acceptable paver subcontractors].

3.02 EXCAVATION
A. Soil shall be excavated to the proper depth dependent on the depth of the gravel base, plus sand base and Aspire Pavers height.

3.03 GEOTEXTILE FABRIC LAYER
A. Geotextile material shall be installed prior to installing gravel.

3.04 GRAVEL BASE
A. Aspire recommends 6" to 10" of gravel compacted every 2" and is dependent on soil conditions and climate freeze/thaw depths.

Note: Local aggregate base materials typical to those used for highway flexible pavements are recommended, or those conforming to ASTM D 2940. Compaction of aggregate is recommended to not less than 98% Proctor density in accordance with ASTM D 698 for pedestrian area. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils Mechanical tampers are recommended for compaction of soil subgrade and aggregate base in areas not accessible to large compaction equipment. Such areas can include that around lamp standards, utility structures, building edges, curbs, tree wells and other protrusions.

Note: Prior to screeding the bedding sand, the recommended base surface tolerance should be ± 3/8 in. (±10 mm) over a 10 ft. (3 m) straight edge. See ICPI Tech Spec 2, Construction of Interlocking Concrete Pavements *for further guidance on construction practices.*

Note: The elevations and surface tolerance of the base determine the final surface elevations of pavers. The paver installation contractor cannot correct deficiencies in the base surface with additional bedding sand or by other means. Therefore, the surface elevations of the base should be checked and accepted by the General Contractor or designated party, with written certification to the paving subcontractor, prior to placing bedding sand and pavers.

B. 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 subgrade preparation, compacted density and elevations conform to specified requirements.
   b. Verify that geotextiles, if applicable, have been placed according to drawings and specifications.
   c. Verify that [Aggregate] [Cement-treated] [Asphalt-treated] [Concrete] [Asphalt] base materials, thickness, [compacted density], surface tolerances and elevations conform to specified requirements.
   d. Provide written density test results for soil subgrade, [aggregate] [cement-treated] [asphalt-treated] [asphalt] base materials to the Owner, General Contractor and paver installation subcontractor.
   e. Verify location, type, and elevations of edge restraints, [concrete collars around] utility structures, and drainage inlets.
2. Do not proceed with installation of bedding sand and composite concrete pavers until [subgrade soil and] base conditions are corrected by the General Contractor or designated subcontractor.

3.05 PREPARATION FOR BEDDING SAND

A. Verify base is dry, certified by General Contractor as meeting material, installation and grade specifications.

B. Verify that base [and geotextile] is ready to support sand, [edge restraints,] and, pavers and imposed loads.

C. Edge Restraint Preparation:

1. Install edge restraints per the drawings [and manufacturer's recommendations] [at the indicated elevations].

Note: Retain the following two subparagraphs if specifying edge restraints that are staked into the base with spikes.

2. Mount directly to finished base.
3. The minimum distance from the outside edge of the base to the spikes shall be equal to the thickness of the base.

3.06 BEDDING SAND, GRIDS AND PAVER INSTALLATION

A. Spread bedding sand evenly over the base course and screed to a nominal 3/4 in. (19 mm) thickness, not exceeding 1 in. (25 mm) thickness. Spread bedding sand evenly over the base course and screed rails, using the rails and/or edge restraints to produce a nominal 1 in. (25 mm) thickness, allowing for specified variation in the base surface.

1. Do not disturb screeded sand.
2. Screeded area shall not substantially exceed that which is covered by pavers in one day.
3. Do not use bedding sand to fill depressions in the base surface.

B. Lay grids over sand bed in a pattern that will allow pavers to overlap grids.

C. Lay pavers on grids in pattern(s) shown on drawings. Provide spacing between grids per the manufacturer's (Aspire Pavers) recommendation (Note: recommendation varies depending on installation temperature and edging / constraints). Place units hand tight without using hammers. Make horizontal adjustments to placement of paver/grid assemblies with rubber hammers as required.

D. Joint (bond) lines shall not deviate more than ±1/2 in. (±15 mm) over 50 ft. (15 m) from string lines.

E. Fill gaps at the edges of the paved area with cut pavers.

F. Cut pavers to be placed along the edge with a 10" miter saw using a 24 tooth, carbide tipped, coated wood blade.

Note. Specify requirements for edge treatment in paragraph below.

G. [Adjust bond pattern at pavement edges such that cutting of edge pavers is minimized. All cut pavers exposed to vehicular tires shall be no smaller than one-third of a whole paver] [Cut pavers at edges as indicated on the drawings].

H. Keep skid steer and forklift equipment off newly laid pavers that have not received initial compaction and joint sand.

I. Use a low-amplitude plate compactor capable of at least minimum of 4,000 lbf (18 kN) at a frequency of 75 to 100 Hz to vibrate the pavers into the sand. Remove any cracked or damaged pavers and replace with new units.

J. Simultaneously spread, sweep and compact dry joint sand into joints continuously until full. This will require at least 2 to 4 passes with a plate compactor. Do not compact within 6 ft (2 m) of unrestrained edges of paving units. Do not over compact.

K. All work within 6 ft. (2 m) of the laying face must be left fully compacted with sand- filled joints at the end of each day or compacted upon acceptance of the work. Cover the laying face or any incomplete areas with plastic sheets overnight if not closed with cut and compacted pavers with joint sand to prevent exposed bedding sand from becoming saturated from rainfall.

L. Remove excess sand from surface when installation is complete.

Note: Excess joint sand can remain on surface of pavers to aid in protecting their surface especially when additional construction occurs after their installation. If this is the case, delete the article above and use the article below. Designate person responsible for directing timing of removal of excess joint sand.

M. Allow excess joint sand to remain on surface to protect pavers from damage from other trades. Remove excess sand when directed by [Architect].
N. Surface shall be broom clean after removal of excess joint sand.

3.07 FIELD QUALITY CONTROL

Note: Surface tolerances on flat slopes should be measured with a rigid straightedge. Tolerances on complex contoured slopes should be measured with a flexible straightedge capable of conforming to the complex curves on the pavement surface.

A. The final surface tolerance from grade elevations shall not deviate more than ± 3/8 in. (±10 mm) under a 10 ft (3 m) straightedge.
B. Check final surface elevations for conformance to drawings.

Note: For installations on a compacted aggregate base and soil subgrade, the top surface of the pavers may be 1/8 to 1/4 in. (3 to 6 mm) above the final elevations after compaction. This helps compensate for possible minor settling normal to pavements.

C. The surface elevation of pavers shall be 1/8 in. to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.
D. Lippage: No greater than 1/8 in. (3 mm) difference in height between adjacent pavers.

Note: Joint sand stabilization may be required for some applications. Delete article below if joint sand stabilizers are not applied.

3.08 JOINT SAND STABILIZATION
A. Apply joint sand stabilization materials between composite pavers in accordance with the manufacturer's written recommendations.

3.09 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 the site.

END OF SECTION