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SLABS ON AN AGGREGATE SETTING BED FOR ROOFS

SECTION 32 14 13.16

Note: This guide specification for Canada is for paving slabs used as ballast and/or paving on pedestrian plaza roof deck applications with a free draining aggregate setting bed and joints. Slabs installed with this method are not recommended for vehicular traffic. Slabs larger than 300 x 300 mm are typically placed on pedestals. See detail drawing ICPI-63.

*This Section includes the term "Architect." Edit this term as necessary to identify the design professional in the General Conditions of the Contract. **The text must be edited by a qualified, licensed design professional to suit specific project requirements.** ICPI makes no representations or warranties of any kind, expressed or implied, and disclaims any liability for damages resulting in the use of this guide construction specification.*

PART 1 GENERAL

1.01 SUMMARY

- A. **Section Includes:**
 - 1. Paving slabs.
 - 2. Bedding material.
 - 3. [Drainage mat].
 - 4. [Cleaning and Sealing].
- B. **Related Work.**
 - 1. Section [] - Membrane roofing.
 - 2. Section [] - Roof drains.
 - 3. Section [] - Roof accessories.
 - 4. Section [] - Roof and Deck Insulation.
 - 5. Section [] - Sheet Metal Flashing and Trim.

Note: Pavements should be designed in consultation with a qualified civil engineer, in accordance with established pavement design procedures and in accordance with the ICPI Tech Spec technical bulletins. Use the current year reference.

1.02 REFERENCES

- A. **Canadian Standards Association (CSA)**

Revised April 3, 2020

1. A231.1 Precast Concrete Paving Slabs.
 2. A23.2A Sieve Analysis of Fine and Coarse Aggregates.
- B. American Society for Testing and Materials (ASTM).**
1. C979 Standard Specification for Pigments for Integrally Coloured Concrete.
 2. D448 Standard Classification of Sizes of Aggregate for Road and Bridge Construction.
- C. Interlocking Concrete Pavement Institute (ICPI) Technical Bulletins**
1. Tech Spec 5 Cleaning, Sealing and Joint Sand Stabilization of Interlocking Concrete Pavement.
 2. Tech Spec 14 Segmental Concrete Paving Units for Roof Decks.

1.03 SUBMITTALS

- A. Shop drawings: Indicate perimeter conditions, relationship to adjoining materials and assemblies, expansion and control joints, paving slab [layout,] [patterns,] [colour, arrangement,] installation [and setting] details.**
- B. Sieve analysis per CSA A23.2A for the bedding materials.**
- C. [Drainage mat sample.]**
- D. Paving slabs**
1. [Four] representative full-size samples of each slab type, thickness, colour, finish. Select samples to indicate the extremes of colour and texture expected in the finished installation.
 2. Accepted samples become the standard of acceptance for the work of this Section.
 3. Laboratory test reports certifying compliance of the paving slabs with CSA A231.1.
 4. Manufacturer's catalog literature and material safety data sheets for the safe handling of the specified materials and products.
 5. Current certificates from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program for job foremen on the project.

1.04 QUALITY ASSURANCE

- A. Paving Subcontractor Qualifications:**
1. Utilize an installer having successfully completed concrete paving slab installations 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. Regulatory Requirements and Approvals: [Specify applicable licensing, bonding or other requirements of regulatory agencies.].**
- C. Mock-Ups:**
1. Install a 2 x 2 m paving slab area.
 2. Use this area to determine surcharge of the bedding layer, joint sizes, lines, laying pattern(s), colour(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 & 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 concrete paving slabs to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by forklift or clamp lift.
 - 3. Unload slabs 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. [Store concrete paving slab cleaners and sealers per manufacturer's instructions.]**
 - 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 aggregate bedding materials or slabs during heavy rain or snowfall.
 - 2. Do not install frozen aggregate.
 - 3. Do not install concrete slabs on frozen or saturated aggregate bedding materials.

1.07 MAINTENANCE

- A. **Extra Materials: Provide [Specify area] [Specify percentage.] additional material for use by owner for maintenance and repair.**
- B. **Slabs shall be from the same production run as installed materials.**

PART 2 PRODUCTS

2.01 CONCRETE PAVING SLABS

- A. **Manufacturer: [Specify ICPI member manufacturer name.].**
 - 1. Contact: [Specify ICPI member manufacturer contact information.].
- B. **Concrete paving slabs:**
 - 1. Slab type: [Specify name of product group, family, series, etc.].
 - a. Material Standard: Comply with CSA A231.1: 5 MPa minimum average flexural strength. Freeze-thaw test requirements shall be waived for applications not exposed to freezing conditions.
 - b. Colour [and finish]: [Specify colour.] [Specify finish].
 - c. Size: [Specify mm] x [Specify mm] x [Specify mm] thick.

2.02 PRODUCT SUBSTITUTIONS

- A. **Substitutions: No substitutions permitted.**

2.03 BEDDING MATERIAL

- A. **Bedding material**
 - a. Washed, clean, non-plastic, washed and free from deleterious or foreign matter, manufactured from crushed rock. Do not use gravel.
 - b. Conforming to the grading requirements for ASTM No. 89 per ASTM D448 and as noted in Table 1 below. Sieve according to CSA A23.2A.

Table 1

ASTM No. 89 Grading Requirements for Bedding Material

Sieve Size	Percent Passing
12.5 mm	100
9.5 mm	90 to 100
4.75 mm	20 to 55
2.36 mm	5 to 30
1.18 mm	0 to 10
0.300 mm	0 to 5
0.075 mm	0 to 1

2.03 GEOTEXTILE

- A. ☐ or approved substitute.

Note: Drainage mat is optional. Edit as required.

2.04 DRAINAGE MAT

- A. ☐ or approved substitute.

PART 3 EXECUTION

Note: The elevations and surface tolerance of the roof deck determine the final surface elevations of concrete slabs. The paving slab installation contractor cannot correct deficiencies in elevations of the base surface with additional bedding 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 materials.

3.01 EXAMINATION**A. Acceptance of Site Verification of Conditions:**

1. General Contractor shall inspect, accept and certify in writing to the slab installation subcontractor that roof conditions meet specifications for the following items prior to installation of concrete paving slabs.
 - a. Verify that geotextiles, if applicable, have been placed according to drawings and specifications.
 - b. Verify that roof deck materials, thickness, surface tolerances and elevations conform to specified requirements.
 - c. Provide written test results for roof deck materials to the Owner, General Contractor and paving slab installation subcontractor.
 - d. Verify location, type, and elevations of edge restraints, drains, drain holes, and inlets.
2. Do not proceed with installation of bedding materials until roof conditions are corrected by the General Contractor or designated subcontractor.

3.02 PREPARATION

- A. Verify that all surfaces, membrane(s), protection board, insulation, drains, are free from dirt, oil, grease or any deleterious substances and debris which may prevent installation, drainage, and stability of the paving slab installation.
- B. Verify that roof has a minimum of 2% slope to drains.
- C. Do not begin paving work until such conditions have been corrected [to the Architect's satisfaction] and are ready to receive geotextile, [drainage mat,] bedding materials and paving slabs.

3.03 INSTALLATION

Note: Include A below if using drainage mat. Edit as required.

- [A. Spread, join, and trim drainage mat according to manufacturer's recommendations.]**
- B. Spread geotextile and turn up at sides of installation against parapets and protrusions in the roof. Overlap geotextile [30 cm] [as indicated on the drawings].**

Note: No. 89 bedding layer can be as thick as 75 mm to accommodate slopes in roof decks.

- C. Spread and screed bedding material to 25 mm thick. Do not disturb.**
- D. Install paving slabs on the bedding material in the locations, [layout and pattern] indicated on the drawings. Maintain consistent joint widths of [10 mm].**
- E. Fit slabs tightly against parapets, walls, and protrusions in the roof. Cut paving slabs with a masonry saw to fit in these areas. Cut slabs without damage to exposed faces and edges. Cut units should be no smaller than [1/3] of a whole slab.**
- F. Fill joints with No. 89 stone and remove all excess stone from slab surfaces.**
- G. Compact the paving slabs with a vibratory plate compactor with no greater than 22kN force operating at 75 to 90 Hz with non-metallic rollers attached to bottom. Make a minimum of two passes in perpendicular directions.**
- H. Refill joints with stone as required. Remove all excess stones from the surface.**

3.04 FIELD QUALITY CONTROL

- A. Check final surface elevations for conformance to drawings.**
- B. Lippage: Maximum 3 mm height variation between adjacent paving slabs.**

Note: Cleaning and sealing may be required for some applications. See ICPI Tech Spec 5, Cleaning, Sealing and Joint Sand Stabilization of Interlocking Concrete Pavement for guidance on when to clean and seal the slab surfaces. Delete article below if cleaners and sealers are not applied.

3.05 [CLEANING] [SEALING]

- A. [Clean] [Seal] concrete paving slabs in accordance with the manufacturer's written recommendations.**

3.05 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

ABOUT CMHA

The Concrete Masonry & Hardscapes Association (CMHA) represents a unification of the Interlocking Concrete Pavement Institute (ICPI) and National Concrete Masonry Association (NCMA). CMHA is a trade association representing US and Canadian producers and suppliers in the concrete masonry and hardscape industry, as well as contractors of interlocking concrete pavement and segmental retaining walls. CMHA is the authority for segmental concrete products and systems, which are the best value and preferred choice for resilient pavement, structures, and living spaces. CMHA is dedicated to the advancement of these building systems through research, promotion, education, and the development of manufacturing guides, design codes and resources, testing standards, and construction practices.

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