Provided By:

GRID PAVERS
SECTION 32 14 13.19

Note: This guide specification for Canadian applications is for concrete grid units placed on a sand bedding course over a compacted, dense-graded aggregate base. The text allows an option of topsoil and grass in the grid openings or ASTM No. 8 stone. This specification is for limited vehicular applications such as access roads and emergency fire lanes, as well as intermittently used overflow parking areas. 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.***

If the area is exposed to recurring vehicular traffic and additional stormwater storage in the base is desired, consider using permeable interlocking concrete pavements as they provide additional structural support to vehicles while providing runoff storage in an open-graded, crushed stone base. In such cases, the specifier should refer to the ICPI manual, Permeable Interlocking Concrete Pavements.

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Concrete grid units.
2. Bedding sand.
3. Edge restraints.
4. Geotextiles.
5. [Topsoil and grass for the grid openings.]
6. [Open-graded aggregate for the grid openings.]
7. [Open-graded aggregate bedding course].

B. Related Sections:

1. Section [_____]: Curbs and drains.
2. Section [_____]: Dense-graded aggregate base.

1.02 REFERENCES

A. American Society of Testing Materials (ASTM)

1. C140 Standard Test Methods of Sampling and Testing Concrete Masonry Units.

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2. C979 Standard Specification for Pigments for Integrally Colored Concrete.
3. C1319 Standard Specification for Concrete Grid Paving Units.
4. D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft^3 (600 kN-m/m^3)).
5. D2940 Standard Specification for Graded Aggregate Material for Bases or Subbases for Highways or Airports.
6. D5268 Specification for Topsoil Used for Landscaping Purposes.

B. Canadian Standards Association (CSA)

1. A23.2A Sieve Analysis of Fine and Coarse Aggregates.

C. Interlocking Concrete Pavement Institute (ICPI) Technical Bulletins

1. Tech Spec 8 Concrete Grid Pavements

1.03 SUBMITTALS

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

B. Manufacturer's drawings and details: Indicate perimeter conditions, relationship to adjoining materials and assemblies, expansion and control joints, paving slab [layout,] [patterns,] [colour arrangement,] installation [and setting] details.

C. Sieve analysis per A23.2A for grading of bedding and base materials.

Note: Include D below if the grid openings will be filled with topsoil and grass seed, or sod plugs.

D. Source and content of topsoil and grass seed [sod].

E. Concrete grid units:

1. Colour selected by Architect.
2. [Four] representative full-size samples of each grid type, thickness, colour, finish that indicate the extremes of colour variation and texture expected in the finished installation.
3. Accepted samples become the standard of acceptance for the work.
4. Test results from an independent testing laboratory for compliance of grid paving unit requirements to ASTM C1319.
5. Manufacturer's catalog literature, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.

F. 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. Engage an experienced installer who has successfully completed grid pavement installations similar in design, material, and extent indicated for this Project.
2. Hold a current certification from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification program.

B. Single-source Responsibility: Obtain each colour, type, and variety of grids, joint materials and setting materials from single sources with resources to provide products and materials of consistent quality, appearance and physical properties without delaying progress of the Work.

C. Regulatory requirements and approvals: [Specify applicable licensing, bonding or other requirements of regulatory agencies.]

D. Mock-up

1. Locate where directed by the Architect.
2. Notify Architect in advance of dates when mock-ups will be erected.
3. Install minimum [10] m^2 of concrete grid units.
4. Use this area to determine the quality of workmanship in to be produced in the final unit of Work including surcharge of the bedding sand layer, joint sizes, lines, pavement layingpattern(s), colour(s), and texture.
5. This area shall be used as the standard by which the work is judged.
6. Subject to acceptance by the owner, mock-up may be retained as part of the finished work.
7. If mock-up is not retained, remove and properly dispose of.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirement Section

B. Deliver concrete grid units to the site in steel banded, plastic banded, or plastic wrapped packaging capable of transfer by forklift or clamp lift. Unload grids at job site in such a manner that no damage occurs to the product or existing construction.

C. Cover sand with waterproof covering to prevent exposure to rainfall or removal by wind. Secure the covering in place.

D. Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.

1.06 ENVIRONMENTAL CONDITIONS

A. Do not install bedding materials or grid units during heavy rain or snowfall.

B. Do not install bedding materials and grid units over frozen base materials.

C. Do not install frozen bedding materials.

1.07 GRID MAINTENANCE MATERIALS

A. Supply [ ] m^2 of [each type and colour of grid unit] in unopened pallets with contents labeled. Store where directed.

B. From the same production run as installed materials.

PART 2 PRODUCTS

2.01 CONCRETE GRID UNITS

A. Manufacturer: [Specify ICPI member manufacturer name.].
1. Contact: [Specify ICPI member manufacturer contact information.].

B. Grid unit type: [Specify name of product group, castellated, lattice, etc.]
1. Material standard: Comply with material standards set forth in ASTM C1319.
2. Size: [Specify] mm x [Specify] mm x [Specify] mm thick.
3. Colour [and finish]: [Specify colour.] [Specify finish].
4. Colour Pigment Material Standard: Comply with ASTM C979.

2.03 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

2.03 BEDDING MATERIALS

Note: If openings are filled with topsoil or No. 8 stone, use sand bedding. Edit 2.04 accordingly.

A. Sieved per A23.2A.

B. Bedding Sand

Note: The type of sand used for bedding is often called concrete sand. Sands vary regionally. Contact contractors local to the project and confirm sand(s) successfully used in previous similar applications

1. Washed, clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter, frozen lumps, and other deleterious substances.
2. Conforming to the grading requirements in Table 1 below.
3. Do not use limestone screenings.

Table 1

CSA A23.1-FA1 Gradation

Sieve Size	Percent Passing
10 mm	100
5 mm	95 to 100
2.5 mm	80 to 100
1.25 mm	50 to 90
0.630 mm	25 to 65
0.315 mm	10 to 35
0.160 mm	2 to 10
0.075 mm	2 to 10

2.04 FILL MATERIALS FOR GRID OPENINGS

A. Topsoil: Conform to ASTM D5268.

Note: Consult with local turf grass specialists for recommendations on grass seed mixture or sod materials.

B. Grass seed [Sod]: [mixture and source].

-OR-

[A. ASTM No. 8 stone]

2.05 EDGE RESTRAINTS

A. Provide edge restraints installed around the perimeter of all concrete grid paving unit areas as follows:

1. Manufacturer: [Specify manufacturer].
2. Material: [Plastic] [Concrete] [Aluminum] [Steel] [Precast concrete] [Cut stone].
3. Material standard: [Specify material standard].

2.06 ACCESSORIES

A. Provide accessory materials as follows:

1. Geotextile:
   a. Material Type and Description: [Specify material type and description].
   b. Material Standard: [Specify material standard.].
   c. Manufacturer: [Acceptable to concrete grid unit manufacturer] [Specify manufacturer.].

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. [Specify acceptable paving subcontractors.].

3.02 EXAMINATION

Note: Compaction of the soil subgrade is recommended to a minimum of 95% standard Proctor density per ASTM D698 for pedestrian and lightly trafficked vehicular areas. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils.

Note: Local aggregate base materials typical to those used for highway flexible pavements are recommended, or those conforming to ASTM D2940. Compaction of aggregate is recommended to not less than 95% Proctor density in accordance with ASTM D698 is recommended for pedestrian and vehicular areas. 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. The recommended base surface tolerance should be ±10 mm over a 3 m straight edge after compaction.

Note: The elevations and surface tolerance of the aggregate base determine the final surface elevations of concrete grids. The installation contractor cannot correct deficiencies in the base surface with additional bedding materials. 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 and concrete grids.

A. Acceptance of site verification conditions:

1. Contractor shall inspect, accept and verify in writing to the grid installation subcontractor that site conditions meet specifications for the following items prior to installation of bedding materials and concrete grid units:
    a. Verify that drainage and subgrade preparation, compacted density and elevations conform to specified requirements.
    b. Verify that geotextiles, if applicable, have been placed according to drawing and specifications.
    c. Verify that base materials, thickness, [compacted density,] surface tolerances and elevations conform to specified requirements.
    d. Provide written density test results for the soil subgrade, base materials to the Owner, Contractor, and grid installation subcontractor.
2. Do not proceed with installation of bedding materials and concrete grids until [subgrade soil and] base conditions are corrected by the Contractor or designated subcontractor.

3.03 PREPARATION

A. Verify that base is dry, certified by Contractor as meeting material, installation and grade specifications [and geotextile] are ready to support sand, [edge restraints,] grids and imposed loads.

B. Edge Restraint Preparation:

1. Install edge restraints per the drawings [and manufacturer's recommendations] [at the indicated elevations.].
2. Mount directly to finished base. Do not install on bedding sand.
3. The length between the outside edge of the mounted restraint and the end the base shall be no less than the base thickness.

3.04 INSTALLATION

A. Spread the sand [No. 8 stone] evenly over the compacted, dense-graded base course and screed uniformly to 13 to 25 mm. Place sufficient sand [stone] to stay ahead of the laid grids.

B. Ensure the grid units are free from foreign materials before installation.

C. Lay the grid units on the bedding sand in the pattern(s) shown on the drawings. Maintain straight joint lines.

D. Joints between the grids shall be consistent, between 3 and 6 mm.

E. Fill gaps at the edges of the paved area with cut grids or edge units.

F. Cut grids to be placed along the edge with a double-bladed splitter or masonry saw.

G. **Sweep [topsoil] [No. 8 aggregate] into the openings and joints until full.**

H. **Sweep the grid surface clean prior to compacting.**

I. **Compact and seat the grids into the screeded bedding sand using a low-amplitude, 75-90 Hz plate compactor capable of at least 22 kN centrifugal compaction force. Use rollers, a rubber or neoprene pad between the compactor and grids to prevent cracking or chipping. Do not compact within 2 m of the unrestrained edges of the grid units.**

J. **All work more than 2 m of the laying face must be left fully compacted at the completion of each day.**

K. **[Broadcast grass seed at the rate recommended by seed source.] [Place sod plugs into openings.] [Add topsoil to the surface to cover the seeds.]**

L. **Remove excess [topsoil] [No. 8 aggregate] on the grid surface when the job is complete.**

Note: Depending on season and climate, consider repeated watering until grass is fully grown.

M. **[Distribute straw covering to protect germinating grass seed [sod]. Water entire area. Do not traffic pavement for [30] days.] if seeded.**

3.05 FIELD QUALITY CONTROL

A. **After removal of excess topsoil/aggregate, check final elevations for conformance to the drawings. Allow 3 to 6 mm above specified surface elevations to compensate for minor settlement.**

B. **The final surface tolerance from grade elevations shall not deviate more than 10 mm over a 3 m straightedge.**

C. **The surface elevation of grid units shall be 3 to 6 mm above adjacent drainage inlets, concrete collars or channels.**

D. **Lippage: No greater than 3 mm difference in height between adjacent grid units.**

3.06 PROTECTION

A. **After work in the section is complete, the 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.