Concrete-based pavers with recycled glass or recycled porcelain may qualify for LEED credits that may contribute toward your project certification.

THE PRODUCTS OFFERED IN THIS CATALOG ARE MANUFACTURED IN WAUSAU, WISCONSIN, BY:

Wausau Tile Inc.
PO Box 1520
Wausau, Wisconsin 54402-1520

WAUSAUTILE.COM | TECTURADESIGNS.COM

Concrete-based pavers with recycled glass or recycled porcelain may qualify for LEED credits that may contribute toward your project certification.
WE ARE TECTURA DESIGNS.

At Tectura Designs, we help the world’s leading architects and designers bring their big visions to life. Our cutting-edge products – showcased around the globe, from Mount Rushmore to Times Square – have been made in America for more than six decades. That time-honored work established a reputation for quality and innovation that lives on today in everything we do. Each product is made by skilled craftsmen at our facilities in the heart of the Midwest with the same impeccable attention to detail our founder displayed since 1953.

Our elegant and durable pavers, custom precast concrete, site furnishings, custom precast terrazzo, and terrazzo tile create unforgettable and inviting spaces. Whether you seek bold, contemporary design or timeless beauty, our team of skilled designers and craftsmen will turn your vision into a lasting work of art.

CONTENTS

Paver Product Data ...................................... 02
Ashlar Patterns ........................................ 03
Paver Dimensions ...................................... 04
ADA Paver Sizes ........................................ 05
Lok-Down Paver Sizes ................................ 13
Paver Sizes ............................................. 20
Typical Architectural Details ....................... 68
Terra-Stand Pedestal System ....................... 77
Lok-Down Instructions .............................. 79
Wall Termination Methods ......................... 82
Wall of Wind Test Results ......................... 83
SRI Test Summary .................................... 97
Lok-Down Pedestal Installation Guide .......... 99
Open Joint Pedestal Installation Guide .......... 105
Mortar Set Installation Guide .................... 110
Sand Set Installation Guide ....................... 114
Bituminous Installation Guide ................... 119
Thin-Set Installation Guide ....................... 124
Care and Maintenance ............................ 128
Wausau Tile Limited Warranty .................. 130
All Tectura Designs pavers are subject to rigorous testing and manufactured to uphold the industry’s tightest performance tolerances. Available in countless sizes and thicknesses – and with the ability to manufacture any size desired – Tectura Designs’ high-quality concrete pavers bring big visions to life with beauty that’s built to last.

### SIZE AND WEIGHTS

Standard available sizes square pavers (nominal):
- 12", 16", 18", 24", 30", 36", and 42"

Standard available sizes rectangular pavers (nominal):
- Thickness: 2", 2 ¼", 2 ½", 2 ¾", 3", and 4"
- Weight: 24 to 48 lbs./sq. ft.

ADA Pavers: 12”x12” and 24”x24”.

Dimensional tolerance: +/- ¼” (Length, width, height, convex, concave).

Custom sizes and thickness, available upon request.

### TESTING

<table>
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<tr>
<th>PROPERTY</th>
<th>STANDARD TESTING VALUE</th>
<th>ADVANCED TESTING VALUE</th>
<th>TEST METHOD</th>
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<td>Compressive Strength</td>
<td>&gt; 8,000 PSI avg. with no individual unit less than 7,000 PSI</td>
<td>&gt; 9,500 PSI avg. with no individual unit less than 8,500 PSI</td>
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<td>&lt; 0.1% loss of dry weight (50 cycles)</td>
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<td>Center Load</td>
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<td>2,000 lbs.</td>
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Tectura Designs’ Ashlar Patterns give paving projects an intricate, one-of-a-kind look, and are available for all paver colors and finishes.

**MOD-1**
12”, 18”, 24” sq., 6” x 18”, 6” x 24” and 12” x 24”

**MOD-2**
6”, 12”, 18”, 24” sq. and 6” x 12”

**MOD-3**
6”, 9”, 12”, 18” sq., 6” x 12”, 9” x 18” and 12” x 18”

**MOD-4**
6”, 12”, 18”, 24” sq., 6” x 12” and 12” x 24” inches

**MOD-5**
6”, 12”, 18”, 24”, 30”, 36” sq. and 6” x 12”
### Paver Dimensions

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### ADA Paver

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### LOK-DOWN Paver

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ADA PAVER SIZES

Unless otherwise specified, dimensions are in inches.

Tolerance:
Fractions ± ¼” | Angle ±0.5° | Dim: 2-Pl ±0.01 | 3-Pl ±0.005

- 12” x 12” x 2” ADA - 1 PAVER
- 12” x 12” x 2” ADA - 2 PAVER
- 12” x 12” x 2” ADA - 3 PAVER
- 12” x 12” x 2” DIRECTIONAL BAR
- 24” x 24” x 2” ADA - 1 PAVER
- 24” x 24” x 2” ADA - 2 PAVER
- 24” x 24” x 2” ADA - 3 PAVER
12" x 12" x 2", ADA - 1 PAVER

12" x 12" x 2", ADA - 1 PAVER

WAUSAU TILE, INC.

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DIM: 2-PL ±0.01   3-PL ±.005

NAME      DATE            NOTES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°

R1/4"
3/16" X 45.0°

3/16"
2"
12" x 12" x 2", ADA - 2 PAVER
12" x 12" x 2", ADA - 3 PAVER
12" x 12" x 2", DIRECTIONAL BAR
24" x 24" x 2", ADA - 1 PAVER
24" x 24" x 2", ADA - 2 PAVER
24" x 24" x 2", ADA - 3 PAVER
LOK-DOWN PAVER SIZES

Unless otherwise specified dimensions are in inches.

Tolerance:
Fractions ± 1/16” | Angle ±0.5° | Dim: 2-Pl ±0.01 | 3-Pl ±0.005

- 24" x 24" x 2" LOK-DOWN
- 24" x 36" x 2" FALSE SCORE
- 24" x 36" x 2" LOK-DOWN
- 24" x 48" x 2 ½" LOK-DOWN RUNNING BOND
- 24" x 48" x 2 ½" LOK-DOWN
- 30" x 30" x 2 ¼" LOK-DOWN
24" x 24" x 2", LOK-DOWN

LOK-DOWN PAVER SIZES CONTINUED
24" x 36" x 2", FALSE SCORE
24" x 36" x 2", LOK-DOWN
24" x 48" x 2½", LOK-DOWN RUNNING BOND
24" x 48" x 2½", LOK-DOWN

LOK-DOWN PAVER SIZES CONTINUED
30" x 30" x 2¼", LOK-DOWN

- CHAMFER
- R1½" TYP [50.8mm]
- 3/16" CHAMFER TYP
- 2× 3/4" [19.05mm]

- 1 3/16" [27mm]  R1/16" TYP
- 1 1/16" [27mm]

- 2" [50.8mm]
- 2" [50.8mm]
- Ø 7/8" [22.2mm]
- Ø 1 7/16" [36.5mm]
PAVER SIZES

Unless otherwise specified dimensions are in inches
Tolerance: Fractions ± ¼” | Angle ±0.5° | Dim: 2-PI ±0.01 | 3-PI ±0.005
Material: Cement

- 3" x 12" x 2" PAVER
- 3" x 18" x 2 ¼" PAVER
- 3" x 24" x 2 ¾" PAVER
- 4" x 8" x 3" PAVER
- 4" x 12" x 2" PAVER
- 4" x 16" x 2 ¾" PAVER
- 4" x 18" x 2" PAVER
- 4" x 24" x 2 ½" PAVER
- 6" x 6" x 2 ¼" PAVER
- 6" x 12" x 2" PAVER
- 6" x 16" x 2" PAVER
- 6" x 18" x 2 ¾" PAVER
- 6" x 24" x 2" PAVER
- 6" x 30" x 2 ¾" PAVER
- 6" x 36" x 2 ¾" PAVER
- 8" HEX x 2" PAVER
- 8" x 12" x 2" PAVER
- 8" x 24" x 2" PAVER
- 8" x 30" x 2 ¼" PAVER
- 8" x 30" x 2 ¾" PAVER
- 8" x 36" x 2 ¾" PAVER
- 9" x 12" x 3" PAVER
- 9" x 18" x 2 ¾" PAVER
- 10" x 12" x 2" PAVER
- 12" x 12" x 2" PAVER
- 12" x 12" x 3" PAVER
- 12" x 18" x 2 ¼" PAVER
- 12" x 24" x 2" PAVER
- 12" x 30" x 2 ¼" PAVER
- 12" x 30" x 2 ¾" PAVER
- 12" x 36" x 2 ¾" PAVER
- 12" x 48" x 2 ¾" PAVER
- 15" x 30" x 2" PAVER
- 16" x 16" x 2" PAVER
- 16" x 24" x 2 ¾" PAVER
- 18" x 18" x 2" PAVER
- 18" x 24" x 2 ¼" PAVER
- 18" x 36" x 2 ½" PAVER
- 18" x 36" x 2 ¾" PAVER
- 20" x 24" x 2 ¾" PAVER
- 24" x 24" x 2" PAVER
- 24" x 24" x 2 ¼" PAVER
- 24" x 36" x 2" PAVER
- 24" x 36" x 2 ¾" PAVER
- 24" x 36" x 2 ½" PAVER
- 24" x 36" x 2 ¾" PAVER
- 24" x 48" x 2 ½" PAVER
- 30" x 30" x 2 ¼" PAVER
- 36" x 36" x 2 ½" PAVER
- 36" x 36" x 2 ¾" PAVER
- 42" x 42" x 4" PAVER
3" x 18" x 2 ¼", PAVER

3/16" CHAMFER, TYP

DIMENSIONS: 17 13/16" x 2 13/16" x 2 ¼"

TOLERANCE: FRACTIONS ± 1/8"  ANGLE ±0.5°

DIM: 2-PL ±0.01   3-PL ±.005

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4" x 8" x 3", PAVER

3/16" CHAMFER, TYP

TOP VIEW

LEFT VIEW

FRONT VIEW

7 13/16"

3 13/16"

3"
4" x 12" x 2", PAVER

Dimensions: 4" x 12" x 2"

TOLERANCE:
- Fractions ± 1/8"
- Angle ± 0.5°
- DIM: 2-PL ± 0.01, 3-PL ± 0.005

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4" x 16" x 2 3/4", PAVER

PAVER SIZES CONTINUED
4" x 24" x 2 1/2", PAVER
6" x 6" x 2 ¼", PAVER

3/16" CHAMFER, TYP

TOP VIEW

LEFT VIEW

FRONT VIEW

DIMENSIONS ARE IN INCHES

TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°

DIM: 2-PL ±0.01   3-PL ±.005

REVISIONS
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6" x 12" x 2", PAVER

PAVER SIZES CONTINUED
6" x 16" x 2", PAVER

3/16" CHAMFER, TYP

TOP VIEW

LEFT VIEW

FRONT VIEW
6" x 18" x 2 ¾", PAVER
6" x 24" x 2", PAVER
6" x 30" x 2 3/4", PAVER

PAVER SIZES CONTINUED
6" x 36" x 2 3/4", PAVER

TOP VIEW

LEFT VIEW

FRONT VIEW

3/16" CHAMFER, TYP

2 3/4"

TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°
DIM: 2-PL ±0.01   3-PL ±.005

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TOLERANCE:
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ANGLE ±0.5°

C3/16" CHAMFER TYP [4.8 mm]

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DRAWN BY: RJK
DIM: 2-PL ±0.01   3-PL ±.005

REVISIONS
NAME      DATE            NOTES

PAPER SIZES CONTINUED
8" x 12" x 2", PAVER

TOP VIEW

FRONT VIEW

LEFT VIEW

3/16" CHAMFER, TYP

DIMENSIONS ARE IN INCHES
TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°
DIM: 2-PL ±0.01   3-PL ± .005

MATERIAL:
CO NUMBER:
WEIGHT:

NAME      DATE            NOTES

DRAWN BY: WSF
8” x 24” x 2”, PAVER

DIMENSIONS ARE IN INCHES

TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°

DIM: 2-PL ±0.01   3-PL ±.005

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8" x 30" x 2 ¼", PAVER
8" x 30" x 2 3/4", PAVER

3/16" CHAMFER, TYP

DIMENSIONS ARE IN INCHES
TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°
DIM: 2-PL ±0.01   3-PL ±.005

MATERIAL:
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NUMBER:
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8" x 36" x 2 3/4", PAVER
9" x 12" x 3", PAVER

PAVER SIZES CONTINUED
9" x 18" x 2 ¾", PAVER

TOP VIEW

LEFT VIEW

FRONT VIEW

MATERIAL:

CO NUMBER:

WEIGHT:

DIMENSIONS ARE IN INCHES

DIM: 2-PL ±0.01   3-PL ±.005

TOLERANCE:

FRACTIONS ± 1/8"  ANGLE ±0.5°

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12" x 12" x 2", PAVER

PAVER SIZES CONTINUED
12" x 12" x 3", PAVER

3/16" CHAMFER, TYP

LEFT VIEW

1. TOP VIEW

2. FRONT VIEW

3. LEFT VIEW
12" x 18" x 2 ¼", PAVER

PAVER SIZES CONTINUED
12" x 24" x 2", PAVER

2" [50.8mm]  
11 13/16" [300mm]  
23 13/16" [604.8mm]  

C3/16" CHAMFER TYP [4.8mm]
12" x 30" x 2 ¼", PAVER

3/16" CHAMFER, TYP

2 1/4"  

3 TOP VIEW

29 13/16"

11 13/16"

2 FRONT VIEW

1 LEFT VIEW

DIMENSIONS ARE IN INCHES

TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°
DIM: 2-PL ±0.01   3-PL ±.005

NAME      DATE            NOTES

MATERIAL:

CO NUMBER:

WEIGHT:

NUMBER:

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EXTERNAL DIMENSIONS FLUSH ON ALL SIDES

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PAVER SIZES CONTINUED
12" x 30" x 2 3/4", PAVER
12" x 36" x 2 3/4", PAVER

PAVER SIZES CONTINUED
12" x 48" x 2 ⅞", PAVER

1. TOP VIEW
2. FRONT VIEW
3. LEFT VIEW

2 ⅞"

3/16" CHAMFER, TYP

47 13/16"  11 13/16"
15" x 30" x 2", PAVER

TOP VIEW

LEFT VIEW

FRONT VIEW

MATERIAL:

CO NUMBER:

WEIGHT:

NAME      DATE            NOTES

DIMENSIONS ARE IN INCHES

TOLERANCE:

FRACTIONS ± 1/8"  ANGLE ±0.5°

DIM: 2-PL ±0.01   3-PL ±.005

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16" x 16" x 2", Paver
16" x 24" x 2 3/4", PAVER
18" x 18" x 2", PAVER
18" x 24" x 2 ¼", PAVER

2 ¼"

3/16" CHAMFER, TYP

23 13/16"

17 13/16"

① TOP VIEW

② FRONT VIEW

③ LEFT VIEW

PAVER SIZES CONTINUED
18" x 36" x 2 1/2", PAVER

**Dimensions:**
- Top View: 35 13/16" x 17 13/16"
- Left View: 2 1/2" x 3/16" Chamfer, Typ

**Notes:**
- Material: CO
- Number: 5
- Weight: 8

**Drawn By:** WSF
18" x 36" x 2 3/4", PAVER
20" x 24" x 2 3/4", PAVER
24" x 24" x 2", PAVER

DIM: 2-PL ±0.01   3-PL ±.005

TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

24 sq x 2 PAVER

23 13/16" [604.8mm] 23 13/16" [604.8mm]

C3/16" CHAMFER TYP

PAVER SIZES CONTINUED
24" x 36" x 2", FALSE SCORE
24" x 36" x 2 3/4", PAVER
24" x 36" x 2", PAVER
24" x 48" x 2 ½", PAVER
30" x 30" x 2 ¼", PAVER

2 1/2" x 29 13/16" x 2 1/4", Type CHAMFER

MATERIAL: CEMENT

DIMENSIONS ARE IN INCHES

TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°
36" x 36" x 2 ½", PAVER
42" x 42" x 4", PAVER

TOP VIEW

LEFT VIEW

FRONT VIEW

DIMENSIONS ARE IN INCHES
TOLERANCE:
FRACTIONS ± 1/8"  ANGLE ±0.5°
DIM: 2-PL ±0.01   3-PL ±.005
TYPICAL ARCHITECTURAL DETAILS

• WALL/BUILDING TERMINATION: USING TERRA-TAB
• WALL/BUILDING TERMINATION: USING WAFFLE REDUCER
• WALL/BUILDING TERMINATION: USING TERRA-STAND
• PAVER JOINT
• PEDESTALS IMAGES & EDGE RERAINT SYSTEM
Wall/Building Termination: Using Terra-Tab

(a) Sealant
(b) Metal Flashing
(c) Protection Course
(d) Pressed Paver
(e) Terra-Tab ½ Unit
(f) Membrane/Waterproofing
(g) Insulation (60 PSI Minimum)
(h) Approved Substrate
Wall/Building Termination: Using Waffle Reducer

(a) Sealant
(b) Metal Flashing
(c) Protection Course
(d) Pressed Paver
(e) Terra-Tab ½ Unit
(f) Waffle Reducer
(g) Shim, cut to size
(h) Membrane/Waterproofing
(i) Insulation (60 PSI Minimum)
(j) Approved Substrate
Wall/Building Termination: Using Terra-Stand

(a) Pressed Paver
(b) Protection Course
(c) Sealant
(d) Terra-Tab ½ Unit
(e) Terra-Stand
(f) Metal Flashing
(g) Membrane/Waterproofing
(h) Insulation (60 PSI Minimum)
(i) Approved Substrate
3/16 SPACING, STANDARD

OPTION 1

(a) Paver
(b) Terra-Tab
(c) Protection Course
(d) Waterproof Membranes
(e) Insulation, 60 PSI (min)
(f) Approved Substrate

OPTION 2
TYPICAL ARCHITECTURAL DETAILS CONTINUED

**Paver Joint Continued**

**OPTION 1**

(a) Paver  
(b) Terra-Tab  
(c) Waffle Reducer  
(d) Protection Course  
(e) Waterproof Membranes  
(f) Insulation, 60 PSI (min)  
(g) Approved Substrate

**OPTION 2**

Adjust from $\frac{1}{2}''$ - $3''$  
Shim, cut to size

$\frac{3}{16}$ SPACING, STANDARD
OPTION 1

(a) Paver
(b) Terra-Tab
(c) Terra-Stand
(d) Protection Course
(e) Waterproof Membrane
(f) Insulation, 60 PSI (min)
(g) Approved Substrate

OPTION 2

Adjust from 2” - 21”
Pedestals Images

EDGE RESTRAINT SYSTEM
patent pending

TYPICAL ARCHITECTURAL DETAILS CONTINUED
TERRA-STAND PEDESTAL SYSTEM

**Terra-Stand**
Adjustable pedestal that screws up, down and tilts from side to side to provide a level surface for the paver installation. Also available with 8” protection pad – ¼” thick, 8” sq. – to protect from membrane damage.

**Terra System One**
Provides a level surface for installation of concrete pavers over a pitched surface. The system ensures precise paver alignment with even spacing to allow drainage and air circulation critical to the health of a deck installed over any waterproof membrane. It allows for easier access to the subsurface for scheduled maintenance or repairs without damage to the paved surface.

**Components and Materials**
Terra-Stand Pedestals are made of a high impact copolymer polypropylene that adjust from 2 ¼” to 22” in height, with slope compensating up to 5/8” to provide a level installation. Outside base dimension of 7” x 7” provides contact surface of 49” square. It is installed on previously established grid lines, adjusted for height and slope and ready for installation. Load of 3,000 lbs per pedestal.

**Lok Down**
Mechanism designed for areas where high-wind conditions exist. Pavers are locked together to create a rafting effect. The Lok Down system can be used in conjunction with Terra-Stand pedestals. Several colors are available to match pavers.

**Waffle Reducer**
Waffle Reducers are manufactured to accommodate height adjustments of 1/2” to 3”. The unit consists of one base with three pieces of 3/8” waffle rings and two pieces of ¼” waffle rings. An outside base diameter of 6” provides surface contact of 28 square inches. The waffle reducer is made of high impact copolymer polypropylene. Also available with 8” protection pad – ¼” thick, 8” sq. – to protect from membrane damage.
Terra-Tab
Terra-Tabs allow for perfect ⅛" (4.76 mm) spacing between paver joints. They allow for expansion, air circulation, drainage and precise paver alignment. Available in the following sizes:

#5 - ⅛” thick, 5” sq, ⅛” wide spacer  
#5a - ¼” thick, 5” sq, ⅛” wide spacer  
#6 - ⅛” thick, 6” sq.  
#6a - ⅛” thick, 6” sq, ½” wide spacer  
#6 - ⅛” thick, 6” sq.  
#7 - ⅜” thick, 7” sq, ⅛” wide spacer  
#7 - ⅛” thick, 7” sq.  
#6 - ⅛” thick, 6” sq.  
#7 - ⅛” thick, 7” sq.  
#5 - ⅛” thick, 5” sq.

Terra-Shim Plates
Manufactured to coincide with Terra-Tab sizes. Irregularities in deck sub-surfaces will increase the number of shims required.

#5 - ⅛” thick, 5” sq.  
#6 - ⅛” thick, 6” sq.  
#5 - ⅛” thick, 5” sq.  
#7 - ⅛” thick, 7” sq.  
#5 - ⅛” thick, 5” sq.

Terra-Tabs and Terra-Shims can be set directly on the waterproof membrane, on an optional protection pad or insulation without harm.

Terra-Spacer
Allows for ⅛” or ¼” spacing used in conjunction with Terra-Shim plates.

Running Bond Spacer
⅛” T Spacer for running bond patterns

Blok Handle
Made of 10-gauge HRCQ steel, Blok Handles are available for most Terra-Pavers. Precise sizing of the handle provides for easy manipulation during installation without harm to the paver or other components, while allowing for ⅛” (4.76 mm) joints. The handle also makes removal easy should repairs to subsurface components be necessary.

Big-Blok Handle
Made of steel, unit is adjustable to work with 24”, 30”, and 36” pavers. Requires two people to operate.

Maintenance
Complete Terra System installations require periodic cleaning by use of high-pressure water system to rinse off debris. Regular maintenance also includes adjustment of pavers that may have shifted or been damaged. Installations over waterproof membranes allow for access to the substrate for maintenance. Drains should be cleaned as needed to prevent water back up.

Terra-Tabs and Terra-Shims
are manufactured exclusively for the support of Tectura Designs Pavers for use with the Terra-Stand Pedestal System when installed over a waterproof membrane. They have a Shore hardness of 70 (ASTM D 2240-91), allowing for resiliency without sound transmission.

Warranty
Full Terra System One installation, using all components, carries a three-year limited warranty. Individual components are warranted as follows: Terra-Tab/Terra-Shim have a three-year limited warranty. Blok Handles/Big-Blok Handles have one-year limited warranty.
Set grid marks for pedestal locations

Lok-Down units must be installed on a level pedestal system

Lok-Down base units can be installed on shims, waffle reducers, or terra-stand pedestals

(a) Base plate of Lok-Down
(b) 1/16” rubber shim plate
(c) Terra-Stand assembly

Install Lok-Down pavers on base plates

Maintain proper alignment between the base plate, and the underside of the paver
Lok-Down top plate must be flush with paver surface
Verify screw does not exceed 70 ft. – torque

Install screw into Lok-Down with a hex bit
Tighten to 70 ft. – pounds maximum
Do not overtighten
WALL TERMINATION METHODS

Termination bar installed above the paver

Termination bar installed flush with paver

Concealed terra paving under edge restraint

edge restraint system
Rooftop and balcony spaces can be alluring, functional additions to any building, but powerful wind uplift poses a constant safety threat, capable of dislodging building parts and sending them flying dangerously through the air.

Working with the world’s leading wind experts, all of Tectura Designs’ rooftop paving products are tested against hurricane-condition wind speeds and proven to perform. The Lok Down wind uplift resistance system is specifically designed to resist wind uplift forces on rooftop paver installations and exceeds maximum wind resistance requirements – able to withstand wind speeds of more than 145 miles per hour – for ultimate safety. Tectura Designs offers three different edge restraint systems, ensuring all pitched surfaces and rooftop spaces are both beautiful and built to last.
FULL-SCALE AERODYNAMIC TESTING OF A LOOSE CONCRETE ROOF PAVER SYSTEM

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ABSTRACT

The paper presents an experimental study to assess wind induced pressure on full-scale loose concrete roof pavers by using Wall of Wind, a large-scale hurricane testing facility at Florida International University. Experimental tests were conducted on full-scale concrete pavers mounted on a test building to evaluate wind-induced external and underneath pressures acting on the pavers. The study shows that roof pavers could be subjected to significant uplifting wind forces due to negative pressures. In corner and edge areas of the roof, pressure differences produced net uplift on the pavers, at design wind speed, that was greater than the individual weight of the pavers. The study provides new insights by testing the actual roofing material at high wind speeds in a controlled environment and also showed that locking the pavers together can mitigate the issues at corners and edges by increasing the weight of the pavers that acts together to counterbalance the net uplift pressure.

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1. Introduction

Hurricane winds cause economic losses, which can exceed $30 billion dollars each year in the United States, and the loss of many lives. Hurricane winds compete with earthquakes as the dominant environmental loads for structures [14,20]. The past decade has seen increased Atlantic hurricane activity with enormous economic losses [11,17]. During hurricanes, damage to building’s roofs is mostly due to uplift forces. The ability to withstand uplift forces caused by wind across the roof surface is one of the critical design aspects.

Flat roofs are commonly used in many commercial structures, offices, apartment complexes, podiums as part of high rise buildings and residential buildings. Wind across the roof produces uplift forces at the roof surface which may cause catastrophic roof failure under extreme wind conditions [19,5,6,10]. It is common to see use of loose concrete roof pavers with these flat roofs. The pavers are also being used more and more as additional landscaping elements, path ways on vegetated roofs (green roofs) and as mitigation element for preventing uplift of vegetative materials due to their relatively heavy dead-weight. The loose-laid roofing pavers utilize gravity ballasting in lieu of anchors or adhesives [9,4]. In certain zones of the roof, (i.e., windward edges, corners, and eaves), wind flow may cause large drop in air pressure above the paver’s surface. The resultant pressure difference on individual tiles (net pressure, which is the difference between external and underneath pressures) creates an uplift force. In case of loose paver roofs, the uplifting force can only be countered by the weight of the individual paver itself. This means, for scenarios in which the uplift force is higher than the individual weight of the paver, dislodgement may occur, resulting in roof failure and airborne missiles.

The determination of the wind speed limits at which loose pavers initiate dislodgement has important economical and safety implications. Aside from its economy in areas where abundant, roof paver has demonstrated a propensity for failure, while under less severe conditions, it may become an airborne missile when under extreme wind conditions. Being airborne missiles, roof pavers may lead to successive failure to the surrounding building environment. For the above reasons, a number of studies have been developed for the estimation of the uplifting forces on the pavers [9,4] and hence finding suitable securing techniques are needed.

In addition to wind tunnel tests, full-scale testing and measurement of wind effects play an important role. Effective studies of wind effects on full- and large-scale building models have been limited. Nevertheless, full-scale measurements have provided valuable findings and data, and contributed to the validation or otherwise of certain wind tunnel techniques. Useful wind load data have been collected on roofs of residential homes during hurricanes through the Florida Coastal Monitoring Program (FCMP) (see http://users.ce.ufl.edu/~fcmp/overview/house.htm). Researchers at International Hurricane Research Center (IHRC) of Florida International University (FIU) developed a new full-scale testing facility, the Wall of Wind (WoW) (see Fig. 1a), to enhance our capabilities to test under hurricane wind forces [12,13,2,3] and rain [7].

Full-scale testing is advantageous in the general context of wind engineering tools for the following reasons: (1) adverse scaling effects (such as those due to violation of Reynolds number similitude) can be reduced, (2) some building components (such as roof tiles and pavers) are too small in size to be reproduced in wind tunnel model scale tests but can be prototyped without any distortion in full-scale tests, (3) full-scale tests under wind flows with speeds comparable to those of destructive hurricanes can examine the structural integrity of building components and their connection/mounting mechanism. Some disadvantages of full-scale testing are: (1) the test model and overall testing costs are high, (2) only low-rise structures can be tested due to the wind field size limitation of the facility and blockage effects, (3) only isolated testing can be performed without modeling the surroundings as usually done in wind tunnels.

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The purpose of this study is to assess the aerodynamic windloads acting on a concrete roof paver using the full-scale 6-fan WoW at IHRC of FIU. Experimental tests were conducted on fullscale pavers mounted on a test building model in order to evaluate the wind-induced external and underneath pressures acting on the pavers. The aim of the study is to help better understand external and underneath pressure distribution over blasted roof system (in this case concrete paver roofs) through experimental testing for more effective protection against damage caused by the wind. The study provides the best possible locking arrangements of pavers, which would perform at high wind speeds, and bring improved paver qualities to the roofing industry.

2. Methodology

The full-scale six-fan WoW facility at FIU (see Fig. 1a) was used to generate the wind field for the present study. The 6-fan WoW can generate a category I Saffir–Simpson Scale hurricane wind speed that reasonably replicates mean wind speed and turbulence characteristics of those of real hurricane winds [15,7,12,13]. A combination of passive flow management devices and active controls allowed the 6-fan WoW to generate a suburban terrain mean wind profile (target power law coefficient value was $\alpha = 1/4.0$). The longitudinal and vertical turbulence intensities measured at typical low-rise model roof eave height were 24% and 7%, respectively. The mean wind and turbulence intensity profiles are shown in Fig. 2a–e. The integral length scale ($L_x$) at typical low-rise building roof eave height was 90 m. This value was comparable to the estimated mean value of 98 m based on tropical cyclone wind data collected through Florida Coastal Monitoring Program (FCMP) [21]. The longitudinal and vertical power spectral densities at y = 3.66 m and z = 3.35 m, and a comparison with the FCMP, the revised Kaimal and the Panofsky models (see [15,20] are shown in Fig. 3; it worth noting that the quasi-periodic waveform (W2) was used in the present study. The satisfactory reproduction of turbulence parameters is essential for simulating realistic aerodynamic responses (such as peak pressures). For more detailed information on the 6-fan WoW configuration, its flow characteristics (including the wind turbulence spectra), and comparisons with tropical cyclone flow characteristics, see Huang et al. [15].

A test building was constructed to support the full-scale concrete pavers (a total of 25) in a similar way to real roof concrete pavement system (see Fig. 4a). The size of the test building model was 10 ft width 10 ft depth 7 ft height (3.05 m width 3.05 m depth 2.13 m height) which was engulfed completely in the 22 ft wide 16 ft high (6.71 m wide 4.9 m high) wind field generated by the WoW as described in Fig. 2a. The concrete paver has a dimension of 2 ft by 2 ft with 2 in. thickness (61 cm by 61 cm with 5.1 cm thickness). The spacing between the underneath of the paver and the roof deck is 1 ft. The whole test model represents a generic roofing system for a flat roof of a low-rise building without a parapet wall. Pressure taps were installed on the roof paver and underneath it (Fig. 4a) to measure both external and underneath pressure simultaneously. Fig. 4b shows the external and underneath pressure tap layout. The pavers are named alphabetically from A to Y. As shown in Fig. 4b, all the 25 roof pavers were instrumented for both external and underneath pressure measurements. Underneath pressure taps are referred to on the figure by hollow circles and external pressure taps with solid circles. The underneath and external pressures were measured using SETRA low pressure transducers (see Fig. 5). A total of 63 transducers were used. Each transducer has two ports, a reference pressure port and a port connected to the pressure tap at location of interest to measure the fluctuating pressures (external or underneath). The differential pressure which resulted in the data acquisition (DAQ) system in a voltage ranging from 0 to 5 V was calibrated and converted into PSI. The transducers have a measuring range of ±1.8 PSI and allow for data collection at sampling rate of 100 Hz. To ascertain the highest level of accuracy in the measurements, on-site calibration was conducted for each transducer.

Wind speeds were measured at the eave height of the test model (i.e. at 7 ft height (2.13 m)) using a turbulent flow Cobra probe. A fixed frame was used to which the probe could be secured. The frame was built using a system of steel tubes connected together (see Fig. 1b) and fixed to the ground. In order to get the reference wind speed, velocity measurements were taken without the presence of the test structure as the structure would have affected the wind. A quasi-periodically varying wind speed was used for the tests [15]. The wind had duration of about 3-min average with a 3 s mean wind speed of about 63.7 mph
Time history and spectrum of pressure data collected from one pressure tap are shown in Fig. 7a. The effects of the cutoff frequency on the measured pressure were investigated for a tap location exhibiting high pressure magnitude. Representative results are shown in Fig. 7b and Table 1. It can be seen that both the peak (minimum value) and (fluctuation) rms of the roof pressure can be significantly affected by the low-pass filtering when the cutoff frequency is lower than 30 Hz. Although further systematic investigations are needed to generalize this result, it is tentatively concluded that the pressure fluctuations are not significant if frequency contents higher than 30 Hz are considered.

3. Results and discussion

At the location of each pressure tap, the time history of the pressure coefficient, $C_p(t)$, is obtained from the time history of the measured differential pressure, $p(t)$, as

$$C_p(t) = \frac{p(t)}{\frac{1}{2} \rho U_t^2}$$

where $\rho$ is the air density at the time of the test (1.16 kg/m$^3$) and $U_t$ is the highest observed peak 3-s wind speed measured at the eave height of the test model over a time period of three minutes. The 3-s wind speed was 28.48 m/s (63.7 mph). The pressure data are recorded during the test in PSI (Pressure in Pa = 6894.76 [Pressure in PSI]). Referring to the data vector of the pressure coefficients over the sampling time period as $C_{p_i}$, the mean value of the pressure coefficients at any location, $C_{p_{\text{mean}}}$, is defined as

$$C_{p_{\text{mean}}} = \frac{1}{n} \sum_{i=1}^{n} C_{p_i}$$

After the 3-min tests (baseline measurements). The average of the two mean values of the one minute measurements before and after each test (baseline) was measured and monitored to avoid natural wind effects to influence the results being sought.
where $n$ is the number of measurements in the sample. The root mean square value of the pressure coefficients is defined as

$$C_{p_{\text{rms}}} = \left[ \frac{1}{n} \sum_{i=1}^{n} (C_{p_i} - C_{p_{\text{mean}}})^2 \right]^{\frac{1}{2}}$$

The minimum pressure coefficient values ($C_{p_{\text{min}}}$) are obtained from the measured pressure time histories. However, these observed peaks can exhibit wide variability from one realization to another due to the highly fluctuating nature of wind pressures. This means that significant differences might be expected in the peak values of pressure time series obtained from several different tests under nominally identical conditions. Therefore it is generally preferable to use a more stable estimator for the expected peaks. To remove the uncertainties inherent in the randomness of the peaks, probabilistic analyses were performed using an automated procedure developed by Sadek and Simiu [18] for obtaining statistics of pressure peaks from observed pressure time histories. Because estimates obtained from this approach are based on the entire information contained in the time series, they are more stable than estimates based on observed peaks (see also [3]).

Surface plots of the mean, root mean square, and observed negative peak (min) values of the external pressure coefficients ($C_{p_{\text{mean}}}$, $C_{p_{\text{rms}}}$, and $C_{p_{\text{min}}}$) acting on the external surface of the paver roof are shown on Fig. 8a–c for 0 deg. Fig. 9 shows the estimated minimum values for the external pressure coefficients acting on the roof for different wind exposures. For the evaluation of the estimated minimum values of the pressure coefficients, a time period of 1 h and 95% confidence were considered. For all of the possible wind directions, results show that pavers close to the edges and corners of the roof are subjected to comparatively high negative pressures. This is mainly due to the wind-induced conical vortices (e.g., [5,10]).
The values of the pressure coefficient are highly dependent on wind direction. Among all of the possible wind exposures, results show that directions 22.5 deg and 67.5 deg are the most critical. Measured values of \( C_{p_{\text{rms}}} \) and \( C_{p_{\text{rms}}} \) should be considered for the proper securing of individual pavers, as wind-induced damage on building pavers may occur either due to local peak wind loads, that is, by exceeding the ultimate capacity, or due to fatigue caused by repetitive loads.

Compared to external pressures, the values of underneath pressures acting on the lower surfaces of the pavers are low. The pressure distribution produced by the wind flow over the outer surface of the roof produced secondary flows through the spaces between the paver elements and underneath the elements. A pressure distribution is thus established under the roof pavers. This pressure distribution is related to, but different from, that on the outer surface. In fact, underneath pressure exhibits more uniformity compared to external pressure distribution. Fig. 8d–f shows mean (\( C_{p_{\text{mean}}} \)), root mean square (\( C_{p_{\text{rms}}} \)), observed minimum (\( C_{p_{\text{min}}} \)) values of the underneath pressure coefficients distributed over the inner surface of the paver roof.

In designing the roof it is necessary to determine, the pressure differential on the individual pavers. The total pressure coefficient at any location, \( C_{p_{\text{tot}}} \), is the instantaneous difference between the external pressure coefficient, \( C_{p_{\text{ext}}} \), and the corresponding underneath pressure coefficient, \( C_{p_{\text{int}}} \), at the same locations the net design total pressure can be obtained as

\[
C_{p_{\text{tot}}}(t) = [C_{p_{\text{ext}}}(t) - C_{p_{\text{int}}}(t)],
\]

\[
P_{\text{tot}}(t) = \frac{1}{2} \rho U_2^2 [C_{p_{\text{ext}}}(t) - C_{p_{\text{int}}}(t)]
\]
Figs. 4 and 5. Paver roof test model: (a) under construction, (b) pressure tap and paver layout (solid circles designate external taps, hollow circles designate underneath taps). Table 1. Effect of filtration on the statistical parameters of the raw pressure data measured at tap 4 on paver A of Fig. 4.}

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where \( \rho \) is the air density which may be assumed to be 1.25 kg/m\(^3\), \( U_3 \) is the peak 3-s wind speed in m/s. The design wind speed for houses in the Miami region is usually taken as \( U_3 = 146 \) mph (65.27 m/s). In certain areas of the roof, pressure differences (i.e., differences between external and underneath pressures) produce uplift on the elements that, at design wind speeds, can be greater than the weight of the individual paver. Two explanatory examples are provided below.

3.1. Design wind loads for a single paver

The external pressure coefficient distribution over the roof paver system indicates that paver A is subjected to the worst load for 67.5 deg angle of attack. To properly secure such pavers in place, it is necessary to know the wind-induced loads acting on each individual paver under the design wind speed.

Fig. 10 shows the external and the net pressure distribution over the surface of paver A. The figure shows the spatial distribution of the instantaneous...
Pressure coefficients over the paver surface at the instant when observed area-average pressure coefficient reached minimum value. It is to be noted that the imperfect spatial coherence of the velocity fluctuations (such as in the present case) may result in reductions of the overall wind effects (such as area-averaged pressures) with respect to the case of perfectly coherent flows. For large building components those reductions are significant. However, for components with sufficiently small dimensions (such as the roof pavers in this study) the reductions are hypothesized to be relatively small. Detailed analyses on correlation will be performed in future to test this hypothesis for roof pavers and extend the findings to the net pressures at the edges.

Fig. 10 shows that the underneath pressure contributes to a reduced net pressure compared to the external pressure. For example for paver A the mean pressure may have been overestimated by about 15% if the underneath pressure was not measured. The surface of the paver close to the left edge is subjected to higher suction than the surface close to the right edge. This means that the overall uplifting force is not acting at the center of the paver but close to the left edge. Therefore even for cases where the total uplift force is less than the weight of the paver, the corresponding overturning moment may not be resisted by the weight of the paver. This situation may be critical under relatively high wind speeds, and be followed by drag forces causing the paver to become wind-borne.

The time history of the overall wind load, \( F_A(t) \), acting on any single paver was obtained from the time history of the total pressure coefficients as follows:

\[
F_A(t) = \frac{1}{2} \rho U^2 \sum_{i=1}^{n_a} \frac{1}{n_a} \sum_{t} C_{p_{tot,i}}(t) \times A_i
\]
Two explanatory examples uplift on the elements that, at design wind speeds, can be greater differences between external and underneath pressures) produce uplift force is less than the weight of the paver, the corresponding example for paver becomes wind-borne. This situation may be critical under relatively high wind speeds, and be followed by drag forces causing the paver to become wind-borne. The uplifting force and overturning moment at the de movement acting on paver is the tributary area of the tap of paver was obtained from the time history of the total pressure surface of paver are schematically presented in Fig. 11 b. The values of the tributary areas for each external pressure tap on the paver surface at the right edge, right boundary of the paver, was obtained from the time history of the total pressure of the paver.

Where $q$ is the air density which may be assumed to be 1.25 kg/m$^3$, $C_p$ is the pressure coefficient, $X$ and $Y$ are the spatial coordinates, and $U$ is the wind speed.

Fig. 9. Estimated $C_{p_{\text{min}}}$ (external pressure) for four different angles of attacks over the whole roof.

Fig. 8. External (a-c) and underneath (d-f) pressure for 0 deg angle of attack over the whole roof.
where \( n_a \) is the total number of external pressure taps on the paver, \( A_i \) is the tributary area of the tap \( i \), and \( C_{p_{\text{tot},i}}(t) = [C_{p_{\text{ext},i}}(t) - C_{p_{\text{int},i}}(t)] \) is the net total pressure coefficient at the external pressure tap number \( i \) for the single paver at any time \( t \).

Similarly, the overturning moment caused by the wind about the right edge, \( M_{A}(t) \) (see Fig. 11a), was obtained from

\[
M_{A,0-o}(t) = \frac{1}{2} \rho U_3^2 \left[ \frac{1}{n_a} \sum_{i=1}^{n_a} C_{p_{\text{tot},i}}(t) \times A_i \times d_i \right]
\]

where \( d_i \) is the moment arm which can be defined as the distance between the centroid of the tributary area \( A_i \) and the edge o-o. Tributary areas for each external pressure tap on the surface of paver \( A \) are schematically presented in Fig. 11b. The values of the tributary areas in m\(^2\) and in.\(^2\) along with the corresponding moment arms about the edge o-o are given in Table 2.

Fig. 11 provides the total wind uplift force and overturning moment acting on paver \( A \) for 67.5 deg angle of attack as a function of wind speed (peak 3-s gust) in terms of mean, rms, observed peak, and estimated peak. It was observed that the values of the uplifting force and overturning moment increase with the increase in the wind speed. The uplifting force and overturning moment at the design Fig. 12 wind speed \( [U_3 = 146 \text{ mph (65.27 m/s)}] \) for Miami downtown region for example was observed to be greater than the counterbalancing weight and the corresponding resisting moment of the paver.

3.2 Design wind loads for a group of pavers locked together

In order to evaluate the efficacy of locking a group of pavers together, the net wind-induced uplift force acting on a group of four pavers was determined as a function of the 3-s gust wind speed.

Fig. 13a shows the net mean, rms, observed peak, and estimated peak uplifting wind-induced force acting on a group of four pavers \( (A, B, F, \text{and } G) \) as indicated in Fig. 4b. The figure shows that at the design wind speed \( [146 \text{ mph (65.27 m/s)}] \), both of observed and estimated peak forces are higher than
the overall resisting force due to weight (-1.886 kN). This means that connecting pavers together into groups of four elements is not sufficient to withstand the wind-induced uplifting force at design wind speed.

Fig. 13b shows the net mean, rms, observed peak, and estimated peak uplifting wind-induced force acting on a group of nine pavers (A, B, C, F, G, H, K, L, and M as indicated in Fig. 4b). The figure shows that, at design wind speed [146 mph (65.27 m/s)], both of observed and estimated peak forces are lower than the overall resisting force due to weight [-954 lb (4.244 kN)]. This means that connecting pavers together into groups of nine elements was found to be sufficient to withstand wind-induced uplifting force at design wind speed.

In conclusion, a technique for locking a group of pavers together can be used to create a paver group acting together to create sufficient counterbalancing weight even for net uplifting force expected at high velocity wind zones such as Miami. However, in order to have additional safety, for high velocity zones it is recommended that the locking system should be able to hold a group of at least 4 x 4 or 5 x 5 pavers together. The performance of the locking system to maintain a group of pavers connected together under any arbitrary force or moment (that is enough to cause uplifting of the group as one rigid body) applied at, but not limited to, the center of the group should be tested by the designer (i.e., the group of pavers should be held together as if it was one rigid body). This condition should be guaranteed over the expected life of the roof. This means that the locking system itself may require additional maintenance or replacement due to member aging or windinduced fatigue loading. It is also important to maintain the gap between the pavers (about 0.2 in. (0.005 m) between each two neighbor pavers) to take the advantage of the reduction of the net uplift due to the underneath pressure. Since dirt or movement of the pavers with aging can close the gaps it will be safer to design based on external pressure alone unless there strict maintenance/cleaning program in place. Neglecting or eliminating this gap may result into group net uplifting force that is higher than the one predicted by the current study.

4. Comparison with ASCE 7-2005

Following the procedure of Section 6.4 of ASCE 7-2005 [1] for rigid buildings, the wind uplift force on tile A is calculated for the following conditions:

i Basic wind speed 146 mph (65.27 m/s).
ii Building classification: category II importance factor (I = 1) (see page 77 of the standard).
iii Exposure: category B (suburban terrain).
iv Height exposure adjustment coefficient 1: from page 40 of the standard, \( \lambda = 1 \).
v Simplified design wind pressures, \( p_s \), for the Main Wind-Force Resisting System (MWFRS) of low-rise simple diaphragm buildings represent the net pressures (sum of internal and external) to be applied to the horizontal and vertical projections of building surfaces. 
vi \( p_s = \lambda p_{s30} = 1.0 \times 1.0 \times p_{s30} \) (Eq. (6-1) of the standard, p. 24).
vii Roof tile A design pressure: from page 43 of the standard, tile A lies totally in zone 3, effective wind area of the paver is \( 4 \text{ ft}^2 \) (0.37 m²), for \( V = 146 \text{ mph} \).

\[
p_s = \lambda p_{s30} = 1.0 \times 1.0 \times (-95.5) = -95.5 \text{psf}
\]
which gives the total uplift force on tile A as: 
95.5 x 2 x 2 = 382 lb = 173.3 kg = 1.7 kN.

The external wind load (i.e. external pressure only) on tile A from the present study is 1.5 kN (see Fig. 12a.) which is close to the value predicted by ASCE 7-2005 with 12% difference. However when the effect of internal pressure was considered, the net wind load from the present study is 1.35 kN (see Fig. 12a). This reveals that the internal pressure contributes towards reducing the total uplift wind load.

5. Conclusion

Full-scale aerodynamic tests were carried on concrete roof pavers at the Wall of Wind to evaluate the external and underneath pressure coefficient distribution on the pavers. The pressure coefficients at various locations on the roof paver system were evaluated for five different wind directions. Among the tested cases, the 22.5 deg and 67.5 deg angle of attack produced the highest pressure coefficients. At the corners and edges of the paver roof system, the net pressure difference produced uplift forces, at the design wind speed, that were greater than the weight of the individual paver.
The help offered by the Wall of Wind manager, Walter Conklin and the Research scientist, Roy Liu Marquis is greatly acknowledged. We would also like to acknowledge the great help received from our graduate research assistants (Amanuel Tecle, Francis Bain, Ruilong Li, Carlos Guerra, Serge Fueze and Zak Lata).

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Table 2. Tributary area and distance from tap centroid to line o-o for each individual tap on paver A.

Considering the fact that the wind may blow from any direction, all the pavers close to the edges and corners of the roof should be properly secured. The present study shows that by locking a group of loose pavers together produced sufficient weight that acts together to counterbalance the net uplifting loadings caused by the wind. It is recommended to use a locking system that will be able to hold a group of at least 4 x 4 or 5 x 5 pavers together.

In addition, comparisons between the results obtained in this study for external pressure only and the values predicted by the ASCE 7-2005 shows close agreement. The contribution of underneath pressures to the net pressure was observed to be significant (15% reductions were observed in the present study). This indicates that future measurements of underneath pressures are indispensable. The results of the research reported in this paper will enable the design and development products and appropriate criteria for the securing of the roof pavers safely.

Acknowledgments

The help offered by the Wall of Wind manager, Walter Conklin and the Research scientist, Roy Liu Marquis is greatly acknowledged. We would also like to acknowledge the great help received from our graduate research assistants (Amanuel Tecle, Francis Bain, Ruilong Li, Carlos Guerra, Serge Fueze and Zak Lata).

References

As the world continues to warm, solar reflectance is crucial in keeping our buildings cool. Tectura Designs’ pavers are manufactured with specially formulated, environmentally friendly aggregate finishes that allow for maximum solar reflectance. The Cool Series, one of Tectura Designs’ most energy-efficient paver lines, helps to ward off heat island effect, and is one of many lines proven to exceed an SRI of 78.
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LOK-DOWN INSTALLATION
(a) Architectural paver
(b) Typical edge condition is \( \frac{3}{16} \)" chamfer
(c) Lok-Down system
(d) Terra-Stand screw top pedestal
(e) 60 PSI minimum insulation or protection board
(f) Waterproof membrane
(g) Structural base

TERRA PAVING UNDER EDGE RESTRAINT SYSTEM
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provision of contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY
A. Perform all work required to complete as indicated by the Contract Documents and furnish all supplementary items necessary for the proper installation of Pressed Concrete Pavers.
B. Concrete paver and pedestal support systems, if used, are to be placed over roofing/waterproofing systems where indicated. Standard concrete Paver System to comply with IBC 1504.4 – ANSI/SPRI RP-4 for wind uplift. Standard Concrete paver with Lok-Down System to meet ultimate design wind speed of 146 mph per ASCE 7-05 Section 6.6 Method 3 using full-scale wind tests. Full-scale wind tests comply with IBC 1504.4- ANSI/SPRI RP-4 and IBC 1609.1.1.2. Pedestal components are to meet ASTM D635 burn rate category CC2.
C. Related Sections include the following:
1. Section 03 30 00 Cast in Place Concrete.
2. Section 07 00 00 Modified Bituminous Sheet Membrane Waterproofing.
3. Section 07 10 00 Waterproof Membrane.
4. Section 07 10 00 Drains in Waterproofed Concrete Slabs above Conditioned Space
5. Section 07 92 00 Sealants.

1.3 REFERENCES
A. Testing Standards
2. ASTM C-127 - Test method for specific gravity and absorption of Coarse Aggregates.
3. ASTM C-128 - Test method for specific gravity and absorption of Fine Aggregates.
5. ASTM C-140 - Standard test methods for sampling and testing Concrete masonry and related units.
6. ASTM C-293 - Flexural Strength.
7. ASTM C-1028 - Static Coefficient of Friction.
9. WTCL 99 - Test for Center Load Capacity.
15. ASTM D635-06 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

1.4 SUBMITTALS
A. Submit under provisions of Section 01 30 00.
B. Product Data:
1. Manufacturer’s data sheets on each product to be used, including preparation instructions, installation methods, storage and handling requirements and recommendations.
2. Submit test results for compliance with performance requirements specified herein.
3. Submit written instructions for recommended maintenance.
C. Shop Drawings:
1. Layout drawings of each paved area showing the pattern of pressed pavers and indicate pavers requiring cutting, Lok-Down System, pedestals and waffle reducers if required, drainage patterns, drains, and relationship of paving joints. Include details of specified rigid board insulation, noting all materials and their thickness, and show details at curbs, and vertical surfaces.
2. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation.
D. Samples:
   1. Submit sample to be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer’s available standard and custom colors.

**1.5 QUALITY ASSURANCE**

A. Manufacturer Qualifications: All products covered under this Section shall be produced by a single manufacturer, unless otherwise specified, with a minimum of fifteen (15) years proven production of this concrete paver product. Lok-Down System must provide evidence of completed full-scale wind testing of the system per ASCE 7-05, Section 6.6 Method 3 Wind Tunnel.

B. Installer Qualifications: Installer shall have a minimum of five (5) years proven specialized construction experience with this product and be capable of estimating and building from blueprint plans and details, in addition to proper material handling. All work must comply with local, state/provincial licensing and bonding requirements.

**1.6 MOCK-UP INSTALLATION**

Prior to the start of pressed concrete paver work, construct mock-up of each type of pressed paver size and pattern area for the owner and architect to review. The mock-up will be at the project site or at a location mutually agreed to by the owner and contractor.

1. Construct the mock-up installation in a minimum 4-foot by 4-foot area of typical concrete units and slabs with all setting beds, joints, edge and curb details as shown on the drawings.

2. After review of the mock-up, it will be retained and used as a standard of quality for the pressed concrete paver work. At completion of the work, remove the mock-up installations and related materials from the project site. If the mock-ups are incorporated in the actual construction, record their locations and sizes on the actual built record drawings for the project.

**1.7 DELIVERY, STORAGE AND HANDLING**

A. In accordance with provisions of Section 01 60 00.

B. Pressed concrete pavers to be banded on pallets and delivered in original unopened packaging with legible manufacturer identification, manufacturing number and manufacture date.

C. Protect pressed concrete pavers during shipment, storage and construction against damage.

**1.8 PROJECT CONDITIONS**

A. Maintain environmental conditions (temperature, humidity and ventilation). Do not install products under adverse environmental conditions.

**PART 2 – PRODUCTS**

**2.1 MANUFACTURERS**

A. Acceptable Manufacturer:
   **Tectura Designs, a Wausau Tile Inc. brand**
   Phone: 800-388-8728 | (715) 359-3121 | Fax: (715) 359-7456
   E-mail: info@tecturadesigns.com | Website: www.tecturadesigns.com

B. Choose from EcoPremier, UltraFace, Textured Granite, Textured Sand, Stoney Creek, Stone River, Granitex, ExpoStone, ExpoGranite, Exterior Terrazzo, SeaShell, CoolSeries, Expression, Washed Glass, Blasted Glass, ADA, Detectable Warning or Ballast pavers.

C. Substitutions: Not permitted.

D. Pressed concrete pavers, equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals from Section 00 26 00 are approved in writing by the architect prior to bid.

**2.2 MATERIAL REQUIREMENTS**

The pressed paver system shall include the following components:


B. Aggregates: All aggregates are tested in accordance with ASTM C127, ASTM C128 and ASTM C-136 specifications. Aggregate shall be blended to meet individual project requirements.

C. Coloring: Pigments used shall be inorganic and alkali resistant and used per manufacturer’s recommendations.

D. Factory Applied Sealer: Colorless slip and stain resistant penetrating or acrylic sealer.
2.3 PERFORMANCE REQUIREMENTS*

*Standard Performance Requirements based on 24” x 24” x 2” pressed paver

A. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 8,000 PSI with no individual unit less than 7,000 PSI.

B. Water Absorption: (ASTM C-140) The average shall not be greater than 6 percent.

C. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.

D. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 1,850 lbs.

E. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.

F. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60

G. Sizing Dimensions: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

*Advanced Performance Requirements based on 24” x 24” x 2” pressed paver

H. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 9,500 PSI with no individual unit less than 8,500 PSI.

I. Water Absorption: (ASTM C-140) The average shall not be greater than 4 percent.

J. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.

K. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 2,000 lbs.

L. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.

M. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60

N. Sizing Dimensions: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

2.4 INSTALLATION MATERIALS

A. Components and Materials:

1. Terra-Stand: High impact copolymer polypropylene that adjusts from 2 1/2 to 21 inches in height. Slope compensation of up to 5/8 inch per foot. Outside base dimension of 7 inches by 7 inches provides 49 inches square of contact surface. Maximum static load per pedestal is 3000 lbs.

2. Terra-Shim Plate: 1/16-inch, 1/8-inch or 1/4-inch thick made of SBR rubber.

3. Burn Rates of plastic Terra-Stand pedestal and waffle reducer: Must meet burn rate category CC2 per ASTM D635 for plastic materials.

4. Lok-Down: The Lok-Down is made of a high impact copolymer polypropylene. Outside base dimension of 7 inches by 7 inches provides 49 inches square of contact surface. It is installed on previously established grid lines. An average project will require one Lok-Down for each paver.

B. Basic Use:

1. Terra pavers are designed for exterior application on roof decks, plazas, parking garages, terraces and other flat or sloped surfaces structurally sound with required dead load capacity.

2. The standard paver is an open joint system and will drain all water to waterproofing/roofing system below.

3. The Lok-Down System complies with above sections.

C. Design Wind Speed

1. Full scale wind pressure studies at the International Hurricane Research of Florida International University have shown the Wausau Tile Lok-Down System to reach an ultimate design wind speed of 146 mph. The full scale work was performed using the Wall of Wind with pressure taps, multi-dimensional wind force was used and no parapets were present on the roof deck of the full scale test model. Paver units were 2 feet by 2 feet, 2 inches
2. The Lok-Down devise provides a multiple paver static lift resistance to uplift. Factors of safety are computed based on specific wind uplift pressures generated at each paver system location on the building.

3. This full scale wind evaluation per ASCE 7-05 Section 6.6 also meets the requirements of IBC 1504.8 – ANSI/SPRI RP-4 and IBC 1609.1.1.2.

2.5 INSTALLATION MATERIALS

A. Pedestals and Accessories

1. Terra-Tabs and Shim Plates:
   a. The SBR rubber Terra-Tab units provide spacing tabs, ⅛ inch or ⅝ inch, allowing for drainage and air circulation. Terra-Tabs to have a shore hardness of 70, allowing for resiliency without sound transmission. Terra-Tab sizes to correspond with various sizes of pavers.
   b. Shim plates are ¼-inch, ⅛-inch and ⅜-inch thick and of various sizes to correspond with various size Terra-Tabs. Shim Plates to be of the same material as the Terra-Tab.

2. Pedestal Systems:
   a. Terra-Stand Pedestals: Accommodates various pitches and height changes of the project area. Unit has outside dimension of 7 inches square and provides surface contact of 49 square inches. Unit adjusts from a minimum of 2-½ inches to a maximum of 21 inches and can tilt to a level plane. Units to be high impact copolymer polypropylene. Terra-Tabs are used on top of this unit.
   b. Lok-Down: The Lok-Down is made of a high impact copolymer polypropylene. Outside base dimension of 7 inches by 7 inches provides 49 inches square of contact surface. It is installed on previously established grid lines. An average project will require one Lok-Down for each Terra Paver.

3. Waffle Reducer: The Waffle Reducer is made of high impact copolymer polypropylene. Waffle Reducers are made to accommodate height adjustments ⅛ to 3 inches. An outside base diameter of 6 inches provides surface contact of 28 square inches. The unit consists of one base with three pieces of ⅛-inch waffle rings and two pieces of ⅜-inch waffle rings.

4. Terra Paving Under Edge Restraint System: Edge termination system for mechanical fastening pavers in areas where the maximum wind uplift force occurs on the roof deck. The versatility of this system accommodates complex roof and parapet designs.

5. Installation Handles:
   a. Paver Blok Handles: Units to handle paver sizes 12 inches to 24 inches nominal, allowing installing contractor to set units into proper location with ⅛-inch or ⅝-inch joint between units. Also allows for removal and reinstallation units without causing any damage to units or adjacent units, thus allowing inspection of utilities or drains at any time.
   b. Big Blok Handle: Unit to handle paver sizes 24 inches to 36 inches nominal allowing installing contractor to set units reinstallation without causing any damage to units or adjacent units, thus allowing inspection of utilities or drains at any time.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine all jobsite surfaces to receive the parts of the paving materials. Notify the contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Installation of pressed concrete pavers and associated construction constitutes acceptance of the adjacent and underlying construction.

3.2 INSTALLATION OF LOK-DOWN SYSTEM

A. Install in accordance with Wausau Tile Inc:
   1. Install in accordance with contributing manufacturer’s instructions. Installation requirements vary for each individual project site. Pressed pavers used, pattern, grid layout, starting point and finished elevation should be shown on plan view shop drawings which have been prepared and approved by the designer, installing contractor and/or owner.
   2. Inspection of deck and fixed elevation locations. All height or location problems to be corrected before installation.
3. Compare layout of deck to shop drawings or architectural drawings. All variances of field conditions to drawings to be reviewed and corrected prior to starting installation.

4. Set Terra-Stand units or Lok-Down Base as a set of grid patterns.

5. Level surface installation using Terra-Stand screw-top pedestal to follow manufacturer’s installation procedures. No variances to system allowed.

6. Minor height and pitch adjustments to pedestal are handled with \( \frac{1}{16} \)-inch rubber shim plates.

7. Waffle Reducer unit is used for height adjustments of between \( \frac{1}{2} \) and 3 inches in \( \frac{1}{8} \)-inch increments.

8. Set Lok-Down base on top of Terra-Stand or Waffle Reducer with shim (see Step 6).

9. Set paver on base of Lok-Down. Aligning the knob on base with recess on bottom of paver.

10. Set top plate on. Aligned flanges on top plate with flanges on bottom plate. (Top cap should fit into recess on top of the paver.)

11. Place bolt in place and tighten with the bit. Tighten to 70 PSI max with torque wrench; do not over tighten. 07 76 00-4, Roof Pavers

12. Install Terra Paving Under Edge Restraint System and fasten per engineering design.

B. Placement Tolerance:

1. Maximum of \( \frac{1}{16} \)-inch (1.6 mm) height variation between adjacent pavers.

2. Individual pressed pavers shall not vary more than \( \frac{1}{16} \) inch (1.6 mm) from level across width of the pressed paver.

3. Paved areas shall not vary more than \( \frac{1}{4} \) inch (6 mm) in a distance of 10 feet (3 m) measured at any location and in any direction.

4. The surface elevation of pavers shall be \( \frac{1}{8} \) inch to \( \frac{1}{4} \) inch (3 mm to 6 mm) above adjacent drainage inlets, concrete collars or channels.

5. Joints between pavers to be greater than \( \frac{1}{16} \) inch (1.6 mm).

### 3.3 Cleaning and Protection

A. Remove and replace pressed pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.

B. Wash entire surface with phosphate free neutral cleaner, rinse with clean water and allow to dry thoroughly.

C. Apply sealer in accordance with manufacturer’s directions.

1. Penetrating or topical type sealer designed especially for pressed concrete pavers.
OPEN JOINT PEDESTAL INSTALLATION GUIDE

PEDESTAL INSTALLATION

(a) Architectural paver
(b) Terra Tab
(c) Waffle Reducer with Terra-Shim
(d) Terra-Stand Screw Top Pedestal
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provision of contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY
A. Perform all work required to complete, as indicated by the Contract Documents, and furnish all supplementary items necessary for the proper installation of Pressed Concrete Pavers.
B. The paver installation shall be absolutely rigid, supported by pedestals and with fixed wall at the perimeter.
C. Related Sections include the following:
1. Section 31 22 00 Grading.
2. Section 31 23 00 Excavation, Backfilling and Compaction.
3. Section 32 16 00 Concrete Paving, Walks, Curbs and Gutters.
4. Section 07 00 00 Modified Bituminous Sheet Membrane Waterproofing.
5. Section 07 92 00 Joint Sealants.

1.3 REFERENCES
A. Testing Standards
2. ASTM C-127 - Test method for specific gravity and absorption of Coarse Aggregates.
3. ASTM C-128 - Test method for specific gravity and absorption of Fine Aggregates.
5. ASTM C-140 - Standard test methods for sampling and testing Concrete masonry and related units.
6. ASTM C-293 - Flexural Strength.
7. ASTM C-1028 - Static Coefficient of Friction.
9. WTCL 99 - Test for Center Load Capacity.
15. ASTM D635-06 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

1.4 SUBMITTALS
A. Submit under provisions of Section 01 30 00.
B. Product Data:
1. Manufacturer’s data sheets on each product to be used, including preparation instructions, installation methods, storage and handling requirements and recommendations.
2. Submit test results for compliance with performance requirements specified herein.
3. Submit written instructions for recommended maintenance.
C. Shop Drawings:
1. Layout drawings of each paved area showing the pattern of pressed pavers and indicate pavers requiring cutting, drainage patterns, drains and relationship of paving joints. Include details of setting beds, noting all materials and their thickness and show details at curbs and vertical surfaces.
2. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation.
D. Samples:
1. Submit sample to be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer’s available standard and custom colors.

1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications: All products covered under this Section shall be produced by a single manufacturer, unless otherwise specified, with a minimum of fifteen (15) years proven production of
this concrete paver product.

B. Installer Qualifications: Installer shall have a minimum of five (5) years proven specialized construction experience with this product and be capable of estimating and building from blueprint plans and details, in addition to proper material handling. All work must comply with local, state/provincial licensing and bonding requirements.

1.6 MOCK-UP INSTALLATION

Prior to the start of pressed concrete paver work, construct mock-up of each type of pressed paver size and pattern area for the owner and architect to review. The mock-up will be at the project site or at a location mutually agreed to by the owner and contractor.

1. Construct the mock-up installation in a minimum 4-foot by 4-foot area of typical concrete units and slabs with all setting beds, joints, edge and curb details as shown on the drawings.

2. After review of the mock-up, it will be retained and used as a standard of quality for the pressed concrete paver work. At completion of the work, remove the mock-up installation and related materials from the project site. If the mock-up is incorporated into the actual construction, record their location and size on the actual built record drawings for the project.

1.7 DELIVERY, STORAGE AND HANDLING

A. In accordance with provisions of Section 01 60 00.

B. Pressed concrete pavers to be banded on pallets and delivered in original unopened packaging with legible manufacturer identification, manufacturing number and manufacture date.

C. Protect pressed concrete pavers during shipment, storage and construction against damage.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation). Do not install products under adverse environmental conditions.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
   Tectura Designs, a Wausau Tile Inc. brand
   Phone: 800-388-8728 | (715) 359-3121 | Fax: (715) 359-7456
   E-mail: info@tecturadesigns.com | Website: www.tecturadesigns.com

B. Choose from EcoPremier, UltraFace, Textured Granite, Textured Sand, Stoney Creek, Stone River, Granitex, ExpoStone, ExpoGranite, Exterior Terrazzo, SeaShell, CoolSeries, Expression, Washed Glass, Blasted Glass, ADA, Detectable Warning, or Ballast pavers.

C. Substitutions: Not permitted.

D. Pressed concrete pavers, equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals from Section 00 26 00 are approved in writing by the Architect prior to bid.

2.2 MATERIAL REQUIREMENTS

The pressed paver system shall include the following components:


B. Aggregates: All aggregates are tested in accordance with ASTM C127, ASTM C128, and ASTM C-136 specifications. Aggregate shall be blended to meet individual project requirements.

C. Coloring: Pigments used shall be inorganic and alkali resistant and used per manufacturer’s recommendations.

D. Factory applied Sealer: Colorless slip and stain resistant penetrating or acrylic sealer that does not affect color or physical properties of pressed paver surface.

2.3 PERFORMANCE REQUIREMENTS*

*Standard Performance Requirements based on 24” x 24” x 2” pressed paver

A. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 8,000 PSI with no individual unit less than 7,000 PSI.

B. Water Absorption: (ASTM C-140) The average shall not be greater than 6 percent.

C. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.

D. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 1,850 lbs.
E. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.

F. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60

G. Sizing Dimensions: Shall not differ by more than ¼ inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than ¼ inch (1.6 mm) in either concave and/or convex warpage.

*Advanced Performance Requirements* based on 24” x 24” x 2” pressed paver

H. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 9,500 PSI with no individual unit less than 8,500 PSI.

I. Water Absorption: (ASTM C-140) The average shall not be greater than 4 percent.

J. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.

K. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 2,000 lbs.

L. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.

M. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60

N. Sizing Dimensions: Shall not differ by more than ¼ inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than ¼ inch (1.6 mm) in either concave and/or convex warpage.

2.4 INSTALLATION MATERIALS

A. Pedestals and Accessories

1. Terra-Tabs and Shim Plates:
   a. The SBR rubber Terra-Tab units provide spacing tabs, ⅛ inch or ⅛ inch, allowing for drainage and air circulation. Terra-Tabs to have a shore hardness of 70, allowing for resiliency without sound transmission. Terra-Tab sizes to correspond with various sizes of pavers.
   b. Shim plates are ⅛-inch, ¼-inch and ⅛-inch thick and of various sizes to correspond with various size Terra-Tabs. Shim Plates to be of the same material as the Terra-Tab.

2. Terra-Stand Pedestals: Accommodates various pitches and height changes of the project area. Unit has outside dimension of 7 inches square and provides surface contact of 49 square inches. Unit adjusts from a minimum of 2-½ inches to a maximum of 21 inches and can tilt to a level plane. Units to be high impact copolymer polypropylene. Terra-Tabs are used on top of this unit.

3. Waffle Reducer:
   a. The Waffle Reducer is made of high impact copolymer polypropylene. Waffle Reducers are made to accommodate height adjustments ¼ inch to 2-½ inches. An outside base diameter of 6 inches provides surface contract of 28 square inches. The unit consists of one base with three pieces of ⅛-inch waffle rings and two pieces of ⅛-inch waffle rings.

4. Installation Handles:
   a. Paver Blok Handles: Units to handle paver sizes 12 inches to 24 inches nominal, allowing installing contractor to set units into proper location with ¼-inch or ⅛-inch joint between units. Also allows for removal and reinstallation units without causing any damage to units or adjacent units, thus allowing inspection of utilities or drains at any time.
   b. Big Blok Handle: Unit to handle paver sizes 24 inches to 36 inches nominal, allowing installing contractor to set units into proper location with ¼-inch or ⅛-inch joint between units. Also allows for removal and reinstallation without causing any damage to units or adjacent units, thus allowing inspection of utilities or drains at any time.

3.1 INSPECTION

A. Examine all jobsite surfaces to receive the parts of the paving materials. Notify the contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Installation of pressed concrete pavers and associated construction
constitutes acceptance of the adjacent and underlying construction.

**3.2 INSTALLATION OF OPEN JOINT PEDESTAL SYSTEM**

A. Install in accordance with Wausau Tile Inc.:

1. Installation requirements vary for each individual project site. Pressed pavers used, pattern, grid layout, starting point and finished elevation should be shown on plan view shop drawings, which have been prepared and approved by the designer, installing contractor and/or owner.
2. Inspection of deck and fixed elevation locations. All height or location problems to be corrected before installation.
3. Compare layout of deck to shop drawings or architectural drawings. All variances of field conditions to drawings to be reviewed and corrected prior to starting installation.
4. Level surface installation using Terra-Stand screw-top pedestal to follow manufacturer’s installation procedures. No variances to system allowed.
5. Terra-Tabs and shim plate are placed, maximum of one shim per location, at intersection of grid line if finished surface is to follow slope of substrates. Paver size centerlines must be adhered to.
6. Minor height and pitch adjustments are handled with 1/8-inch rubber shim plates.

B. Placement Tolerance:

1. Maximum of 1/16-inch (1.6 mm) height variation between adjacent pavers.
2. Individual pavers shall not vary more than ⅛ inch (1.6 mm) from level across width of the paver.
3. Paved areas shall not vary more than ¼ inch (6 mm) from level in a distance of 10 feet (3m) measured at any location and in any direction.
4. The surface elevation of pavers shall be ⅛ inch to ¼ inch (3mm to 6mm) above adjacent drainage inlets, concrete collars or channels.
5. Joints between pavers to be greater than ⅛ inch (1.6 mm).

**3.3 CLEANING AND PROTECTION**

A. Remove and replace pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.

B. Wash entire surface with phosphate free neutral cleaner, rinse with clean water and allow to dry thoroughly.

C. Apply sealer in accordance with manufacturer’s directions.

1. Penetrating or topical type sealer designed especially for pressed concrete pavers.
THICK-SET INSTALLATION

(a) Architectural paver
(b) Typical edge condition is $\frac{3}{16}$“ chamfer
(c) Slurry bond coat
(d) 1 ¼” mortar bed with reinforcing
(e) 4”- 6” concrete
(f) 6”- 8” compacted road-grade gravel (#6)

For vehicular applications:
- Use 12” square pavers (2 ¾” thick)
- 6”- 8” concrete and 8”- 12” compacted road-grade gravel (#6)
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provision of contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY
A. Perform all work required to complete, as indicated by the Contract Documents, and furnish all supplementary items necessary for the proper installation of Pressed Concrete Pavers.
B. The paver installation shall be absolutely rigid, and even large slabs when subjected to vehicular traffic, shall not be displaced.
C. Related Sections include the following:
   1. Section 31 22 00 Grading.
   2. Section 31 23 00 Excavation, Backfilling and Compaction.
   3. Section 32 16 00 Concrete Paving, Walks, Curbs and Gutters.
   4. Section 07 00 00 Modified Bituminous Sheet Membrane Waterproofing.
   5. Section 07 92 00 Joint Sealants.

1.3 REFERENCES
A. Testing Standards
   2. ASTM C-127 - Test method for specific gravity and absorption of Coarse Aggregates.
   3. ASTM C-128 - Test method for specific gravity and absorption of Fine Aggregates.
   5. ASTM C-140 - Standard test methods for sampling and testing Concrete masonry and related units.
   6. ASTM C-293 - Flexural Strength.
   7. ASTM C-1028 - Static Coefficient of Friction.
   9. WTCL 99 - Test for Center Load Capacity.
B. Installation Methods
   1. TCNA F101-07 - Mortar Installation
   2. TCNA EJ171 - Movement Joints.

1.4 SUBMITTALS
A. Submit under provisions of Section 01 30 00.
B. Product Data:
   1. Manufacturer’s data sheets on each product to be used, including preparation instructions, installation methods, storage and handling requirements and recommendations.
   2. Submit test results for compliance with performance requirements specified herein.
   3. Submit written instructions for recommended maintenance.
C. Shop Drawings:
   1. Layout drawings of each paved area showing the pattern of pressed pavers and indicate pavers requiring cutting, drainage patterns, drains and relationship of paving joints. Include details of setting beds, noting all materials and their thickness and show details at curbs and vertical surfaces.
   2. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation.
D. Samples:
   1. Submit sample to be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer’s available standard and custom colors.

1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications: All products covered under this Section shall be produced by a single manufacturer, unless otherwise specified, with a minimum of fifteen (15) years proven production of this concrete paver product.
B. Installer Qualifications: Installer shall have a minimum of five (5) years proven specialized construction experience with this product and be capable of estimating and building from blueprint plans and details, in addition to proper material handling. All work must comply with local, state/provincial licensing and bonding requirements.

1.6 MOCK-UP INSTALLATION
Prior to the start of pressed concrete paver work, construct mock-up
of each type of pressed paver size and pattern area for the owner and architect to review. The mock-up will be at the project site or at a location mutually agreed to by the owner and contractor.

1. Construct the mock-up installation in a minimum 4-foot by 4-foot area of typical concrete units and slabs with all setting beds, joints, edge and curb details as shown on the drawings.
2. After review of the mock-up, it will be retained and used as a standard of quality for the pressed concrete paver work. At completion of the work, remove the mock-up installation and related materials from the project site. If the mock-up is incorporated into the actual construction, record their location and size on the actual built record drawings for the project.

1.7 DELIVERY, STORAGE AND HANDLING
A. In accordance with provisions of Section 01 60 00.
B. Pressed concrete pavers to be banded on pallets and delivered in original unopened packaging with legible manufacturer identification, manufacturing number and manufacture date.
C. Protect pressed concrete pavers during shipment, storage and construction against damage.

1.8 PROJECT CONDITIONS
A. Maintain environmental conditions (temperature, humidity and ventilation). Do not install products under adverse environmental conditions.

PART 2 – PRODUCTS
2.1 MANUFACTURERS
A. Acceptable Manufacturer:
   Tectura Designs, a Wausau Tile Inc. brand
   Phone: 800-388-8728 | (715) 359-3121 | Fax: (715) 359-7456
   E-mail: info@tecturadesigns.com | Website: www.tecturadesigns.com
B. Choose from EcoPremier, UltraFace, Textured Granite, Textured Sand, Stoney Creek, Stone River, Granitex, ExpoStone, ExpoGranite, Exterior Terrazzo, SeaShell, CoolSeries, Expression, Washed Glass, Blasted Glass, ADA, Detectable Warning, or Ballast pavers.
C. Substitutions: Not permitted.
D. Pressed concrete pavers, equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals from Section 00 26 00 are approved in writing by the Architect prior to bid.

2.2 MATERIAL REQUIREMENTS
The pressed paver system shall include the following components:
B. Aggregates: All aggregates are tested in accordance with ASTM C127, ASTM C128, and ASTM C-136 specifications. Aggregate shall be blended to meet individual project requirements.
C. Coloring: Pigments used shall be inorganic and alkali resistant and used per manufacturer’s recommendations.
D. Factory Applied Sealer: Colorless slip and stain resistant penetrating or acrylic sealer.

2.3 PERFORMANCE REQUIREMENTS*
*Standard Performance Requirements based on 24” x 24” x 2” pressed paver
A. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 8,000 PSI with no individual unit less than 7,000 PSI.
B. Water Absorption: (ASTM C-140) The average shall not be greater than 6 percent.
C. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.
D. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 1,850 lbs.
E. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.
F. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60
G. Sizing Dimensions: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.
Advanced Performance Requirements based on 24” x 24” x 2” pressed paver

H. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 9,500 PSI with no individual unit less than 8,500 PSI.

I. Water Absorption: (ASTM C-140) The average shall not be greater than 4 percent.

J. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.

K. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 2,000 lbs.

L. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.

M. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60

N. Sizing Dimensions: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

2.4 INSTALLATION MATERIALS

A. Mortar Setting Bed Method
   1. Portland Cement Mortar Mix: Approved mortar mix for Thick Bed (1 ¼ to 2 inches) Mortar Mix.
   2. Reinforcement: Welded galvanized wire mesh used in thick mortar bed.
   3. Water: Clean and free of deleterious acids, alkalies or organic materials.
   5. Sealant, Back-up and Bond Breaker: As specified in Section 07 92 00 – Joint Sealants.
   6. Pressed Pavers to be used in vehicular application must be a minimum of 2 3/4 inches thick.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine all jobsite surfaces to receive the parts of the paving materials. Notify the contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Installation of pressed concrete pavers and associated construction constitutes acceptance of the adjacent and underlying construction.

3.2 INSTALLATION OF MORTAR SET SYSTEM

1. Install in accordance with contributing manufacturer’s instructions. Installation requirements vary for each individual project site. Pressed pavers used, pattern, grid layout, starting point and finished elevation should be shown on plan view shop drawings which have been prepared and approved by the designer, installing contractor and/or owner.

B. Placement Tolerance:
   1. Maximum of 1/16-inch (1.6 mm) height variation between adjacent pressed pavers.
   2. Individual pressed pavers shall not vary more than 1/16 inch (1.6 mm) from level across width of the pressed paver.
   3. Paved areas shall not vary more than 1/4 inch (6 mm) from level in a distance of 10 feet (3 m) measured at any location and in any direction.
   4. The surface elevation of pavers shall be 1/8 inch to 1/4 inch (3 mm to 6 mm) above adjacent drainage inlets, concrete collars or channels.
   5. Joints between pavers to be greater than 1/16 inch (1.6 mm).

3.3 CLEANING AND PROTECTION

A. Remove and replace pressed pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.

B. Wash entire surface with phosphate free neutral cleaner, rinse with clean water and allow to dry thoroughly.

C. Apply sealer in accordance with manufacturer’s directions.
   1. Penetrating or topical type sealer designed especially for pressed concrete pavers.
SAND SET INSTALLATION GUIDE

SAND SET INSTALLATION

(a) Architectural paver
(b) Typical joint is ¼” to ⅜”
(c) Typical edge condition is ⅛” chamfer
(d) Sand setting bed (⅜” to 1” thick)
(e) 6” to 8” compacted road-grade gravel (#6)

For pavers installed on an incline, filter cloth is recommended to stabilize the setting bed
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provision of contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY
A. Perform all work required to complete, as indicated by the Contract Documents, and furnish all supplementary items necessary for the proper installation of Pressed Concrete Pavers.
B. The pressed paver installation shall be absolutely rigid, and even large slabs when subjected to vehicular traffic, shall not be displaced.
C. Related Sections include the following:
   1. Section 31 22 00 Grading.
   2. Section 31 23 00 Excavation, Backfilling and Compaction.
   3. Section 32 16 00 Concrete Paving, Walks, Curbs and Gutters.
   4. Section 07 00 00 Modified Bituminous Sheet Membrane Waterproofing.
   5. Section 07 92 00 Joint Sealants.

1.3 REFERENCES
A. Testing Standards
   2. ASTM C-127 - Test method for specific gravity and absorption of Coarse Aggregates.
   3. ASTM C-128 - Test method for specific gravity and absorption of Fine Aggregates.
   5. ASTM C-140 - Standard test methods for sampling and testing Concrete masonry and related units.
   6. ASTM C-293 - Flexural Strength.
   7. ASTM C-1028 - Static Coefficient of Friction.
   9. WTCL 99 - Test for Center Load Capacity.

1.4 SUBMITTALS
A. Submit under provisions of Section 01 30 00.

B. Product Data:
   1. Manufacturer’s data sheets on each product to be used, including preparation instructions, installation methods, storage and handling requirements and recommendations.
   2. Submit test results for compliance with performance requirements specified herein.
   3. Submit written instructions for recommended maintenance.

C. Shop Drawings:
   1. Layout drawings of each paved area showing the pattern of pressed pavers and indicate pavers requiring cutting, drainage patterns, drains, and relationship of paving joints. Include details of setting beds, nating all materials and their thickness, show details at curbs and vertical surfaces.
   2. Details of custom (non-standard) curbs and stair tread/risers include methods of installation.

D. Samples:
   1. Submit sample to be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer’s available standard and custom colors.

1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications: All products covered under this Section shall be produced by a single manufacturer, unless otherwise specified, with a minimum of fifteen (15) years proven production of this concrete paver product.
B. Installer Qualifications: Installer shall have a minimum of five (5) years proven specialized construction experience with this product and be capable of estimating and building from blueprint plans and details, in addition to proper material handling. All work must comply with local, state/provincial licensing and bonding requirements.

1.6 MOCK-UP INSTALLATION
Prior to the start of pressed concrete paver work, construct mock-up of each type of pressed paver size and pattern area for the owner and architect to review. The mock-up will be at the project site or at a location mutually agreed to by the owner and contractor.

1. Construct the mock-up installation in a minimum 4-foot by
4-foot area of typical concrete units and slabs with all setting beds, joints, edge and curb details as shown on the drawings.  
2. After review of the mock-up, it will be retained and used as a standard of quality for the pressed concrete paver work. At completion of the work, remove the mock-up installation and related materials from the project site. If the mock-up is incorporated into the actual construction, record their location and size on the actual built record drawings for the project.

1.7 DELIVERY, STORAGE AND HANDLING
   A. In accordance with provisions of Section 01 60 00.  
   B. Pressed concrete pavers to be banded on pallets and delivered in original unopened packaging with legible manufacturer identification, manufacturing number and manufacture date.  
   C. Protect pressed concrete pavers during shipment, storage and construction against damage.

1.8 PROJECT CONDITIONS
   A. Maintain environmental conditions (temperature, humidity and ventilation). Do not install products under adverse environmental conditions.

PART 2 – PRODUCTS

2.1 MANUFACTURERS
   A. Acceptable Manufacturer:  
      Tectura Designs, a Wausau Tile Inc. brand 800-388-8728  
      Phone: (715) 359-3121 | Fax: (715) 359-7456  
      E-mail: info@tecturadesigns.com | Website: www.tecturadesigns.com  
   B. Choose from EcoPremier, UltraFace, Textured Granite, Textured Sand, Stoney Creek, Stone River, Granitex, ExpoStone, ExpoGranite, Exterior Terrazzo, SeaShell, CoolSeries, Expression, Washed Glass, Blasted Glass, ADA, Detectable Warning, or Ballast pavers.  
   C. Substitutions: Not permitted.  
   D. Pressed concrete pavers, equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals from Section 00 26 00 are approved in writing by the Architect prior to bid.

2.2 MATERIAL REQUIREMENTS
   The pressed paver system shall include the following components:  
   B. Aggregates: All aggregates are tested in accordance with ASTM C127, ASTM C128, and ASTM C-136. Aggregate shall be blended to meet individual project requirements.  
   C. Coloring: Pigments used shall be inorganic and alkali resistant and used per manufacturer’s recommendations.  
   D. Factory Applied Sealer: Colorless slip and stain resistant penetrating or acrylic sealer.

2.3 PERFORMANCE REQUIREMENTS*
   “Standard Performance Requirements” based on 24” x 24” x 2” pressed paver
   A. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 8,000 PSI with no individual unit less than 7,000 PSI.  
   B. Water Absorption: (ASTM C-140) The average shall not be greater than 6 percent.  
   C. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.  
   D. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 1,850 lbs.  
   E. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.  
   F. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60  
   G. Sizing Dimensions: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.  

“Advanced Performance Requirements” based on 24” x 24” x 2” pressed paver
   H. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 9,500 PSI with no individual unit less than 8,500 PSI.
I. Water Absorption: (ASTM C-140) The average shall not be greater than 4 percent.

J. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.

K. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 2,000 lbs.

L. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.

M. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60

N. Sizing Dimensions: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

2.4 INSTALLATION MATERIALS

A. INSTALLATION OF SAND SETTING BED – PEDESTRIAN

1. (Optional) Place a layer of the specified geotextile filter fabric uniformly on the surface of the properly prepared grade that is ready to receive the sand setting bed. Cover the designated area in its entirety.

2. Place solid steel, 3/4-inch or 1-inch thick, control bars directly on the sand or geotextile filter fabric. Install shims under bars for minor adjustment of depth and finish pressed paver elevations and slopes. Space bars approximately 7 feet apart and parallel to each other to serve as guides for strike-off boards. Spacing can vary as determined by the size of the area and layout.

3. Place sand setting bed between control bars on the sand or geotextile filter fabric to not less than thickness of the designated control bars. Spread material and strike off by pulling the material with a 8-foot long by 2-inch by 6-inch wood board several times to produce a smooth, firm and even setting bed. Add fresh material in low areas after each pass of the strike-off board. After each panel is complete, remove and advance the first control bar to the next panel position in readiness for placing and striking adjacent panels. Fill in depressions left by the control bar and any shims.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine all jobsite surfaces to receive the parts of the paving materials. Notify the contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Installation of pressed concrete pavers and associated construction constitutes acceptance of the adjacent and underlying construction.

3.2 INSTALLATION

A. Install in accordance with contributing manufacturer’s instructions. Installation requirements vary for each individual project site. Pressed pavers used, pattern, grid layout, starting point and finished elevation should be shown on plan view shop drawings which have been prepared and approved by the designer, installing contractor and/or owner.

1. Install pressed concrete pavers in patterns, allowing for surface drainage as shown on the drawings. Install pressed concrete pavers in accordance with the manufacturer’s installation instructions and the final reviewed shop drawings.

2. Lay out pavement in 30-foot working area modules. Set pressed concrete pavers on sand setting bed in patterns shown on the drawings with hand tight joints 1/8-inch to 3/16-inch wide joints and uniform top surfaces.

3. Field cut pressed concrete pavers in accordance with manufacturer’s recommendations for methods, equipment and precautions.

4. Maintain accurate alignment and check for creep and shrinkage. Make adjustments to creep and shrinkage within the 30-foot module area.

5. Install edge restraints where required and as shown on the architectural drawings and details.

6. Sweep fine dry polymeric sand of a type and color approved by the architect over pavement surface to fill joints immediately after installing pressed pavers, slabs and curbs on setting bed. Brush in polymeric sand until joints are completely filled, remove surplus sand. Do not allow traffic on installed pressed pavers, slabs or curbing until the joints have been filled.

7. Protect newly laid pressed pavers, slabs and curbs with plywood
panels on which workers stand. Advance protective panels as work progresses, but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of installed pressed pavers, slabs and curbs.

8. Install the specified joint filler where pressed concrete pavers abut curbs vertical surfaces and other construction.

9. Final cleaning to remove all soiling from pressed pavers for final acceptance.

B. Placement Tolerance:

1. Maximum of 1/16-inch (1.6 mm) height variation between adjacent pavers.
2. Individual pressed pavers shall not vary more than 1/16 inch (1.6 mm) from level across width of the paver.
3. Paved areas shall not vary more than 1/4 inch (6 mm) from level in a distance of 10 feet (3m) measured at any location and in any direction.
4. The surface elevation of pavers shall be 1/8 inch to 1/4 inch (3mm to 6mm) above adjacent drainage inlets, concrete collars or channels.
5. Joints between pavers to be greater than 1/16 inch (1.6 mm).

3.3 CLEANING AND PROTECTION

A. Remove and replace pressed pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.

B. Wash entire surface with phosphate free neutral cleaner, rinse with clean water and allow to dry thoroughly.

C. Apply sealer in accordance with manufacturer’s directions.

1. Penetrating or topical type sealer designed especially for pressed concrete pavers.
BITUMINOUS INSTALLATION

(a) Architectural paver
(b) Typical edge condition is \( \frac{3}{16} \)" chamfer
(c) 2% modified neoprene tackcoat
(d) \( \frac{3}{4} \)" thick bituminous setting bed
(e) 4" concrete or 2"– 4" bituminous binder
(f) 6"– 8" compacted road-grade gravel (#6)

For vehicular applications:
- Use 12" square pavers (2 \( \frac{3}{4} \)" thick)
- 6" concrete or 3"– 6" bituminous binder
- And either 8"– 12" compacted road-grade gravel (#6) or 10"– 12" compacted gravel.
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provision of contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY

A. Perform all work required to complete, as indicated by the Contract Documents, and furnish all supplementary items necessary for the proper installation of Pressed Concrete Pavers.

B. The paver installation shall be absolutely rigid, and even large slabs when subjected to vehicular traffic, shall not be displaced.

C. Related Sections include the following:
   1. Section 31 22 00 Grading.
   2. Section 31 23 00 Excavation, Backfilling and Compaction.
   3. Section 32 16 00 Concrete Paving, Walks, Curbs and Gutters.
   4. Section 07 00 00 Modified Bituminous Sheet Membrane Waterproofing.
   5. Section 07 92 00 Sealants.

1.3 REFERENCES

A. Testing Standards
   2. ASTM C-127 - Test method for specific gravity and absorption of Coarse Aggregates.
   3. ASTM C-128 - Test method for specific gravity and absorption of Fine Aggregates.
   5. ASTM C-140 - Standard test methods for sampling and testing Concrete masonry and related units.
   6. ASTM C-293 - Flexural Strength.
   7. ASTM C-1028 - Static Coefficient of Friction.
   9. ASTM C-144 - Specification for Aggregate used in Masonry Mortar.
   13. WTCL 99 - Load Carrying Capacity.

B. Tile Council of America (TCA)
   1. TCA F102 - Installation Method Cement Mortar Bonded.

C. American National Standards Institute (ANSI)
   1. ANSI A-118.4 - Latex Portland Cement Mortar.
   2. ANSI A-118.6 - Cement Grouts.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data:
   1. Manufacturer’s data sheets on each product to be used, including preparation instructions, installation methods, storage, handling requirements and recommendations.
   2. Submit test results for compliance with performance requirements specified herein.
   3. Submit written instructions for recommended maintenance.

C. Shop Drawings:
   1. Layout drawings of each paved area showing the pattern of pressed pavers, indicate pavers requiring cutting, drainage patterns, drains and relationship of paving joints. Include details of setting beds, noting all materials and their thickness, and show details at curbs and vertical surfaces.
   2. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation.

D. Samples:
   1. Submit sample to be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer’s available standard and custom colors.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: All products covered under this Section shall be produced by a single manufacturer, unless otherwise specified, with a minimum of fifteen (15) years proven production of this concrete paver product.
B. Installer Qualifications: Installer shall have a minimum of five (5) years proven specialized construction experience with this product and be capable of estimating and building from blueprint plans and details, in addition to proper material handling. All work must comply with local, state/provincial licensing and bonding requirements.

1.6 MOCK-UP INSTALLATION

Prior to the start of pressed concrete paver work, construct mock-up of each type of pressed paver size and pattern area for the owner and architect to review. The mock-up will be at the project site or at a location mutually agreed to by the owner and contractor.

1. Construct the mock-up installation in a minimum 4-foot by 4-foot area of typical concrete units and slabs with all setting beds, joints, edge and curb details as shown on the drawings.
2. After review of the mock-up, it will be retained and used as a standard of quality for the pressed concrete paver work. At completion of the work, remove the mock-up installations and related materials from the project site. If the mock-ups are incorporated in the actual construction, record their locations and sizes on the actual built record drawings for the project.

1.7 DELIVERY, STORAGE AND HANDLING

A. In accordance with provisions of Section 01 60 00.
B. Pressed concrete pavers to be banded on pallets and delivered in original unopened packaging with legible manufacturer identification, manufacturing number and manufacture date.
C. Protect pressed concrete pavers during shipment, storage and construction against damage.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation). Do not install products under adverse environmental conditions.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:

Tectura Designs, a Wausau Tile Inc. brand
Phone: 800-388-8728 | (715) 359-3121 | Fax: (715) 359-7456

E-mail: info@tecturadesigns.com | Website: www.tecturadesigns.com
B. Choose from EcoPremier, UltraFace, Textured Granite, Textured Sand, Stoney Creek, Stone River, Granitex, ExpoStone, ExpoGranite, Exterior Terrazzo, SeaShell, CoolSeries, Expression, Washed Glass, Blasted Glass, ADA, Detectable Warning or Ballast pavers.
C. Substitutions: Not permitted.
D. Pressed concrete pavers, equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals from Section 00 26 00 are approved in writing by the Architect prior to bid.

2.2 MATERIAL REQUIREMENTS

The pressed paver system shall include the following components:
B. Aggregates: All aggregates are tested in accordance with ASTM C127, ASTM C128, and ASTM C-136 specifications. Aggregate shall be blended to meet individual project requirements.
C. Coloring: Pigments used shall be inorganic and alkali resistant and used per manufacturer’s recommendations.
D. Factory Applied Sealer: Colorless slip and stain resistant penetrating or acrylic sealer.

2.3 PERFORMANCE REQUIREMENTS*

*Standard Performance Requirements based on 24” x 24” x 2” pressed paver
A. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 8,000 PSI with no individual unit less than 7,000 PSI.
B. Water Absorption: (ASTM C-140) The average shall not be greater than 6 percent.
C. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.
D. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 1,850 lbs.
E. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.
F. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60
G. Sizing Dimensions: Shall not differ by more than ¼ inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than ¼ inch (1.6 mm) in either concave and/or convex warpage.

*Advanced Performance Requirements based on 24” x 24” x 2” pressed paver
H. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 9,500 PSI with no individual unit less than 8,500 PSI.
I. Water Absorption: (ASTM C-140) The average shall not be greater than 4 percent.
J. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.
K. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 2,000 lbs.
L. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.
M. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60
N. Sizing Dimensions: Shall not differ by more than ¼ inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than ¼ inch (1.6 mm) in either concave and/or convex warpage.

2.4 INSTALLATION MATERIALS
A. Asphalt Setting Bed Materials:
   1. Asphalt Cement: ASTM D 3381, viscosity grade AC 10 or AC 20.
   2. Fine Aggregate: Clean hard sand free of organic matter, uniformly graded from coarse to fine, all passing the No. 4 sieve meeting the gradation requirements when testing in accordance with ASTM C 136.
   3. Mixing: Provide plant mixed asphalt setting bed by combining dry fine aggregate (approximately 93 percent) and hot asphalt cement (approximately 7 percent) and heat to approximately 300 degrees Fahrenheit. Provide each ton of setting bed material apportioned by weight with the approximate ratio of 145 lbs. of asphalt to 1,855 lbs. of sand.
B. Setting Bed Primer: Cut back asphalt, ASTM D 2028, grade as recommended by the asphalt paving manufacturer.
C. Asphalt Adhesive: Standard neoprene modified asphalt adhesive containing oxidized asphalt combined with 2 percent neoprene and 10 percent long fibered mineral fibers with a softening point of 155 degrees Fahrenheit.
D. Joint Filler Materials: Sand conforming to ASTM C 144 with 100 percent passing a No. 16 sieve.
E. Pre-formed Asphalt Joint Filler: ASTM D 994, ½-inch thick for expansion joints.

PART 3 – EXECUTION
3.1 INSPECTION
A. Examine all jobsite surfaces to receive the parts of the paving materials. Notify the contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Installation of pressed concrete pavers and associated construction constitutes acceptance of the adjacent and underlying construction.

3.2 INSTALLATION
A. Install in accordance with contributing manufacturer’s instructions. Installation requirements vary for each individual project site. Pressed pavers used, pattern, grid layout, starting point and finished elevation should be shown on plan view shop drawings which have been prepared and approved by the designer, installing contractor and/or owner.
B. Placement Tolerance:
   1. Maximum of 1/16-inch (1.6 mm) height variation between adjacent pavers.
   2. Individual pressed pavers shall not vary more than ¼ inch (1.6 mm) from level across width of the pressed paver.
   3. Paved areas shall not vary more than ¼ inch (6 mm) in a distance of 10 feet (3 m) measured at any location and in any direction.
   4. The surface elevation of pavers shall be ¼ inch to ½ inch (3 mm to 12 mm) above level of adjacent paved areas.
to 6 mm) above adjacent drainage inlets, concrete collars or channels.
5. Joints between pavers to be greater than 1/8 inch (1.6 mm).

3.3 CLEANING AND PROTECTION
A. Remove and replace pressed pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.
B. Wash entire surface with phosphate free neutral cleaner, rinse with clean water and allow to dry thoroughly.
C. Apply sealer in accordance with manufacturer’s directions.
   1. Penetrating or topical type sealer designed especially for pressed concrete pavers.
THIN-SET INSTALLATION

(a) Architectural paver
(b) Typical edge condition is 3/16” chamfer
(c) Latex thin-set mortar (per manufacturers recommendation)
(d) 4”- 6” concrete
(e) 6”- 8” compacted road-grade gravel (#6)

For vehicular applications:
- Use 12” square pavers (2 ¾” thick)
- 6”- 8” concrete and 8”- 12” compacted road-grade gravel (#6)
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provision of contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.2 SUMMARY
A. Perform all work required to complete, as indicated by the Contract Documents, and furnish all supplementary items necessary for the proper installation of Pressed Concrete Pavers.
B. The pressed paver installation shall be absolutely rigid, and even large slabs when subjected to vehicular traffic, shall not be displaced.
C. Related Sections include the following:
   1. Section 31 22 00 Grading.
   2. Section 31 23 00 Excavation, Backfilling and Compaction.
   3. Section 32 16 00 Concrete Paving, Walks, Curbs and Gutters.
   4. Section 07 00 00 Modified Bituminous Sheet Membrane Waterproofing.
   5. Section 07 92 00 Joint Sealants.

1.3 REFERENCES
A. Testing Standards
   2. ASTM C-127 - Test method for specific gravity and absorption of Coarse Aggregates.
   3. ASTM C-128 - Test method for specific gravity and absorption of Fine Aggregates.
   5. ASTM C-140 - Standard test methods for sampling and testing Concrete masonry and related units.
   6. ASTM C-293 - Flexural Strength.
   7. ASTM C-1028 - Static Coefficient of Friction.
   9. WTCL 99 - Test for Center Load Capacity.
  10. ANSI A-118.15 - Mortar
  11. ANSI A-118.6 - Latex Grout

B. Installation Methods
   1. TCNA F101-07 - Mortar Installation
   2. TCNA EJ171 - Movement Joints.

1.4 SUBMITTALS
A. Submit under provisions of Section 01 30 00.
B. Product Data:
   1. Manufacturer’s data sheets on each product to be used, including preparation instructions, installation methods, storage and handling requirements and recommendations.
   2. Submit test results for compliance with performance requirements specified herein.
   3. Submit written instructions for recommended maintenance.
C. Shop Drawings:
   1. Layout drawings of each paved area showing the pattern of pressed pavers and indicate pavers requiring cutting, drainage patterns, drains and relationship of paving joints. Include details of setting beds, noting all materials and their thickness, and show details at curbs and vertical surfaces.
   2. Details of custom (nonstandard) curbs and stair tread/risers include methods of installation.
D. Samples:
   1. Submit sample to be selected by Architect / Engineer / Landscape Architect / Owner from manufacturer’s available standard and custom colors.

1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications: All products covered under this Section shall be produced by a single manufacturer, unless otherwise specified, with a minimum of fifteen (15) years proven production of this concrete paver product.
B. Installer Qualifications: Installer shall have a minimum of five (5) years proven specialized construction experience with this product and be capable of estimating and building from blueprint plans and details, in addition to proper material handling. All work must comply with local, state/provincial licensing and bonding requirements.
1.6 MOCK-UP INSTALLATION
Prior to the start of pressed concrete paver work, construct mock-up of each type of pressed paver size and pattern area for the owner and architect to review. The mock-up will be at the project site or at a location mutually agreed to by the owner and contractor.

1. Construct the mock-up installation in a minimum 4-foot by 4-foot area of typical concrete units and slabs with all setting beds, joints, edge and curb details as shown on the drawings.
2. After review of the mock-up, it will be retained and used as a standard of quality for the pressed concrete paver work. At completion of the work, remove the mock-up installation and related materials from the project site. If the mock-up is incorporated into the actual construction, record their location and size on the actual built record drawings for the project.

1.7 DELIVERY, STORAGE AND HANDLING
A. In accordance with provisions of Section 01 60 00.
B. Pressed concrete pavers to be banded on pallets and delivered in original unopened packaging with legible manufacturer identification, manufacturing number and manufacture date.
C. Protect pressed concrete pavers during shipment, storage and construction against damage.

1.8 PROJECT CONDITIONS
A. Maintain environmental conditions (temperature, humidity and ventilation). Do not install products under adverse environmental conditions.

PART 2 – PRODUCTS
2.1 MANUFACTURERS
A. Acceptable Manufacturer:
   Tectura Designs, a Wausau Tile Inc. brand 800-388-8728
   Phone: (715) 359-3121 | Fax: (715) 359-7456
   E-mail: info@tecturadesigns.com | Website: www.tecturadesigns.com
B. Choose from EcoPremier, UltraFace, Textured Granite, Textured Sand, Stoney Creek, Stone River, Granitex, ExpoStone, ExpoGranite, Exterior Terrazzo, SeaShell, CoolSeries, Expression, Washed Glass, Blasted Glass, ADA, Detectable Warning, or Ballast pavers.
C. Substitutions: Not permitted.
D. Pressed concrete pavers, equal in appearance and function and meeting these specifications, will be acceptable when the specified submittals from Section 00 26 00 are approved in writing by the Architect prior to bid.

2.2 MATERIAL REQUIREMENTS
The pressed paver system shall include the following components:
B. Aggregates: All aggregates are tested in accordance with ASTM C127, ASTM C128, and ASTM C-136. Aggregate shall be blended to meet individual project requirements.
C. Coloring: Pigments used shall be inorganic and alkali resistant and used per manufacturer’s recommendations.
D. Factory Applied Sealer: Colorless slip and stain resistant penetrating or acrylic sealer.

2.3 PERFORMANCE REQUIREMENTS*
* Standard Performance Requirements based on 24" x 24" x 2" pressed paver
A. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 8,000 PSI with no individual unit less than 7,000 PSI.
B. Water Absorption: (ASTM C-140) The average shall not be greater than 6 percent.
C. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.
D. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 1,850 lbs.
E. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.
F. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60
G. Sizing Dimensions: Shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true
plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

*Advanced Performance Requirements* based on 24” x 24” x 2” pressed paver

H. Compressive Strength: (ASTM C-140) The average compressive strength shall not be less than 9,500 PSI with no individual unit less than 8,500 PSI.

I. Water Absorption: (ASTM C-140) The average shall not be greater than 4 percent.

J. Flexural Strength: (ASTM C-293-14) Shall not be less than 800 PSI.

K. Center Load: (WTCL 99) Pressed paver units shall have a tested center load capacity of 2,000 lbs.

L. Freeze/Thaw: (ASTM C-1262) Durability of the pressed paver shall meet the freeze/thaw tests per Section 8, shall have no breakage and not greater than 1 percent loss in dry weight of any individual unit when subject to 100 cycles of freeze/thaw.

M. Static Coefficient of Friction: (ASTM C-1028): Wet: > 0.50 and Dry: > 0.60

N. Sizing Dimensions: Shall not differ by more than 1/6 inch (1.6 mm) from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/6 inch (1.6 mm) in either concave and/or convex warpage.

### 2.4 INSTALLATION MATERIALS

A. Thin-Set Method:
   1. Latex Mortar Mix: ANSI A-118.15.
   2. Water: Clean and free of deleterious acids, alkalies or organic materials.
   4. Sealant: Back-up & Bond Breaker: As specified in Section 07 92 00 - Sealants and Caulking.

### 3.2 INSTALLATION

A. Install in accordance with contributing manufacturer’s instructions. Installation requirements vary for each individual project site. Pressed pavers used, pattern, grid layout, starting point and finished elevation should be shown on plan view shop drawings, which have been prepared and approved by the designer, installing contractor and/or owner.

1. Installation: (F101-07), (EJ171) in accordance with TCNA Bonded Mortar installation method.

B. Placement Tolerance:
   1. Maximum of 1/16-inch (1.6 mm) height variation between adjacent pavers.
   2. Individual pressed pavers shall not vary more than 1/6 inch (1.6 mm) from level across width of the paver.
   3. Paved areas shall not vary more than 1/4 inch (6 mm) from level in a distance of 10 feet (3m) measured at any location and in any direction.
   4. The surface elevation of pavers shall be 1/8 inch to 1/4 inch (3mm to 6mm) above adjacent drainage inlets, concrete collars or channels.
   5. Joints between pavers to be greater than 1/6 inch (1.6 mm).

### 3.3 CLEANING AND PROTECTION

A. Remove and replace pressed pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units with same joint treatment to eliminate evidence of replacement.

B. Wash entire surface with phosphate free neutral cleaner, rinse with clean water and allow to dry thoroughly.

C. Apply sealer in accordance with manufacturer’s directions.

1. Penetrating or topical type sealer designed especially for pressed concrete pavers.
CARE AND MAINTENANCE

MAINTAINING WAUSAU PAVERS

Wausau Tile pavers can be maintained to retain the attractive appearance and prolong the life of the pavers. When using maintenance materials, please follow the product manufacturer's instructions regarding the use of any equipment or cleaning materials described here. Be sure to angle the spray and limit the pressure, as not to damage the surface of the paver when using a pressure washer. For specific or unusual problems, please call us at 800-388-8728.

WEEKLY MAINTENANCE

Sweep or pressure wash deck. In areas of high traffic, such as doorways, daily cleaning may be required.

SEMIANNUAL MAINTENANCE (SPRING AND FALL)

Power sweep, then pressure wash total deck surface. Spot clean any stained areas using procedures described in “Cleaning Heavily Soiled Areas.”

Remove pavers located over drains on open joint systems. Clean debris from all drain covers to prevent plugging of drains and replace pavers.

Check pavers for rocking, low or high edges, joint spacing, alignment and broken or chipped pavers. If minor settling or movement has occurred, pavers can be leveled and adjusted with shims. Chipped or broken pavers should be replaced.

CLEANING HEAVILY SOILED AREAS

Soiled areas should be cleaned as soon as possible to avoid staining. The type of material causing the soiling determines the correct procedures.

A. Oil or Petroleum Products

Remove as much of the material as possible with hot water high pressure washer. Apply degreaser cleaner directly to the soiled area. With a stiff nylon brush or broom, scrub the area. Rinse the area with hot water high pressure washer. In some cases, a second cleaning may be required.

B. Rust Stains

Soak area with water. Scrub rust stains with masonry cleaner products per manufacturer’s recommendations. (Be extremely careful around any metal surfaces.) Rinse area thoroughly.

C. Soiling from Normal Foot Traffic, Road Salts, Everyday Use

Wash area thoroughly with hot water high pressure washer. On heavily soiled areas, spray the area with a commercial grade cleaner and scrub with a nylon brush. Rinse thoroughly.

D. Gum or Tar

Apply dry ice directly on top of the gum or tar. After freezing, use a putty knife or scraper to remove the gum or tar from the surface.

E. Tobacco Stains on Light Colored Pavers

After pressure washing with hot water, saturate a paper towel with household bleach. Apply towel directly to stain and cover with minimum 3 mil poly. Tape poly to surface to hold in place. Leave stain covered for 24 to 48 hours. Remove to see if stain is gone or lightened. Repeat if necessary.

SNOW REMOVAL

Snow can be cleaned from the deck using shovels, walk-behind snow blowers or power brushes. A four wheeled garden tractor, weight not exceeding 1,700 lbs. manned, can also be used. Nylon or rubber scrapers are recommended to avoid scratching of pavers. Tire chains can cause minor scratching and extra care should be taken with chains.
The use of snow melt materials should be minimal and in accordance with manufacturer’s recommendations. Some types of snow melt are not recommended for use on new concrete and can cause surface damage to the paver.

OPEN JOINT INSTALLATIONS

Open joint installation is unique in that the pavers are elevated to allow water and air to flow through the joints of the pavers. It is essential that all the joints and all drains stay open, clean and free of dirt and debris. Failure to maintain clean joints may result in performance issues.

EFFLORESCENCE IN COLORED PAVERS

Efflorescence is a condition which appears as a white stain on some colored concrete and masonry products. It is a common occurrence in new concrete, created by sodium and sulfate compounds of several hydroxides, minerals, chlorides and nitrates which deposit on the surface and pores. It is the result of moisture evaporation and is most common on darker colored pavers and fabricated surfaces.

Water (rain, humidity, or ground water which “wicks”) penetrates the pavers and dissolves latent salt. Sun draws the salt in solution to the surface and as moisture evaporates it is deposited on the surface. Efflorescence clears up as paver’s age and eventually dissipates. The length of time varies with weather conditions and wear. Efflorescence can also be caused when salts in the sub-base material wick up around and through the pavers and joints and deposit on the paver surface and sides.

WAUSAU TILE WARRANTY

Wausau Tile products are warranted to be free from defect in material and workmanship during manufacturing based on applicable industry standards. Warranty periods begin on delivery date of the warranted product and extend for the period listed below:

- Precast terrazzo products are warranted for two years.
- Terrazzo tile, plastic and metal pieces are warranted for one year.
- Framing and aluminum products are warranted for two years.
- Powder coating is warranted for two years.
- Thermo-plastic coating is warranted for five years.
- Concrete site furnishings are warranted for two years.
- Pavers are warranted for three years if properly installed according to both project specifications and Wausau Tile installation recommendations. Placing pavers on non-Wausau Tile pedestals voids this LIMITED WARRANTY.
WAUSAU TILE LIMITED WARRANTY

The offer to sell Wausau Tile products is expressly limited to acceptance of the warranty terms set forth in this LIMITED WARRANTY. By purchasing a Wausau Tile product, you accept the LIMITED WARRANTY terms herein. THIS LIMITED WARRANTY AND REMEDIES HEREIN ARE EXCLUSIVE AND INSTEAD OF ALL OTHER WARRANTIES AND REMEDIES, WHETHER ORAL, WRITTEN, STATUTORY, LEGAL OR EQUITABLE, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AS WELL AS WARRANTIES AGAINST HIDDEN OR LATENT DEFECTS. ALL WARRANTIES ARE EXCLUDED EXCEPT THOSE EXPRESS WARRANTIES STATED ON THE FACE OF THIS LIMITED WARRANTY. REMEDIES FOR ANY BREACH OF THIS LIMITED WARRANTY ARE LIMITED TO WAUSAU TILE’S ABSOLUTE OPTION TO REPAIR OR REPLACE THE DEFECTIVE PRODUCT AND THERE IS NO OTHER REMEDY AVAILABLE. WAUSAU TILE SHALL NOT BE LIABLE FOR DAMAGE TO PROPERTY BEYOND WAUSAU TILE’S PRODUCT; AND, WAUSAU TILE IS NOT LIABLE FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES FOR ANY CLAIMS, INCLUDING BUT NOT LIMITED TO TORT, STRICT LIABILITY, STATUTORY, BREACH OF EXPRESS WARRANTY, BREACH OF IMPLIED WARRANTY, AND BREACH OF CONTRACT. NO PERSON IS AUTHORIZED TO MAKE ADDITIONAL STATEMENTS, PROMISES, GUARANTIES, WARRANTIES OR REPRESENTATIONS REGARDING PERFORMANCE OF WAUSAU TILE PRODUCTS. Terms that are either additional to, conflicting with or different from those herein are excluded unless specifically agreed to in a separate writing and signed by a corporate officer or division manager of Wausau Tile. This LIMITED WARRANTY is for the benefit of the original purchaser of the Wausau Tile product who may transfer this LIMITED WARRANTY to the owner of the real estate where the warranted product is originally installed.

Concrete products may exhibit efflorescence which appears as a white stain on some colored concrete products as the result of moisture evaporation. Efflorescence is a common condition to which concrete products are susceptible. It generally clears up and eventually dissipates as concrete products age. Efflorescence is a condition that does not affect the structural integrity or the longevity of the product and is not covered under this warranty. Tile not installed immediately after delivery should be stored in a climate controlled environment.

Wausau Tile products are warranted to be free from defect in material and workmanship during manufacturing based on applicable industry standards. Warranty periods begin on delivery date of the warranted product and extend for the period listed below:

- Precast terrazzo products are warranted for two years.
- Terrazzo tile, plastic and metal pieces are warranted for one year.
- Framing and aluminum products are warranted for two years.
- Powder coating is warranted for two years.
- Thermo-plastic coating is warranted for five years.
- Concrete site furnishings are warranted for two years.
- Pavers are warranted for three years if properly installed according to both project specifications and Wausau Tile installation recommendations. Placing pavers on non-Wausau Tile pedestals voids this LIMITED WARRANTY.

If any Wausau Tile product fails to perform due to a defect in workmanship or materials within the applicable warranty period, then Wausau Tile, at its sole option, will either repair or replace the defective product. The dollar amount of warranty coverage under this LIMITED WARRANTY shall not exceed the invoiced price for the defective product itself, excluding sales tax and freight. This LIMITED WARRANTY is void if the product is not maintained as recommended by Wausau Tile. Wausau Tile’s warranty does not cover cosmetic scratches, dents, normal discoloration or fading. Due to inherent properties of concrete products, concrete products may exhibit efflorescence which appears as a white stain on some colored concrete products as the result of moisture evaporation. Efflorescence is a common condition to which concrete products are susceptible. It generally clears up and eventually dissipates as concrete products age. Efflorescence is a condition that does not affect the structural integrity or the longevity of the product and is not covered under this warranty. Tile not installed immediately after delivery should be stored in a climate controlled environment.

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and cement products, it is normal for variations in shading or color to be present in a finished product or occur over time due to sunlight exposure or other environmental factors and such variations in shading or color are not covered by this LIMITED WARRANTY. Wausau Tile’s LIMITED WARRANTY does not cover cracking, chipping or other damage caused by: (a) settling or other foundation movement regardless whether caused by man-made or natural environmental causes, (b) failure of the structure or its foundation, (c) failure of non-Wausau Tile products or (d) improper storage or handling after delivery. There is no warranty for damage caused by impact, vandalism, acts of third parties or natural disaster. Alteration of product, floor or tiles voids this LIMITED WARRANTY. Installation of structures, fixtures or utilities on or through the product without prior written approval from Wausau Tile voids this LIMITED WARRANTY.

As a precondition to validate any warranty claim, purchaser must present written notice of a warranty claim to Wausau Tile within 30 days after a warranty claim accrues or within 30 days after purchaser first notices an alleged defect, whichever is earlier. If purchaser or its installer believes a defect exists, do not install the product; instead, contact Wausau Tile within 24 hours after notice of alleged defect and make a warranty claim to Wausau Tile. While this LIMITED WARRANTY is in effect, Wausau Tile and its agents shall have free access to inspect, test, repair or remedy the warranted product and Wausau Tile shall have the first opportunity to remedy any alleged defect.

In any dispute as to the LIMITED WARRANTY or defective product, the purchaser or Owner making a claim (Claimant) has the burden of proving all elements under applicable law plus: (1) the product was installed according to applicable industry and project specifications, (2) the product was maintained according to applicable maintenance recommendations and (3) the product was defective within the meaning of this LIMITED WARRANTY. In the event a civil action is filed, Wausau Tile and Claimant shall attempt mediation facilitated by a mutually agreed upon neutral mediator before conducting formal discovery. At mediation, both Wausau Tile and Claimant shall each have a designated representative attend who has full authority to settle the civil action. Wausau Tile and Claimant shall be responsible for their own attorney fees and any other expense associated with mediation as well as paying for an equal share of the mediator’s fee. To obtain installation or maintenance recommendations, request information on extended warranties or make a warranty claim contact: Wausau Tile, Inc., c/o Vice President of Operations by mail at PO Box 1520, Wausau, WI 54402 or by fax at 715-355-4627.
THE PRODUCTS OFFERED IN THIS CATALOG ARE MANUFACTURED IN WAUSAU, WISCONSIN, BY:

Wausau Tile Inc.
PO Box 1520
Wausau, Wisconsin 54402-1520

WAUSAUTILE.COM | TECTURADESIGNS.COM