

# DIAMOND DOWEL® SYSTEM

## TAPERED PLATE DOWELS FOR FORMED CONSTRUCTION JOINTS

Reliably deliver serviceable construction joints and deliver joint stability measurements of .01 inches (.25 mm) in concrete flatwork applications with the Diamond Dowel® System. The specific size and tapered shape of the Diamond Dowel® System reliably provides joint stability, positive load transfer and continuity of surface profile to minimize joint spalling, eliminate tripping hazards and improve joint filler performance without inducing restraint. Since 1997, contractors and engineers have realized a return on their investment in the Diamond Dowel® System in more than 1.5 billion square feet of placed concrete worldwide through the delivery of highly serviceable concrete flatwork.

### The Diamond Dowel® System Helps You:

- Collect your retainage
- Reduce your call backs and save labor
- Optimize the amount of steel in your project
- Limit your liability
- Deliver cost-effective concrete flatwork

### Efficient Constructability

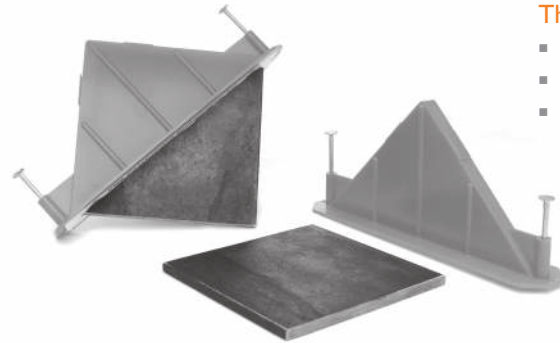
- Eliminates drilling bulkheads, greasing/spinning dowels and removing/reinstalling dowels
- Allows for easy stripping of forms
- Ensures positive load transfer and eliminates cracking from restraint with reliable dowel alignment
- Reduces job-site trip hazards



Diamond Dowel® installation template



Diamond Dowel® bulkhead



### Available in Three Sizes:

- 1/4" (6 mm)
- 3/8" (10 mm)
- 3/4" (20 mm)

### Steel Options:

- Plates are manufactured from steel certified to meet ASTM A36 (1/4" and 3/8") or ASTM A108 (3/4")

For corrosion resistance, plates can be manufactured from:

- Electroplated zinc steel certified to meet ASTM B633 Type II; or
- Grade 304 stainless steel certified to meet ASTM A240

### Installation Options:

The Diamond Dowel® System is engineered to guarantee the fastest and most perfectly aligned installation of load transfer at construction joints.

### Diamond Dowel® installation template

- Reduces labor costs by more than 75 percent when compared to round dowel installation
- Included in each box of Diamond Dowel® pocket formers for job-site convenience

### Diamond Dowel® bulkhead

- Delivers consistent, even and true joint performance when used in conjunction with the Diamond Dowel® System
- Saves set-up time with the pre-cut top chamfer
- Optimizes fast, efficient alignment of the Diamond Dowel® pocket former using the pre-cut trench groove
- Eliminates the need for a release agent with a bond breaker overlay
- Reduces waste by up to ten percent compared to lumber as it is straight and true
- Bulkheads are 1/4 inch (6 mm) shorter than full elevation of slab to accommodate allowable tolerances in the subgrade
- Available in standard 16 foot (4.8 meter) length

## PERFORMANCE-BASED ENGINEERING

All published engineering on the spacing of plate dowels at the construction joints is based on the geometry and size of the Diamond Dowel® System.

### Reduce Joint-Edge Spalling

- Delivers acceptable joint stability per industry guides of less than .01 inch (.25 mm) and continuity of surface profile across the joint
- Minimizes initial dowel looseness through the consistent and tight manufacturing tolerance in the formation of the Diamond Dowel® pocket former
- Reduces additional dowel looseness by delivering an engineered 6.36 inches (159 mm) of steel at the joint and 5.45 square inches (136.25 mm) of steel (given a joint opening of 1/8 inch [3 mm]) in the first inch of embedment where the bearing, shear and flexural stresses are the highest
- Permits dowel placement where the curling stresses are highest, to within six inches (150 mm) of the joint intersection

### Minimize Random Cracks and Ensure Joint Activation

- Allows for free horizontal movement of the concrete without restraint with 45° tapered diamond plate geometry
- Minimizes horizontal and vertical alignment deviations of the tapered plate with the Diamond Dowel® bulkhead or installation template
- Allows for a 3/8 inch (9.4 mm) of lateral movement at a joint that opens 1/8 inch (3 mm)

### Product Performance Characteristics:

#### Materials

- Diamond Dowel® 1/4" and 3/8" plates are manufactured from steel certified to meet ASTM A36, providing consistent modulus of dowel support to ensure reliable quality and performance; 3/4" plates are manufactured from Grade 1018 cold-finished steel certified to meet ASTM A108 to ensure thickness tolerances of the manufactured material reliably enables delivery of the allowable total differential deflection of .01 inches (.25 mm)
- Diamond Dowel® pocket former is molded from high density ABS plastic with internal collapsible fins and spacers that ensure load plate is installed in correct position, maintains integrity of the pocket former and creates a vertical void to its vertical faces
- Extracted, harvested or recovered, as well as manufactured, in the USA from recycled steel and eligible for LEED® credits

#### Processes

- All steel is sawn full-depth and deburred per industry guidelines ensuring smooth, square plate edges that will not induce restraint

### Dowel Size and Spacing for Construction Joints

Slab Depth, in. (mm)	Dowel Dimensions*, in. (mm)			Dowel Spacing Center-to-Center, in. (mm)		
	Round	Square	Diamond-shaped**	Round	Square	Diamond-shaped
5 to 6 (130 to 150)	3/4 x 14 (19 x 360)	3/4 x 14 (19 x 360)	1/4 x 4-1/2 x 4-1/2 (6 x 110 x 110)	12 (300)	14 (360)	18 (460)
7 to 8 (180 to 200)	1 x 16 (25 x 410)	1 x 16 (25 x 410)	3/8 x 4-1/2 x 4-1/2 (9 x 110 x 110)	12 (300)	14 (360)	18 (460)
9 to 11 (230 to 280)	1-1/4 x 18 (32 x 460)	1-1/4 x 18 (32 x 460)	3/4 x 4-1/2 x 4-1/2 (19 x 110 x 110)	12 (300)	12 (300)	20 (510)

Source Material: ACI 360R-06, *Design of Slabs-on-Ground*, Table 5.2; ACI 302.1R-04, *Guide for Concrete Floor and Slab Construction*, Table 3.2  
 \* Total dowel length includes allowance made for joint opening and minor errors in positioning dowels. \*\* Construction tolerances required make it impractical to use diamond-shaped load plates in saw-cut contraction joints. Note: Table values based on maximum opening of .2 in. (5 mm). Dowels must be carefully aligned and supported during concrete operations. Misaligned dowels may lead to cracking.

## DIAMOND DOWEL® SYSTEM IS PART OF

### THE "STRATEGIC REINFORCEMENT" DESIGN

The "strategic reinforcement" design is a performance-based, cost-effective design for interior and exterior concrete flatwork exposed to wheeled traffic. Applicable to a broad variety of facility types, this design is used by owners worldwide. By removing steel from the mid-panel and placing PNA tapered plate dowels where steel is actually needed, at the joints, you optimize materials and minimize joint spalling and random cracking. PNA moisture curing covers deliver improved abrasion resistance.

### THE NOMINAL JOINT DESIGN

If the facility usage and/or aesthetics dictates a reduction in the number of joints, the nominal joint design is a reliable and cost-effective option to reduce saw-cut contraction joints and deliver a reliable, high-performance floor. This design allows for extended joint spacing through a combination of PNA macro fibers for crack-width control and PNA tapered plate dowels for joint stability. PNA moisture curing covers provide improved abrasion resistance.