

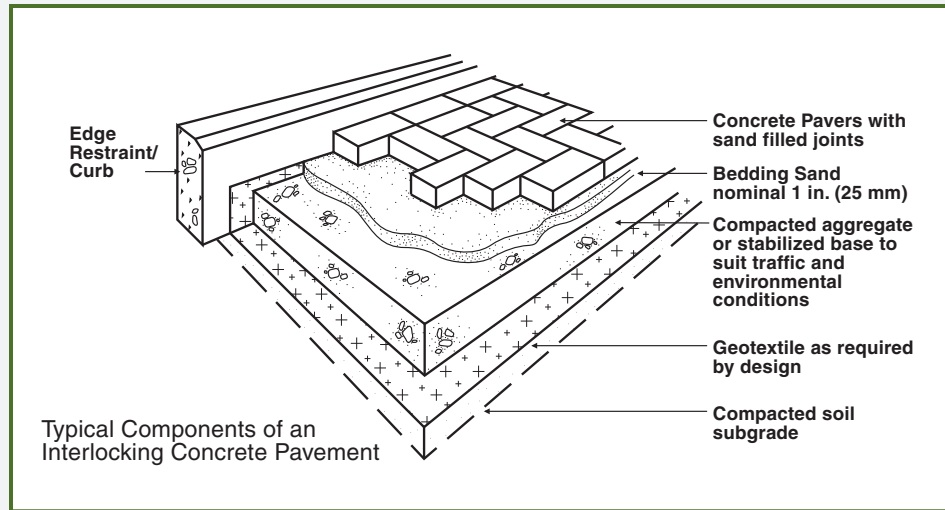
# Construction Tolerances and Recommendations for Interlocking Concrete Pavements



**icpi**

Interlocking Concrete Pavement Institute®

Note: This guide does not apply to permeable interlocking concrete pavements or tumbled pavers



## Paver and bedding layer

### Attribute

Paver joint width  
Paver surface flatness  
Lippage at catch basins/drains

*Lippage between individual pavers maximum 1/8 in. (3 mm) for pedestrian access routes*

### Attribute

Paver aspect ratio (l:t)  
*(length divided by thickness)*  
Joint fill depth

Bond lines<sup>1</sup>

Slope for drainage

Cut pavers<sup>5</sup>

Paver laying pattern<sup>2</sup>

Minimum paver thickness

Bedding layer thickness

Joint sand gradation

Bedding sand gradation

### Tolerance\*

1/16 in. (2 mm) to max. 3/16 in. (5 mm)  
±3/8 in. (10 mm) in 10 ft. (3 m) (non cum.)  
1/8 in. to 3/8 in. (3 to 10 mm) (non ADA)

### ICPI recommendation

max. 4:1 for pedestrian & driveways  
max. 3:1 for street/parking  
max. 1/2 in. (13 mm) measured from top of pavement  
±1/2 in. (13 mm) max. over 50 ft. (16 m)  
min. 2%  
No less than 1/3 for vehicular application  
No less than 3/8 in. (10 mm) for all other applications

Acceptable for application

3 1/8 in. (8 cm) for street/parking  
2 3/8 in. (6 cm) for pedestrian & driveways

1 in. (25 mm) nominal

ASTM C144 or C33  
CSA A23.1 FA1 or CSA A179

ASTM C33 or CSA A23.1 FA1

## Base and subbase layer

### Attribute

Top of base surface variation

### Attribute

Base thickness variation<sup>3</sup>  
Compaction  
Over-excavation  
(dense graded bases)  
Geotextile

### Minimum base thickness<sup>4</sup>

Sidewalks, patios, pedestrian

Residential driveways

Parking lot/residential street

### Tolerance\*

± 3/8 in. (10 mm) over 10 ft. (3 m)  
(non cumulative)

### ICPI recommendation

+ 3/4 in. to -1/2 in. (+20 mm to -13 mm)  
min. 98% standard Proctor  
greater of 6 in. (150 mm) or equal  
to base thickness  
as needed

4 in. (100 mm)

6 in. (150 mm)

8 in. (200 mm)

## Edge restraint/curb edge

### Attribute

No movement  
Proper restraint

### ICPI recommendation

firmly in place  
acceptable for application  
(see "Guide References" on reverse)

### Notes:

<sup>1</sup>Bond lines: Unless it is deemed that the pavement is not adequately restrained at the edges the bond line tolerance is considered cosmetic

<sup>2</sup>Paving layer pattern: ICPI recommends herringbone laying pattern for all vehicular applications

<sup>3</sup>Base thickness variation: An example of an acceptable variation is 7 1/2 in. to 8 3/4 in. (190 to 220 mm) for an 8 in. (200 mm) required total base thickness. The excavated cut should have the same slope and contouring as the final surface profile.

<sup>4</sup>Minimum base thickness: These are for well drained soils. Increase thickness in colder climates or weak soils.

<sup>5</sup>The contractor should have the discretion on cuts no less than 1/3 paver size. Sometimes it is not possible to adjust the cuts to less than 1/3 paver size without adjusting laying pattern, and sometimes it is not possible to adjust laying pattern with certain shapes.

\*See reverse for tolerance measurement guidance

## Guide References

### Specification and design references

ASCE 58-10 *Structural Design of Interlocking Concrete Pavements for Municipal Streets and Roadways*

ICPI Tech Spec 4—*Structural Design of Interlocking Concrete Pavement for Roads and Parking Lots*

ICPI Tech Spec 9—*Guide Specification for the Construction of Interlocking Concrete Pavement*

### Pavement system references

ASTM C936 *Standard Specification for Solid Interlocking Concrete Paving Units*

CSA A231.2 *Precast Concrete Pavers*

ICPI Tech Spec 1—*Glossary of Terms for Segmental Concrete Pavement*

ICPI Tech Spec 2—*Construction of Interlocking Concrete Pavements*

ICPI Tech Spec 4—*Structural Design of Interlocking Concrete Pavement for Roads and Parking Lots*

ICPI Tech Spec 5—*Cleaning, Sealing and Joint Sand Stabilization of Interlocking Concrete Pavement*

### Bedding and joint sand references

ASTM C33 *Standard Specification for Concrete Aggregates*

CSA A23.1 *Concrete Materials and Methods of Construction*

ASTM C144 *Standard Specification for Aggregate for Masonry Mortar*

CSA A179 *Mortar and Grout for Unit Masonry*

ICPI Tech Spec 17—*Bedding Sand Selection for Interlocking Concrete Pavements in Vehicular Applications*

### Base, subbase and subgrade layer references

ASTM D 2940 *Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports*

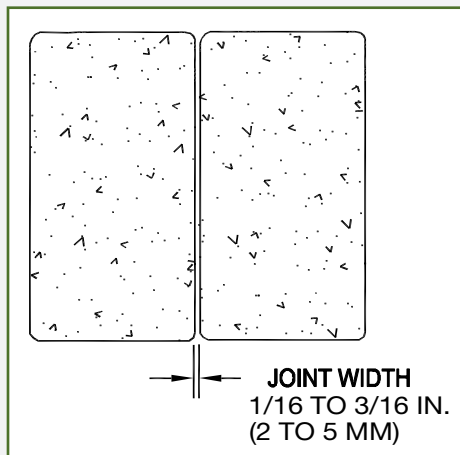
ICPI Tech Spec 2—*Construction of Interlocking Concrete Pavements*

ASTM D698 *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort*

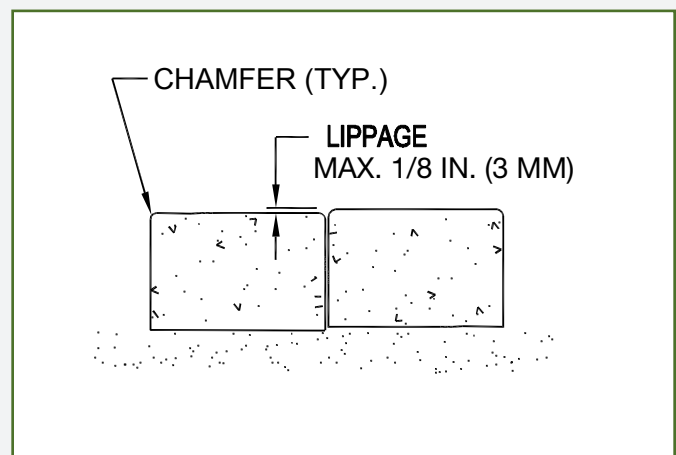
### Edge restraint references

ICPI Tech Spec 3—*Edge Restraints for Interlocking Concrete Pavements*

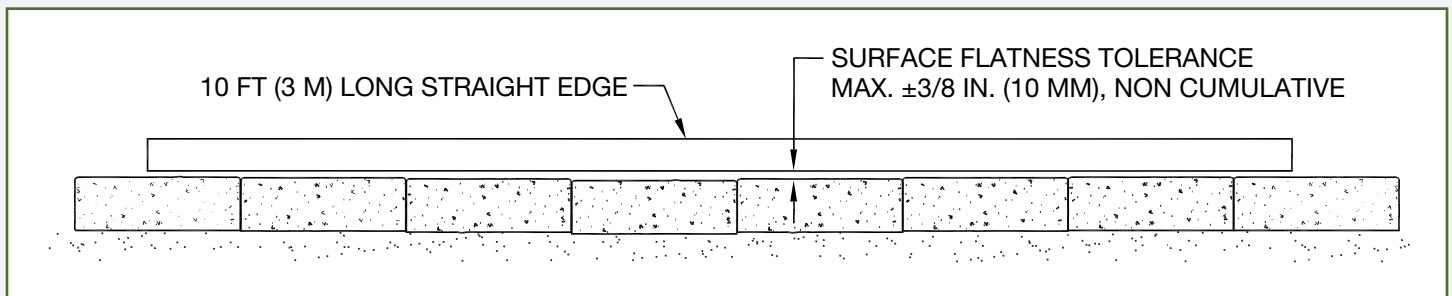
## Tolerance Measurement Guidance



Joint widths are measured with a ruler from inside edge of paver to inside edge paver between adjacent pavers



Lippage is measured from the top of a paver to the top of the adjacent paver



Paver surface flatness and top of base surface variation are measured with a straight edge for simple slopes and with a transit for complex contours