



A R C H I T E C T U R A L   S U R F A C E S

## INFORMATION & GUIDELINES FOR THE INSTALLATION OF PORPHYRY PAVERS

### RECOMMENDED INSTALLATION

Porphyry is one of the most durable paving and facing materials in the world. Porphyry is an attractive option for streets, plazas, common areas, courtyards, driveways, walkways, paths and sidewalks. It is available in pavers (cobblestones), tiles and flagstones in a variety of colors: gray, mixed red, red/gold, brown, and mixed colors.

Because porphyry is geologically formed in layers, its surface is naturally unique, smooth and refined. Unlike granite pavers, porphyry will not become slippery after years of use.

SOLI can fabricate porphyry stone into curbstones, pool coping, stairs, risers, etc. according to your specifications.

### FOUNDATION

The foundation should be a firm strata that bears the load of the pavers. It is required to maintain its unaltered physical and mechanical characteristics and must be non-compressible. From a functional viewpoint, its structure is aimed at creating slope and, in the case of outdoor paving, for the draining of surface water.

The choice of foundation type is the function of the existing terrain and of the load to be borne by the pavement. Two main types of foundation exist: Gravel base and the concrete slab.

**Gravel Base** is compacted gravel at least 30 cm thick, consisting of chunks of larger gravel in contact with the ground and smaller grains above to obtain effective surface compactness.

**Concrete Slab** consists of a 10 to 15 cm thick layer of concrete mixed at 250 kg of cement per m<sup>3</sup> of suitably graded inert material, slightly reinforced against shrinkage.

### SETTING BED

This is the actual paving bed, placed on top of the foundation. There are two methods for setting a paving bed:

**Sand Setting** consists of crushed stone gravel (split type) 3–5 mm, polyhedral in shape, washed and sorted. This type of sand not only provides the pavement with great stability after compacting, but also drains water both during and after pavement setting.

As an alternative, another kind of bedding consists of 0–6 mm coarse sand, cleaned and soil-free. The sand used for the bedding layer can be mixed with dry cement added in the ratio of 150 kg per m<sup>3</sup> of sand in order to prevent sinking. When setting binders and cubes, a bedding of sand and cement is recommended.

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## ARCHITECTURAL SURFACES

**Dry Mortar Setting** consists of dry-mixed sand and cement in the ratio of 400 kg of cement per cubic meter of sand. Considering that the thickness of the sand bed will decrease by about 2 cm because of installation operations, its initial thickness should range from 6 to 8 cm according to the height of the building element. During the design phase, it is important to remember that the finished pavement will consist of the thickness of the product plus 4–5 cm of pressed sand.

### COMPACTING

Once setting of the stones is completed, special large brushes are used to clean the surface. The spaces between elements are then filled with sand or a mixture of sand and cement. At this point, compacting is performed to press every single piece into final position in the bedding layer and therefore obtain a perfectly even surface. The pavement should receive at least two compacting treatments in two directions. When sand alone is used for setting, the surface is drenched with water following the first round of compacting and before starting the second one. When sand and cement are used, the quantity of water used is less prior to the second compacting phase. After compacting, the pavement is carefully rinsed in order to remove any surplus cement.

### GROUTING

The last phase of SOLI Porphyry installation is joint grouting between the stones. If possible, this is done with a binding material. Among the various sealing systems, the most commonly used are sand and cement slurry.

- 1) Grouting using sand is done by distributing over the paving, after compacting, a layer of fine sand (0–4 mm), and filling in all of the joints by using a large brush. The sand must be left on the paving for at least 15 days to ensure complete packing of the joints, after which the surplus sand can be removed. This technique allows for the complete recovery of the stone in the case of paving removal for excavation works, but requires greater maintenance because sand is easily removed by streaming surface water.
- 2) In the case of joint sealing using cement slurry, it is first necessary to verify that, during compacting, the depth of the joints between one element and the next has increased by 1.5–2 cm. Then the slurry, obtained by mixing equal parts of fine sand (0–4 mm), water and cement, is applied and pushed into every joint using rubber squeegees. As soon as the mortar starts to set, the surface is cleaned by removing excess mortar with large brushes aided by a flow of water.

To prevent cement from depositing on the surface of the porphyry, it is possible to apply a non-stick product using special rollers, so that the cement will only remain in the joints. Any remaining cement residue can be removed by covering the surface with wet sawdust that is then collected and removed. Any cement halos can be removed using sulphuric acid mixed with water or other acid products commonly found on the market.

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## ARCHITECTURAL SURFACES

### ASTM RESULTS – PORPHYRY

Test Method	Value	Section
Compressive Strength – Wet	31,656 psi	ASTM C-170
Compressive Strength – Dry	29,633 psi	ASTM C-170
Modulus of Rupture – Dry	3,042 psi	ASTM C-99
Modulus of Rupture – Wet	2,869 psi	ASTM C-100
Flexural Strength – Dry	3810	ASTM C-880
Flexural Strength – Wet	3141	ASTM C-881
Absorption	0.534%	
Bulk Specific Gravity	2517 kg/m <sup>3</sup>	
Static Coefficient of Friction – Dry	0.62	ASTM C-1028
Static Coefficient of Friction – Wet	0.66	ASTM C-1028
Abrasion Resistance	70.92	ASTM C-241