Marmiro Stones® Natural Stone Pavers (MSNSP) Installation Guideline
Dry-Laid (Lobascio System)

Review
- The aggregate base material, thickness, surface tolerances, compaction, and elevations are according to specifications.
- Location, installation, type, and elevations of edge restraints around the perimeter area to be paved.
- Sub-grade preparations, elevations, and compacted density vary upon specifications.

Installation
Excavation
- Remove excess concrete/other material.
- Set forms - 6” or 4” thick concrete to designated length & width. Approximately 4” bigger than actual driveway/walkway patio.
- Tamp sub-soil according to specifications.
- Place #6 wire/mesh in the field and on perimeter, put 1/4” rebar expansion where needed, can apply this to existing concrete.

Pouring Concrete
- Do not bull float or towel, straight edge concrete only.

Setting up MSNSP
- Set the screed rails, thickness 1” no more then 1 1/2”.
- Mix 4 wheelbarrows of concrete sand to 1 bag of Portland Cement.
- Place mixture between rails, spread sand 1” evenly and use a come along rake to tighten the sand.
- Begin screeding the sand and fill the voids, notch the board along the coping or concrete. Set 1/4” to 1/2” higher than the existing coping and concrete.
- Fill-in the screed rail with desirable mixture and trowel evenly.

Laying MSNSP
- Lay MSNSP inside the square string line.
- Lay MSNSP in the pattern specified and maintain straight pattern line.
- Hand lay tight to one another as you are standing on MSNSP.

Setting the Edge Restraint
- Mix Portland Cement, gravel mix & sand.
- Place concrete edge restraint on the outer edge.
- Place 2” or 3” under the MSNSP, use mallet to bring material to desirable height.
- To apply edge restraint, only go as far as you are going to tamp.

Apply Joint Sand
- This is a protective barrier before bringing the tamping machine onto the MSNSP.
- Sand will filter into the joint when it appears.
- Sweep the sand evenly on the top of the MSNSP.
- Clean the sand off the top of the MSNSP 1/4” down from the top of the joint of each MSNSP.

Tamping MSNSP
- Tamper must have a rubber mat.
- Trench tamper 12” x 24”, use a 4 horse power tamper.
- When finished clean sweep sand off MSNSP.
Marmiro Stones® Natural Stone Pavers (MSNSP) Installation Guideline

Mortared

Review

- Confirm sub-grade preparation, compacted density and elevations to match the specifications.
- Geotextiles, if applicable, are according to specifications.
- The aggregate base material, thickness, compaction, surface tolerances, and elevations are according to specifications.
- Location, type, installation and elevations of edge restraints around the perimeter area to be paved.

Installation

- If a masonry surface is used, it should be clean and free of loose dirt, dust, or other elements. If a wood structure is used, make sure the supporting framework is rigid enough to prevent flexing of the area. For interior applications, a wood substructure is recommended. Install a vapor barrier of tar paper or other membrane over the wood sub-flooring.
- For both masonry and wood substructures, prepare a mortar mixture of 3 parts sand to 1 part Portland II Cement, measure ingredients to keep the mix consistent from one batch to another and mix these ingredients dry.
- Add water and any other additives to the dry mix to create a damp mixture. Prepare a bond coat consisting of water and straight cement powder to the consistency of cake batter.
- Apply the mortar bed bond coat to the slab. Lay-out a layer of setting mortar, no less than ¾" for a masonry structure and 1 ¼" for a wood structure.
- Mortar should cover 95% of the surface area. Dust the surface of the setting bed with a fine layer of dry Portland Cement.
- Coat the back of the MSNSP with bond coat consistent of water and straight Portland Cement and add water. This mix will be used to create suction between the MSNSP and the masonry structure and will hold the stone in place until the mortar cures. Pack the mortar under the edges of the MSNSP to leave no voids.
- Keep the joints between the MSNSP free of loose mortar. It is important to have clean joint cavity to fill with mortar.

Mortar Joints

- Prepare the same mixture used for the setting bed note, the joint mix should be wetter than the setting bed mixture. A "grout bag" is needed in this phase.
- Take a damp sponge and work back and forth across the joint in a 45°direction, compressing the joint and cutting off excess joint mix. Remove as much of joint mix smear as possible from the face of the MSNSP before it dries.
- If the unused portion of the mixture starts to set, do not add more water, as this will result in an inconsistent joint strength and possible color differences.
- Allow the stonework to cure for a minimum of 5 days. In very hot weather you may dampen the joints with a spray bottle to help slow the curing process, making the joints stronger.

Setting the Edge Restraint

- Find the longest straight line, set a string line.
- 90 degree off of that long line at desirable length.
  (Note: this applies for new concrete, existing concrete with expansion joint you would need to apply crack membrane to the existing concrete.)
Marmiro Stones® Natural Stone Pavers (MSNSP) Installation Guideline
Dry-Laid

Review
- The aggregate base material, thickness, surface tolerances, compaction, and elevations are according to specifications.
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Installment
- Spread the bedding sand evenly over the base course and screed to a normal thickness of 1", no more than 1.5". The screeded sand should not be disturbed then screed enough sand to stay ahead of new laid MSNSP.
- Make sure that the MSNSP’s are free of foreign materials before installation takes place.
- Maintain consistent joints between the MSNSP’s; 3⁄16" to 3⁄8" wide.
- Fill any gaps at the edges of the paved area with cut MSNSP or edge materials.
- For cutting pavers, utilize a power-driven masonry saw.
- To vibrate the MSNSP into the sand bed, use a low-amplitude high frequency plate.
- To vibrate the MSNSP, sweep dry sand into the joints until joints are full. This may require at least two or three cycles. Do not vibrate within 3 feet of unrestrained edges.
- For all work done within a day should be fully compacted with sand filled joints within 3 feet of unrestrained edges.
- The final surface elevation of the MSNSP should not deviate more than 3⁄8" under 10 foot straight edge.
- The final surface elevation of the MSNSP should be 3⁄8" to 3⁄4" above adjacent drainage inlets, concrete collars or channels.

Marmiro Stones® Natural Stone Thin Veneer (MSNSTV) Installation Guideline

Tools and Materials

<table>
<thead>
<tr>
<th>Tools Needed</th>
<th>You May Also Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet or Diamond Blade Mason Saw</td>
<td>Weather Resistant Barrier</td>
</tr>
<tr>
<td>Mason’s Trowel</td>
<td>Metal Jointing Tool</td>
</tr>
<tr>
<td>Mortar</td>
<td>Metal Lath</td>
</tr>
<tr>
<td>Grout Bag</td>
<td>Hammer or Staple Gun</td>
</tr>
<tr>
<td>Wide Mouth Nippers</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Safety Glasses</td>
<td></td>
</tr>
<tr>
<td>Dust Mask</td>
<td></td>
</tr>
<tr>
<td>Wheelbarrow and shovel</td>
<td></td>
</tr>
<tr>
<td>Whisk Broom</td>
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</tbody>
</table>

Marmiro Stones® Natural Stone Thin Veneer (MSNSTV) may be applied over any masonry surface such as, concrete block, cement, brick etc. Painted surfaces must be sandblasted, or stripped of paint. If it gets difficult to remove paint or if surface is of frame construction, nail metal lath to wall securely, 6" on center, (for exterior, vapor barrier first, then metal lath). Apply a scratch coat to lath. Lath must be covered completely with a thin coat (½"-¾" thick). Use small scrap of lath to lightly rake horizontal grooves in the scratch coat. Allow scratch coat to set-up or cure. Use the following steps below to install MSNSTV.
Step 1: Mix rich mortar (2 parts sand to 1 part cement) to a thick consistency.

Step 2: Install corner units first, if your project includes corners. Notice that the corner units have long and short leg, alternate these to prevent a vertical bonded joint.

Step 3: Surface must be free of dirt, sand or loose particles. If surface is dry, dampen first with a masonry brush but do not saturate. This prevents the wall from pulling the moisture from the mortar, allowing it to set naturally with a better bond. For cleaner installation, begin applying stone at the top of the wall and work towards the bottom.

Step 4: Spread rich mortar on wall with the trowel, approximately ½” thick.

Step 5: Take the MSNSTV and slightly dampen the backside. This frees any dust and prevents moisture loss from mortar.

Step 6: Apply thick coat of rich mortar onto backside of the MSNSTV to fill in pits and create a stronger bond with the wall.

Step 7: Press the MSNSTV into mortar, rotating slightly, forcing some of the mortar to squeeze out freely. Any mortar forced out beyond finished joint must be removed with a trowel, joint tool, or brushed before the mortar is allowed to set up. Narrow joints will provide a nicer appearance.

Step 8: Use a grout bag or trowel to fill all joints. As the mortar stiffens, tool to the desired depth and be sure to brush off all excess.

**Durability and Maintenance**

Natural stone has very low absorption, high strength, excellent resistance to weathering, and will give you long lasting performance if you follow the few simple guidelines below.

- Keep excess moisture from saturating the wall. Adjust landscape sprinklers, downspouts, etc, to prevent water from constantly wetting the wall.
- Periodically remove any vegetation such as ivy or moss.
- Clean with a gentle water spray to remove dust and dirt. If you have stains, graffiti, or other heavy solid areas, use gentle methods to avoid damaging the mortar and stone. Test any cleaning solution on a small area to check for results.
- Cracks may appear over time as the building shifts and settles. Repoint cracks with new mortar to restore the wall’s natural weather resistance.
- Never use acid based materials, or a power washer to clean natural stone.

**If Grouting:**

Joints should be raked or smeared during this process, use a grout bag to fill in joints. Brush joints to remove loose mortar.

**Backwall Surface Specifications**

<table>
<thead>
<tr>
<th>Backwall Surface</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridge Backwall</td>
<td>Wallboard-Plywood-Concrete</td>
</tr>
<tr>
<td>Clean &amp; Untreated</td>
<td>Board-Paneling-Wall Sheathing</td>
</tr>
<tr>
<td>Dirty, Painted, or Sealed</td>
<td>Concrete-Masonry-Stucco</td>
</tr>
<tr>
<td>Metal Buildings</td>
<td>Concrete-Masonry-Stucco</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>
Marmiro Stones® Natural Stone Pool Coping (MSNSPC) Installation Guideline

Installation

- Set the wood from 1/4” to a 1/2” above the bond beam.
- Apply bonding agent to MSNSPC and allow the bonding agent to set.
- Then apply bonding agent to the top of the bond beam.
- Mortar must then be applied to the top of the bond beam towards your desirable height.
- Set your “String Line” to a desirable length of overhang.
- Mortar joints should not be more than 3/8” thick.
- Wipe off with a sponge the excess mortar at the top of the MSNSPC.

Marmiro Stones® Natural Stone Wall Blocks (MSNSWB) Installation Guideline

Excavation

- All utility lines should be clearly marked before starting excavation.
- Follow OSHA recommendations for excavating and bench cutting of slopes.
- Dig out a trench in accordance with the total height of wall or requirements stated for local building codes.
- Minimum depth should be 6” for leveling pad and 1 buried course (embedded depth) of wall stone being used or 10% of the total height of wall, whichever is greater. Never less than 6” buried.
- The width of the trench should never be less than 6” in front of the wall stone and 12” behind the wall stone plus the width of the wall stone.
- Compact and level the excavated trench.

Foundation/Leveling Pad

- Wrap the excavated trench with a geotextiles extending to back of wall then vertical behind the drainage zone ending at the finished height of wall cap.
- Approved level pad material; ASTM #57 washed stone, ASTM C2940 ¾” minus or unreinforced concrete.
- Spread the trench with approved leveling pad material. Then compact using a vibratory plate compactor until desired leveling and height. No compaction needed if using unreinforced concrete for leveling pad. The leveling pad should be no less than 6” in height.
- A thin layer of ½” washed stone may be used for ease of leaving first course of wall stone block.

Setting and Leveling First Course

- Place wall stone on leveling pad at the predetermined height as the buried course.
- Set wall stone 6“ from front of leveling pad and no less than 12” from back of leveling pad. Level each wall stone front to back, side to side and block to block.
- Set each adjacent unit tight to each other. If there are any voids between wall stones fill with ASTM #57 washed stone.
- Place 4” perforated drain pipe behind first coarse or other specified location based on site conditions, leveling pad type, water sources and embedment depth.

Backfilling

- Placed washed ASTM #57 stone behind and up to the height of the wall stone unit. This is known as drainage zone.
- Place and compact infill soil behind drainage zone to 95% of standard proctor density.
- Use small compaction equipment within 3” directly behind the wall. Compaction lifts should not exceed 6”.

Installing Subsequent Courses

- Continually check for alignment of the wall.
- Clean top of wall stone any debris before setting next course.
- Place and compact ASTM #57 stone behind and up to each subsequent course until desired height is met never exceeding 6” lifts.
- Be sure to offset subsequent courses to avoid vertical seams from course to course.