MARKET OVERVIEW:
The United States is one of the chief producers of dimension stone in the world, having generated an estimated 2.73 million tons in 2017. Slate sales often make up the smallest portion of this market.

Extensive and productive slate deposits exist in the eastern US, and large volumes of slate are imported into the US from China, India, Brazil, Canada, and Spain. Comparatively small quantities of slate products are exported from the United States to Canada and the UK.


PRODUCTS & APPLICATIONS:

Common Dimensions
Characteristics of quarried stone are dependent upon the attributes of the deposit from which the stone was extracted; each quarry is able to offer a range of products unique in dimensions, color, and structural properties to its deposit. Therefore, it is preferable that the designer and stone supplier collaborate closely prior to and throughout the design process since planning a project around readily available stone reduces the environmental impact of raw material extraction. Slate is quarried in irregularly-shaped slabs by being split along natural cleavage. Slab dimensions often fall within the following ranges but may also be extracted in larger sizes as a deposit permits:

AREA (length x width): 1-60 ft²
THICKNESS: 4-24 inches

Common Building Applications
• Cladding (exterior/interior) • Countertops • Landscaping
• Roofing • Coping • Flooring • Paving

Other Uses: aggregate, memorials & monuments, mulch

Available Finishes

<table>
<thead>
<tr>
<th>TEXTURED</th>
<th>Hammer-milled</th>
<th>Split</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Natural/cleft</td>
<td>Thermal flamed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SMOOTH</th>
<th>Honed</th>
<th>Polished</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sand rubbed</td>
<td>Sandblasted</td>
</tr>
<tr>
<td></td>
<td>Machine gauged</td>
<td></td>
</tr>
</tbody>
</table>

Custom finishes may also be available through your stone supplier.

FORMATION & SOURCES:

Slate is a metamorphic deposit that evolves from sedimentary rock consisting of clay or volcanic ash. While typically composed of numerous minerals, the predominant constituents include quartz and muscovite or illite.

The slate quarried in North America comes mainly from the eastern regions of the United States and Canada, particularly from the slate belts of New York, Pennsylvania, and Vermont.

This fact sheet was developed by the Natural Stone Council as part of a continuous effort to provide reliable and useful information regarding Genuine Stone® products. The information presented has been extensively reviewed by owners and operators of granite quarries and fabrication facilities. To access fact sheets for other stone types and learn more about Genuine Stone®, including the industry’s environmental initiatives, visit www.naturalstonecouncil.org.

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ENVIRONMENTAL DATA:

<table>
<thead>
<tr>
<th></th>
<th>Quarrying</th>
<th>Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embodied Energy (MJ/ft³ stone)</td>
<td>140</td>
<td>2,400</td>
</tr>
<tr>
<td>Embodied Water (gal/ft³ stone)</td>
<td>160</td>
<td>8,400</td>
</tr>
<tr>
<td>Global Warming Potential (kg CO₂ equivalents/ft³ stone)</td>
<td>4.0</td>
<td>24</td>
</tr>
</tbody>
</table>


INDOOR AIR QUALITY:

Volatile Organic Compounds (VOCs)
- None emitted from slate
- May source from adhesives and sealants applied; low-VOC options are available on the market
- Resources: refer to MSDS of chemical(s) used

PHYSICAL PROPERTIES:

A wide variety of slates exist on the market, both foreign and domestic, and these can be drastically different in density, hardness, porosity, and aesthetics. Users should verify that the slate they plan to use is applicable to the demands of the project and has a successful history in such installations. ASTM test data is the most common data available to compare the properties of any stone, including slate.

PERFORMANCE:

**Durability**
- Flooring: 100 years with proper maintenance
- Roofing: 20-40 years for Grade S₁, 40-75 years for Grade S₂, and over 75 years for Grade S₃ with proper maintenance
- Other exterior applications: lifetime


**Reuse & Recyclability**
- Ensure reclaimed slate meets ASTM specifications before using for structural purposes.
- Example applications:
  - Aggregate/fill
  - Landscaping
  - Memorials & monuments
  - Re-installation on other buildings
  - Retaining walls
  - Walkways

ASTM STANDARDS:

**ASTM C-406 “Standard Specification for Roofing Slate”**
**ASTM C-629 “Standard Specification for Slate Dimension Stone”**
- Includes material characteristics, physical requirements, and sampling appropriate to the selection of slate for roofing slate and general building and structural purposes, respectively.
- The table below lists the required test values for slate; the necessary tests are prescribed by and located in the ASTM standards.

<table>
<thead>
<tr>
<th>ASTM STANDARD</th>
<th>PROPERTY</th>
<th>REQUIRED TEST VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C-406</td>
<td>Breaking load, min, lb (N)</td>
<td>Exterior</td>
</tr>
<tr>
<td>ASTM C-406</td>
<td>Absorption, max, %</td>
<td>n/a</td>
</tr>
<tr>
<td>ASTM C-406</td>
<td>Absorption, max, %</td>
<td>n/a</td>
</tr>
<tr>
<td>ASTM C-629</td>
<td>Absorption by weight, max, %</td>
<td>n/a</td>
</tr>
<tr>
<td>ASTM C-629</td>
<td>Abrasion resistance, min, hardness*</td>
<td>8.0</td>
</tr>
<tr>
<td>ASTM C-629</td>
<td>Acid resistance, max, in (mm)</td>
<td>0.015 (0.015)</td>
</tr>
</tbody>
</table>

*Pertains only to stone subject to foot traffic.