MARKET OVERVIEW
The United States is one of the chief producers of dimension stone in the world, having generated an estimated 1.3 million tons in 2006. Granite sales comprised the largest portion of this market at 39% by tonnage.

Despite its abundance in the U.S., granite is purchased from a number of other countries. Brazil, China, India, Italy, and Norway typically lead as sources of imports to the U.S. Exports of the material are shipped predominantly to Canada, China, and Italy.

<http://www.stoneworld.com/CDA/HTML/a8142955339b7010VgnVCM100000f932a8c0>.

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. Nevertheless, the most common dimensions of granite on the market are as follows:

BLOCKS: Maximum size of 8ft x 5ft x 5ft
SLABS: Maximum size of 8ft x 5ft with thickness of 2-3cm

Common Building Applications
• Cladding (exterior/interior)  • Landscaping  • Paving
• Flooring  • Moulding  • Statuary

OTHER USES: aggregate, curbing, & mulch

Available Finishes

<table>
<thead>
<tr>
<th>TEXTURED</th>
<th>Bush-hammered</th>
<th>Rock face</th>
<th>Shot-sawn</th>
<th>Waterblasted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine</td>
<td></td>
<td>Sandblasted</td>
<td>Split face</td>
<td></td>
</tr>
<tr>
<td>-tooled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SMOOTH

<table>
<thead>
<tr>
<th></th>
<th>Circular-sanded</th>
<th>Honed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flamed</td>
<td>Polished</td>
</tr>
</tbody>
</table>

Custom finishes may also be available through your stone supplier.

FORMATION & SOURCES:

Granite is an igneous rock that forms when magma cools slowly beneath the earth’s surface, forming large, easily visible crystals of quartz, feldspar, and mica. Scientifically, an intrusive (plutonic) igneous rock must contain between 10% and 50% quartz to be classified as granite, but other similar stones such as gabbro, diabase, anorthosite, sodalite, gneiss, and basalt are sometimes sold as “granite” commercially.

The granite quarried in North America comes mainly from the eastern and upper Midwest United States, but quarries can be found from coast to coast.
ENVIRONMENTAL DATA:

<table>
<thead>
<tr>
<th></th>
<th>Quarrying</th>
<th>Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embodied Energy (Btu/ton)</td>
<td>4.6 million</td>
<td>17 million</td>
</tr>
<tr>
<td>Embodied Water (gal/ton)</td>
<td>310</td>
<td>9,500</td>
</tr>
<tr>
<td>Global Warming Potential (kg CO2 equivalents)</td>
<td>100</td>
<td>500</td>
</tr>
</tbody>
</table>


INDOOR AIR QUALITY:

Volatile Organic Compounds (VOCs)
- None emitted directly from granite
- 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 granites 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 granite 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 granite.

PERFORMANCE:

**Durability**
- Countertops: lifetime
- Flooring: 100 years with proper maintenance
- Exterior applications: lifetime


**Reuse & Recyclability**
- Ensure reclaimed granite meets ASTM specifications before using for structural purposes
- Example applications:
  - Concrete mixture
  - Landscaping
  - Retaining walls
  - Fill
  - Re-installation on new buildings
  - Statuary
  - Walkways

ASTM STANDARDS:

**ASTM C-615 “Standard Specification for Granite Dimension Stone”**
- Includes material characteristics, physical requirements, and sampling appropriate to the selection of granite for general building and structural purposes.
- The table below lists the required test values for granite; the necessary tests are prescribed by and located in the ASTM standards.

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>REQUIRED TEST VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density, min lb/ft³ (kg/m³)</td>
<td>160 (2560)</td>
</tr>
<tr>
<td>Absorption by weight, max, %</td>
<td>0.40</td>
</tr>
<tr>
<td>Compressive strength, min, psi (MPa)</td>
<td>19,000 (131)</td>
</tr>
<tr>
<td>Modulus of rupture, min, psi (MPa)</td>
<td>1500 (10.34)</td>
</tr>
<tr>
<td>Abrasion resistance, min, hardness*</td>
<td>25</td>
</tr>
<tr>
<td>Flexural strength, min, psi (MPa)</td>
<td>1200 (8.27)</td>
</tr>
</tbody>
</table>

*Pertains only to stone subject to foot traffic.