GENUINE STONE

MATERIAL FACT SHEET

SANDSTONE

NATURAL STONE COUNCIL

MARKET OVERVIEW:

The United States is one of the chief producers of dimension stone in the world, having generated an estimated 1.5 million tons in 2006. Sandstone sales are typically the third or fourth largest portion of this market.

Sandstone quarries are common across North America, with over sixty percent of production in the U.S. being sold as flagstone. The largest portions of exports are typically sold to Canada and Mexico. However, the U.S. imports a relatively small magnitude of sandstone. Canada is often the chief source of the material, but it is also purchased from India and Mexico, among others.

Sources: Dolley, T.P. 2007. 2006 Minerals Yearbook: Stone, Dimensional. U.S. Geological Survey. pg. 72.0-72.14.
Dolley, T.P. 2008. 2007 Mineral Commodity Summaries: Stone (Dimension). U.S. Geological Survey. pg. 160-161.
Stone World Magazine. Monthly Statistics. Accessed 15 December 2008.
<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 sandstone on the market are as follows:

BLOCKS: Maximum 10ft x 6ft with height of 5-6ft
SLABS: Maximum 10ft x 6ft with minimum thickness of 1in

Common Building Applications

- Cladding (exterior/interior)
- Paving/Flagging
- Landscaping
- Statuary

Available Finishes

TEXTURED	Bush-hammered	Machine -tooled	Sandblasted
	Chat-sawn	Rock face	Split face
SMOOTH	Diamond-Sawn		

Custom finishes may also be available through your stone supplier.

Photo by Warren Patterson/Courtesy of ARC/Architectural Resources

FORMATION & SOURCES:

Sandstone is a sedimentary rock formed when layers of eroded sediment are compressed and cemented with minerals through lithification. The stone is composed mainly of sand-sized grains, or clasts, of quartz cemented with silica, calcium carbonate, or iron oxide.

Sandstone is quarried widely across North America, particularly in the West, Midwest, and Northeast United States.

This factsheet 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 sandstone quarries and fabrication facilities. To access factsheets for other stone types and learn more about Genuine Stone®, including the industry's environmental initiatives, visit www.genuinestone.com.

ENVIRONMENTAL DATA:

	Quarrying	Processing
Embodied Energy (MJ/ft³ stone)	51	2,500
Embodied Water (gal/ft³ stone)	24	8,400
Global Warming Potential (kg CO_2 equivalents/ft³ stone)	1.3	50

Source: Natural Stone Council. Sandstone Dimensional Stone Quarrying and Processing: A Life-Cycle Inventory. August 2008. Center for Clean Products. University of Tennessee. <http://isse.utk.edu/ccp/projects/naturalstone/results_pubs.html>.

INDOOR AIR QUALITY:

Volatile Organic Compounds (VOCs)

- None emitted directly from sandstone
- 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 range of sandstones exist on the market, varying in the amount of quartz present in the stone. These varieties can be different in density, hardness, porosity, and aesthetics. Users should verify that the sandstone 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 sandstone.

PERFORMANCE:

Durability

- Exterior & interior applications: lifetime
- Damage may be caused by acidic cleaners, abrasive contact, or water absorption

Source: National Association of Home Builders. 2007. Study of Life Expectancy of Home Components. <http://www.nahb.org/fileUpload_details.aspx?contentID=72475>.

Photo courtesy of Douglas Fredrikson Architects, Inc.

Reuse & Recyclability

- Ensure reclaimed sandstone meets ASTM specifications before using for structural purposes
- Example applications:

Landscaping	Retaining walls	Walkways
Fill	Re-installation on new buildings	Statuary

ASTM STANDARDS:

ASTM C-616 "Standard Specification for Sandstone Dimension Stone"

- Includes material characteristics, physical requirements, and sampling appropriate to the selection of sandstone for general building and structural purposes.
- Classifies sandstone into three categories: sandstone, quartzitic sandstone, and quartzite. The table below lists the required test values for sandstone; the necessary tests are prescribed by and located in the ASTM standards.

PROPERTY	SANDSTONE	QUARTZITIC SANDSTONE	QUARTZITE
Density, min lb/ft³ (kg/m³)	*125 (2000)*	*150 (2400)*	*160 (2560)*
Absorption by weight, max, %	*8.00*	*3.00*	*1.00*
Compressive strength, min, psi (MPa)	*4000 (28)*	*10,000 (69)*	*20,000 (138)*
Modulus of rupture, min, psi (MPa)	*350 (2.41)*	*1000 (6.89)*	*2000 (13.79)*
*Abrasion resistance, min, hardness**	*2*	*8*	*8*

**Pertains only to stone subject to foot traffic.*