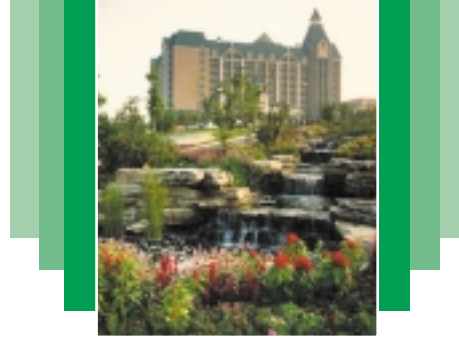




# Structural Lightweight Aggregates' Holistic Contribution to Sustainable Development





## Structural Lightweight Aggregates' Holistic Contribution to Sustainable Development

### Our Commitment to Sustainable Development

The Expanded Shale, Clay and Slate Institute (ESCSI) and its member companies are committed to the long-term performance of our products and the sustainable development of the building industry. Innovative, practical and responsible designs, combined with realistic construction practices, will contribute to the establishment of a vibrant, sustainable society. The use of lightweight aggregate will contribute significantly to sustainable development and promote the ability of future generations to meet their own needs.

Structural lightweight aggregate (SLA) has been successfully used for well over two millennia. It has had widespread use for the past eighty years. This track record of proven performance has demonstrated how structural lightweight aggregate contributes to sustainable development by conserving energy, lowering transportation requirements, maximizing structural efficiency and increasing concrete service life. The use of lightweight aggregate in site development assists designers in addressing the important issue of storm water management with on site treatment. SLA can help to reduce heat island effects by amending soil to improve landscaping and promoting the use of “green roofs.”

### What is Rotary Kiln Produced Structural Lightweight Aggregate?

SLA is a ceramic material produced by expanding and vitrifying select shales, clays, and slates in a rotary kiln. The process produces a high quality ceramic aggregate that is structurally strong, physically stable, durable, environmentally inert, light in weight, and highly insulative. It is a natural, non-toxic, absorptive aggregate that is dimensionally stable and will not degrade over time.



### How does SLA fit into the LEED™ Green Building Rating System?

The use of SLA in building designs contributes toward LEED Green Building certification credits. The Leadership in Energy and Environmental Design (LEED) system was designed by the United States Green Building Council (USGBC) to evaluate the influence of building design and construction on the environment.

SLA is a highly versatile material with many uses. Its varied applications apply to diverse areas of the LEED System. Listed below are SLA’s benefits and their relation to the six basic areas of concentration outlined in the LEED rating system.

#### LEED Rating System Summary (Version 2.1)

Category	Available Points	Points Where SLA Can Contribute
Sustainable Sites	14	4
Water Efficiency	5	3
Energy & Atmosphere	17	1+ (see note below)
Materials & Resources	13	5
Indoor Environmental Quality	15	1
Innovation & Design	5	1
<b>Total Possible Points</b>	<b>69</b>	<b>15+</b>

Note: 1-10 points can be awarded for energy cost savings of 15%-60% for new buildings and 5%-50% for existing buildings. SLA will improve the thermal performance of building materials and contribute toward obtaining these credits.



## Sustainable Sites



- Limits storm water runoff** – allows free draining of soils;
- Structural soils** – the strong, inert, ceramic nature of SLA resists degradation and will support the weight of vehicles while still allowing a healthy root system.
- Bioswales** – will help to direct runoff and filter contaminants;
- Vegetative filter strips** – supports plant growth and filters solids; SLA has been used extensively in site development and in horticultural applications for the promotion of plant growth;
- Constructed wetlands** – superb phosphorus removal properties;
- Rooftop gardens** – used in both intensive and extensive applications; blended into soil, SLA's absorptive, porous, ceramic characteristics provide critical soil aeration necessary for plant growth and survival; its lighter weight reduces deadloads on rooftop structures.

## Water Efficiencies

- Drought resistant plantings** – allows reduction of potable water use; SLA's porous characteristics serve as a moisture buffer and offer a degree of drought resistance;
- On-site sewage treatment** – supports beneficial aerobic microbial action for waste decomposition and wastewater filtration systems.

## Energy and Atmosphere

- Low thermal conductivity** – Lightweight concrete building components will increase the thermal resistance of the structural envelope;
- Mass wall construction** – thermal lag shifts the peak heating/cooling loads to off peak times;
- Low thermal bridging** – minimizes heat flow bridging around insulation products.

## Materials and Resources

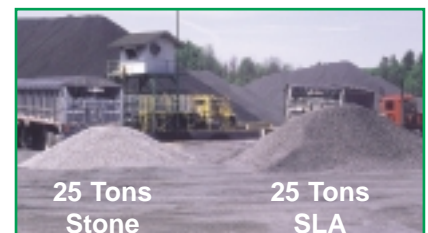
- Lightweight concrete building components** – may be used to retrofit structures with minimal impact on foundations;
- Products made with SLA are manufactured locally** – producers in close proximity to jobsites;
- SLA extracted regionally** – virtually all of United States within 500 miles radius of manufacturing location. Because of its lower weight SLA is often shipped longer distances economically.

## Indoor Environmental Quality

- Better thermal performance** – will contribute to a thermally comfortable environment;
- Not a source of food for mold** – will not contribute to sick building syndrome.

## Innovation & Design Process

- Lightweight building components** – requires fewer truckloads of material for same application. This also reduces traffic congestion and air pollution.





## Life Cycle Cost Performance

The long term value of any building material is predicated on a combination of cost, durability, functionality, and aesthetics. Life cycle costing is the only way to evaluate the performance and long-term sustainability of a material or building project. Any increased up-front cost of components manufactured with SLA is more than offset by the cost savings in the following areas: labor, lower dead loads, better fire resistance resulting in reduced concrete thickness, less reinforcing required in building frames, girders, piers, and footings. Long-term heating and cooling costs will be reduced due to the higher insulating properties and overall superior thermal performance of the building.

## Energy Performance

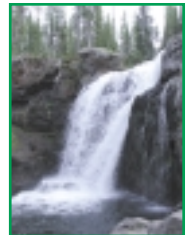
The embodied energy to make SLA includes mining, manufacturing, and transporting the material to the jobsite or building product manufacturer. The cost of this embodied energy is often paid back in a very short period of time, because of the increased thermal performance and lower transportation and labor cost associated with the building elements. Life cycle energy savings realized from using SLA will help to conserve valuable natural resources for future generations.



## The Holistic Picture

Rotary kiln produced structural lightweight aggregate is an environmentally friendly product that saves material, labor and transportation cost, as well as improves the functionality and service life of concrete. Additionally, using lightweight aggregate will lower the overall energy consumption of structures thereby reducing the associated life cycle costs throughout the structure's useful life. These benefits support sustainable development and contribute to projects becoming LEED certified.

When viewed from an overall perspective, the utilization of SLA is a small but important step forward. The lightweight aggregate industry acknowledges that for the successful achievement of truly sustainable development, a fundamental shift in attitudes, belief systems and conscious behavior must take place. Considering the fact that architecture (building performance) accounts for a major part of total U.S. energy consumption, initial cost should no longer be the sole determining criteria when evaluating the usefulness of a product or structure. All construction materials must be evaluated from a total life cycle assessment. This is the only way to determine the total impact of a product or structure. To develop a sustainable world we must shift from our current short-term ways and attitudes, to a long-term, holistic mind-set that recognizes performance and the interdependence of all life.



### Material Supplier

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