

# Expanded Shale, Clay & Slate

A World of Applications . . . Worldwide.





## A World of Uses

### *SmartWall® High Performance Concrete Masonry*

- Concrete Masonry Units (CMU's) above & below grade
- Architectural units (split face, colored, etc.)
- Larger CMU's (8" x 8" x 24", etc.)
- Prison construction
- Concrete brick (all shapes & colors)
- Segmental retaining walls
- Privacy fences & sound barrier walls
- Sound absorption walls
- Other (pre-cast lintels, loose fill core insulation, pavers, patio units, etc.)

### *Structural Concrete (including high performance)*

- Floors in steel frame buildings (fill on metal deck)
- Precast & prestressed elements (beams, double-tees, tilt-up walls, raised access floor panels, planks, hog slats, utility vaults, pipes, bridge decks, ornamentals, etc.)
- Concrete frame building & parking structures (all types, including post-tensioned floor systems)
- Floating docks, boats & offshore platforms
- Bridge decks, piers & AASHTO girders (prestressed, post-tensioned & normal reinforcement)
- Topping over precast concrete

### *Asphalt Pavement (rural, city & freeway)*

- Surface treatments (chip seal, seal coat, etc.)
- Plant mix seal overlay & open-graded friction coarse
- Hot mix surface coarse
- Micro-surfacing (slurry seal)
- Cold mix (pothole patch, minor repairs, etc.)

### *Geotechnical*

- Landscape & elevated plaza fills
- Fill over poor soils and marshlands
- Waterfront structures
- Bulkheads & retaining walls
- Structural repairs & rehabilitation
- Insulating backfill & insulating road base
- Shallow foundations
- Enveloping underground conduits & pipelines for insulation or when in unstable soil conditions
- Landfill leachate drainage systems

### *SOILMatrix™ Horticulture Applications*

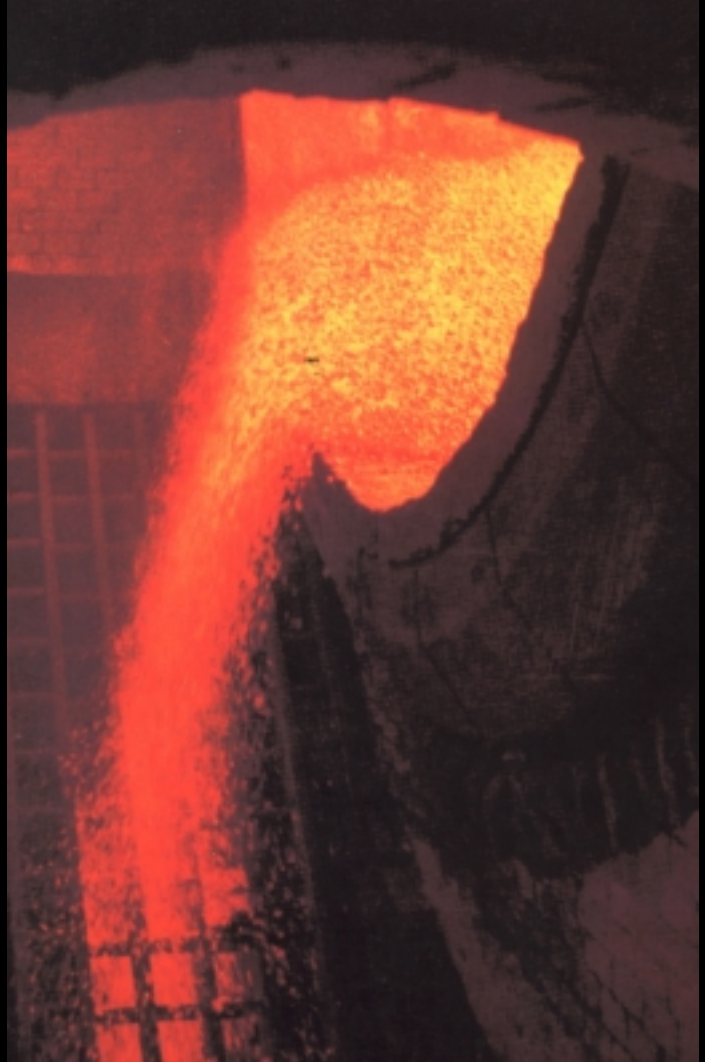
- Green roof (intensive, extensive)
- Bioswales
- Soil conditioner (planting, golf greens, potting soil, etc.)
- Soil conditioner for sports fields and dirt tracks (running, bike, horse, stock car)
- Ground cover (decorative & insulating)
- Herbicide & fertilizer carrier
- Hydroponics

### *Specialty Concrete*

- Lightweight concrete roof tiles
- Cement wallboard
- Artificial stone
- Bagged concrete mix
- Topping on wood floor systems
- Roof fill for flat roofs (insulation & slope)
- Insulating fill around temperature sensitive elements
- Refractory (fireplace logs & boxes, chimney liners, etc.)
- Insulating refractory for industrial uses in kilns, boilers, stacks, petrochemical refining, etc.)
- Ferrocement & shotcrete
- Animal & environmental structures (sewage treatment, etc.)

### *Miscellaneous*

- Medium in wastewater treatment & water filters
- De-slicking/traction grit for icy roads
- Grog for clay brick
- Coverstone & ballast on built-up roofs
- Fire protection for impermeable plastic liners



**Produced at temperatures in excess of 2000° F, ESCS aggregate offers more than twice the volume for the same weight of conventional aggregates.**

# Expanded Shale, Clay and Slate (ESCS) Structural Lightweight Aggregate's 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. We realize that to create a vibrant and sustainable society, innovative, practical and responsible designs need to be combined with realistic construction practices. The use of green products in these designs promotes sustainable development and enhances the ability of future generations to meet their own needs.

ESCS structural lightweight aggregate 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 ESCS contributes to sustainable development by conserving energy, lowering transportation requirements, maximizing structural efficiency and increasing the service life of structural concrete, concrete masonry, and asphalt chip seal. The use of lightweight aggregate in site development assists designers in addressing the important issue of storm water management by making on-site treatment a viable option. ESCS can help to reduce heat island effects by amending soil to improve landscaping and making the use of “green roofs” not only desirable, but economically feasible.



Structural lightweight aggregate particle showing interior voids



Intensive Roof Garden, North Park 400, Atlanta, GA

## The Holistic Picture



Bioswale using free-draining lightweight aggregate as planting medium

Rotary kiln produced ESCS structural lightweight aggregate is an environmentally friendly product that saves material, labor and transportation cost, as well as improves the performance and service life of concrete and other products made with it. 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 (*Leadership in Energy and Environmental Design*) certified.

When viewed from an overall perspective, the utilization of ESCS lightweight aggregate is a significant and important step forward. The lightweight aggregate industry acknowledges that for the successful achievement of truly sustainable development, a fundamental shift in attitudes, beliefs 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, and embrace a long-term, holistic mind-set that recognizes performance and the interdependence of all life.



Garden and pool over Main Street Plaza parking structure, Salt Lake City, Utah



Sedums growing in SOILMatrix lightweight aggregate medium





## Wherever you live, work or play, ESCS Structural Lightweight Aggregate improves your world!

For nearly a century ESCS (Expanded Shale, Clay and Slate) has been used

with great success around the world in more than 50 different types of applications. The most notable among these are concrete masonry, high-rise building, concrete bridge decks, precast and prestressed concrete elements, asphalt road surfaces, soil conditioner and geotechnical fills.

What is ESCS? It is a unique, ceramic lightweight aggregate prepared by expanding select minerals in a rotary kiln at temperatures over 2000° F. The production and raw materials selection processes are strictly controlled to insure a uniform, high quality product that is structurally strong, stable, durable and inert, yet also lightweight and insulative. ESCS gives designers greater flexibility in creating solutions to meet the challenges of dead load, terrain, seismic conditions, construction schedules and budgets in today's competitive marketplace.



### SmartWall® Concrete Masonry



SmartWall concrete masonry units are up to 40% lighter than traditional masonry units. This lighter weight results in increased mason productivity, lower construction costs and reduced injuries.

SmartWall masonry provides superior insulation by combining high R-values with thermal mass and low thermal bridging, and offers superior fire resistance, effective sound absorption, excellent seismic performance, low shrinkage and high strain capacity.



### Asphalt Pavement



When bonded to asphalt, ESCS creates an advanced road surface that is safer, more economical and longer lasting than conventional aggregate surfaces. Wet or dry, road surfaces of ESCS aggregate

provide superior skid resistance that is maintained throughout the surface life, because ESCS does not polish as it wears. Because it is lightweight, ESCS affords shipping and handling cost advantages to the contractor. Also, damage to windshields, headlights and paint caused by "flying" stones is virtually eliminated with ESCS, thus avoiding costly insurance claims and motorist complaints.



### Structural Concrete



ESCS structural lightweight concrete solves weight and durability problems in buildings and exposed structures. ESCS concrete has strengths comparable to normal weight concrete, yet is typically

25% to 35% lighter. ESCS offers design flexibility and substantial cost savings by providing less dead-load, improved seismic structural response, longer



spans, better fire rating, thinner sections, decreased story height, smaller size structural members, less reinforcing steel and lower foundation costs. Precast elements have reduced transportation and placement costs. The excellent durability performance of ESCS is a result of the ceramic nature of the aggregate,

and its exceptional bond to and elastic compatibility with the cementitious matrix.



### SOILMatrix™ Horticulture Applications



ESCS SOILMatrix is environmentally friendly. It is non-toxic, odorless, 100% inert and will not compress, degrade, decompose, or react with agricultural or horticultural chemicals.

It acts as an insulator in the soil

mixture and protects plants from rapid temperature extremes. SOILMatrix retains a high percentage of its weight in absorbed water and waterborne nutrients, making it an excellent buffer. SOILMatrix is user friendly because it is lightweight, inert, pH adjustable, easy to handle, economical and readily available.

### Specialty Concrete and Miscellaneous Uses



The superior qualities of ESCS are effective and economical in many other applications. Examples include roof tile, cement wallboard, artificial stone, bagged concrete mix, wood floor topping, refractory, traction grit,

insulating fill, and medium in wastewater treatment and water filters.



### Geotechnical



ESCS compacted fills are approximately half the weight of common fills. This advantage, coupled with its high internal friction angle, can also reduce lateral forces by more than one-half. It has been effectively used to solve numerous geotechnical engineering problems and to convert unstable soil into usable land.

ESCS also provides permanent insulation around water and steam line, and other thermally sensitive elements. ESCS is a reliable, economical geotechnical solution.

Expanded shale, clay and slate aggregate, as manufactured by the rotary kiln process (originally developed in 1908 and patented in 1918 as Haydite), is available throughout the world.



Rotary Kiln Produced Structural Lightweight Aggregate

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