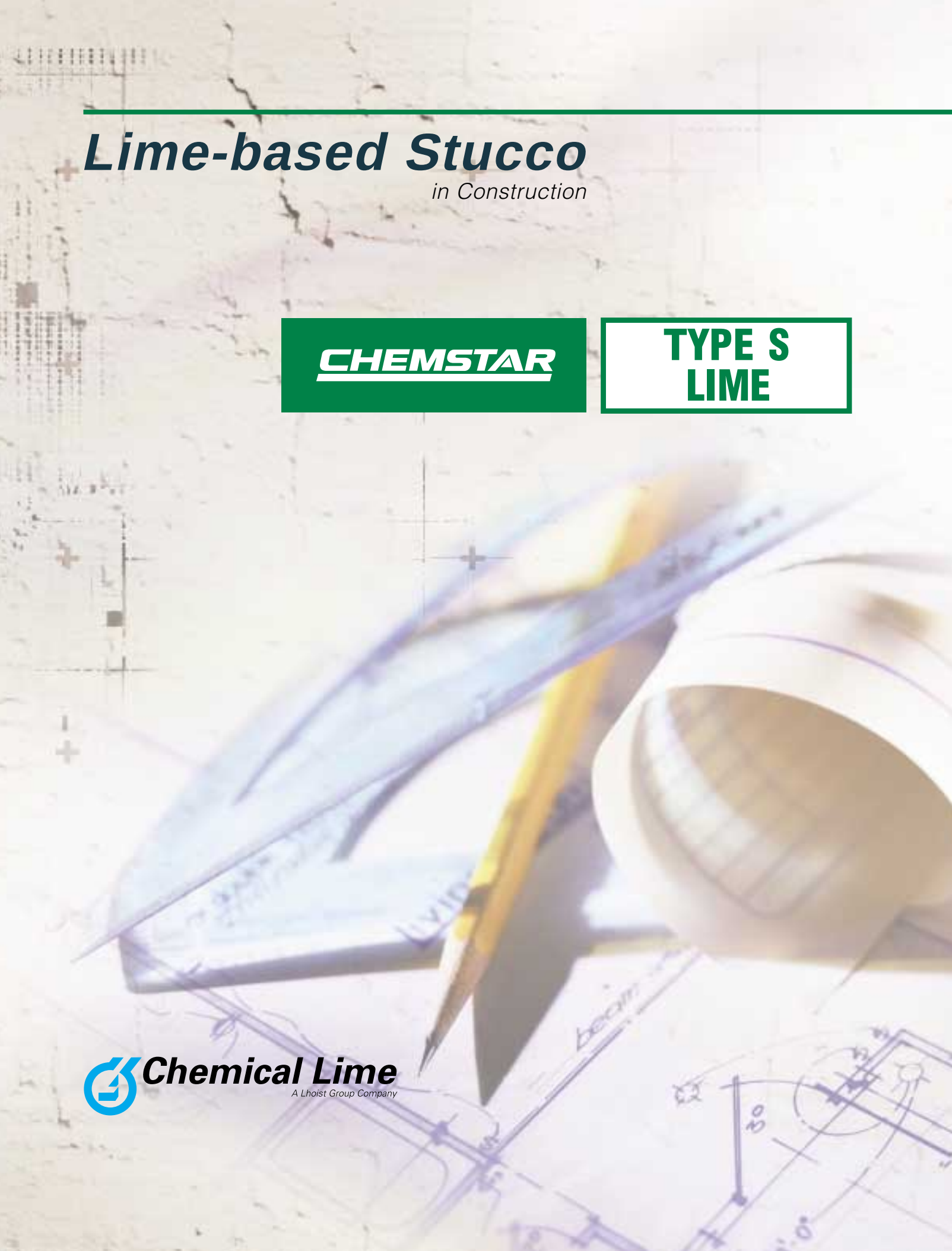
Lime-based Stucco

in Construction

CHEMSTAR

TYPE S LIME



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A Brief History

Lime-based exterior stucco has been used extensively in construction for thousands of years. The technique and style of exterior stucco depended essentially on the experience of the local craftsman in the region and the nature of the local materials. The Northeast saw a strong northern European influence with the use of lime-based stucco on soft clay brick or stone. In the Southwest, the Native American and Spanish influences were melded, whereby lime-based stuccos have been and continue to be used to cover soft adobe earthen brickwork. In California, a Mediterranean style or influence has evolved over time. Modern construction mimics these historic architectural styles, and lime-based stucco remains as a primary method of expression.

Up until the 1930's, most exterior plaster applications or stuccos were lime-sand only. Portland Cement was originally limited to concrete production, but its use in exterior renders increased with the change in construction style from all brick buildings to wood frame construction. The benefit and purpose of exterior plaster expanded from being directly applied to massive walls of brick or stone, providing only a weather barrier, to one where a degree of flexural resistance is imparted to the structure.

The addition of cement increased both the value and speed of compressive strength development, which was needed for the new building style.

Traditional Lime-based Stucco

Three-Coat System:

Lime-based stucco is typically applied using a three-coat method. The first coat (sometimes called the base, dash-bond, or scratch-coat), is applied to the substrate, which may range from porous adobe brick, to concrete masonry, to polystyrene sheets covered with wire mesh. In these cases, the first coat covers the entire substrate and is scratched horizontally while wet to provide a surface for a mechanical key.

The second coat (called the brown, or leveling-coat) evens out the bumps and hollows telegraphed from the substrate material, as well as any created by the first coat. Should water penetrate the finish coat, this second coat provides a line of defense against water penetration.

The third, or finish coat provides the decorative properties of the finish, as well as offers defense against water penetration. It is designed to take on water but let it quickly drain away. Pigment is commonly added to the finish coat (integral color), providing a long lasting color with reduced maintenance.

If the finish coat does not have integral color it can be painted. One choice of paint is to use pigment and lime slurried with water to a milk-like consistency.

Applied using the three-coat method, lime-based stucco is one of the most durable and versatile exterior wall finishes available. Used primarily to cover such non-durable materials as adobe brick, clay brick, concrete masonry blocks, and wood framing, lime-based stucco offers the durability, flexibility, breathability, and fire safety that other materials lack. In addition, lime-based stucco can easily accommodate a variety of appealing architectural styles, including today's popular Tudor, Mediterranean, Spanish, and Southern Californian styles, among others.

Manufactured Stucco Products:

Manufactured, pre-bagged, stucco products supply a large portion of the stucco market today. They provide a high degree of quality assurance as they are designed to exceed the requirements of the local market place. Finish coat products are most commonly produced by stucco manufacturers and in the western United States, Chemstar Type S lime is an important component of these mixes.

The term “One Coat Stucco” indicates that one product is used as both the brown and finish coats, with no scratch coat. In this application a flat surface is assumed. Integral color pigments are not used and the surface is usually painted with an elastomeric coating.

Why Choose Lime-based Stucco?

By adding lime to the stucco mix, you enjoy a number of important benefits, both when the stucco is wet (plastic) and after it has hardened:

- Superior workability
- Excellent water retention and evaporation properties
- Improvement of mixes containing poorly-graded or poorly-shaped sand
- Enhanced hardening properties

Workability

Lime particles in the stucco mix have a fine, plate-like surface which promotes an extremely versatile and workable mix. Its small grain size and surface chemistry allows it to thoroughly coat every grain of aggregate, enabling the aggregates to easily slide against each other, significantly improving the workability of the surface.

Water Retention

By its composition, lime particles can easily retain large amounts of water. Since cement requires water for the hydration process, this slower drying rate will reduce the tendency of cement-based stucco materials to crack.

Sand Carrying Capacity

Because lime coats every aggregate grain, it provides plasticity to the mortar. With the growing scarcity of premium river aggregates, this "forgiveness" is growing in importance. What's more, since aggregate is both the least expensive and most abundant ingredient in a mortar, the use of lime allows for maximum yield while minimizing cost. Plus, adding lime to the mix permits slight variations in field-measured sand, while retaining the integrity and quality of the mortar.

Hardened Properties

Lime naturally bonds with the aggregate during hardening, adding to the overall strength of the finish. Lime hardens by converting calcium hydroxide to calcium carbonate by reacting with the carbon dioxide in the air. As a result, the ongoing conversion heals fine cracks and fissures as it hardens, decreases water penetration, while increasing the durability of the stucco.

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For field mix design information please visit:
www.chemicallime.com

The Finish Material of Choice

While styles and tastes may change over time, lime-based stucco has stood the test as a flexible, durable and reliable exterior finish product. That's why discerning architects, contractors, and home owners specify Type S Lime in their stucco as the finish material of choice.

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Lime-based stucco decreases water penetration and allows what water or vapor, if present, to escape easily and quickly, These properties prevent the deterioration of the substrate materials while extending the useful life of the structure.

Lime-based stucco is both non-combustible and non-toxic. It provides a natural thermal sink which delays fire infiltration to combustible building materials and provides a margin of safety to building occupants.

The flexibility of lime-based stucco resists cracking from shrinkage and settling. Recent studies (Filitroult and Hall, 2000) even suggest that it resists cracking from earthquakes better than other exterior materials tested.

From an aesthetic standpoint, its workability properties make it an ideal finish that gracefully combines beauty and functionality.

Chemical Lime's Innovative Spirit

. . . has propelled it into a leadership position in today's markets. Employing technical experts in the various industries it serves, is one way Chemical Lime adds further value to its customer-supplier relationships. In the construction markets, assisting customers with product development, formulation and related testing are common practice at Chemical Lime Company.

Headquartered in Fort Worth, Texas, Chemical Lime Company has over 55 locations in North America.

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