

The Alfranjet Shotcrete System

by Jesús Gómez-Millán Roselló

For more than 80 years, Refractarios Alfran has supplied the refractory industry worldwide with materials from precast pieces to castables. During these eight decades, the company has developed, improved, and amplified its products and services to be able to provide total service to its customers. Among several important milestones in the history of the company is the introduction of the Alfranjet System of high-speed spraying, referred to as “shotcreting,” to the Spanish steel, cement, and power/energy industries.



Shotcrete in cement industry (preheater)

Alfranjet is the technology developed by Alfran for the shotcreting technique of refractory application. The Alfranjet System includes material design, equipment technology, and installation methodology.

A major advantage of the Alfranjet Shotcrete System is the ability to install at rates significantly faster than other traditional methods like gunning or vibrocasting, while achieving performance similar to linings installed with vibrocasted refractory. The system also provides cleaner and safer working conditions for people and equipment involved in the installation process.

Total Service and Refractory Solutions

Refractarios Alfran believes that its customers deserve a complete solution to their refractory needs, including design and engineering, demolition, anchoring system supply and installation, supply and application of all types of insulating materials and refractories, and after-sale service.

Due to the change in the composition of new fuels, more aggressive atmospheres are generated and remain in the atmosphere longer. This change can be attributed to enriched sulfur content from the derivatives of petroleum, high concentrations of sodium and chlorine due to the use of organic residues, and the use of other industrial by-products. In addition, the evolution of processes to reduce CO₂ emissions has resulted in the need to modify refractory materials to fit these processes. All of these changes in the refractory industries present new challenges to research



Shotcrete in lime industry (kiln)



Shotcrete in aluminum industry (furnace)



Shotcrete in power plant (boiler)



Shotcrete in petrochemical industry (chimney)



Shotcrete in steel plant (reheat furnace)



Shotcrete pumps

and identify refractories that meet these new operational conditions.

The design of a monolithic refractory must take into account all the variables that play a part in its process, such as temperature, physical and chemical exposure, installation sites, and the various methods of installation—vibrocasting, self-casting, gunning, or high-speed spraying (shotcreting). A granulometric study is required to achieve maximum refractory compaction and the use of additives that influence the physiochemistry and the rheology of the refractory materials. Following the analysis of the aforementioned information, the refractory material is formulated through a detailed study of the multiple variables that influence a refractory installation. Refractorios Alfran conducts this study in its Research & Development Laboratory. The lab contains the most cutting-edge equipment used for analysis, testing, and simulation. The laboratory staff is populated by highly trained researchers with vast experience in the refractory industry.

This design and innovation process has been applied in both new refractory projects and

remodeling projects. The shotcrete system plays a vital role due to its versatility and rapid installation rates resulting in reduced downtime and better working conditions, allowing other trades to work simultaneously. This new shotcrete equipment with increased capacities can reach optimal performance working directly from the floor with reduced manpower.

Summary

Alfran is the first European company to deliver “turn-key” Integral Refractory Services for most industrial applications. As part of Grupo Aldomer, Alfran combines the experience and resources to deliver innovative solutions to refractory requirements. Refractorios Alfran has expanded its activities from brick and castable manufacturing to high-tech installations based on shotcrete systems and engineering services, to manufacturing and installation of passive fireproofing materials.

To achieve the results expected by our clients, Alfran recognizes that skill and knowledge are important from the design stage all the way to the job site. Refractory shotcrete installations require a very

professional and experienced team, both for operating the pump/mixer and projecting at the nozzle. Installation crews are carefully selected and trained to understand the entire process, not just the task.

The Alfranjet Shotcreting System has been a primary tool since 1997. To date, Alfran has

successfully performed in over 500 projects in Spain, France, Portugal, and Mexico in steel, cement, lime, petrochemical, aluminum, incineration, and power plants. Alfran is committed to continue meeting refractory demands from the easiest to the most complex projects.



Shotcrete rotary kiln



Jesús Gómez-Millán Roselló is the Industrial Engineer and Engineering Manager of Refractorios Alfran S.A. Since 1998 he has managed specialized teams responsible for

shotcrete projects in Europe, South Africa, and Mexico in steel, cement, lime, petrochemical, aluminum, incineration, and power plants. He is involved in the Alfranjet shotcrete process and has developed formulas and systems for refractory shotcrete methods.