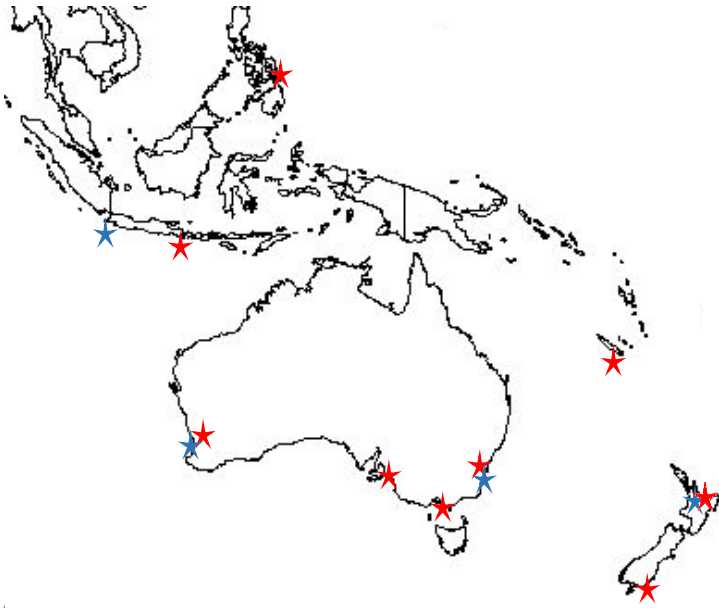




SHINAGAWA



★ Manufacturing Location

★ Sales Office/Agency



REFRATORIES FOR THE ALUMINA INDUSTRY

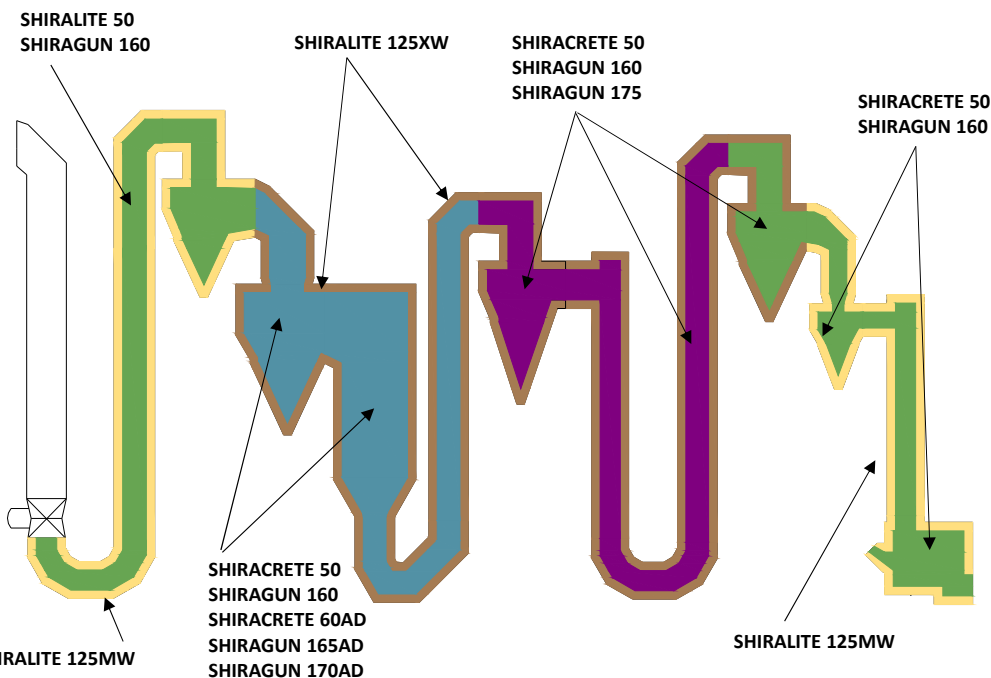


GLOBAL PROVIDER OF THERMAL SOLUTIONS

Shinagawa is a major supplier of product and design knowledge into the regional alumina industry. We have an extensive product range that has proven performance in production of calcined alumina.

Fluid Bed Calciners

Shinagawa has developed a range of abrasion resistant materials to meet the performance requirements of this operating environment. **SHIRACRETE® 50** and **SHIRAGUN® 160** are mullite based low cement castables used throughout the calciner vessels where abrasion resistance is required. The **SHIRAGUN** technology has the advantage of delivering low cement technology properties with the associated advantages of a gunned installation. Andalusite containing castables, **SHIRACRETE 60AD** and **SHIRAGUN 170AD**, have been formulated for application in the furnace where a combination of abrasion and thermal shock resistance is needed. The low cement castable hot face products are complemented with **SHIRALITE® 125XW**, an insulation product that can be either installed by casting or gunning. The **SHIRALITE 125XW** is formulated to provide both the strength and the insulation properties to meet strict thermal design criteria. A schematic listing some of these product recommendations is attached below.



As part of the alumina production process, caustic soda is recovered and put back into the digestion. The refractories used in rotary kilns and associated equipment require good alkali resistance and Shinagawa has developed **SHIRACRETE 50KN** and **SHIRAGUN 160KN** to provide the necessary performance.

Shinagawa also supplies a range of brick and monolithic products for use in spent Liquour purification kilns (rotary and fluid bed) and Oxalate kilns.

Project Management Capabilities

Shinagawa has an extensive range of proven products that have been installed into alumina calciners in Australasia, the Americas and most recently the Middle East. This product range is complemented by specific design and project management skills that add value to the specific project. The service package includes:

- Selection of the correct refractory products to meet performance and thermal design criteria.
- Design of the refractory lining to incorporate recommended anchors to suit the specific vessel profile.
- Incorporates Thermal heat transfer analysis, FEA and CAD .
- Purchase of anchors and other ancilliary items.
- Supply of a mobile laboratory for onsite testing.
- Supply of technical personnel to assist with accreditation of lab and refractory installation personnel.



Reference List

Listed below is a reference list of recent greenfield projects where Shinagawa has supplied both product and a range of project management services.

- Alcoa of Australia – Wagerup #4 and Pinjarra #7
- Alcan Gove - 2 off 3500TPD calciners and 2 off liquor purification units
- Queensland Alumina - 3 off 4500TPD calciners
- Rio Tinto Yarwun (Stage 2) - 2 off 3500TPD calciners
- Ma’aden Alumina Refinery - 2 off 3500TPD calciners

Shinagawa also supplies refractory for ongoing Maintenance to:

- Alcoa of Australia
- Alcoa World Alumina Brazil
- Queensland Alumina
- Rio Tinto Yarwun