PRECAST BIG BLOCK SOLUTIONS FOR COKE OVENS
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Introduction

Dickinson Group of Companies was founded in 1910 followed by the establishment of its furnace service business in 1928. The company has more than 85 years experience in providing Specialist Furnace and Industrial Services to the mining, metals smelting, mineral processing, thermal power generation and petrochemical refining industries.

VISION

Dickinson Group of Companies’ Vision is to be a Leading provider of Furnace and Industrial Services

MISSION

Dickinson Group of Companies’ purpose is to provide an integrated and multidisciplinary “One Personalised Solution” by offering essential furnace and industrial services, which increase productivity and performance together with reducing costs for our customers.

CERTIFICATION

Dickinson Group of Companies is certified to OSHAS 18001
Dickinson Geographic Presence - Footprint

Office Locations
- Dickinson South Africa
- Dickinson Zambia
- Dickinson Mauritius
- Dickinson Tianjin China
- Dickinson – Menco, Egypt
- Angola Representative Office
Dickinson Office & Workshops

Total land area: 14,000 m²
Total buildings (including offices, workshops & warehouses): 8,500 m²
Services

- Furnace Rebuild Projects
- Refractory Installation Services
- Furnace Demolition Services
- Silo Cleaning Services
- Industrial Vacuum Services
- Catalyst Services
- Deep Level Mining Services
- Turnkey Mechanical Projects
- Heavy Industrial Demolition Services
- Metallurgical Advisory Services
Products
Industrial Sectors
Industries we serve

- Aluminium
- Glass
- Platinum
- Iron, Coke and Steel
- Copper
- Ferrochrome & Ferromanganese
- Cobalt
- Heavy Sands
- Nickel
- Power Plants
- Lead Smelter
- Cement & Lime
- Chemical & Petrochemical
- Power Generation
- Vanadium
- Ceramic
- Refractory Manufacturing
Global References
Precast Refractory Shapes

- Over 25 years experience
- State-of-the-art Production Facilities
- Stringent Quality Control Measures
- Latest Polystyrene Cutting & Mould Design Technology
- Licence agreements in engineering and design technology
- 20 Ton Overhead Crane Capacity
- High Intensity Paddle Mixers (50kg to 1000kg)
- Reliable & Efficient Service
- Ensuring Extended Service Life
- Revolutionary patented design technology that increase product quality, installation speed and performance
- An established an alliance with US based Vanocur Refractories, an industry leader in innovative design, manufacture and repair of coke ovens utilizing “Big BLOCK Solutions.”
Latest Polystyrene Cutting & Mould Design Technology

- Every component is designed with the latest in 3D parametric computer modelling software
- State-of-the-art technology
- High quality products for our customers.
- Tight tolerances
- Experience
- Innovation
- Design expertise
High Intensity Paddle Mixers

- The new technology range of high intensity paddle mixers for more consistent mixing with the capacity to mix from 50kg to 1000kg.

- The mixers have automatic water and mix timing functions.

- New adjustable high frequency vibrating tables able to handle big block casts.
Programmable Drying Furnace

- New adjustable programmable drying furnace capable of drying precast blocks from 2.5 meters to 10 meters in length.
- Environment temperatures during installation and dry out influence the ability to drive off the chemically combined water.
- The refractory materials are heated to a temperature between 850 and 1000 °C to form a ceramic bond.
Precast Products for Ferrous and Non Ferrous

- Aluminium Melting Furnaces
- Coke Oven
- Boilers
- Rotary Kilns
- Kiln Hood
- Clinker Coolers
- Sinter Plants
- Shaft Kilns
- Combustion Chambers
- Burners
- Launders
- Ladles
- Feed Chutes
Precast Big Blocks for Coke Ovens

World-class design, production and installation of Big Blocks:

- Mould Production
- 3D Engineering Design
- Big Blocks Production
- Curing and Drying
- Delivery
- Demolition
- Installation
- Repairs and Maintenance
Why big block precast shapes?

- Big Block Solutions have an average of 89% less joints and 81% less mortar area which improves resistance to hot metal penetration and reduces gas emissions.
- Large cast sections versus bricks ensures less joints and faster installation.
- Hot repairs can be speedily done on furnaces
- Better consistency of product and installation.
- Lower carbon footprint and emissions.
- Large modular blocks streamlines installation
- Intricate shapes and purpose designed products that would not normally be possible with bricks or conventional monolithic installation methods.
Methodology

- Components are designed using the latest in 3D parametric modelling software and placed in assemblies to visually inspect the form and fit of our modules.

- Customers are able to view what their final product will look like and how it will be assembled before the first component is made.

- A 3D file is sent to our CNC milling station and the mould parts are cut from large foam blocks.

- By automating the mould production phase the amount of time required for mould assembly is significantly reduced.

- The patented Modular Cast Block (MCB) is made with Vanocast. Vanocur’s exclusive material, which is far superior to traditional silica brick reducing spalling and cracking due to thermal shock.

- This technology allows our staff to hold tight tolerances and produce the highest quality coke oven repairs in the industry.
Methodology
Quality Control and Delivery

- At this stage of production, the blocks are carefully measured and visually inspected one final time.
- The blocks are then labelled, palletized and wrapped.
- Foam inserts and wood blocks are used for protecting the modules during shipment.
Demolition

Use of heavy machinery for tear out and manual labor for cleaning up
Installation
Benefits and Cost Savings

- **Labour Efficiency**
  - Eliminates up to 2/3 of the required labour hours necessary for installation by traditional methods.
  - One Modular Cast Block (MCB) replaces nearly 30 traditional silica shapes.

- **Faster Installation**
  - A 3 month installation process, which can be a drain on productivity and revenues, is reduced to mere weeks.
  - The large modular blocks, with the tongue and groove design, helps to streamline the process of installation.
  - The oven taper is BUILT INTO the modules. The guess work is taken out of building coke ovens.
  - Unlike traditional silica bricks that require multiple weeks for start-up, the modules require less than 48 hrs heat up before the flues can be lit off.

- **Safer Operations**
  - Dickinson continually seeks for methods to create a safer work environment.
  - Historically, most incidents occur within the groups of "outside contractors" and "maintenance"; coke oven repairs fall under both of these categories.
  - A shorter demolition and rebuild with fewer workers equals less opportunities for an accident.
Benefits and Cost Savings

Our patented products provides immediate and future cost savings.

- **Fewer Installers:**
  A typical through-wall rebuild with traditional silica brick would require 60 skilled bricklayers. The Big Block module rebuilds average between 10 and 12 labourers/riggers.

- **Riggers vs Bricklayers**
  Unlike traditional repairs, the big Block repairs do not require skilled bricklayers and are installed with rigging equipment. In a time where skilled bricklayers are at a premium, the installation cost can be greatly reduced by using either in-house personnel or contracted labourers/riggers.

- **Minimal Loss of Coke Production**
  Total average completion for a double through-wall replacement from push-out to charge-in is 30 days. This can be accomplished through a combination of mechanical demolition and installation of modules that are displacing approximately 30 traditional silica bricks at one time.

- **Reduced Post Maintenance Costs**
  With the use of VANOCAST, spalling and cracking due to thermal shock are greatly reduced. This translates into reduced need for spraying and patching.
Business Alliances

USA
- Brick Solutions
- Haldor Topsoe

DENMARK
- M&S Group of Companies

SOUTH AFRICA
- Taylor Studwelding Systems Limited

UK
- Soyer

FRANCE
- Fives

EGYPT
- Menco Group
- Borg El Arab for Steel Fabrication
- Vanocur Refractories, LLC

GERMANY

USA
Dickinson Group
Attributes and Benefits

- Specialist and experienced personnel
- Global Footprint
- Global Alliances
- Dickinson Group Attributes and Benefits
- Inherent Innovative Culture
- State of the Art Equipment
- Certification: OSHAS 18001
Dickinson Group of Companies provides a “One Personalised Solution” and strives to be your preferred partner and supplier.

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