

# Case Study

How **Ultralite™** is saving **energy** and **improving production yields** within many of India's Ceramics Manufacturers



Mantec Technical Ceramics continues to be successful in supplying its energy efficient ceramic insulation material, Ultralite™, within the sub-continent of India. This Case Study serves to outline the key benefits that the following companies have enjoyed in the utilisation of Ultralite within the base of their tunnel kiln cars:

- Anchor Sanitaryware
- Sonya Ceramics
- Solar Ceramics
- Shiv Shakti Ceramics

## What is Ultralite?

Ultralite™ is a unique lightweight refractory material that has excellent thermal insulation properties. Its thermal characteristic is now proving itself within the Tableware, Sanitaryware and Brick and Tile Manufacturing industries saving significant energy and costs associated with the overall kiln operation.

Ultralite™ is designed to replace the more traditional insulation material within kiln car bases without any of the growing concerns associated with the health and safety implications of ceramic fibres. Ultralite™ is now proving to be a real alternative choice for the energy conscious manufacturer.

## Anchor Sanitaryware

Anchor operates two major facilities which produce around 4,000 pieces per day. The company was established in 1970 by Mr Suresh Sompura with day-to-day management now being undertaken by his son Dushyant Sompura. Anchor Sanitaryware is well known throughout South Asia for its quality products.

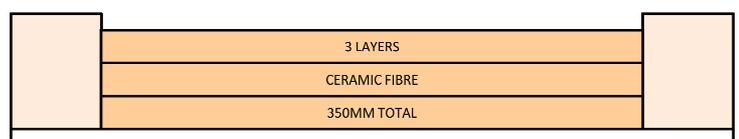


In 2011, Anchor Sanitaryware embarked on an energy saving program to improve firing efficiencies and placed an initial order for 80m<sup>3</sup> of Ultralite™, since then it has rolled out a programme of Ultralite use across its entire sanitaryware manufacturing operation to continue to save energy and improve profits.

## Original Kiln Car Construction

The tunnel kiln has a total fleet of 153 kiln cars, each car being around 2.5m wide x 1.5m long, with a cavity depth of 350mm.

The insulation material employed within the original construction comprised 3 layers of ceramic fibre, within a cavity surrounded by a periphery wall.



## New Kiln Car Construction



An efficient, low density insulation material was the target to help reduce the amount of energy consumption within the kiln car base. Anchor decided to completely redesign the kiln car to maximise the Ultralite benefit, this included new lightweight periphery blocks, new kiln furniture and supports all of which contributed to the saving. Clearly, in volumes terms the construction was made up largely of Ultralite to a depth of 340mm, topped with a 12mm fibre blanket.



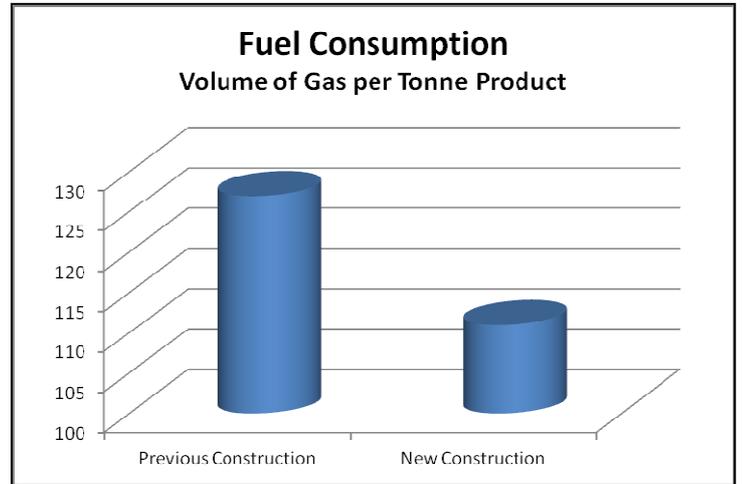
### Benefits

Following the kiln car modifications, a comparison was made of the fuel consumption allied to the new construction when compared with the previous construction. In order to demonstrate a fair comparison, the data was collected in terms of quantity of gas per tonne of product fired. Readings were taken during 2011 with the average fuel consumption falling from 127 m<sup>3</sup>/Tonne to 111 m<sup>3</sup>/tonne, **an average saving of 13% on fuel.**

### Summary

The decision to switch to Ultralite by Dushyant Sompura demonstrates the same experienced vision exhibited by Mr Suresh Sompura when he first founded Anchor Sanitaryware.

As Anchor Sanitaryware have always said: "As the advanced technologies are being introduced, we embrace it to improve our production capacity, product quality and improve our cost base."

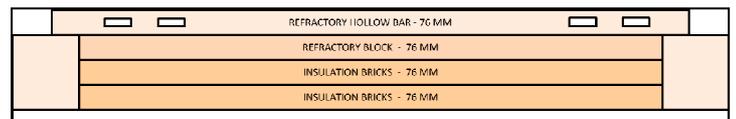


## Sonya Insulators

Ahmedabad based Sonya Insulators manufactures a range of Low Tension Insulators and Technical Ceramics. In 2011, the company embarked on a major kiln car modification programme, investing in Rs 488000 (\$9,500) in new insulation and refractories.

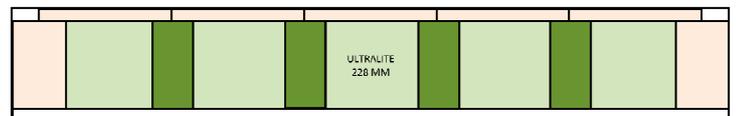
### Original Kiln Car Construction

The Tunnel Kiln has 26 kiln cars, each car measuring approximately 1.6m x 0.7m. The kiln car bases were originally of solid refractory brick construction. Whilst robust, this construction traditionally acts as a heat sink and serves to exert quite a pressure on the wheel bearings.



### New Kiln Car Construction

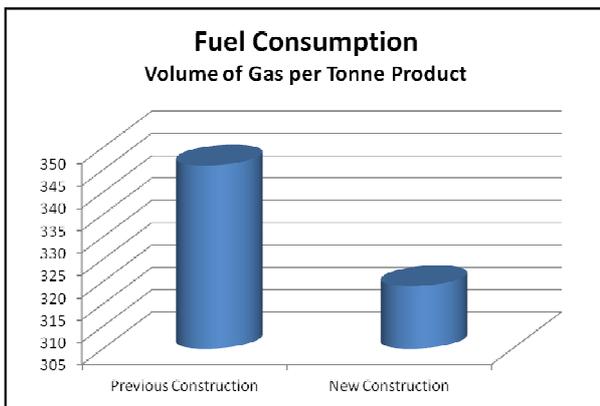
The new construction was designed to retain the support for the super-structure of the kiln car, but the refractory bricks in the main body of the base were replaced by Ultralite, providing a kiln car base that was lighter by some 25%.



## Benefits

A comparison was made between the fuel consumption both before and after. The comparison was measured in terms of volume of gas used per tonne of product fired.

The average gas consumption measured prior to the kiln car conversion was 346 m<sup>3</sup>/tonne of product. Following the conversion, the consumption was measured at 319 m<sup>3</sup>/tonne, representing a **saving of 8% of the fuel cost.**



The company benefited from the lighter kiln car construction on several fronts. The lighter car exerted less pressure on the wheel bearings, resulting in less maintenance. In addition, the kiln cars cooled down more quickly post kiln due to the lower density and the natural behaviour of the Ultralite insulation material. This meant that the re-loading of the cars could be carried out sooner improving kiln turnaround times.

## Summary

In today's world, the cost of energy is forever reported to be on the increase. Recognising this, Sonya Insulators have already started to take significant steps to reduce their fuel costs. The use of Ultralite has contributed considerably to this energy reduction programme.

## Solar Ceramics

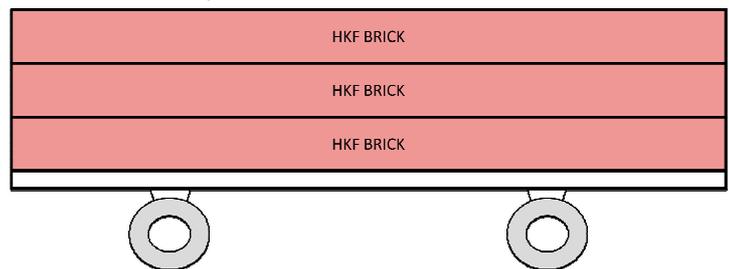
Solar Ceramics, run by Mr. Purushottam Patel and his Sons, is a small Stoneware Pottery manufacturing unit located at Naroda G.I.D.C., Ahmedabad. It is a traditional manufacturing unit using, conventional technology, although the company employs a modern tunnel kiln for the firing of its ware.

The company has recently recognised the potential of Ultralite™ and consented to carry out a trial using Energy Efficient Ultralite™

to replace the existing Solid HFK Brick insulation within the kiln car bases, such that energy savings and reduced firing costs can be explored. Following very successful trials, Solar embarked on the conversion of their remaining kiln cars as follows:

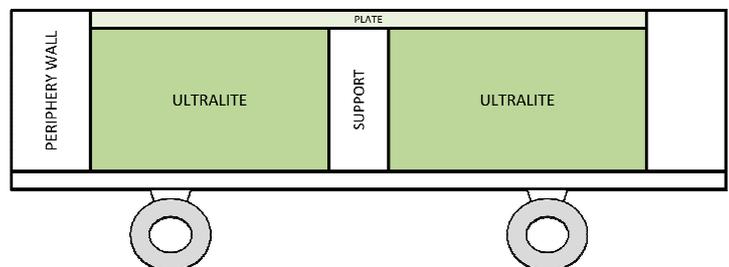
## Original Kiln Car Construction

The original construction of the Kiln Cars can be seen from the diagram below. The kiln cars measure 1790mm long x 790mm wide x 267mm deep.



## New Kiln Car Construction

For the new construction, a periphery wall was constructed from HFK Brick, to a corresponding depth of 267mm. The inner cavity was filled with the Energy Efficient Ultralite™ material, which was capped with a loadbearing capping plate.



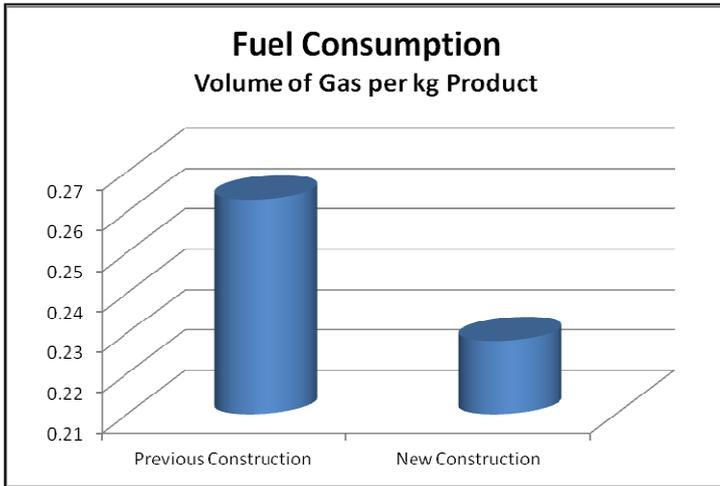
## Benefits

**Reduction in Weight** - The greater the weight saved within the construction, whilst still providing adequate insulation, the more energy can be saved. This results in less fuel being used and significant financial benefits gained. The modifications to the kiln car bases resulted in a considerable overall weight saving of 17% .

The initial trial was undertaken within the Tunnel Kiln in similar conditions to those used for normal production. The fuel consumed per cycle was recorded with the original and Ultralite kiln Cars in the firing zone and then conclusions drawn. Following the success of the initial trial, the full fleet of 34 kiln cars was converted.

Comparisons were analysed between the consumption of fuel gas both before and after the reconstruction of the kiln cars. Prior to

the change in kiln car construction, the average consumption was 0.2628 m<sup>3</sup> per kg, compared with 0.2280 m<sup>3</sup> per kg after the modifications, representing a saving of 13%.



This new construction also meant that Solar could now use the bottom deck on which to place products. Previously this had been left blank because the kiln car had a tendency to under fire the ware, this has now been eliminated resulting in increased production yields.

## Summary

Solar has not only enjoyed the same benefits as its peer companies in deploying Ultralite as an energy efficient insulation material, but has also profited from increased production yields as a result of improving the overall design of the kiln car bases.

## Shiv Shakti Ceramics

Naroda based Shiv Shakti is headed by Mr Dinesh Patel. The company produces Stoneware for the Indian market and employs a 32 car Tunnel Kiln for the firing of its products.

## Kiln Car Construction

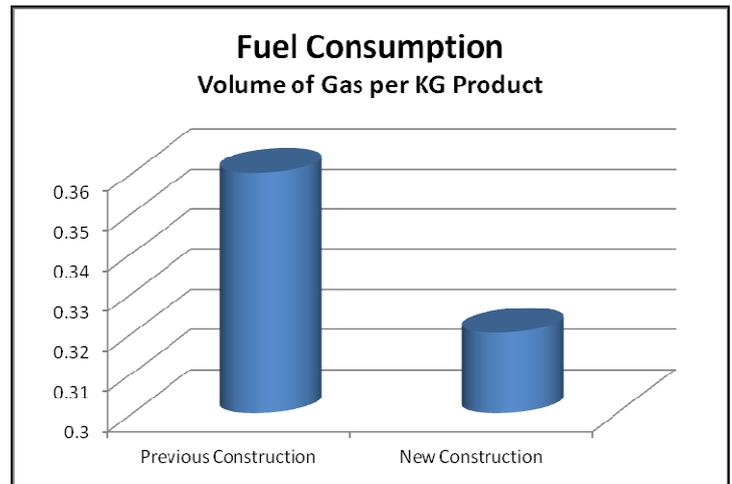
The original kiln car construction was constructed from Hot Face Kyanite bricks, having a density of around 1100 kg/m<sup>3</sup>. The cars measure almost 1 m square and the base has a depth of 180mm.

In line with the company's forward thinking policy to improve energy efficiency, the kiln cars were re-designed, incorporating a periphery wall around the perimeter of each car, and filling the void with Ultralite, which has a density of just 75 kg/m<sup>3</sup>. The construction was completed with load bearing cover slabs, placed on structural

support posts. All 32 kiln cars were converted as part of the kiln car improvement programme.

## Benefits

The average fuel consumption prior to the modifications was 889 SCM per day, which was apportioned as 0.36 m<sup>3</sup> per kg of product produced.



Following the kiln car modifications, the average gas consumption was 788 SCM per day, representing 0.32 m<sup>3</sup> per kg of product. This demonstrated a saving of 11.45% in fuel cost.

## Summary

Since the kiln car modifications, Shiv Shakti Ceramics are enjoying the benefits of Ultralite as a highly energy efficient, safe and easy to use insulation material within the design of their kiln car bases.

For more information please refer to the contact details below:

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