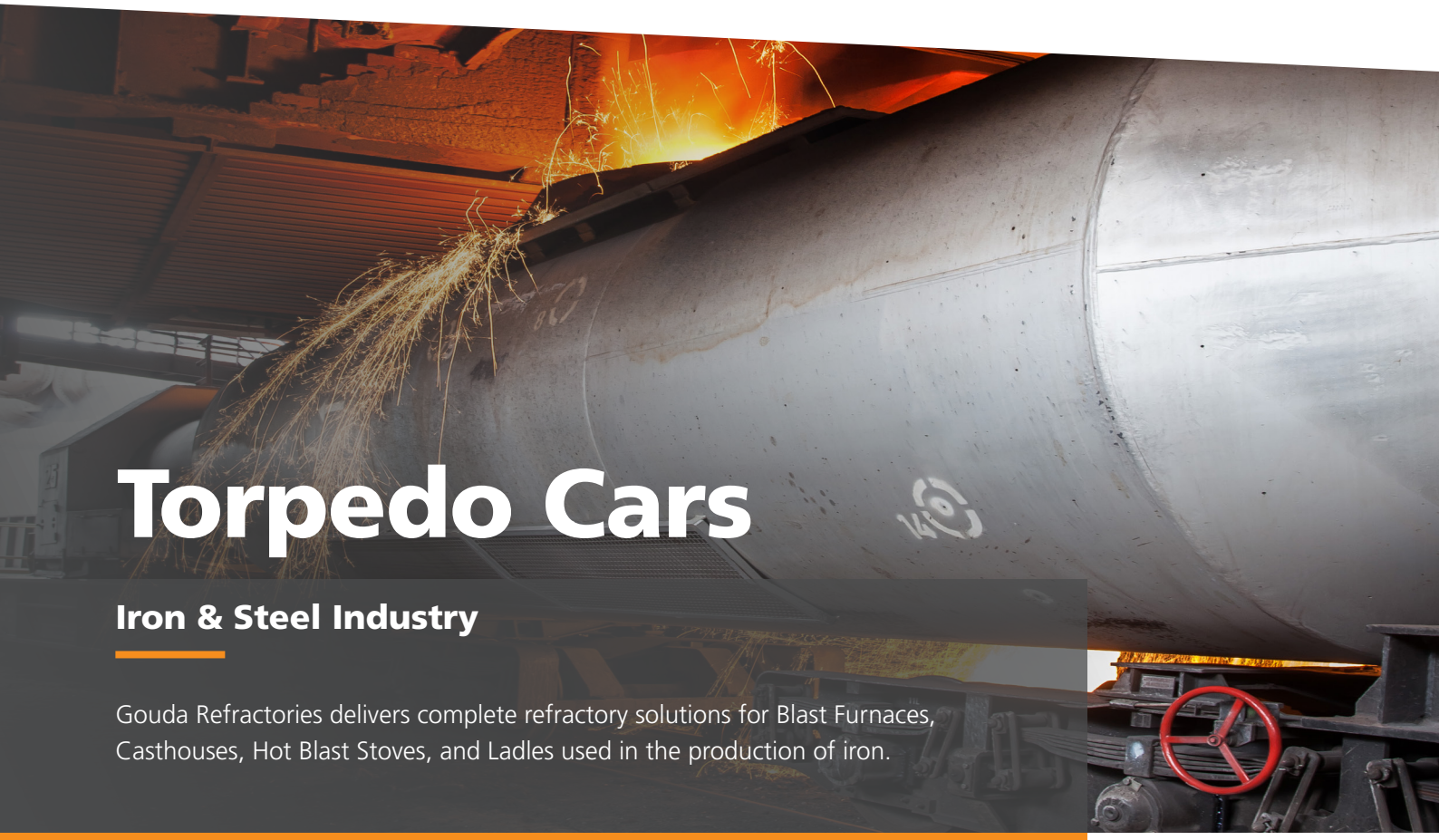
GOUDA refractories



Torpedo Cars

Iron & Steel Industry

Gouda Refractories delivers complete refractory solutions for Blast Furnaces, Casthouses, Hot Blast Stoves, and Ladles used in the production of iron.

Since 1901, Gouda Refractories has proven that the company adds extra value when designing and producing refractory linings. Its state of the art production facilities does not just deliver refractory bricks, monolithic and precast shapes, but offers worldwide customer-specific total solutions for the iron & steel, non-ferrous metals, petrochemical, environment & energy and cement industries.

LRQA CERTIFIED ISO 9001

Scope **A-Z**

Since 1901

Dedicated product range

Every industry has its own specific challenges and demands. Whether it concerns a greenfield project or maintenance, Gouda Refractories seamlessly matches the design and the choice of materials to the specific needs of the industry and the process. Longevity, ease of installation and consistency are all top priorities. Through dialogue and cooperation with the customer, products can be developed for any specific application.

Torpedo cars have specific requirements for refractory materials, due to different iron qualities, operating practices and heat loss efficiencies. These differences in the process mean that different types of refractory material are required for each steel plant. With its unique product line, Gouda Refractories has solutions for process-specific problems such as mechanical and chemical wear, thermal shock, mechanical stresses and heat loss. Gouda Refractories delivers high-quality, tailored products for the critical stages of the steel production process.

SHINAGAWA REFRA GROUP

GOUDA refractories

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Introduction

At many steel plants, heat loss reduction of the torpedo cars is desired, so the pig iron from the blast furnace has a higher temperature at the steel plant. In this way the scrap input in the converter can be increased (or the pig iron input can be reduced). This can be realized by adjusting the refractory lining.

Semi-dense semi-insulating brick FI45-20

Due to the heavy load of the pig iron in the torpedo car and the movement during transport, the dense chamotte back-up lining could not be replaced by an insulating lining due to the risk of crumbling of this insulating lining and risk of break-outs of pig iron. Gouda Refractories developed a semi-dense brick called FI45-20; this brick has the strength of a dense brick but with a lower thermal conductivity; FI45-20 therefore has a better insulation value. This brick has been successfully installed in back-up lining of torpedo cars since 2017 with a measured, significant reduction in temperature (heat) loss of the pig iron.

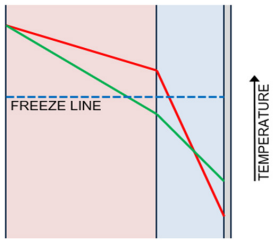
Applying MengerCoating MC-1 by brush and roller

MengerCoating MC-1

Repairs to the wear-lining have shown that the solidified pig iron in the wear-lining and the (new) back-up lining were "fused' together in some locations. This was because the torpedo car's better insulation changed the temperature profile in the lining. The freezing isotherm (solidification temperature) of the pig iron was therefore also contained in the back-up lining. This "thermal" problem is inherent to the better insulating of the lining. See below.

Schematic heat transfer through the refractory lining:
The red line indicates that a better insulating back-up layer shifts (compared to the green line) the freezing isotherm into back-up lining.

This is a standard thermal problem: when reducing the heat losses, there is an increased risk of liquid metal penetration into the non-resistant back-up layer, thus reducing the refractory lifetime.

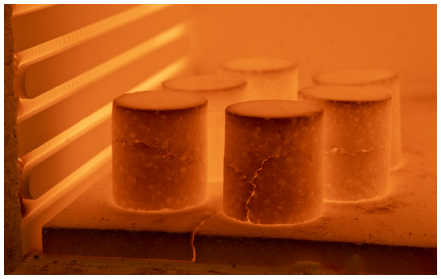


MengerCoating MC-1 ("Menger" meaning Torpedo Car in Dutch) was developed to prevent/ minimize this pig iron penetration in the back-up lining.
This coating is based on Alumina/SiC and is similar to the mortar (HS 180 K10 TP mortar for torpedo car developed and produced by Gouda Refractories). This mortar has been in use with the ACS wear lining (Alumina Car SiliconCarbide resin bonded bricks) for over 15 years.
The coating was further developed in cooperation with the brick laying department of TATA to optimize workability (applying by brush or paint roller) and setting time.

Heat setting mortar HS 180 K10 TP

Heat setting refractory mortar HS 180 K10 TP is a corundum based mortar. Due to a small amount of silicon carbide, HS 180 K10 TP shows a good resistance against aggressive slags. HS 180 K10 TP is especially developed for use in torpedo ladles in the steel industry.

Datasheets are available upon request.



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