

UNIFRAX APPLICATION STORY



Product Solution: Saffil® M-Fil Modules
Industry: Ferrous
Application: Forge Furnace
Location: France

FEBRUARY 2018

Business Challenge

The end user for this application is a specialist in upmarket metallurgy, a world leader in designing, developing and industrialising high-performance steel, superalloy, and aluminum or titanium parts. They provide highly reliable metallurgical solutions and are dedicated to providing the correct solutions in metallurgical grade design and production, atomizing, forging, rolling, closed die-forging and heat treatment.

It is essential that the materials are provided with the right characteristics for specific application requirements. The manufacturing phase is based on a strict, atmospheric or vacuum production process followed by re-melting to obtain special steels, alloys and superalloys. The metal is then processed by atomizing, rolling, forging or closed die-forging.

Application

One of the hot working processes involves the forging of metal components; typically these are in the aerospace, energy or defense sectors. Several metal ingots are placed on a rolling hearth and heated up within a forge furnace to the required temperature necessary for the forging process. The temperatures involved can be as high as 1300 °C. After a specific time period the pieces remove one by one for forging. This process requires the furnace lining to be low thermal mass to allow multi-cycles without compromising productivity. The lining must also be able to withstand the physical and thermal demands for this application. This was the third furnace to have this critical zone revamped. The decision to proceed with a lining solution from Unifrax was based on the previous successful experiences. The material choice and lining designs, based on Anchor-Loc® Modules from Unifrax, have been proven to meet the efficiency requirements.

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“PROVEN EFFICIENCY IN PREVIOUS FURNACE LININGS”

Solution

An internal lining for the walls and roof of the forge furnace based on using the proven Saffil M-Fil grade Modules was chosen as the ideal solution for this application. The high temperature resistance and low thermal conductivity met the client's operational and energy saving requirements. The polycrystalline chemistry (PCW) of Saffil also passes EU regulatory requirements for health and safety. (Photo-1)

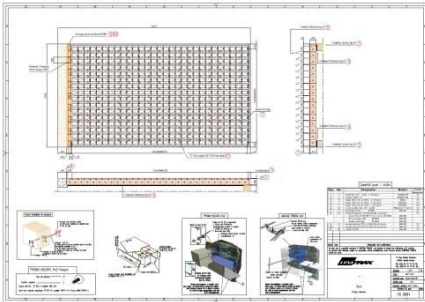


Photo-1 Lining drawing developed by Unifrax
The lining was 300m thick Saffil M-Fil grade modules 110 kg/m³ density, edge-stacked, with the RX2 type fixing system. The modules were installed over a back-up layer of Insulfrax SF Blanket (aluminium foil faced) 25mm thick, 128 kg/m³. The installation was a uni-directional system with a single batten of Fibermax Blanket, 13mm x 128 kg/m³ between rows of modules compressed down to 9mm during installation. We worked closely with the client and supplied a special packaging system for the modules. In order to maintain the compressed width these modules are supplied with wooden side plates and banding straps. For this project we provide modules with carton (cardboard) plates and 6 straps. (Photo-2 & Photo-3)



Photo-2 Modules with special straps



Photo-3 Module lining on the roof and walls before tamping

The rectangular furnace was about 9.500 metres long and 5.100 metres wide and 3.000 metres high. The modules were supplied as square blocks 300 x 300mm. The base of the furnace side walls were lined with a refractory castable. This was based on previous experience. In the past the fibre lining had suffered mechanical damage by the roller hearth. (Photo-4)



Photo-4 Refractory lining to the base of the walls

The installation of the lining was carried out quickly. An installation team of 6 people took one week to install around 850 modules successfully and the unit was put into service on schedule. (Photo-5)



Photo-5 Lining during the installation

Customer Advantages

The Application Engineering team at Unifrax worked closely with the client and delivered a bespoke lining solution. This was accomplished by providing detailed design and engineered drawings and project support for the Saffil M-Fil Module installation.

The benefits included a thermally efficient lining system with proven performance. The ease of installation allowed for a reduced time on site, allowing the furnace to be put into service quickly upon completion. As a Non-classified solution, this installation was carried out within EU Health and Safety regulations.

About Unifrax

Unifrax is a global leader in high-performance specialty products used by many industries in a diverse group of industrial applications. Our products provide substantial improvement in thermal performance, save thousands of dollars in energy costs and can help reduce your operations environmental footprint.

Contact Us

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