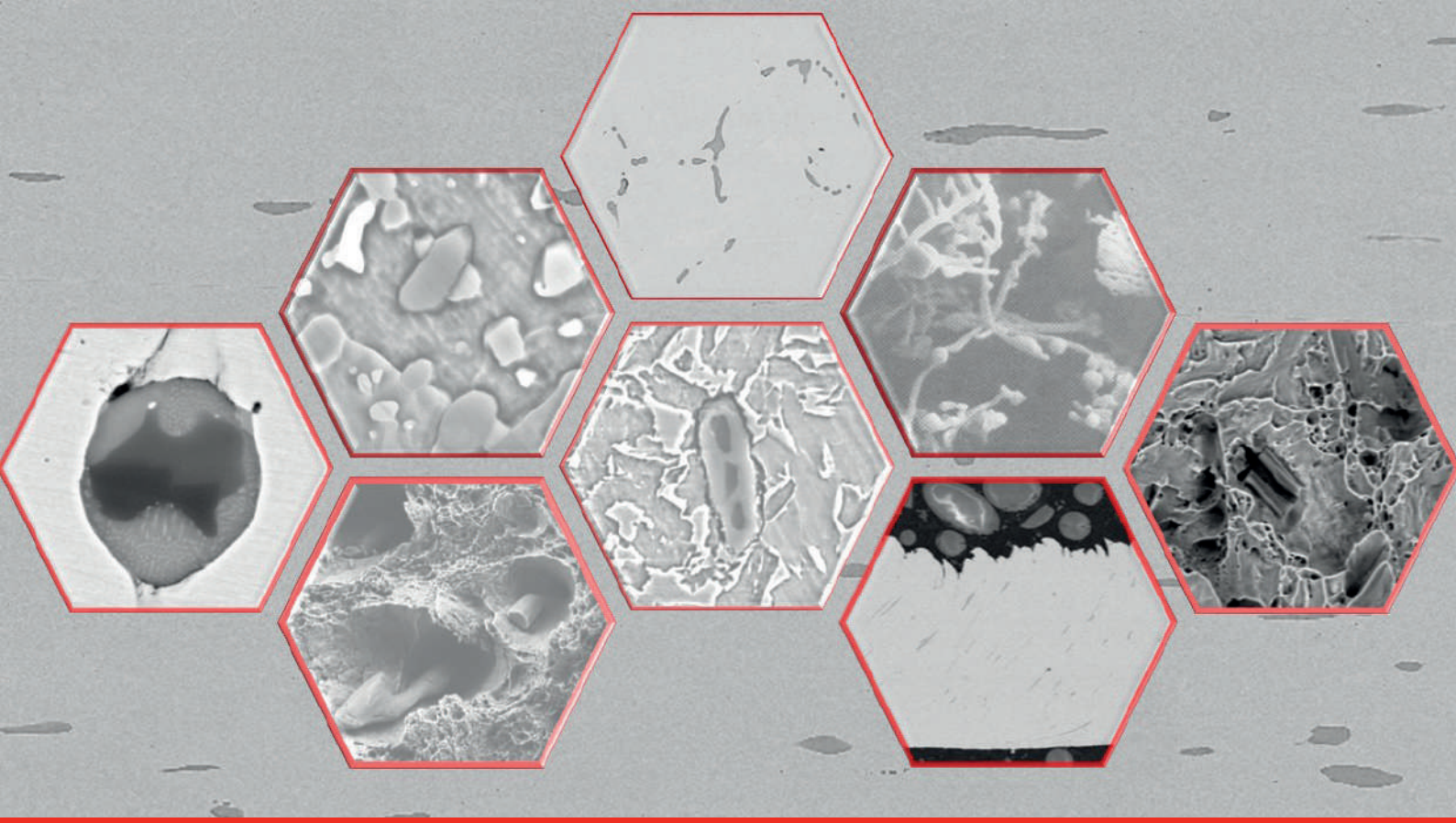


WHITEPAPER

Clean Steels:

Sidenor is committed to a multitask strategy to tackle steel cleanliness.

sidenor steel

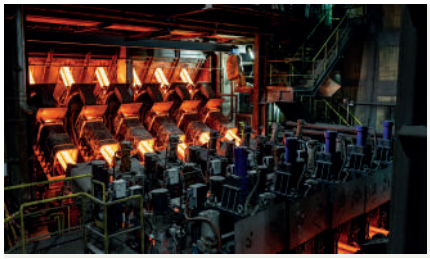
Sidenor is committed to a multitask strategy to tackle steel cleanliness

The word "**clean steel**" is commonly used to describe steels which present a low level of soluble elements such as sulphur, phosphorus, nitrogen, oxygen and hydrogen to refer to steels which have a controlled level of residual elements such as copper, lead, zinc or magnesium and, above all, to define steels with a low **frequency of failure** due to defects related to **non-metallic inclusions** which mainly occur during the **melting, secondary metallurgy and casting** processes.

It is precisely this last meaning of the word that causes major problems for steel producers as, apart from the difficulty of the objectives, the definition of the word "clean" is not absolute but depends on the chain of manufacturing processes up to the final product, on the features to be met and on the expected service time.

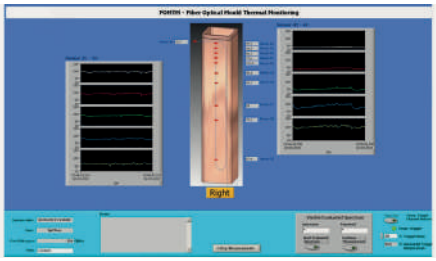
Furthermore, clean steel is not requested exclusively anymore by the traditionally strictest sectors and for traditional applications (for example, bearings): there is now a **growing tendency towards demands for a wide catalogue of final applications worldwide**.

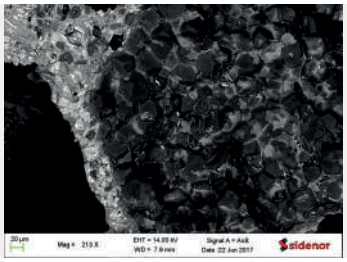
Sidenor, as a leading special steel manufacturer, is deeply involved in implementing the strategy designed with the aim of facing the new market conditions. This strategy contemplates various perspectives, all of which are necessary for meeting the level of demand requested for manufacturing quality steel:



A continuous update of manufacturing **facilities**: recent investment in the **continuous casting machine for billets of 240x240 mm**, equipped with the latest control technologies.

Monitoring, modelling and simulation: on-line control systems of the thermal profile in the mould, so as to ensure adequate working conditions of the mould powder; definition of the best fluid-dynamic conditions inside the ladle, launder or mould...



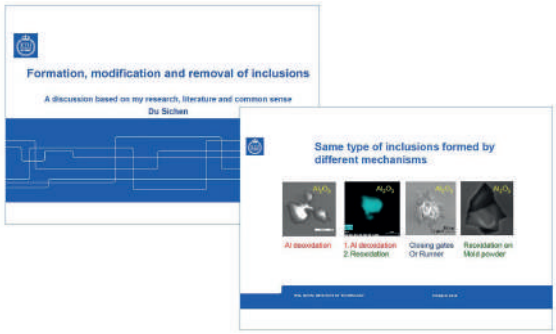


Identification of **high-performance materials** involved in the manufacturing process: ladle and launder refractories with high resistance to chemical corrosion.

Investment in new **measuring devices and quality control techniques**: high-frequency ultra-sound devices (10, 20 and 50 MHz), software for automatic analysis of particles, definition of new and faster fatigue tests

Diffusion of **knowledge and training**. In relation to this last heading, Sidenor's activity can be measured by the level of participation in **research projects** related to steel cleanliness (RFCS **INTCLEANCON**, RFCS **LAREFMON**, RFCS **INCAFAT**, Sodercan **Ciguexlimp**, H2020 **COCOP**, Elkartek **Mesaliq**, etc.) or to international events, the latest being the **9th ECCC** in Vienna, and the next, the **10th International Congress on Clean Steel** in Budapest.

Sidenor considers the transmission of knowledge and experience as a fundamental activity; for this reason, it has established a calendar of internal sessions, intended as seminars. Each seminar will focus on the various aspects of clean steel manufacturing and be attended by all departments concerned (Production, Technology and Quality, R&D); on certain occasions, **internationally renowned experts** are invited, so as to obtain a broader view and to establish collaborations. This was the case in the last seminar, which took place on March 9th, where **Professor Sichen Du of the KTH University in Stockholm** presented a paper.



Professor Sichen has been studying the origin, formation and characterisation of non-metallic inclusions in steel for more than 30 years; he and his research team collaborated in multiple industrial projects involving various steel companies, so that his perspective can be considered "theoretical and applied".

The strategy behind the implementation of all these initiatives and activities shows Sidenor's ability to face new challenges and, thus, maintain a high level of commitment towards its customers.