

APPLICATION NOTE

Thermographic monitoring and verification of rhomboidity in billets



Celsa Group makes use of the technology provided by the **bcb** Monitor® software, integrating FLIR thermographic cameras to obtain a dimensional interpretation that improves the precision of billet quality control.

Celsa Group is a European steel company with a presence in 8 countries. Without a doubt, its constant integration of innovative 4.0 technologies positions it as one of the most important steel companies worldwide.

Steel billets are formed under intense heat during the second stage of the steel casting process, at searing temperatures of up to 1.370°C. After shaping the molten steel in the crucible, the billets must be allowed to cool before visual inspection, often leading to intensive production backlog and inspection costs. Due to the hostile conditions under which these billets are produced, not only temperature monitoring and dimensional variation solutions must be considered, but also those related to the protection of the equipment against the high temperatures of the working environment.

Billets and precision thermography

The temperatures in the Celsa Barcelona production line usually reach more than 700°C, even reaching a maximum of 905°C. Due to the extreme conditions of the plant, conventional cameras are not suitable for condition monitoring.

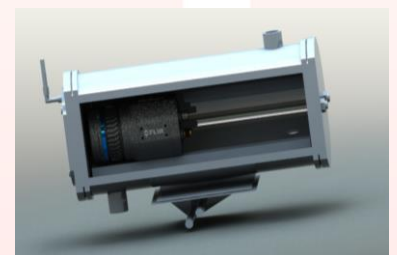
Therefore, the devices offered by **bcb** feature a water-cooled casing, optimal for operating in harsh environments. In this way it is possible to monitor production in real time in an automated and efficient way.



The FLIR A700 achieves a measurement range of up to 2.000°C, excellent for meeting billet monitoring needs.



Tail of a billet with the result of inspection and dimensional control.

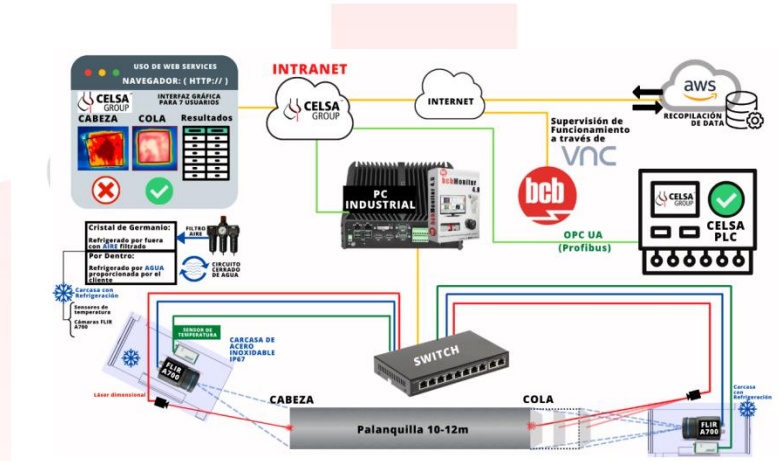


Camera protected in an IP67 housing with internal cooling.

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Rhomboidity check and autofocus

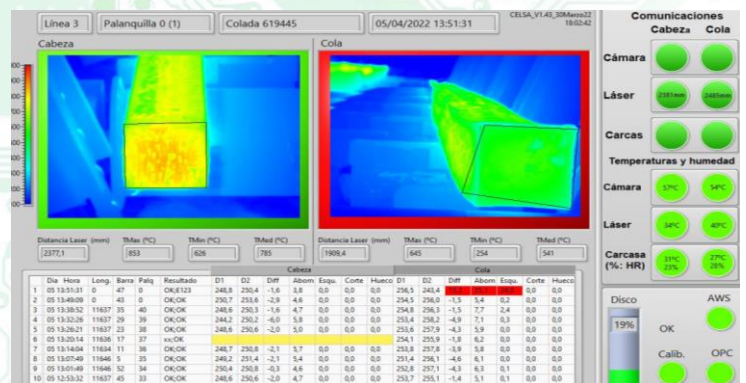
Precision in billet manufacturing is vital to ensure integrity on large scale projects. To meet quality standards, a variation of only 13mm is tolerated in all dimensions of the billet. Previously, inspection was only performed every four hours due to the time required for the billets to cool down, which was an inefficient and costly process in terms of time and labor. For this reason, at **bcB** an efficient and precise system has been developed using two 2D lasers and two FLIR A700 sensors together, which makes it possible to quickly identify any variation that does not meet quality standards.



Architecture used by the system where the OPC UA communication with the PLC of the factory is observed. All information will be uploaded to the cloud via a real-time connection to AWS (Amazon Web Services).

Software

The **bcB**Monitor[®] allows real-time data acquisition and graphically displays bulges, excessive diagonal differences (checking for rhomboidity, corner depression, undercuts and sinkholes) in billets, even when they are at high temperatures. In addition, it offers the past data query function in a segmented way: by line number and monitored billet number.



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