

SmartMetalMarkers™ FAMILY

The worldwide market of metallurgical products is demanding improvements in quality controls and greater traceability leading toward the identification of the single piece of metal products. Unmarked metal products generate additional costs, due to inspections and processes required to identify it, but above all, are not appreciated by end users.

Perfectly marked products, with a very high percentage, give an excellent impression to customers, to the benefit of sales.

The precise answer to all the aforementioned issues, lies in a marking system belonging to the SmartMetalMarkers family, accurately designed by IMTS making use of high specialized know-how and long specific experience.

SmartMetalMarkers is a trademark assigned to high quality marking systems embedding advanced feature, with high reliability.

The advanced features, are focused on the improvement and monitoring of the fundamental technological functions and final result evaluation.



Two collaborative robots can share the markings, or one or both can make the full markings

Main advanced features of SmartMetalMarkers are:

- Product Image Analysis
- Monitoring and Control of main technological functions
- Partial or full redundancy
- Detailed Log and Diagnostics
- Automatic Marking Repetition

Image Analysis of 2D or 3D image, returns properties, information or data of the product to be marked as:

- Shape
- Dimensions
- Position and Orientation
- Products counting
- Profile
- Barcode or Data Matrix readability
- Check of interferences in the working volume

in order to specifically adapt the marking position on each product and to provide details for diagnostics. Just some examples are shown in the pictures.

All images captured before and after marking cycle are stored and shown on HMI.



Marking and reading systems for metallurgical products

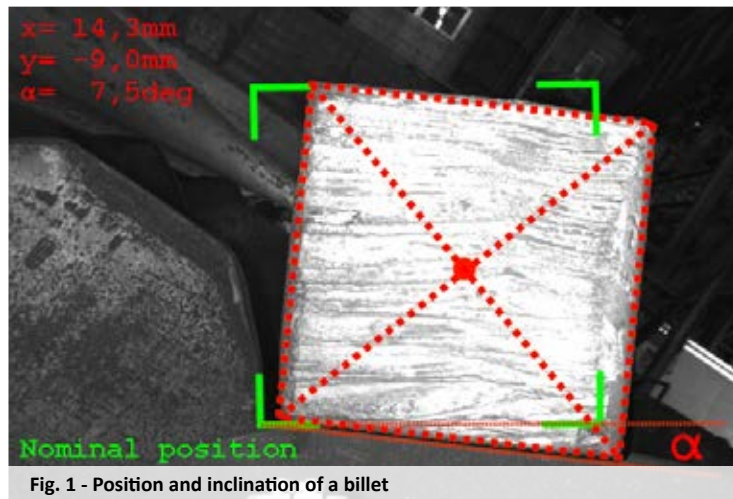


Fig. 1 - Position and inclination of a billet

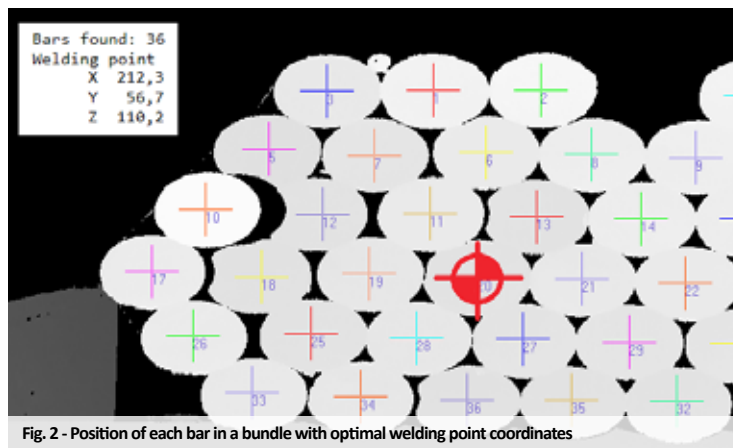


Fig. 2 - Position of each bar in a bundle with optimal welding point coordinates



Fig. 3 - Barcode readability check

Monitoring and Control of main technological functions are key factors to improve the marking result and to provide details for diagnostics.

Some examples are below synthesized:

- Vacuum level for tag holding is continuously monitored and controlled by a double threshold
- MIG welding for tag attaching includes continuous monitoring of arc ignition and current flow
- PIN welding for tag fixing includes monitoring of ground contact and current flow and control of melting depth of pin

The philosophy pursued, is not just execute the function, it treat to do it well

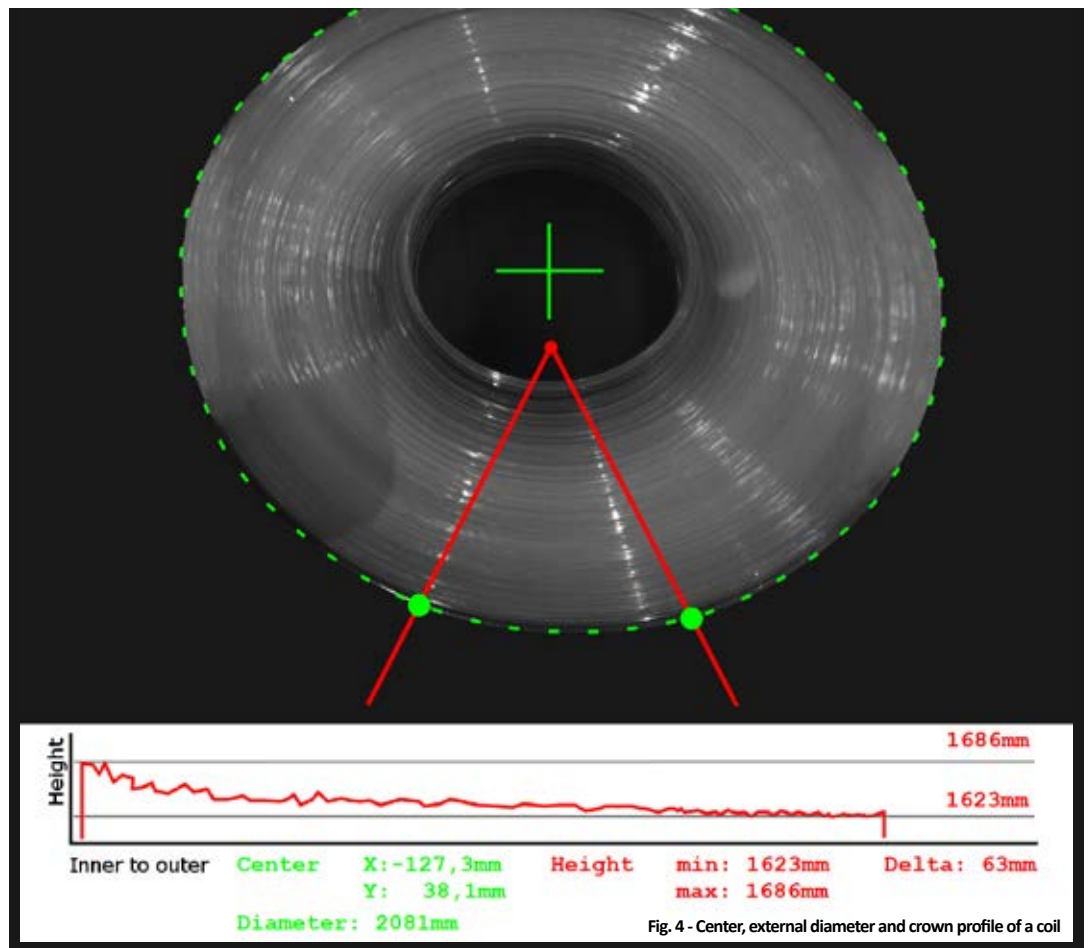


Fig. 4 - Center, external diameter and crown profile of a coil

Partial or full redundancy of technological equipment is implemented to successfully complete the marking cycle, reaching high global performance, even if some working conditions are not standard or in case of worn wear parts. Some examples are below described.

Tag holding is made by means of two completely independent vacuum circuits, each one able to ensure by-self the tag holding, providing diagnostic for the maintenance.

MIG welding of tag is done by means of two completely independent and simultaneous welding systems, each one able to fix the tag by-self, when unfortunately, the other has no chance to successfully weld, due to the presence of a deep groove on an uneven product.

Full system redundancy is becoming even more present in the customers' needs due to the increasing importance of the markings on the products, nowadays considered indispensable.

To perfectly fulfill the customers' requirements, IMTS developed some special configurations with two robots, having not just the redundancy but also smart collaborative functions, as the example below described regarding the hot coil marker.

Main functions:

- Two collaborative robots working simultaneously on the same coil
- One supervisor interface which dials with the customer automation system and with the two robots
- Coil measurement made by one robot only which communicates the measures to the other robot, compensating them by the 3D off-set
- Smart job transfer: if the robot that must mark the shell but is unable to fulfill the task because the tail was not well wrapped, it will transfer the shell marking job to the other robot which will try to perform such operation (even if it was not included in its default job)

The marking job can be set as follows:

- Single marking (one robot marks the shell or the crown or both, the other robot is idle)
- Double markings (both robots mark the shell and the crown for a better readability in the store)
- Shared markings (one robot marks the shell and the other robot marks the crown, usually selected to reduce the cycle time)

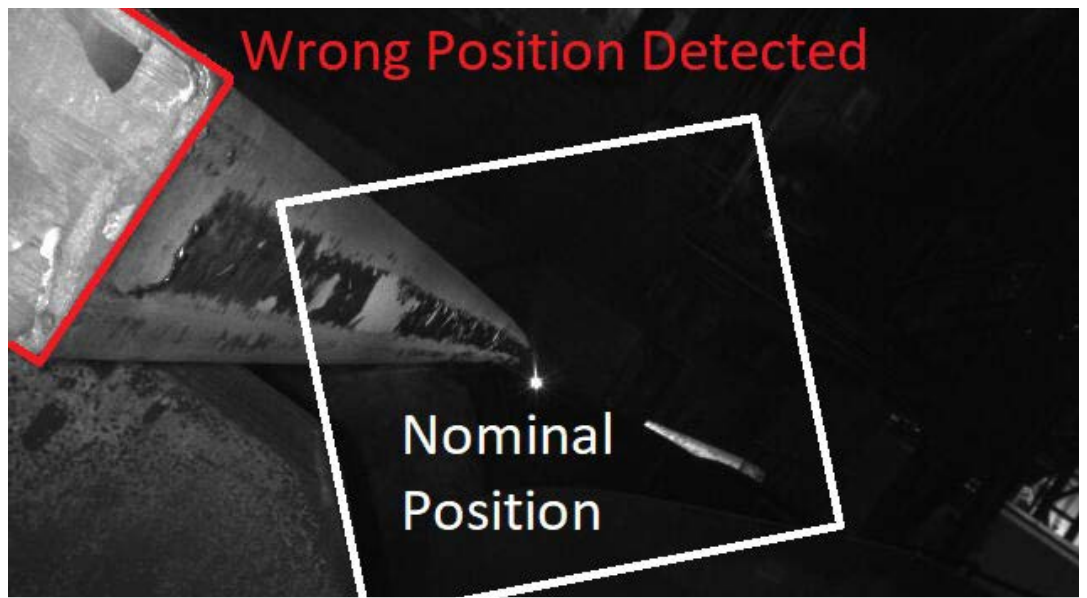


Fig. 5 - Wrong positioning detection



Fig. 6 - Data Matrix readability check

Detailed Log and Diagnostics are generated thanks to the previously mentioned specific sensors and software. They include events, data and images, for a detailed documentation of the marking cycle useful for post-evaluations and statistics. Sometimes the customer just see some unmarked products in the line or store and first thought is “Marker is not functioning properly”. Is it most of times right? Logged pictures, information and alarms immediately alert and help the customer to discover problems, unexpectedly out of marker responsibility as: product out of nominal position, uneven surface or coiling, marking data or start signal missing, etc.

The Automatic Marking Repetition, possible in case of tagging, helps to improve the global performance. At the end of the cycle, the system checks the code readability and in case of alarm, only if the function is enabled and some conditions are satisfied, the system starts automatically a new cycle. Most of times the second cycle successfully solve the problem usually generated by an uneven surfaces of the product, very tough to weld.

SmartMetalMarkers, your Smart and profitable investment at reasonable price!