

Fully automated mixup checking with 99,9 percent reliability

*Deutsche Edelstahlwerke Specialty Steel GmbH, Siegen (Germany) is successfully using SECOPTA's **PMI system** for bright bar*

In 2019, DEW Specialty Steel / Germany have engaged SECOPTA to carry out a first project based on an inline anti-mixup check with LIBS technology. Ever since a number of 3 projects (PMI for bright bar) have been successfully implemented branded under SECOPTA's developed **PMI technology**. After more than 3 Years of inline process measurement application in operation in the NDT line (e.g. for checking of bright bars) the solution of PMI has proven its performance by distinguishing different material compositions with high reliability. As a result, DEW made their transition from 100% magnetic induction testing followed by manual spectrometric testing to industry 4.0, 100% mixup testing by using SECOPTA PMI technology.

Customer requirement: Due to modern days automation processes inside rolling mills, the risk of material mix-ups is pretty low. However, given the rising demand for smaller production lots and the constantly growing number of steel grades, a reliable material identification along the entire process chain became one of the highest concerns within DEW. The current used technologies (e.g., spark, magnetic induction testing) fall short to guarantee a 100% reliable check at the end of the rolling process (e.g. before shipment). Particularly, when safety-critical components are concerned, a mix-up can have catastrophic consequences. As such, DEW was looking for adequate technology to provide all the above requirements.

Technological solution: With fully integrated sample preparation, SECOPTA's LIBS (laser-induced breakdown spectroscopy - based sensor) technology is capable of measuring every bright bar moving at the speed of 2 m/sec between the triple drivers. Depending on the risk of mix-up, this PMI sensor can be integrated into the existing process (e.g. finishing line, NDT line) and be fully compatible with existing MES Systems. As a further application, this sensor can be used also to check each billet or ingot before charging to the reheating furnace assuring maximum safety for mix-up detection without human interference.



Benefits: Below states the results after 1 year of continuous process operation (installed in 2019) in the **bright bar production facility in Deutsche Edelstahlwerke Specialty Steel GmbH**, where 1163 orders consisting of 535,190 results (535,051 bar) were 100% checked by SECOPTA PMI sensors.

Result	Count	In percentage
OK	534,804	99.928%
NOK (Trial mix up +false alarm+ process disturbance+ actual mix-up)	247 (with 2 actual mix-ups detected)	0.046%
No of bars (OK+NOK)	535,051	99.974%
Others (e.g. stops of measurement)	139	0.026%
Sum	535,190	100.000%

"The laser-based system dramatically reduces the manual effort so far involved in material identification processes, very often even making separate mechanical sample preparation unnecessary"

Deutsche Edelstahlwerke Specialty Steel GmbH, Siegen

As a result, DEW have integrated **2 more SECOPTA bright bar PMI systems (in 2022)** in their final inspection line.