



Confidence in recycled steel

Almost half the steel produced in Europe is recycled from scrap materials. These materials come from a variety of sources, some of which may be radioactively contaminated, such as waste from industry, medical facilities and decommissioned nuclear power plants. Given the potential hazards posed by radiation exposure, improved measurement methods and standards are needed to assess the radioactivity of recycled steel and comply with EU regulations designed to protect Europe's citizens.

Europe's National Measurement Institutes working together

The European Metrology Research Programme (EMRP) brings together National Measurement Institutes in 23 countries to address key measurement challenges at a European level. It supports collaborative research to ensure that measurement science meets the future needs of industry and wider society.

Challenge

Any recycled product has the potential to harbour various forms of contamination from its previous use, but this is particularly true of steel, which is retrieved from a huge variety of settings. Inadequate monitoring of radioactivity levels in recycled metals can have major consequences for public health – for example, in 1982, radioactive steel scavenged from a nuclear reactor was recycled and used in the construction of apartment buildings in Taiwan, resulting in the radiation exposure of an estimated 10,000 people.

Recognising these risks, the EU has implemented Council Regulation 333/2011, which requires scrap metal recycling companies to provide certificates based on the radioactive content for each consignment produced. To support this, the steel recycling industry needs traceable methods for reliably measuring radioactivity levels in steel.

However, until recently, there were no calibration standards for steel in the forms commonly encountered in steel recycling, making it difficult for recyclers to ensure the accuracy of their measurements. New calibration standards, designed to reflect the actual samples measured, would enable steel recyclers to reliably certify their products in compliance with the Council Regulation, supporting the protection of the public and environmental safety.

Solution

The EMRP project *Ionising radiation metrology for the metallurgical industry* developed certified radioactive steel calibration standards, which enable highly-accurate measurements at the sensitivity levels required to comply with EU regulations. The new standards will lead to improved and more consistent certification of steel consignments and a reduction in the costs arising from disputes due to inconsistent measurements between different companies.

Impact

Two major steel recycling companies, Sidenor Aceros Especiales and Cyclife Sweden AB, formerly part of Studsvik Nuclear AB, have already adopted the calibration standards to assure the performance of their radioactivity monitoring systems.

Sidenor Aceros Especiales, a leading steel recycler in Europe, is using the project's calibration standards for process monitoring at one of its plants in Spain. The standards are being used as part of weekly quality assurance checks of Sidenor's radioactivity monitoring systems, ensuring the measurements they provide are of the highest accuracy and giving customers confidence in the contamination-free certificates issued to Sidenor's products.

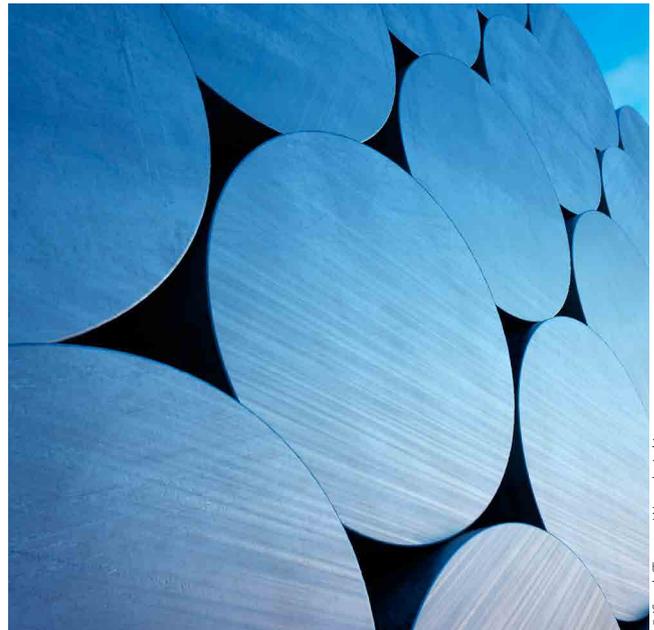
Cyclife is one of only a few steel producers able to recycle radioactive steel from the nuclear industry. Cyclife used the project's calibration standards to confirm the response of its radioactivity detectors, generating greater confidence in the

measurements they routinely make of recycled steel. As Europe's nuclear industry decommissions plants over coming decades, there will be a larger volume of radioactive steel coming into recycling facilities which needs to be made safe. Accurate measurements of radioactivity levels will help avoid accidental plant contamination, which can cost up to €10 million to remedy.

As Europe's steel industry adopts these new standards more widely, end-users will have confidence in the contamination-free certification applied to recycled steel consignments and their safety for use.

Vacuum metrology for industry

The EMRP project *Ionising radiation metrology for the metallurgical industry* has successfully established the basis for common standards for radioactivity monitoring in steel mills and the certification of the radioactive content of scrap metals. This was achieved through the production of SI traceable reference standards and methods for radioactivity measurements. These outputs are expected to lead to significant cost savings, due to a reduction in down time and clean-up costs at industrial sites, and will reduce the risk of potentially hazardous radioactive materials leaking into the environment.



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European Metrology Research Programme
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The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union

www.euramet.org/project-IND04

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