

A CASE STUDY FROM
SPECTRO ANALYTICAL INSTRUMENTS

SPECTRO XEPOS Helps Ramco Cement Its Success

SPECTRO XEPOS Advantages for Ramco Cements

- ▶ Flagship ED-XRF benchtop analytical spectrometer
- ▶ High-speed (3-4 minute) elemental analysis of samples for quicker plant process corrections and better cement product quality
- ▶ High sensitivity for greater analytical precision
- ▶ Optional vacuum system for analysis of light elements
- ▶ Lower cost of ownership and greater ease of use



India has grown into the world's fifth largest economy, spurred by nonstop urbanization plus new technologies for efficiency and productivity. Example: the country's cement industry, buoyed by a tsunami of infrastructure and residential building projects.

Headquartered in Chennai in southern India, Ramco Cements has been at the industry's forefront in adopting innovative products and processes. These include sustainability initiatives, wind farm technology — and the latest spectrometric solutions for process analysis.

The Challenge

Ramco's Haridaspur plant is located in the Jajpur district of India's Odisha state. The Haridaspur facility is a state-of-the-art *clinker grinding station*, where clinker from their integrated plants is finely ground along with additives like gypsum, slag & fly ash to yield several grades of finished cement for sale to builders. The plant currently manufactures 3,000 metric tons of cement per day.

In its QC lab, the chemists must swiftly and accurately analyze the component elements of clinker and cement processing samples to ensure the exact specifications of the finished product.

"We're analyzing four major compounds," the QC Head explains. "Lime — that's CaO ; sulfur trioxide; SO_3 ; silicon dioxide, SiO_2 ; aluminum oxide, Al_2O_3 ; iron oxide, Fe_2O_3 and magnesium oxide, MgO , along with minor element like alkalies, chloride etc. We prepare pressed pellet samples and test about 12 to 15 samples per shift, with 3 shifts in our 24-hour operation."



Older cement works relied on wet chemistry analysis. But this was extremely time-consuming: so the process might continue turning out off-spec product for many hours until analysis results could flag a problem. Some modern plants have turned to wavelength-dispersive X-ray fluorescence (WD-XRF) spectrometers — which deliver excellent analytical performance, but at a high cost.

When the Haridaspur plant opened in 2020, it was instead equipped with an instrument recommended by the Ramco Research and Development Centre: a SPECTRO XEPOS *energy-dispersive X-ray fluorescence (ED-XRF)* spectrometer.

The Solution

Other ED-XRF instruments might struggle to meet cement industry requirements. But SPECTRO XEPOS provides — for a variety of industries including cement processing, geology, and mining, as well as for environmental and waste monitoring, and for research and academia — breakthrough advances in multi-elemental analysis of major, minor, and trace element concentrations. Its innovative excitation and detection technologies deliver outstanding sensitivity and detection limits. These all yield remarkable gains in precision and accuracy, as well as faster analysis.

It's one of the few instruments in its class that, as at Haridaspur, can be equipped with a vacuum system: vital for accurately measuring lighter elements such as magnesium. And it costs perhaps two-thirds the price of a WD-XRF spectrometer. Little wonder that SPECTRO XEPOS is increasingly the instrument of choice for a variety of cement plants worldwide.

"WD has even higher accuracy than ED-XRF," says the QC Head. "But SPECTRO XEPOS has the cost benefit — and is quite sufficient for our cement plant process control."

The Results

Their SPECTRO XEPOS spectrometer delivers critical benefits for Ramco at Haridaspur.

"Fast analysis time — that's the main advantage," says the QC Head. "Our typical analysis time is 3 to 4 minutes. Using wet chemistry on a sample with sulfur dioxide: the result would take about 1 full day. But using SPECTRO XEPOS, even with preparing the pressed pellet, we can get the result within 15 to 20 minutes."

That leads to the second advantage: "We get speed of corrective action," the QC Head continues. "We can fix a deviation in process quality within 20 minutes. So we get better consistency of our finished product."

On long production runs, the team recalibrates their instrument every 10 days or so. SPECTRO is gathering data from the Haridaspur plant to help improve this timing. In the meantime: "Our chemist in charge of that section was well-trained by SPECTRO initially," says the QC Head, "so he is able to perform the recalibration himself. And SPECTRO XEPOS is quite easy to calibrate.

"We're very happy with SPECTRO support," he adds. "Whatever problem we're getting, with just a phone call we have the answer."

In total, Ramco has purchased 13 SPECTRO instruments since 2013. And counting: "Definitely I will recommend SPECTRO XEPOS to my colleagues," says the QC Head. "Faster analysis time, easy to use, cost-effective, easy to calibrate — when a need comes up again, I say go for the SPECTRO instrument."

About Ramco Cements

After more than 6 decades of growth, Ramco Cements is a front-runner in India's thriving cement industry, with 3000+ employees helping serve 10,000+ dealers across 10 Indian states. Its integrated cement plants, grinding units, and dry mix plants, as well as a ready-mix plant and a wind farm, boast a total production capacity of more than 21 million metric tons of cement a year. Its world-class R&D centre at Chennai is famous in India.

About SPECTRO

SPECTRO is one of the world's leading suppliers of analytical instruments. Its advanced analyzers use X-ray fluorescence spectrometry (XRF), optical emission spectrometry (ICP-OES, arc/spark OES), and inductively coupled plasma mass spectrometry (ICP-MS) technologies in providing accurate elemental analysis of materials for industry, research, and academia.



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