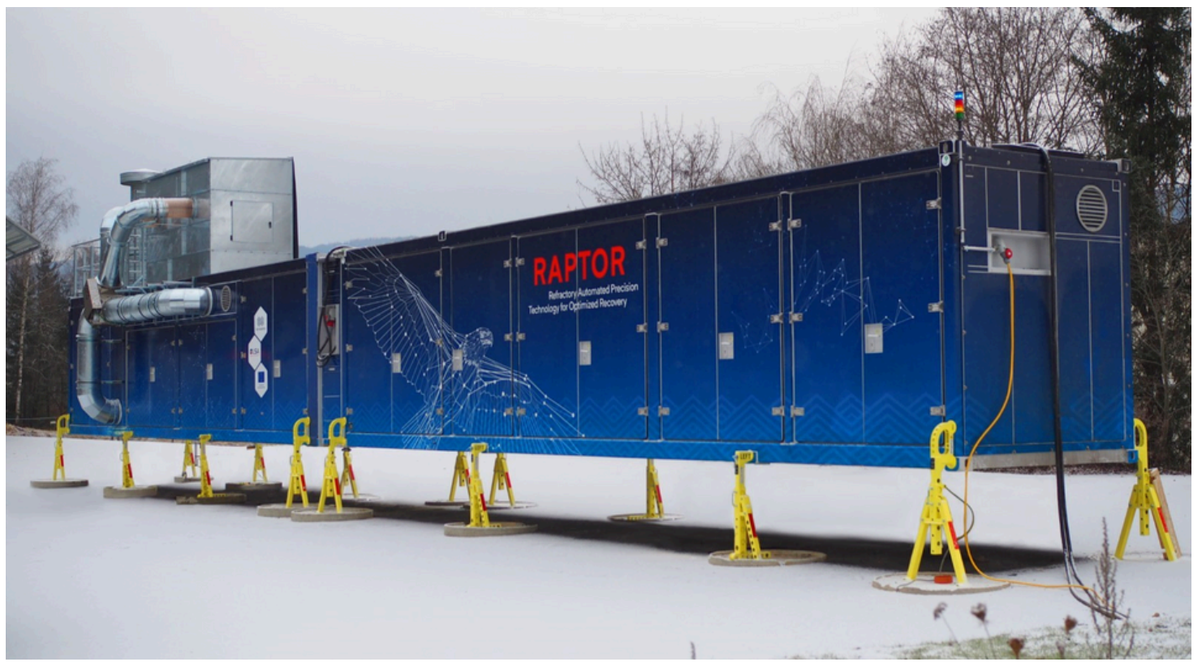
The RAPTOR (Demo A): Automated Sorting Equipment

Fact sheet

What is the RAPTOR?

The Raptor (short for Refractory Automated Precision Technology for Optimized Recovery, Demo A) is a mobile, sensor-based sorting system developed to transform the recycling of used refractories. It is a key demonstrator in the EU-funded ReSoURCE project, targeting coarse particles (>5 mm) from refractory waste streams.



Why Does It Matter?

Refractories are critical for industries like steel and cement but have a high CO_2 footprint. Manual sorting is inefficient and wasteful. The Raptor enables high-precision, automated recycling — boosting recovery, reducing emissions, and advancing the circular economy.

How Does It Work?

The RAPTOR processes pre-crushed and sieved breakout materials on a conveyor. Each particle is analyzed by a 3D camera, hyperspectral imaging (HSI), and a LIBS (Laser-Induced Breakdown Spectroscopy) sensor. Particles are sorted using robotic pickers or air ejection into bins. The LIBS system removes surface contamination and detects chemical elements like magnesium or aluminum. The HSI helps define regions of interest (ROIs), reducing LIBS usage. The system is fully automated and enables high-resolution sorting for enhanced recycling accuracy.

Contact & Further Information

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Key Environmental & Societal Benefits

- Up to 90% recycling rate for used refractories
- Significant CO_2 savings by replacing virgin raw materials
- Reduces landfilling and increases material security
- Supports EU Green Deal goals for sustainable industry

Technical Facts

- TRL: Targeting TRL 7 (prototype in operational environment)
- Sorting size: Particles >5 mm (Demo A)
- Next step: Demo B for fine particles <5 mm
- Modular & mobile design for flexible industrial deployment

Looking Ahead

RAPTOR will be deployed in refractory recycling hubs or on-site at the origin of breakout materials. Future developments include fine sorting (Demo B) and broader cross-sector applications .

Who Is Leading the Development?

Led by RHI Magnesita, the Raptor is part of the Horizon Europe-funded ReSoURCE project, developed in collaboration with leading European tech and research partners (see below).

Consortium Partners

- RHI Magnesita
- LSA GmbH
- InnoLas
- Fraunhofer ILT
- Montanuniversität Leoben
- SINTEF
- NEO
- CPI
- Crowdhelix

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