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PRODUCT

## Robots & Manipulators

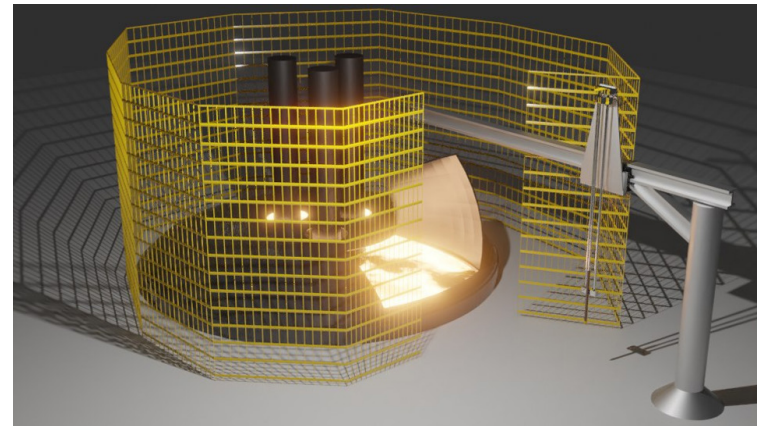
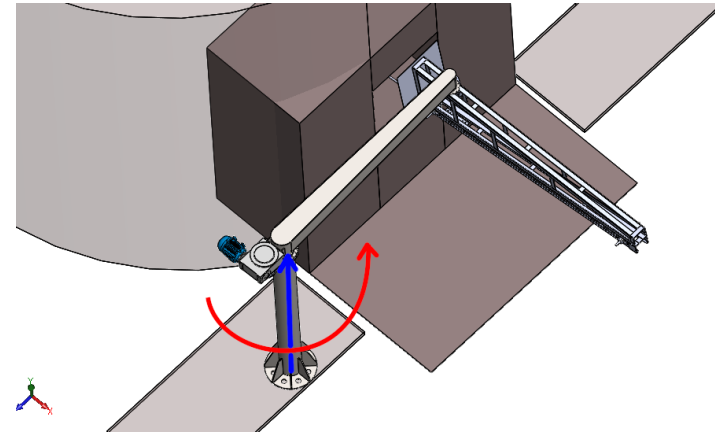
### Mechanisms for automated measurements in molten steel

- Semi or fully automated solutions for immersions
- Massively increases safety in the Melt Shop area
- Provides more accuracy and control to all measurements
- Allows operators to concentrate in more elaborated tasks

# Mechanisms for automated measurements in molten steel

## Manipulators for Electric Arc Furnaces

- Vesuvius provides customized mechanisms to perform the most accurate measurements in each specific application;
- The mechanisms have 4 degrees of freedom so as they can make precise and compact movements and occupying the smallest possible area;
- Option of semi or fully automated solutions (fully automated includes loading, unloading and disposing probes);
- Safety system scans the environment and stops the operation whenever a dangerous presence is detected;
- If integrated with the measurement system "Steel-Lab", it can be also used to calculate the bath level.



## Manipulators for Ladle Applications

- Slightly simpler solutions with 2 or 3 degrees of freedom depending on the dimensions and space at the area;
- Also with fully integrated safety and emergency systems;
- Can use single or multiple lances for different types of measurement (Temperature, Oxygen, Sample and Hydrogen);
- Full control of the immersion depth and measurement of the steel bath level if combined with the Steel-Lab system.

## Robotic Solutions

- Vesuvius provides state of art solutions to robotize the most dangerous tasks in the Melt Shop Area;
- It is made from robust and high tech 6 axis robots that reach a very large area;
- The custom design magazine systems allow full automation of the process from loading the probes until disposing them after the measurement is finished;
- The specially design coupling mechanisms allow the same arm to take different types of probes such as temperature, oxygen, carbon, sample and hydrogen;
- Apart from measurements the same robots can perform several other tasks such as Ladle Shroud change, alloy/powder additions and ladle opening.



## Tested and Approved Technology

- The Vesuvius robot technology is already applied to several areas of a Steel Plant;
- A robust safety system is also installed with a fenced areas and emergency buttons;
- The log of all the robot activities is stored to enrich data analysis and troubleshooting;
- Direct communication with the measurement systems.