

## AUTOMATIC PELLET INSPECTION SYSTEM (APIS)

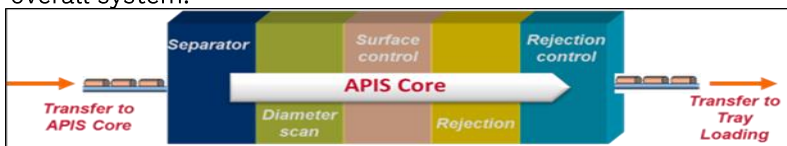
From user – for user: our solution for objective, repeatable and reliable pellet inspection

### Challenge

Pellet quality is a key requirement for the fabrication process of fuel rods and fuel assemblies. Manual pellet sorting is not the preferred solution as it results in higher defect detection slippages. The inspection criteria to the required pellet quality level cannot be adjusted for the complete production lot. Furthermore the operators are exposed to radiation over longer periods.

### Solution

Replacing human visual inspection through the APIS technology means to improve **quality, performance and safety** of the pellet fabrication. The APIS technology is in full operation since 2007, as part of the pellet grinding lines, enabling huge benefits at Framatome plants. Over the years, several R&D and improvement projects were addressed in order to further optimize handling and technical design of the equipment. In 2017, a general technical overhaul of the APIS technology including an adaptation of the vision system to a state-of-the-art architecture was done. This has resulted in significant improvements on robustness and user-friendliness of the overall system.

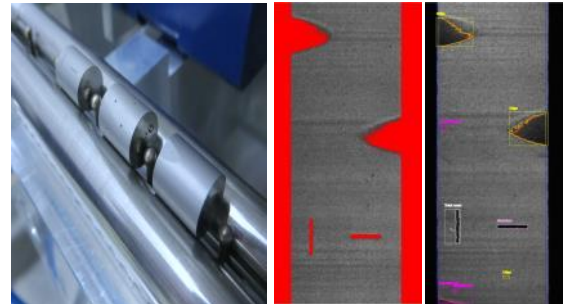


The APIS core consists of separation, diameter scan, surface control and rejection. Only the good-quality pellets are transferred towards the tray loading.

### Customer benefits

- Increase of pellet quality by avoiding human caused pellet defect slippage
- Enabling of objective, adjustable and reliable pellet inspection
- Reduction of fuel manufacturing costs by reduced personnel demand
- Reduction of operator radiation exposure

**Your performance is our everyday commitment**



Test pellets with defined defects (left) and their visualization on the vision software (middle and right)

### Technical information

- Visualization is performed by a state-of-the-art line scan camera with
  - high sensitivity, quality optics
  - high intensity LED lighting with limited field of view, that provides sharp images with a high resolution of 30  $\mu\text{m}$  / pixel.
- Optical setup and related calibration method to detect accurately defects on
  - various pellets types (UO<sub>2</sub>, Gd-containing and Chromium-enhanced)
  - specific metallic pellets (used as system check standards).
- Automatic setup of the equipment and parameter setting, resulting in higher user friendliness and adjustment robustness

### Key figures

Maximum throughput **10** pellets / s

**1** m compact length of the APIS core

**0.1** mm defect size recognition

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