

Field Services, Nuclear Services

Measuring of Nuclear Fuel Dimensions – FuelView 3D

Background

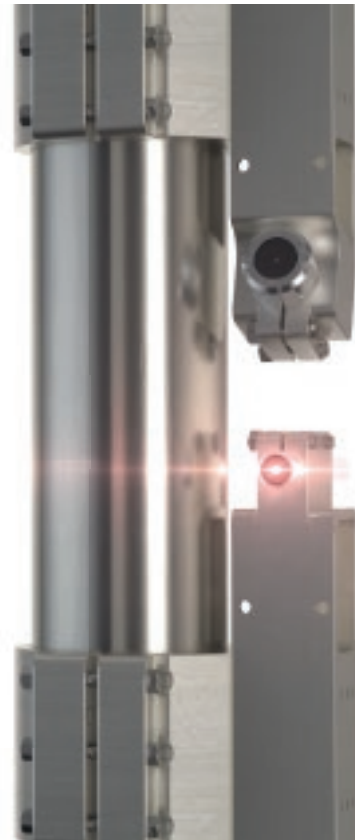
In a nuclear power plant, fuel assemblies are influenced by neutron flux gradients and other local conditions that affect the dimensions of the fuel assemblies. Dimensional changes can for example lead to costly premature disposal of fuel or impact the insertion of Control Rods.

Description

FuelView 3D is based on 3D laser triangulation technology. Each measurement sensor consists of a laser and a camera. Within seconds it measures bow, twist, length and bulge. All the data from the sensors provide precise geometry of the fuel assembly that is immediately saved and visualized on a PC. The measuring can be performed in parallel with regular fuel handling or during fuel shuffling which enables the possibility to receive geometry data of all fuel assemblies that are handled during an outage.

Technical Data

Applicability	PWR, VVER, BWR
Accuracy	Length: ± 0.5 mm Bow: ± 0.2 mm Twist: ± 0.5 degrees Bulge: ± 0.2 mm (only BWR)
Measurement Time	0.5 – 2.0 s
Dimensions	Length: 4.66 m Width: 0.60 m Weight: 125 kg (Dependent on number of sensors)
Material	Fixture: Stainless steel Sensor housings: Stainless steel Brackets: Anodized aluminum
Computer	PC
Camera	Areascan Camera
Laser	Streamline Laser



Measurement of PWR Fuel Assembly with FuelView 3D. Showing sensor (Camera and Laser) to the right.

Benefits

- ❑ Fast deployment and calibration (1 hour).
- ❑ Whole core can be measured during fuel shuffling without influencing outage time.
- ❑ User friendly (Customers personal training within 1 hour).
- ❑ Predict and counteract dimensional changes of fuel assemblies with collected data.
- ❑ Prevent costly downtime caused by dimensional changes.
- ❑ Facilitate evaluations of core reactivity, thermal margins and control rod friction.

Deliverables

- ❑ Pole including sensors (cameras and lasers).
- ❑ Computer including FuelView 3D software.
- ❑ Storage case.

Experience

FieldView 3D Fuel has been successful delivered and used in Nuclear Power Plants in Europe.



Laser Line on a PWR Fuel Assembly during measuring.



FuelView 3D Fixture with Sensors.

