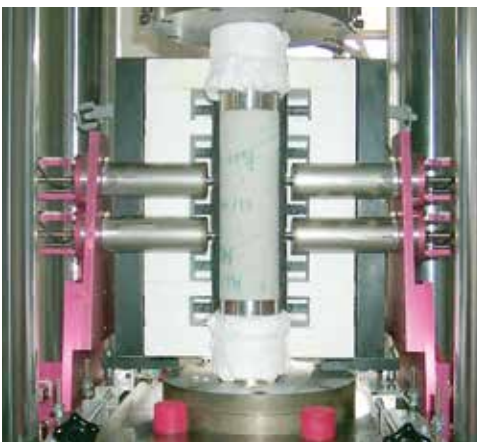


# MATERIALS: HUMAN AND EQUIPMENT RESOURCES AT YOUR SERVICE



FIRE TESTING CENTER • Laboratory approved by the French Ministry of the Interior

## EXTREME THERMO-MECHANICAL CHARACTERIZATION CAPACITY



### ► Compression-strength furnace:

Max. temp.: 750°C.  
Maximum force: 6,000 kN.

### ► Tensile-strength furnace:

Max. temp.: 750°C.  
Maximum force: 250 kN.



## TECHNOLOGICALLY ADVANCED EQUIPMENT



► **Automated batching plant** with conical mixer.



► **Concrete pump.**



► **Scanning electron microscope**  
Observation under mechanical loading and thermal loading from -20°C to over 1000°C.

### Plus...

- X-ray diffractometer (up to 1,200°C).
- Thermal analysis (DTA, TGA) at up to 1,300°C.
- Physico-chemical laboratory (workability, durability, accelerated ageing, etc.).
- Mobile laboratory on request.

# EXAMPLES

## DEVELOPMENT OF SHOTCRETE FOR EIFFAGE

### PROJECT

Excavation of a tunnel in hard convergent rock with deep overburden, and erection of lining segments a short distance from the tunnelling face.

### REQUIREMENT

Shotcrete for immediate backfill capable of absorbing deformation.

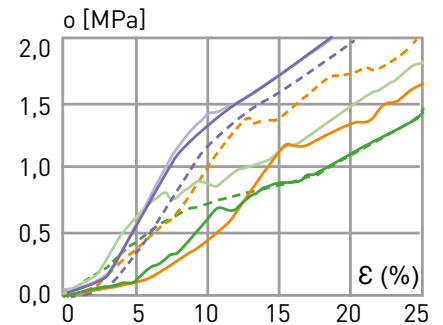
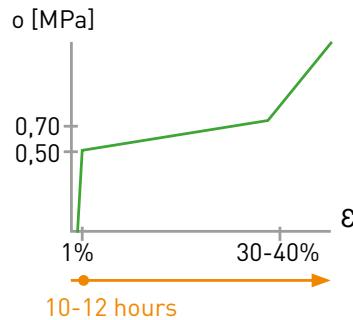
### CRITERIA

- ▶ Consistence.
- ▶ Bleeding.
- ▶ Pumpability.
- ▶ Drying.
- ▶ Washout resistance.
- ▶ Compressibility.

### LABORATORY TESTS



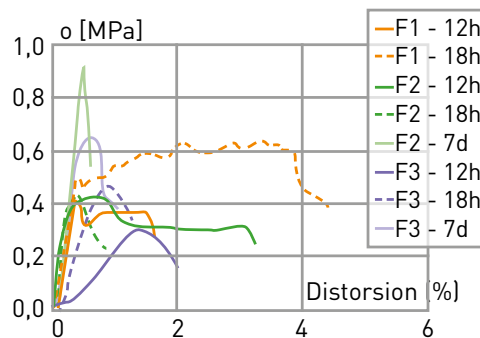
- ▶ Development and adjustment of mix designs prior to in situ testing.



### IN SITU TESTING



- ▶ Provision of **manned mobile site laboratory**: presses, scales, mixers, tooling, etc.



- ▶ Characteristics at 12, 18, and 24 hours, and at 7 and 28 days.  
**Adjustment of mix design.**



- ▶ **Gauging** of concrete spraying equipment.

