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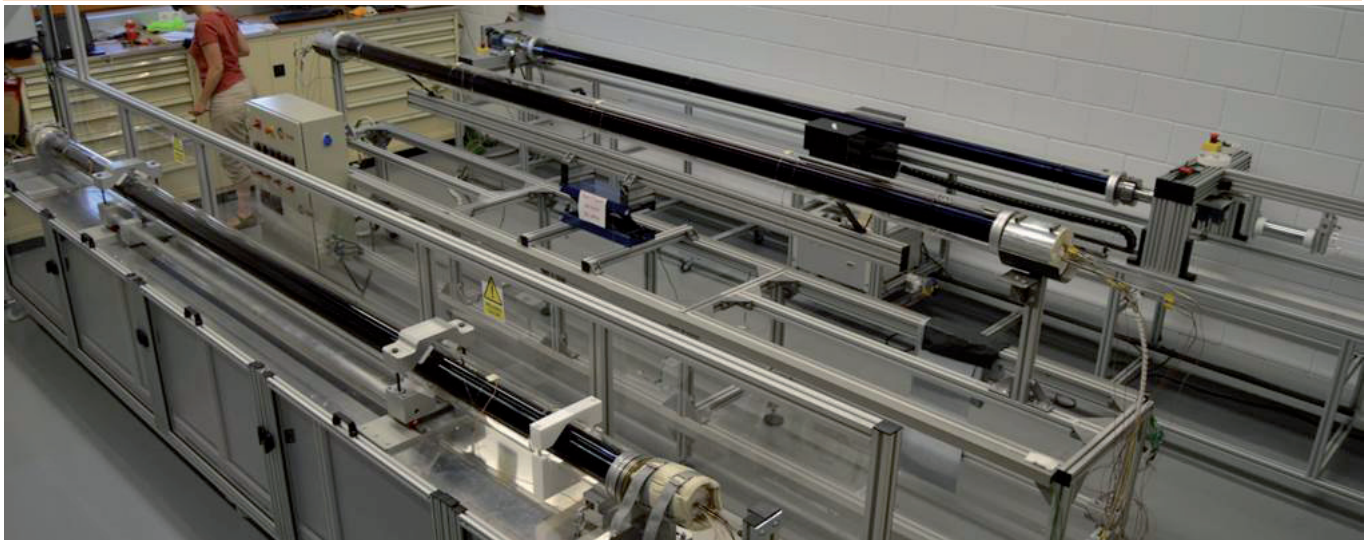
CENTRO NACIONAL DE ENERGÍAS RENOVABLES

NATIONAL RENEWABLE ENERGY CENTRE

TEST LABORATORY FOR PARABOLIC TROUGH RECEIVER TUBES



CONTEXT

- Receiver tubes performance and durability are the most crucial factors for a parabolic-trough plant feasibility.
- CENER's lab supports receiver tubes manufacturers in R&D.
- CENER's lab supports EPC's in the evaluation and selection of suppliers.
- CENER's lab provides quality assurance during plant construction.

INFRASTRUCTURES

- Based on technical specifications from IEC 62862-3-3 draft within the international committee IEC TC 117.

→ Heat losses and non-destructive optical test benches.

→ Overheating and thermal cycling bench for up to 6 simultaneous tubes.

→ Bellows fatigue and hail tests.

→ Spectrophotometer for glass transmittance.

→ Glass samples durability (abrasion and ageing climatic chambers).

→ Spectrophotometer for absorber absorptance and emissivity.

The National Renewable Energy Centre of Spain (CENER) develops applied research in renewable energies, and provides technological support to companies and energy institutions in six areas: wind, solar thermal and photovoltaic solar energy, biomass, smart and efficient buildings and districts, and grid integration of energy. CENER is a technology centre with worldwide recognized prestige, activity and experience.

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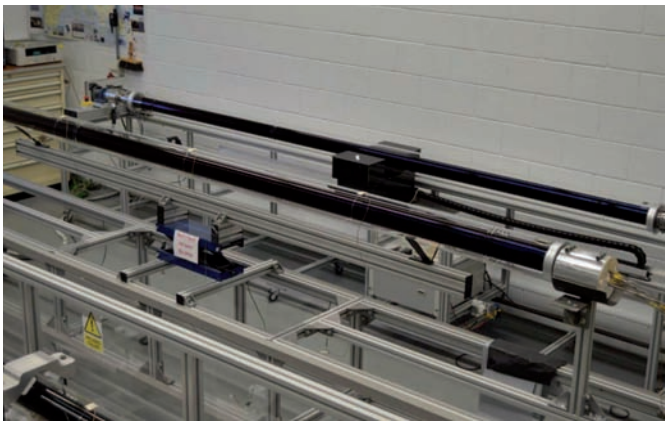
PERFORMANCE TEST

- Thermal characterization (heat losses curve up to 550°C).
- Glass tube transmittance measurement (300 - 2500 nm).
- Absorber absorptance and emissivity measarement (30-15000 nm).



THERMAL STABILITY

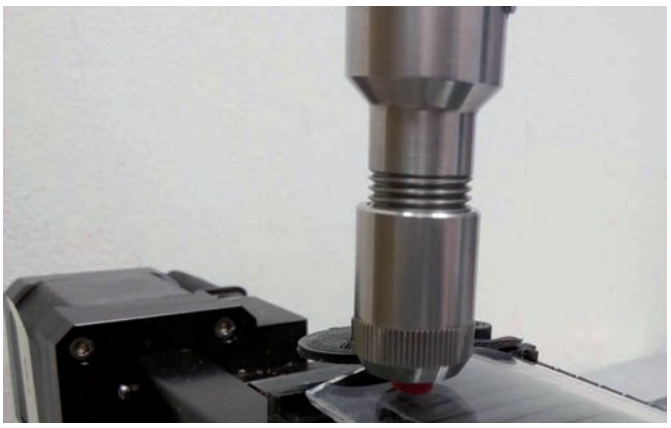
- Non-destructive thermal and optical characterization.
- Overheating (e.g. 1000h @500°C).
- Thermal cycling (e.g. 100 cycles from 200 ºC to 500 °C).
- Non-destructive thermal and optical characterization.

MECHANICAL DURABILITY

- Non-destructive thermal and optical characterization.
- Bellows fatigue. (e.g. 20,000 cycles).
- Thermal characterization (heat losses curve up to 550°C).
- Hail test (25 mm ice ball @ 23 m/s).

GLASS SAMPLES DURABILITY

- Abrasion (5, 10, 20, 50 and 100 cycles with abrassive rubber).
- Condensation (480h, 40°C, 100% RH).
- Humidity freeze (40 cycles, -40°C to 65°C, 85% RH).
- UV stability (up to 15 kWh/m2).



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