CUBOROSSO
Centro Ricerche Caleffi

## / OBJECTIVE: INNOVATION

Innovation means growth, in terms of products and corporate culture. This is the theory behind our new research centre, the vermilion heart of our study into and experimentation on brand-new and existing products.

In light of the vital role played by alternative energy in social responsibility and the development of market opportunities, Caleffi decided to devote its new laboratory to the development of components for solar energy and geothermal plants using energy created to power a percentage of the office needs, among other things.

The main role of the centre, however, consists of research into enhancing products already in the catalogue and tests on standard components with an emphasis on energy-saving features and top quality.

## / WHY CUBOROSSO ?

Red in honour of the colour of science and Italian technology as symbolised by the major industrial brands and the leading Italian technology parks:

entrepreneurship and scientific research striving for excellence. Red to make the building stand apart from its regional setting.

A cube that brings together corporate solidity with the scientific nature of research, a symbology that contains the essence of Caleffi commitment: continual enhancement.

This has been the intention of French architect Francesco Rusconi-Clerici of Milan's Studio Tekne, "The construction needed to provide a strong model of innovation with an even stronger visual impact than the group's main production site.

Therefore the building was conceived as a showcase of a wealth of tools, equipment and controls, fitted into a precise, modular and metallic box, because iron represents adaptability and flexibility, mirroring the company philosophy".

## / RESEARCH CENTRE ACTIVITIES

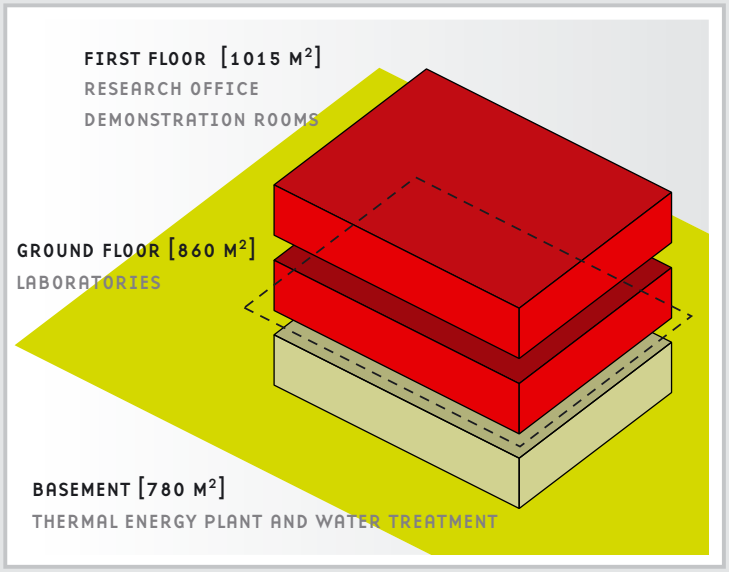
**The research and design of new products and systems for thermal and sanitary installations**

Research and creation of new components for thermal and sanitary installations prioritizes product reliability, longevity, low-noise levels and energy-saving features. As a result the individual components are designed to form part of regulatory groups to avoid energy wastage by adherence to increasingly specific norms.

**The research and design of new products and systems for thermal energy and solar plants, heat pump and geothermal systems**

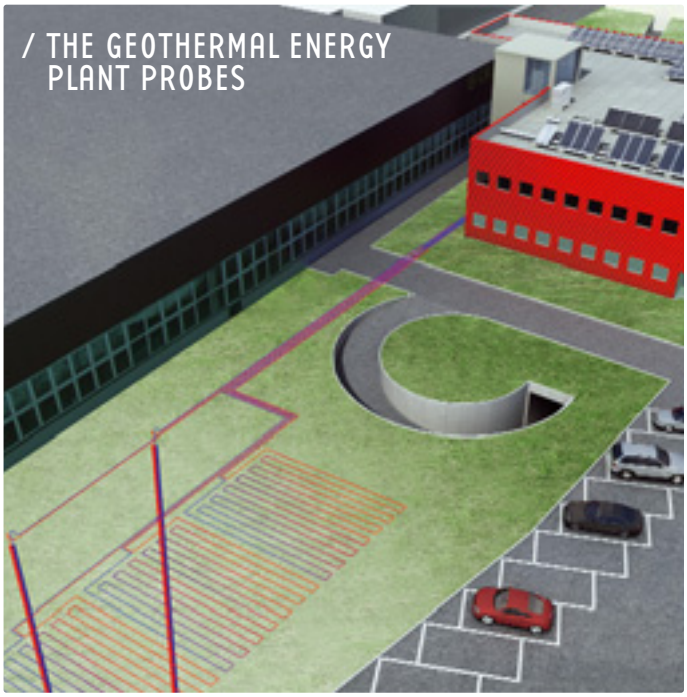
Following the considerable expansion of the solar energy sector, research into components for thermal plants that exploit it to the full has met with great success. A large number of solar panels have been fitted to the new research centre. The hot water produced by this system is used not just for research into components and systems for the panels themselves but also feeds the internal services of the Caleffi factories, thereby avoiding the consumption of fossil fuels.

### The total surface area is split into three levels:




Volume heated: 8347,41 $m^3$ | External surface: 3076,35 $m^2$ | S/V ratio : 0,37 $m^{-1}$

## / THE GEOTHERMAL ENERGY PLANT PROBES



Another fundamental activity is the development of components for heat pumps powered by geothermal energy.

### Research into the applicability of new system technologies

### Research and tests on new materials

### Ratification of new articles and maintenance of existing certifications

Large quantities of Caleffi products are ratified by various international bodies. The role of the research centres is the maintenance of the certifications relating to Caleffi products.

### Endurance tests on products subjected to critical work conditions

Products are subjected to normal working use and to a combination of very critical pressure and temperature. The research centre performs life testing on products considered at risk, recreating work conditions and (deletion) managing to diagnose possible faults, intervening in a timely manner on possible modifications to be adopted.
All thermal vector fluids (hot and cold water) from laboratory tests are completely reused to avoid dissipation of their residual thermal energy. To these ends there are plans to construct a series of tanks to reuse the hot and cold water from the development tests.

### Types of test installations

A large range of tests are undertaken in the new centre, but besides the chemical, mechanical resistance and hydraulic ones, the most interesting are the capacity/loss of load up to 120 $m^3/h$, the noise level according to ISO norms and endurance tests at temperatures up to 160°C and up to 200°C with steam.

Other particularly important controls are the corrosion tests in saline fog and the tests on extreme applications undertaken in a climactic chamber (in a temperature range of -40°C to 160°C and up to 95% humidity).

An automatic control system enables the management and recording of all parameters and operations of the air-conditioning systems and building checks.

## / Information on the building

- **Air-conditioning**
  Centralized air-conditioning system. Heating and cooling by a geothermal energy heat pump.
- **Thermoregulation systems**
  Thermoregulation of rooms according to their ambient temperature.
- **Mechanical ventilation system.**
  Ventilation and air exchange systems.
- **Production and distribution systems for sanitary hot water**
  Solar panels with respective stores of energy and integration from the methane gas boiler. Principle use to supply the adjacent Caleffi factory.
- **Thermal energy supply units**
  Ceiling and wall convector fan units with 4-tube supply.
- **photovoltaic solar plant**
  19 kWp photovoltaic solar plant to power the centre's essential services.

## / Class A-type building

The materials and insulations used allow the building's energy requirements to be classified as class A (calculated according to the regulations: UNI EN 832, UNI 10348, recommendation CTI R 03/3 and correlated norms) with a square metre requirement accepted by the Casaclima agency.

The combination of geothermal heat pump and building/insulation type classifies the building as energy class A.

Energy classification of the research centre building
Heating:
15,86 kWh/$m^2$ per year

CALEFFI
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