

Concentrated Solar Power



Making Progress Together



www.ensival-moret.com



ENSIVAL MORET – SHINING EXPERIENCE

With over 140 years of pump design and manufacturing experience, Ensival Moret has become a global supplier of choice in the energy, chemical, petrochemical, navy, food and beverage industries.

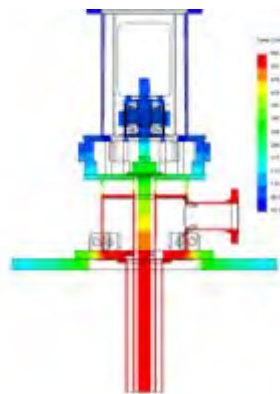
Ensival Moret embraces the protection of the environment and is proud to contribute to the generation of clean renewable energy.

Ensival Moret is the world preferred supplier of pumps for Concentrated Solar Power plants.

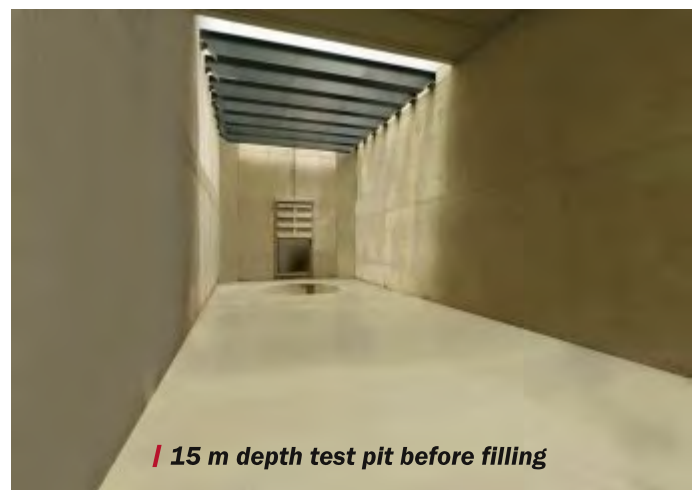
With pumps flawlessly operating and dozens more on order, Ensival Moret has proven its superior technical solutions, pump reliability and high efficiency. Ensival Moret supplies one of the most critical components in Solar Tower power plants, the vertical molten salt pumps. In Parabolic Trough power plants, Ensival Moret supplies both heat transfer fluid pumps (primary and auxiliary) and molten salt pumps for the Thermal Energy Storage system.

Ensival Moret has years of experience with vertical turbine pumps for hot fluids and with manufacturing API pumps for the petrochemical industry.

Ensival Moret takes responsibility for the complete pump system. Its quality design and manufacturing and customer support lead to minimum pump system life cycle cost.



Ensival Moret continuously invests in R&D tools. Experienced engineers utilize the latest software to optimize pump and system design with fluid dynamics simulations, dynamic and thermal analyses.



15 m depth test pit before filling



Molten Salt Pumps for Solar Tower Receivers and Thermal Energy Storage Systems

In the Solar Tower system, molten salt is circulated at temperatures up to 593°C (1100°F). Ensival Moret possesses extensive expertise in pumping high temperature fluids.

Ensival Moret's single or multistage turbine pump design eliminates radial loads and allows for uniform thermal expansion of the pump components. The shaft bearings are lubricated by the pumped liquid.

The vertical turbine pump requires minimal submergence so that molten salt is optimally used to generate power.

Low NPSH required further accommodates the design of the tank system.

- Efficient heat shield and barrier fan protect the pump bearings to increase pump life and limit heat loss.

- Sealing is achieved through a maintenance-free pressure throttling device.

- Vertical pumps are tested at Ensival-Moret's state-of-the-art test loop.

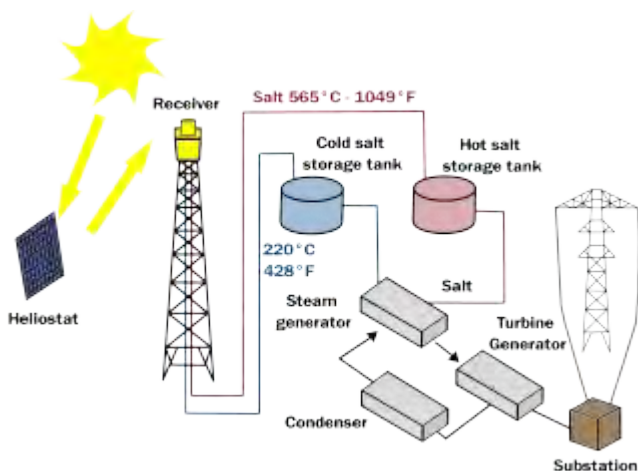
/ Operating capabilities - VEY and VNY pumps :

- Flows up to 3900 m³/h (17,000 USgpm)
- Heads up to 350 m (1,150 ft)
- Pressures up to 65 bar (943 psi)
- Temperatures up to 593°C (1100°F)
- Length up to 20 m (65 ft)



/ Some references:

- Andasol 1 y 2
- Extresol 1 y 2
- Manchasol 1 y 2
- Gemasolar
- Valle 1 y 2
- Extresol 3
- Termosol 1 y 2
- Los Arenales 1
- Casablanca





Heat Transfer Fluid Pumps for Parabolic Trough Systems

Ensival Moret's main Heat Transfer Fluid pumps are derivatives of API 610, designed for extreme conditions.

- The axially split, between bearing pumps use a double suction impeller, resulting in balanced axial loads.
- The casing is centerline mounted to compensate for thermal expansion.
- Several flange configurations accommodate any system requirement.
- The back pull-out design allows for easy pump disassembly without removing piping or motor.
- Excellent efficiency ensures that power goes to the grid and is not consumed on site.
- Low NPSH required gives greater flexibility in system design.

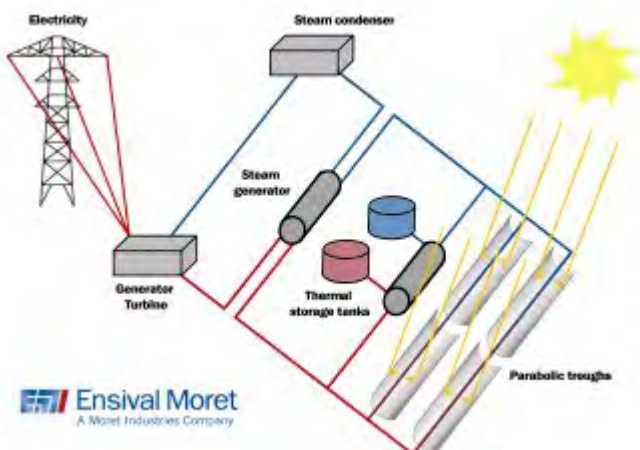
/ Operating capabilities - PRD pumps :

- Flows to 4,100 m³/h (18,000 USgpm)
- Heads to 335 m (1100 ft)
- Pressures to 60 bar (850 psi)
- Temperatures to 425 °C (800 °F)



/ Some references :

- Extresol 1 y 2
- Valle 1 y 2
- Extresol 3
- Termosol 1 y 2
- Los Arenales 1
- Casablanca





Auxiliary Heat Transfer Fluid Pumps for Parabolic Trough Systems

Ensival Moret's auxiliary Heat Transfer Fluid pumps comply with API 610, latest edition. They are used extensively in oil refineries and chemical industries.

- Centerline mounted casing
- Back pull-out design
- Excellent efficiency
- Low NPSH required

/ Operating capabilities - PRE pumps

- Flows up to 2000 m³/h (8,800 USgpm)
- Heads up to 240m (790 ft)
- Static pressures up to 60 bar (850 psi)
- Temperatures up to 400 °C (750 °F)

/ Some references :

- Extresol 1, 2 y 3
- Samcasol 1 & 2
- Manchadol 1&2
- Valle 1 & 2
- Extresol 3
- Termosol 1 & 2
- Casablanca

An alternative solution is a fully sealed canned motor pump compliant with API 685. Canned motor pumps guarantee zero leakage and personnel safety.

- Motors manufactured by Optimex, a member of the Ensival Moret Industries Group.
- Optimex customizes designs to your specific needs.
- Seal-less pumps
- Optional liquid cooling of the motor for pumped liquid above 360 °C (680 °F)
- Centerline mounted casing
- Excellent efficiency
- Low NPSH required
- Reliable design for very high pressures

/ Operating capabilities :

- Flows up to 250 m³/h (1,100 USgpm)
- Heads up to 1000 m (3,280 ft)
- Static pressures up to 500 bar (7300 PSI)
- Temperatures up to 400 °C (750 °F)
- Powers up to 180 KW (240hp)



Making Progress Together



Ensival Moret's Belgium facility is fully dedicated to providing pump systems for your CSP plants.

Our dedicated commercial team will be pleased to answer your information requests and inquiries at solar@em-pumps.com

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