

## LESIEUR CRISTAL: LESIEUR CRISTAL IMPROVES THEIR ENERGY EFFICIENCY WITH VORTISAND FILTER



The Lesieur Cristal trituration plant is located at Roches Noires in the Casablanca region of Morocco. For over sixty years, its principal activity is the production of oil cake for the Moroccan market. Certified ISO 9001 and in the process of ISO 14000 certification, the plant pays close attention to its production quality and has won the national first prize for quality.

The plant has two production lines. The first and biggest has a capacity of 1100 tonnes per day. It is used for soy and rapeseed cake and includes seven tubular condensers connected to cooling towers. The second, used for sunflower cake, has a capacity of 240 tonnes a day and is equipped with three tubular condensers.



### Efficient production

The second leading class of foods after cereals, oil cake is used for livestock feed (generally from soy, sunflower or rapeseed) and is an excellent source of protein. Oil cake in fact is a trituration residue, obtained after extraction of the oil from the fat-rich seeds.

The Lesieur Cristal plant's extraction process produces the best yield and involves several steps. The dust is removed upon arrival from thousands of tonnes of seeds, which are then stored in silos. Preparation of the seeds then involves crushing and film removal, before sending them to the extractors by conveyor.

The oil is then extracted by solubilization with heated organic solvent (hexane) to dissolve the oil, followed by percolation against the flow of solvent. Next, the miscella (oil and solvent mixture) is distilled for separation to recover the solvent and reuse it continuously. The oil cake is "desolventized" by heating by injection of vapor into a toaster. These vapors are then condensed to recover any hexane residue. After passing through the tubular condensers, gaseous hexane reverts to liquid phase and is returned to a tank for reuse in extraction. The deoiled extraction cake has a residual fat content of around 1.5%. The cake is then baked at 105°C and bagged.

For human consumption, crude oil is transported by a domestic pipeline to the neighbouring Lesieur plant for a refining operation.

### Clogging of the exchangers – a recurring problem

The water from the cooling towers, subject to many sources of atmospheric contamination (dust, pollens, bacteria, etc.) cannot clean itself. The accumulation of particles in suspension reduces its chemical conditioning and the effectiveness of the biocides. Particles in suspension are gradually deposited in the lower-flow zones, where biofilm formation is frequently observed. Heat exchange is thus reduced and so, consequently, is the condenser's integral efficiency. Dismantling and cleaning is then the only alternative to improve the situation.

At Lesieur Cristal, clogging of the tubular exchangers used to require regular cleaning. This operation, generally performed by subcontractors, turned out to be costly and temporarily reduced production for a period of 10 to 20 days. The direct impact of the dysfunctions consisted of repetitive unscheduled shutdowns, especially during the summer.

- Clogging and blocking of the exchangers due to the mediocre quality of cooling water.
- Bacteriological proliferation of the industrial water tank and the cooling water line.
- Accumulation of slurry in the industrial water storage tanks.
- Puncturing of the pipes.
- Poor heat exchanges.





## Fine filtration makes the difference...

In 2004, a cooling water line filtration tender was therefore submitted by Fraquemar S.A. with the aim of finding a solution to the dysfunctions related to the cooling water line. In 2005, a Vortisand® filtration system manufactured by Canadian company Sonitec Inc. was installed on a side stream to eliminate suspended particulate matter in the return water and make-up water. The Vortisand® model AWT7-30-SP filter is completely automated and composed of seven stainless steel



We have realized savings on electricity and improved our energy efficiency."

According to the evaluation by the production managers, the return on investment of the Vortisand® filters was estimated at about six months. The management is thinking of installing another Vortisand® filter on the second production line.

tanks, a control panel with PLC and operator interface, and a pump. Its filtration flow of 160 m3/h eliminates all particles bigger than 2µm.

Fine filtration thus minimizes microbiological and mineral clogging of the exchangers, injection nozzles and lines and better control of dissolved solids and corrosion. The system has been equipped with an Optisand® sterilization pot for periodic cleaning of the filtering media (to maintain optimum long-term efficiency of the filter).

This solution allows the Roches Noires LESIEUR CRISTAL plant testing gains in production and maintenance costs.

The opening of the exchangers after five months of continuous filtration revealed a low clogging rate. According to Mr. Abdelkébir Badaoui, Director of Operations, "The tubular exchangers are no longer clogged the way they were before, the condenser bundles are cleaner and heat exchange is better.

For more information on the Vortisand® filters contact Sonitec at: **1-888-876-9655** or visit the website: [www.vortisand.com](http://www.vortisand.com)

