Crystal clear solutions

Discover our exclusive IFC® technology
• HIGHER MEDIUM CRYSTAL SIZE
• NARROWER SIZE DISTRIBUTION
• LESS FINES

■ CHEMICALS
■ SALTS AND MINES
■ FERTILIZERS
■ AGRI-FOOD
■ WATER AND WASTE TREATMENT
■ PHARMACEUTICALS AND COSMETICS
The OSLO technology was the first to solve the problem of crystal breakage and attrition in forced circulation. In fact, in this process, no crystals pass through the pump: the magma is fluidized by the mother liquor.

Very efficient, OSLO crystallizers produce the largest crystals and have the best particle size distribution. However, they are very difficult to operate.

The DTB technology comes close to the performance of the OSLO, with a low-energy internal pump, and required baffles for the fines destruction. It is much easier to operate than the OSLO.

Our IFC® technology, based on a Crystal Evap Consult patent, combines the performance of both systems: the crystals do not pass through the circulation pump and keep a great operating flexibility.
The patented IFC® technology allows the deployment or evolution of very high performance crystallizers, both in terms of quality of the crystals and of energy efficiency of the installations. The IFC® technology solves the problems of clogging observed with the OSLO and contact between the crystals and the agitator in the DTB.

**HOW IT WORKS**

The crystals naturally move towards the mixer located underneath the crystallizer. The mother liquors from the crystallizer tranquil zone are circulated to transport crystals on the top of the crystallizer. Unlike OSLO technology, a significant quantity of crystals is transferred to the supersaturation zone at the top of the crystallizer, which eliminates clogging problems and permits the growth of the crystals.

**ADVANTAGES**

- Low investment
- Easy to manage
- Compact
- Better quality crystals
- Larger crystals than those obtained through Forced Circulation (FC)
- Better particle size distribution compared to forced circulation (FC)
- Reduced risk of secondary nucleation

**DISADVANTAGES**

- Small crystal size
- Significant production of fines
- Very large particle size distribution
- Particle size performance inferior to the OSLO or IFC®
- Risk of higher energy consumption than FC, OSLO or IFC®

**ECONOMIC BENEFITS**

For a comparable investment in DTB technology, IFC® benefits from a reduced operating cost.

**EXAMPLES**

- Sodium sulphate Na₂SO₄: D₅₀ > 350 μm with IFC® for D₅₀ < 250 μm with other technologies
- Very tight crystal size distribution of ammonium sulphate (NH₄)₂SO₄. For a D₅₀ of 2.5 mm, 25% of crystals smaller than 1.8 mm for the DTB as against less than 15% with the IFC®

**COMPARISON OF THE CRYSTALLIZATION TECHNOLOGIES**

<table>
<thead>
<tr>
<th>CF</th>
<th>OSLO</th>
<th>DTB</th>
<th>IFC®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary nucleation</td>
<td>High</td>
<td>None</td>
<td>Low</td>
</tr>
<tr>
<td>Distribution of crystal size</td>
<td>Spread out</td>
<td>Tight</td>
<td>Tight</td>
</tr>
<tr>
<td>Average crystal size (D₅₀)</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Production of fines</td>
<td>Significant</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Cycling problem</td>
<td>Medium</td>
<td>Average</td>
<td>Managed</td>
</tr>
<tr>
<td>Required cleaning frequency</td>
<td>Low</td>
<td>Average</td>
<td>Low</td>
</tr>
<tr>
<td>Investment</td>
<td>Average</td>
<td>Average</td>
<td>Tight</td>
</tr>
<tr>
<td>Operating cost</td>
<td>High</td>
<td>Average</td>
<td>Low</td>
</tr>
</tbody>
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**THE PROCESS**

Forced Circulation is the most widespread continuous crystallization technology as it is the simplest, oldest and most economical. The homogeneous mixture of crystals in the crystallizer is circulated by an external pump. The significant contact between the crystals and the pump’s impeller limits the size of the crystals (important secondary nucleation). This type of crystallizer is suitable for products without size constraints.

**ADVANTAGES**

- Low investment
- Easy to manage
- Compact
- Low operation cost

**DISADVANTAGES**

- Small crystal size
- Significant production of fines
- Very large particle size distribution
- Particle size performance inferior to the OSLO or IFC®
- Risk of higher energy consumption than FC, OSLO or IFC®

**Better Quality Crystals**

Unlike OSLO technology, a significant quantity of crystals is transferred to the supersaturation zone at the top of the crystallizer, which eliminates clogging problems and prevents the growth of crystals.

The absence of secondary nucleation has several advantages:

- The average size of the crystals obtained is much greater compared with Forced Circulation technology and slightly greater compared with DTB
- The size distribution of the crystals is closer with the OSLO
- The production of fines is very low, which avoids the use of crystal recycling facilities
A comprehensive expertise in crystallization

In chemistry, biochemistry, thermal and mechanical engineering, France Evaporation gathers a complete team of engineers specializing in crystallization processes. This is your guarantee of an expert approach to your requirements.

15 years of experience
Our teams have been designing, producing, installing and monitoring crystallization facilities for over 15 years. They have accumulated extensive experience in several industries:
- Chemicals
- Salts and mines
- Fertilizers
- Agri-food
- Waste and water treatment
- Pharmaceuticals and cosmetics

Comprehensive services
France Evaporation works on your whole projects, using a tried and tested methodology which is precise and comprehensive:
- Facility auditing
- Project engineering
- Industrial design
- Test units / Pilot units
- Sourcing
- Production monitoring
- Installation and start-up
- Facility monitoring and upgrade