FLOWMOTION® is a rescue additive specifically designed to help recover normal operating conditions during times of reduced or unstable FCC catalyst circulation. Common cause of circulation problems in standpipes are:

1. Low slide or plug valve differential pressure
2. Inability to circulate additional catalyst despite changes in slide valve position
3. Erratic slide valve differential pressure
4. Physical bouncing or hopping of catalyst standpipes

Why FLOWMOTION®?

Redesigning the fresh FCC catalyst particle size distribution can provide some relief from circulation problems. However, the time to feel the relief will vary, depending upon the current inventory of fresh catalyst. Injection of a fluidization aid, such as FLOWMOTION®, can accelerate the recovery to normal standpipe operations.

The success of FLOWMOTION® is attributable to its optimum particle size distribution (PSD) which quickly improves the critical particle size range of the entire FCC catalyst inventory. The effect of injecting a high 0-40μ additive into the circulating inventory can be measured by the fluidization factor or Umb/Umf:

\[
\frac{Umb}{Umf} = \frac{2300\rho_{d}^{0.126}\mu^{0.523}e^{0.716F}}{dp^{0.8}g^{0.64}(p_{p},p_{d})}
\]

\(Umb = \) Minimum Bubbling Velocity; \(F = 0-45\mu\) fines (weight fraction)

Increasing the amount of fines in the circulating inventory (which is directly proportional to \(F\)) will improve the fluidization factor and increase the stability of your standpipe operation.
FLOWMOTION® also contains a lower 0-20µ fraction than other fluidization aids, which limits losses at the time of injection. The typical properties of FLOWMOTION® are:

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<thead>
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<tbody>
<tr>
<td>0-20µ, wt.%</td>
<td>4</td>
</tr>
<tr>
<td>0-40µ, wt.%</td>
<td>26</td>
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<tr>
<td>APS, µ</td>
<td>53</td>
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<td>DI</td>
<td>6</td>
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**Commercial Experience**

A refiner experienced a steady increase in APS on their Ecat over a 1-year period and, over the same time frame, a chronically low 0-40µ fraction in the circulating inventory. At the point which catalyst circulation became too constrained to operate normally, FLOWMOTION® was injected and the refiner observed a rapid response both in Ecat PSD and circulation stability, enabling the FCCU to continue operating until their scheduled turnaround.

**References**

Predict FCCU Performance with Laboratory Testing

Proper Simulation of Ecat and Reaction Conditions are Critical for Modeling of Future FCC Operations

Introduction

Why do we do testing? We do testing because we want to predict in the lab what is going to happen in the field. Leo Baekeland, an entrepreneur and pioneer in the plastics industry, famously spoke to the importance of lab and pilot plant testing when he stated in his 1916 Perkin Medal acceptance speech: “The principle: ‘Commit your blunders on a small scale and make your profits on a large scale,’ should guide everybody who enters into a new chemical enterprise.” Conducting testing before commercial implementation reduces risk for a refiner. Examples of questions that pilot testing can answer include:

- What will be the effect of a potential feedstock change on yields?
- How will a new catalyst technology perform?
- Which catalyst technology is best for my operating goals?
- What effect will an additive have on my yield structure?

Figure 1 outlines what pilot testing intends to accomplish. On a lab scale, the goal is to match the complex processes occurring in a commercial FCC unit. In the unit, catalyst deactivates over a period of many weeks due to temperature, steam, and contaminant metals. Commercial deactivation conditions are too slow to be practically copied in the lab, so an accelerated lab deactivation is done to generate a simulated Ecat to match the chemical and physical properties of the commercial Ecat. Bench scale (ACE or MAT) or pilot-scale (DCR) test equipment is then used to simulate the reaction conditions in the FCC unit and react catalyst and feed to produce products.