
Question 98: What are the options for removing catalyst fines from the main fractionator bottoms product? Which, if any, can reduce the ash content to 50 ppm or less?

Dennis Haynes (NALCO Champion)

Slurry oil catalyst fines Settling Aid chemistries have been used for many years in this type of application. Electrostatic precipitators and filtration equipment is also available for minimization of ash content in slurry oil. These technologies have demonstrated cases of reduction to below 50 ppm ash for FCC slurry oil product.

Greg Savage (NALCO Champion)

Ash is a particular problem for slurry oils, especially those that are heavy and viscous needing long residence time to allow for catalyst settling. The source of ash in the slurry oil stream is composed of catalyst fines carried over into the fractionator from the reactor section of the FCC. The reactor cyclones are the first point where catalyst fines are removed from the reactor vapors going to the fractionator. Although highly efficient at separation of the vapors and catalyst, a certain level of fines is always present in the slurry oil stream. FCC hardware manufacturers are continuing to make improvements in cyclone design to remove a greater fraction of the fines.

To obtain low ash, special techniques such as heating, chemical additives, filters, electrostatic precipitators, centrifuges, and cyclones might be used. Catalyst selection may help reduce attrition to a great extent.

Many refiners make use of slurry filtration devices to remove as much of the fines as possible, and recycle the fines back to the FCC reactor by backwashing the filters. These devices can reduce ash in slurry but may require frequent maintenance and a significant capital investment for the equipment and installation. Tank settling is the most common means of reducing the ash content of slurry oil. Often, limited tank capacity reduces the residence time available for settling of the ash. Many refiners “de-ash” with chemical settling aids which speed up ash settling in storage. These chemicals are polymeric compounds which adhere to the catalyst surface causing agglomeration of the fine particles in order to accelerate separation. In order to consistently meet very low ash content, a combination of the options described above may be required.

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Year

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