Process Filtration News

Processes that involve precious metal catalysts require reliable, high-efficiency filtration to ensure their complete recovery. But avoiding catalyst loss isn't enough. For the process to be truly cost-effective, the filtration system must run continuously and be easy to maintain. There should be little or no need for continual replacement or maintenance. And it must be able to withstand harsh conditions over long periods of time. It's a tough set of requirements, but fortunately, there's a solution that's even tougher – Mott HyPulse® LSM Filter Systems. They've been recovering industrial catalysts of all types for decades, and this edition of "Did you know…" will help explain why they do it so well.

Reefery Filtration Update

Mott All-Metal Catalyst Recovery Systems

High-strength, high-efficiency filtration of particulate

A unique, continuously operating source for savings

Process operations involving catalysts have traditionally used leaf filters for catalyst recovery, and either bag filters or plate and frame filters for catalyst removal. Mott offers a better approach – one that utilizes sintered porous metal tubes to provide superior filtration, while reducing operator exposure to process materials, and reducing or even eliminating disposal costs for spent filtration media. Mott HyPulse® LSM Filter Systems have been applied extensively throughout the chemical and hydrocarbon processing industries for removal and recovery of supported precious metals and other valuable catalysts.

HyPulse LSM Catalyst Recovery

Mott’s unique HyPulse LSM design allows introduction of the feed to the top of the filter. This feature eliminates the potential for classification of high-density solids which can occur in an upflow mode. As shown here, the patented LSM design utilizes “double open-ended” filter elements which allows for incorporation as crossflow filters into recirculating reactor loop systems.
Maximizing ROI through custom design and testing
The HyPulse LSM is one of several Mott filter system designs widely used in catalyst recovery. Today, HyPulse solutions can be found in some of the largest refineries, chemical, food, petrochemical and pharmaceutical manufacturer’s in the world.

The success of HyPulse filters starts with people – experienced Mott engineers who evaluate and solve catalyst recovery concerns that are specific to each application. Through extensive testing and on-hand pilot systems, Mott can fine-tune each HyPulse solution to maximize catalyst recovery for maximum value.

System benefits include:

- High filtrate recovery
- Higher solids concentration
- Efficient cake washing
- Minimized waste
- Reduction in system downtime
- No recurring media or labor costs
- Reduced or eliminated disposal of media
- Reduced or eliminated exposure to hazardous materials and process fluids
Case Study One
Raney Nickel Catalyst

Description:
Mott HyPulse LSM is applied to catalyst recovery processes with high specific gravity solids with the following criteria:

- Remove Raney Nickel Catalyst from Hydrogenation Reaction Product Stream
- Former method was a low pressure filtration where an abrasive slurry was let down from 400 psi to 20 psi causing a short life for the letdown valve
- Filter at high pressure and continuously recycle catalyst on the high pressure side of reactor

The former method required use of expensive plunger pumps to re-inject catalyst back into process. This was replaced with:

- LSM skidded system to enable continuous recycle of catalyst on high pressure side of reactor
- Low-velocity crossflow LSM filter forms stable cake with stable pressure drop
- Isolates solids and purges as slurry
After installing the HyPulse LSM system, filtrate quality was clear, eliminating need for downstream polishing filters.

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**Case Study Two**  
**Continuous Catalyst Recovery**

**Filter upgrade objectives**  
The previously installed system utilized filter media with a short life, which also allowed catalyst loss. The problems needed to be reversed, with the hope of increasing reactor productivity and of eliminating labor costs associated with maintaining the system.

**Catalyst:**
- 1.5 to 10 wt% concentration
- 0.5 to 100 micron particle size
- Recycle to reactor

**Fluid:**
- Organic solution ≤ 1 cP viscosity
- Filtrate Quality ≤ 1 ppm

**Process:**
- 60°C at up to 90 psig pressure
- Maximum allowable delta p is 12 psi

**Recommended solution:**

Multimode HyPulse LSM Filter with:
- Top feed slurry
- Elements filter inside-out
- Continuous slurry recycle to reactor for cake control
- Purging of spent catalyst in dead-end mode without recycle
  - Recommended for catalysts with high settling velocities, i.e., Raney Nickel, Raney Cobalt, Copper Chromate
- Washing of cake prior to discharge
- De-watering of cake prior to discharge
Inside-out filtration used in Mott HyPulse LSM filters results in uniform deposition, and more secure retention of solids, while eliminating the problem of cake bridging between elements often associated with outside-in filtration.

Design/performance:

- Inside-out filtration eliminates interactions between elements during cake formation and discharge
- Parallel operation of elements
- Pressure and flow uniformity
- Minimize recirculation rate

Realized benefits:

- Filter has been operating fully automated since July of 1994 on a 8,000 hr/year schedule with original elements
- Replacement costs for primary and final filters are eliminated
- Product purity has been increased
- Catalyst life was extended significantly
- Filter capital costs were recovered during the first year

For more information
Click on the images below to download our 8-page catalyst recovery brochure or our 8-page catalyst recovery HyPulse LSM white paper. You may also contact us at Process Systems Sales, Mott Corporation, 84 Spring Lane, Farmington, CT 06032, 1-860-747-6333 or Toll-Free 1-800-BUY-MOTT. E-mail: quest@mottcorp.com.