

Catalyst Regeneration

Moving Belt and optiCAT Plus® Technologies

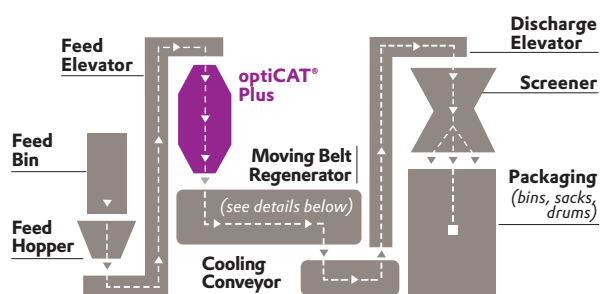
Description

Catalyst regeneration allows for the coke to be eliminated and, consequently, the activity to be restored to 75% - 90% of fresh.

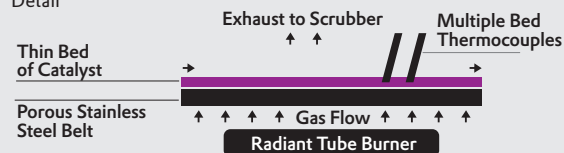
Moving Belt Process

- A thin bed of material is transported through multiple regeneration zones on a porous, stainless steel belt.
- Radiant tube burners heat the air and combustion gases that flow through the catalyst bed.
- Multiple thermocouples in each zone monitor the bed temperatures as the carbon and sulfur contaminants are removed through controlled oxidation.
- Regeneration temperature control system virtually eliminates the risk of thermal damage to the catalyst and allows us to regenerate catalysts to their maximum possible activity.

Moving Belt Catalyst Regeneration Process



Moving Belt Regenerator: Detail



Evonik offers optiCAT Plus® stripping at its Luxembourg and US Plants

Benefits

- Prevents channeling, better temperature control
- Reopens catalyst pores
- Recovers much of original surface area
- Prevents breakage and attrition
- 60+ different grades of catalyst regenerated each year
- 20+ million kilograms per year catalyst regeneration capacity
- Global presence: North America (US-Canada), Europe (Luxembourg), Asia (Singapore & China)

Applications

- Hydrotreating catalysts (CoMo/NiMo)
- Hydrocracking catalysts (NiW/NiMo)
- Selective hydrogenation catalysts (Pd-based catalyst)
- Reforming & isomerization catalysts (Pt-based catalyst)
- Alkylation & transalkylation catalysts for aromatics (zeolite)

By combining optiCAT Plus® with the moving belt process, we restore catalysts and adsorbents to their maximum potential with minimal breakage.

A Fully Integrated Process

1. Detailed Catalyst Analysis (DCA)

- Representative analyses of the full reactor composition
- Bin-by-bin decision whether or not to regenerate
- Recovery of high quality catalyst
- Maximize activity recovery

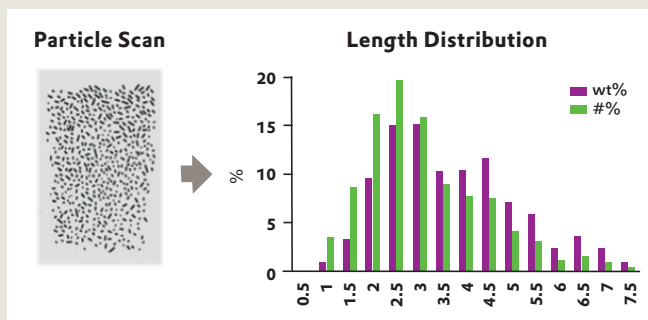
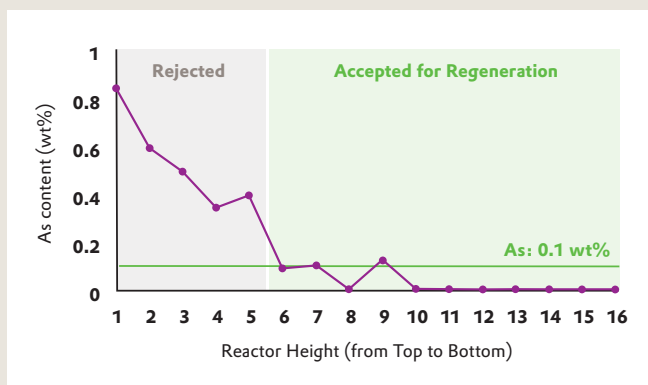
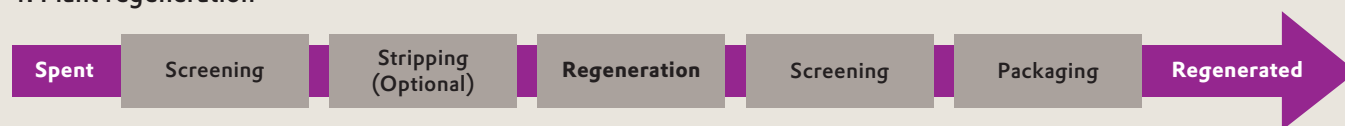
2. Custom Lab Regeneration

- Optimized temperature and residence time

3. Characterization of lab regenerated catalyst

- Physical characterization
- Chemical characterization
- Length Distribution
- X-Ray Diffraction (XRD)
- Relative Volume Activity (RVA) against fresh for HDS and HDN

4. Plant regeneration



Additional Services Available at Evonik

More Than Regeneration

- Witnessing during unloading
- Guidelines for labeling and sampling
- General guidelines for re-use
- Standard analytical procedures
- Density grading
- Length grading

Post-Treatments

- **Rejuvenation:** Excel® is a proven technology which restores activity to near fresh levels
- **Presulfurization:** actiCAT® and actiCAT Shield® technologies are proven, time-saving alternatives to in-situ sulfiding
- **Preactivation:** UltraCAT® technology is a "ready-to-use" solution which includes cracked feed protection, time-savings alternative to in-situ sulfiding

Disclaimer

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EVONIK OPERATIONS GMBH Business Line Catalysts

catalysts@evonik.com
www.evonik.com/catalysts
www.evonik.com