FOR 100 YEARS CYTEC HAS BEEN PROVIDING AN INTEGRATED APPROACH FOR THE MINING CHEMICALS INDUSTRY

THE RIGHT PARTNER
Cytec helps our partners to improve productivity and reduce operating costs while meeting complex economic, environmental and metallurgical challenges. We provide the following support to our customers around the world:

• Formulation Expertise
• Application Knowledge
• Modeling Capabilities
• On-Site technical collaboration

THE RIGHT CHEMICAL TECHNOLOGIES
Our products have optimized mining operations worldwide in such industries as Copper, Alumina, Gold, Nickel/Cobalt, Polymetallic ores and many other metals and minerals.

AT JUST THE RIGHT TIME
Cytec is focused on delivering the best technical solutions, global expertise and supply capabilities to every major mining region of the world.

• Expertise in operational design for New Mines and Brownfield Expansions
• Major investments in our production facilities to ensure capacity to grow with the mining industry
• Global manufacturing footprint, regional research centers, and highly reliable global supply chain
Cytec Alumina strives to be the Specialty Chemical Partner of Choice by combining our full suite of specialty chemicals with industry professionals diligently working with customers solving problems, helping optimize production and identifying cost savings opportunities.
Global Application Technology Group comprised of experienced industry professionals

Equipment Designer & Provider

Intense focus on Reliability and Quality

40% of resources in technical organization

Security of supply with multi-product manufacturing facilities

Fundamental new molecule development

International Logistics Expertise

Global focus to solving multilevel customer problems

Dedicated sales and service group focused solely on Alumina industry
Cytec Alumina has gone from problem to solution with the introduction of premiere products such as HXPAMS for the Bayer Process and MAX HT® for Sodalite scale control, which have created significant value for the industry. Today Cytec stands as the innovation leader in the industry and has a full product line of Flocculants, Scale Inhibitors, Crystal Growth Modifiers, Defoamers, Dewatering Aids, Bauxite Handling Aids, Auto Precipitation Reduction Aids, Humate Removal Aid, Liquor Filtration Aids and Dust Control Agents in order to address the needs of the industry.

Our relentless pursuit of industry needs is fueled by close collaboration and working relationships with our customers. Ultimately it is through these collaborations and our tenacity to solve problems that allows us to meet and exceed our customers’ expectations.
Following is an overview of the main product groups that Cytec offers for alumina processing. Your local Cytec representative is ready to work with you to address your unique situation and help you achieve your operational and financial goals. Contact Cytec to select the optimum combination of individual products for your needs.
1. CYFLOC® Bauxite Grinding (BGA) and Handling (BXD) Aids
Process Stage: Bauxite handling & grinding
Function: Improves handling and flow properties of moist bauxite
- Enables faster off-loading of bauxite
- Reduces chute blockages
- Increases mill throughput
- Reduces viscosity and stickiness during grinding
- Reduces energy required for grinding

2. MAX HT® 500 Series Sodalite Scale Inhibitor
Process Stage: Evaporator and digester heaters and inter-stage piping
Function: Eliminates sodalite scale
- Eliminates sodalite scaling of evaporator and digester heaters as well as inter-stage piping
- Allows for the preservation of maximum heat transfer coefficients across heat exchangers
- Eliminates flow reductions due to scaled heater tubes and inter-stage piping, thus allowing for higher average flows (increased production)
- Allows optimum evaporation area performance
- Reduces caustic consumption through optimum evaporation area performance
- Eliminates the need for acid cleaning heat exchangers and the safety concerns associated with this unit operation
- Reduces the need for heater tube changes due to acid corrosion
- Adsorbs to mud in clarification and will not accumulate in circuit
- Lowers overall energy consumption

3. CYQUEST® 365 Humate Removal Agent
Process Stage: Digester blow-off
Function: Complexes with both soluble and colloidal humates to form insoluble precipitate, thereby controlling humate levels in liquor
- Allows humates to be purged from the liquor
- Reduces the overall level of organics in liquor
- Allows for higher production rates
- Increases brightness of alumina trihydrate

4. CYQUEST® 637 Iron Removal Agent
Process Stage: Digester blow-off and thickener/settler overflow
Function: Reduces iron levels in liquor
- Complexes with colloidal iron forming precipitate that settles with mud or is removed by filters
- Reduces iron contamination of end product

5. CYFLOC® HX 1000 Series Settler Flocculants
Process Stage: Thickener/settlers/decanters (primary red mud settling)
Function: Settling and clarification of digester blow-off slurry and thickening of washed red mud
- Promotes fast settling rates
- Increases settler throughput
- Very low solids overflow

6. CYFLOC® HX, A and 1200 Series Washer Flocculants
Process Stage: CCD mud washing circuit
Function: Settles red mud in mud washing circuit
- Exhibits strong affinity for iron in mud
- Sharp mud/liquor interface – no “cloudy zone” or “diffused layer”
- Settled mud exhibits low yield stress – promotes low rake torque and excellent mud pumpability
- No induction period – immediate flocculation
- Reduces lime usage
- Reduces gibbsitic scaling in settler
- Improves filtration rates
- Reduces energy required for grinding
- Low molecular weight poses negligible risk of blinding the filters
- Ensures very low solids overflow

7. CYFLOC® HX 800 Series Filter Aids
Process Stage: Polishing filtration
Function: Used to enhance overflow filtration rate
- Increases throughput
- Reduces filtration costs
- High underflow densities
- Improves soda recovery
8. CYBREAK® 600 Series Defoamers
Process Stage: Precipitation (or any process area where foam is a problem)
Function: Reduces foam buildup throughout precipitation

- Simple to apply
- Can be diluted in line with clean process water or injected directly into the filter feed
- Delivers sharp mud/liquor

9. CYQUEST® 100 Series Crystal Growth Modifier
Process Stage: Precipitation
Function: Modifies alumina trihydrate crystal growth to reduce fines production in the precipitation circuit

- Enhances the agglomeration of hydrate particles
- Inhibits or stabilizes the co-precipitation of oxalate
- Reduces generation of hydrate fines
- Allows operation at lower fill temperatures and higher seed charges
- Improves yield

10. CYFLOC® TF & HF Series Hydrate Flocculant
Process Stage: Tertiary hydrate settlers
Function: Improves hydrate settling in tertiaries

- Achieves faster settling rate
- Improves production through lower levels of hydrate in spent liquor
- Improves rheology of hydrate (lower rake torque and better pumpability)
- HX or Dextran, based; settles hydrate in the presence of oxalate

11. AERODRI® 100 Series Dewatering Aid
Process Stage: Hydrate filtration
Function: Reduces moisture in hydrate feed

- Reduces leachable soda
- Reduces wash water requirements
- Increases filtration rate (throughput)
- Improves filter cake handling
- Reduces filter cloth blinding
- Requires minimal preconditioning time
- Reduces treatment costs by 30–35%, as compared to competing products

AEROSPRAY® 70 SERIES
Process Stage: Red Mud and Bauxite Storage
Function: Control dust and stabilize soil

- Stabilizes surface particles and prevents erosion by wind and rain
- Extremely resistant to sunlight
- Presents no fire or explosion hazards either in storage or during application
DEFOAMER CUSTOMER EXPERIENCE

Cytec’s CYBREAK® 631 defoamer enabled cost savings, yield improvements and $4.4 AUD increased profits in an Australian Bayer process plant. The plant wanted to reduce its consumption of defoamer and lower the amount of foam in its secondary seed thickeners.

Cytec met both the objectives by replacing the customers’ defoamer with its CYBREAK® 631 defoamer. Cytec’s high performance CYBREAK defoamers generally require lower dosages and last longer than competing products. CYBREAK® 631 defoamer required only 50% of the previous defoamer’s dosage. The customer gained a number of operational and financial benefits from Cytec’s solution including:

• Defoamer costs declined due to reduced usage
• Surface foam on the secondary thickeners was reduced
• Hydrate capture rose by 1 gram per liter of liquor, and stabilized at this level
• The higher yield of hydrate increased profits by AUD 4.4 Million per annum

Cytec CYBREAK 621 defoamer is one of a full range of CYBREAK Defoamer/ Antifoam products including: CYBREAK 625, 628, 629, 631, 632, 633, 646. Each defoamer is carefully chosen by a Cytec technical expert depending on the specific customer goals and process parameters.

HYDRATE FLOCCULANT CUSTOMER EXPERIENCE

CYFLOC® HF Hydrate Flocculant product line has recently incorporated a range of Dextran based flocculants that were developed to provide a step change in performance over existing solutions. The construction of these molecules and high molecular weights offer several advantages. One North American Alumina refinery transitioned from a traditional Dextran to the CYFLOC HF Dextran and experienced:

• Reduced tertiary overflow solids
• Improved rheology resulting in reduced rake torques for the same solids loading
• Increased throughput of the tertiaries
• Increased productivity / production with less hydrate recirculation
• A reduction in the number of tertiaries in service

The positive impact on settled hydrate rheology makes Cytec’s Hydrate flocculant a valuable tool and helps to stabilize operations across the entire classification circuit. Cytec’s Hydrate flocculants have been successfully applied to Tertiaries, Secondaries, and Hydrate Wash Tanks.

In addition to the improved performance and added features over traditional Dextrans, the CYFLOC® Dextran products are the most cost effective Hydrate Flocculants in the industry.

DUST CONTROL CUSTOMER EXPERIENCE

Cytec’s AEROSPRAY® 70 Series dust control product eliminated a red mud lake dust issue at a customer site in Australia. Dust can be a seasonal problem depending on weather conditions in many areas of the red mud and bauxite storage locations. AEROSPRAY 70A was sprayed as a solution to a mud lake in Australia. The AEROSPRAY bonded to the top layer of the red mud to form a hard crust that significantly reduced the amount of dust. The application was successful and results were confirmed under high wind conditions. These results were sustained over a significant time period further justifying the value proposition of this application.

Cytec offers a range of AEROSPRAY products that can be applied depending on the specific conditions and needs at each location.
DEWATERING AIDS CUSTOMER EXPERIENCE

Dewatering aids are used for the reduction of moisture content in filter cakes from hydrate pan filters on the white side in the Bayer process. They are typically surfactant based products and provide benefits by improving filter cake quality through moisture reduction. This feature allows for:

- Reduction of calciner operating costs through fuel savings
- Improved washing efficiency reducing soda in product
- Lower transportation and disposal costs
- Improved cake handling and release from the filter cloth thus increasing throughput of filter table
- Lower wash condensate requirements increasing condensate availability for other applications, for example, mud washing circuit
- Extended filter operation
- Improved filter performance and longevity of filter cloth/wire through reduced caustic retention and with that cloth hardening

Cytec’s AERODRI® dewatering aids are surface active agents that have been specially formulated to maximize the contact angle as well as reduce the surface tension of the water. With >40 years of experience in a variety of plants, the Cytec solution includes a dedicated team that works with each customer ensuring the optimal solution is chosen. The AERODRI series includes 100, 104, 105.

CRYSTAL GROWTH MODIFIER CUSTOMER EXPERIENCE

One refinery in the Americas significantly improved their operations using CYQUEST® 120 CGM compared to no CGM as well as a competitor’s CGM. The plant had experienced product size and overall classification circuit precipitation challenges especially during period of high Hydrate fines inventory. CYQUEST 120 was applied at the filling liquor pumps and was able to:

- Increase the seed charge from 90g/l to 120-150 g/l to achieve the desired amount of agglomeration
- Stabilize their liquor by minimizing the impact of oxalate in the precipitation circuit
- Achieve agglomeration results at the -45um size where the competitor CGM product showed no results

Cytec has decades of experience providing customers with a CYQUEST CGM product line including CYQUEST 100, 120, 170, 174, 178 that are superior in performance and cost effectiveness to all other options available in the market today.

HYDRATE FLOCCULANT CUSTOMER EXPERIENCE

An Americas Bayer process plant was interested in improving the performance of their classification stages during high seed variability while lowering their overall treatment cost. Cytec implemented a Hydrate Flocculant solution including CYFLOC® TF-9000. Improvements when switching from a traditional Dextran based program included:

- Control of the overflow solids in secondary and tertiary classification stages including periods of high seed variability
- Consistent overflow solids and underflow density to stated goals
- Reduced consumption meeting the goals of a 20% cost reduction target.

CYFLOC TF-8000 and 9000 Series Hydrate Flocculants offer customers the widest range of options to ensure an optimized program for each plant.