

# ChemTreat Treatment Programs In Refining Processes

## Introduction

ChemTreat companies are experienced in treating the most problematic refining areas using chemical treatments such as demulsifiers in desalters, neutralizing and filming amines for distillation column overheads, and heat exchanger (H/E) antifoulants, antifoams, and emulsion breakers. This overview summarizes our capabilities and demonstrates the competitive advantages we bring to our refinery process customers.

## What Makes Us Competitive in the Refining Process Market?

Our biggest competitive advantage comes from our more than 35 years of experience in treating production processes throughout South America. We have dealt with crude oils of all characteristics, ranging from natural and synthetic 16° API (bitumen of 8° API and naphtha) to 40° API with problems such as asphaltenes, paraffins, naphthenic acids, and suspended solids. Their severity is comparable to problems experienced with crude oil produced in the Canadian Tar Sands and Maya crude from Mexico.

## Demulsifier Treatments and Corrosion Control of Crude Oil Atmospheric Columns

Our technical expertise enabled us to achieve excellent results in electrostatic dehydrator and refinery desalter treatment using both existing demulsifier products and formulas already in production. For some cases, we were able to formulate new treatment products through integrating asphaltene dispersants, sludge-wetting agents, dehydrating agents, and demulsifiers into a single product. Our experienced Research and Development department can develop treatment products on site, eliminating the risk of changes in sample composition or aging. This allows us to formulate the best possible demulsifier in a matter of days, not weeks.

Laboratory testing is another important part of our success. Our technical specialists use a portable electrostatic dehydrator to confirm the appropriate desalter treatment formulation was selected. This provides the desalted crude and salt PTB demanded by the refinery in real-time. Tests are based on scaling the field desalter mixing valve pressure drop to the Ultra-Turrax® high-speed homogenizer applied to the raw water wash mixture in the laboratory.

We also have experience developing other products typically used in refineries, such as neutralizing amines, filming amines, asphaltene dispersants, antifoulants, antipolymerization agents, and antioxidants.

We classify the treatments according to the crude API ranges. For example, for a heavy crude of 16–22° API, we have up to five different classes of demulsifiers, neutralizing amines, and filming amines.

For many crudes where the top of the tower is not acidic enough, only a filming amine is required. The use of Lipesa 229 or Lipesa 590 as a filming corrosion inhibitor is sufficient.

We track treatment program success by measuring and controlling critical parameters in the desalters and the top of the atmospheric distillation columns.

## Corrosion Control Treatment in Vacuum Columns, Fractionators, and Strippers

Other common refinery treatments include top vacuum unit corrosion inhibitors, fractionation, and stripping columns. Filming amines are used in almost all of these applications; neutralizing amines are not necessary.

Application success is demonstrated by control of sour water pH and total iron content, sustainment of corrosion rates less than 2.0 mpy in the exposed metallurgy, fewer system faults, and fewer heat exchanger repairs. One example is our treatment of an FCC fractionation unit that experienced plant outages every three months because of heat exchanger reboiler failures. After applying our treatment program, the reboiler has run for more than 12 years without failures.

## Antifoulants

Antifoulants, antioxidants, and asphaltene dispersant applications are also common in refineries. Our products are improved with the support of our technology resources, and verified in the field through process simulators like PRO-VISION and CHEMCAD that calculate the coefficient of heat exchanger heat transfer (U) versus time.

## Other Treatments

Our product catalog also includes reverse emulsion breakers, antifoams, cyanide removers, and additives to improve finished product properties. They are backed by ASTM laboratory and field test protocols, UOP, and standard methods.

Location	Capacity (KBPD)	Crude °API Average	Products ( <i>Demulsifier; Neutralizing Amine, Filming Amine</i> )	Average pH (5.5–6.5)	Chloride (ppm) Max. 50 ppm	Total Fe (ppm) Max. 2 ppm
Refinery 1	40	28	Lipesa 1382, Lipesa 507, Lipesa 229	6.00	Not controlled	0.50
Refinery 1	70	21	Lipesa 1354, Lipesa 507, Lipesa 230	6.00	Not controlled	0.50
Refinery 1	40	24	Lipesa 1382, Lipesa 507, Lipesa 231	6.00	Not controlled	0.50
Refinery 1	50	30	Lipesa 1382, Lipesa 507, Lipesa 232	6.00	Not controlled	0.50
Refinery 1	40	24	Lipesa 1382, Lipesa 507, Lipesa 233	6.00	Not controlled	0.50
Refinery 1	65	30	Lipesa 1269, Lipesa 507, Lipesa 229	6.00	Not controlled	0.03