

Connecting**Chemistry**



REFINERY INDUSTRY

Product Portfolio



**EVERYTHING
AT HAND**

Company information

Brenntag is a leading chemical corporation that distributes a full range of chemical materials. Brenntag offers a wide selection of industrial and speciality products, functional additives and other chemicals for almost all industries.

Refinery customers can choose from a wide range of superior quality base and auxiliary products, including highly specialized materials. We approach our customers' needs and requirements with great flexibility.

Brenntag provides a range of added-value services, including:

- professional consulting in product selection
- formula optimization
- implementation
- continuous production
- waste disposal
- waste container management, and
- product packaging solutions

We offer a range of industrial containers for the shipping and storage of liquid chemicals, plus a selection of packaging closures and accessories for a variety of applications. We also provide professional technical service and technological support.

Brenntag maintains a logistics infrastructure and engineering facilities, including analytical and research laboratories, complete with highly qualified staff. With our continuous research development programs and increasing range of analytical methods, we can precisely monitor and improve the quality of the products we offer and develop new formulations.



Infineum as manufacturer of fuel additives

Infineum is a world leader in the formulation, manufacture and marketing of additives for the fuel and lubricant industry. More than 80 years of experience within the additives industry.

Established in January 1999, Infineum is a 50:50 joint venture between ExxonMobil and Shell,

bringing together their respective Additive Divisions.

Three main product areas:

- crankcase lubricant additives
- speciality lubricant additives
- fuel additives

Brenntag & Infineum cooperation

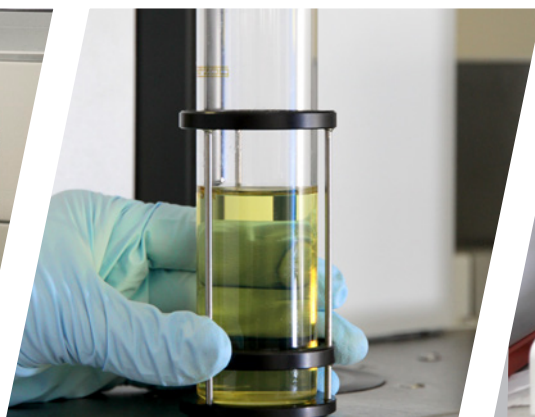
Oil & Gas Research and Development Centre is a complex of the state-of-the-art laboratories dedicated to the oil and gas drilling, production and refinery sectors.

The Fuel Additives Laboratory provides comprehensive technological support to Brenntag's customers in whole Europe in relation to the continuous quality assurance of manufactured chemicals, sample analysis and identification.

Experienced technical support staff backed by test laboratories offer a quick and comprehensive response to customer technical needs:

- technical advice and support
- fuel characterisation and blend prediction
- extensive testing facilities
- additive response evaluations
- additive optimisation
- field test data
- economics optimisation advice for refiners
- additive training for the industry
- advice on industry trends, legislation and spec changes
- specification change impact analysis
- marketing support and advice
- world-wide Diesel Fuel Survey

REFINERY INDUSTRY PRODUCTS



COLD FLOW IMPROVERS

- Cloud Point Depressants (CPD)
- Pour Point Depressants (PPD)
- CFPP Depressants (MDFI)
- Wax-Anti Settling Agents (WASA)
- Wax-Anti Settling Agents & Flow Improvers (WAFI)
- Heavy Fuel Flow Improvers (HFFI)

LUBRICITY IMPROVERS

- ester-based
- mono-acid based
- modified acid

ANTI-STATIC AGENTS

ENERGY ADDITIVES

- cetane improver
- octane improver

BIODIESEL ADDITIVES

- Biodiesel Flow Improvers (BDFI)
- Antioxidants

BIOCIDES

- glutaraldehyde based
- CMIT/MIT based
- oxazolidin / MBO based

DYES

- Sudan® series
- Dyeguard® series

FUEL'S PROCESSING CHEMISTRY

- corrosion inhibitors
- oxygen scavengers
- H₂S scavengers
- dewaxing aids
- anti-foaming agents
- demulsifier agents
- water-clarifiers
- flocculants
- coolant agents
- Heat Transfer Salt HITEC

PRODUCTS FOR CATALYSTS

- NOX AdBlue®
- SulfrZol 54®

ADSORBENTS & SUPPORT MEDIA

- Siliporite® molecular sieves
- Absodan® Plus
- Amberlite® BD10 Dry
- Denstone®

COMMODITY

- acids
- hydroxides
- amines
- alcohols
- solvents
- glycols
- sulphur

Cold-flow additives

When middle distillate fuels are cooled to temperatures below their cloud points, wax crystals form within the fuel. Without the addition of cold flow additives, these are typically flat rhombic shaped crystals that can cause problems:

- at temperatures close to the cloud point, fuel system filters in both vehicle and static installations rapidly become blocked,
- at only slightly lower temperatures an interlocking wax crystal structure forms which totally prevents flow within the fuel system (the pour point is reached).

Addition of cold flow additives modifies the shape of the wax crystals which form. This:

- reduces the tendency to block fuel filters,
- extends the temperature range over which a vehicle will operate,
- significantly lowers the fuel pour point.

Infineum has a wide range of additives which have been developed to provide extended cold flow performance across the spectrum of middle distillate fuels.

COLD-FLOW ADDITIVES FEATURES

CFPP depression

- reduced wax crystal size/ better wax crystal shapes
- improved filtration characteristics
- ability to meet national specifications with a lower quality base fuel

Reduced wax settlement

Greater consistency of fuel supply when the fuel is stored below its cloud point.

Improved vehicle operability

Improved vehicle performance in cold weather due to improved filtration characteristics.

Pour point depression

Ability to meet required pour point specifications.

Lubricity additives

Lowering of diesel fuels natural lubrication qualities by the desulphurisation process has been shown to lead to premature wear and potential failure of fuel lubricated injection equipment, in particular rotary injection pumps.

Today, most countries which produce low sulphur diesel require that diesel lubricity meets minimum standards:

- US specification maximum 520µm wear scar (Included in ASTM D975 since 1st January 2005)
- EU specification maximum 460µm wear scar (Included in EN590 since 1999)

Lubricity additives based on different chemistries

- ester based – robust, deep treatment for severe low sulphur diesel
- mono-acid based – cost-effective for easy to treat fuels
- modified acid – excellent low temperature handling capabilities at lower cost than esters

Approvals:

- DGMK (Germany)
- European multi-product pipeline
- OEM for some products

Anti-static agents for safe fuel's operation

A further consequence of the removal of sulfur from the fuel and producing ultra-low sulfur diesel is a reduction in its electrical conductivity. It presents additional risk to refiners due to the potential build-up of high static charges during pumping operations. Such static charging can result in spark electrical discharge, with

catastrophic potential in highly flammable environments.

Using ASA additives:

- reduce the hazard of electrical charge accumulation
- increase the rate of charge dissipation by increasing conductivity of fuels

Energy additives

Cetane improver based on 2-EHN or DTBP, are diesel fuel additives, which improve Cetane number and offers the best performance in the most competitive way.

- upgrade diesel fuel quality to meet specification requirements
- provide processing flexibility allowing the use of low cetane naphtenic crude oils
- upgrade diesel fuel quality to premium grade

products currently on the market

Octane improver based on metallic or non-metallic chemistry is a gasoline additive which:

- enhance the octane level of gasoline
- protect engine against knocking
- provide a better quality of fuel

Heavy fuel flow improvers

As result of legislation pressure, demand for marine fuels application will change over the next 10-15 years and value opportunities for low S marine fuels are emerging

Legislation requirements

- from January 2015 the max permitted Sulphur level in bunker fuels became 0.1 wt% from 1 wt% in Emission Controlled Areas (ECAs)
- from January 2020 max permitted Sulphur will become 0.5 wt% from 3.5 wt% in non-ECA zones

Shippers have 3 options to comply with the legislation

- fuel compliance (the highest impact on refiners to find ways to provide low S bunker fuels)
- scrubber compliance SOX abatement devices (scrubbers)
- LNG compliance (LNG vessels and dual fuel engines)

Low Sulphur ECA-type marine fuels

- produced from FCC feedstock materials may have high to very high pour points, similar to HFO (*Infineum R170 & R180 series product*)
- produced from diesel or gasoil-type components may require additives to depress both pour point and/or CFPP (*Infineum R200 series product*)

Use of cold flow additives in marine fuels can overcome production challenges and increase profitability of finished fuel for refineries. Infineum has a long history of expertise in Fuels cold flow properties and is actively working with the marine industry (CIMAC – International Council of Combustion Engines) to continue building understanding of these marine fuels, identify constraints and ultimately solutions.

Biocides

Biocide usage is critical for maintaining the integrity of fuels at all points during storage, distribution and usage.

Glutaraldehyde based biocide

- a broad spectrum biocide with established no carcinogenic properties
- rapidly effective against bacteria and fungi within minutes to a few hours
- its active ingredient does not contain sulfur
- for upstream & downstream applications
- for Oil and Gas Water Storage and Transmission Systems

CMIT/MIT based biocide

- effective against bacteria and fungi in fuel and the water phase in a wide range of fuel preservation applications
- active mixture of CMIT/MIT is dissolved in dipropylene glycol, rather than water
- its active ingredients contain sulfur (400 ppm

dosage – 1.4 ppm S)

- for use in liquid hydrocarbon fuels and oils (Crude oils, Diesel fuels, Gasoline, Kerosene, Aviation fluids, Heating oils, Residential fuel oils, Liquefied petroleum gases, Petrochemical feedstocks, Fuel storage)

Oxazolidin / MBO based biocide

- broad activity spectrum against bacteria, yeast and moulds in diesel fuel
- recommended for big storage tanks, i.e. tank farms or depots
- Grotamar® 71 is an effective biocide for treatment of contaminated diesel fuel, and it has good anti-corrosive properties
- Grotamar® 82 is a versatile additive and can be used in all types of diesel fuel and heating oil, each with biodiesel up to 20% and also in pure mineral oil diesel without bio component; provides protection against premature oil-ageing and anti-corrosion for non-ferrous metals.



**LABORATORY OF
YOUR SUCCESS**



OIL & GAS

technology and service

Biodiesel additives

Several unique characteristics of biodiesel, also known as fatty acid methyl esters (FAME), or B100, may cause some operability problems. Low-temperature fluidity, water haze, and thermal and oxidation stability are the most significant issues facing the marketers and end users of biodiesel blends.

Our offer for biodiesel treatment include:

- Biodiesel Flow Improvers (BDFI) from Infineum to improve cold-flow properties of biodiesel blends
- Antioxidants which increase oxidative stability of biodiesel blends

Fuel's processing chemistry

Brenntag knows that refining crude oil into high-value fuels and other refined products requires the careful coordination and precision of many complex and expensive systems. The refinery's profitability depends on maintaining the quality and efficiency of these key process units, controlling operating costs, meeting environmental requirements and improving efficiencies in every step of the production process, while ensuring final product quality.

Our technology includes:

- **Corrosion inhibitors** to prevent corrosion in critical production units and extend equipment life, maintaining throughput and increase operational flexibility
- **Scavengers for oxygen and hydrogen sulfide** to neutralise and remove gases selectively to help meet product and process specifications
- **Demulsifiers** to break water-in-oil emulsions and remove water
- **Antifoulant agents** to minimize the costly effects of fouled equipment

- **Anti-Foam agents** to foam control, prevent potential spillage due to overflowing, process disruptions and liquid carryover, in addition to reduction in the capacity of the treating system
- **Water clarifiers** to purify water because of liquid pollutants, to reuse the water in technological processes
- **Floculants & Coagulants** used in effluent water treatment processes for solids removal, water clarification, lime softening, sludge thickening, and solids dewatering
- **Dewaxing aids** for solvent dewaxing of residual feed stocks. The additives adsorb onto the wax crystals as they grow, modifying their shape and making them easier to filter
- **UV Stabilizers**
- **Coolant Agents** to enhance equipment efficiency for maintaining everyday operations
- **Heat Transfer Salt HITEC**, the heat transfer medium that is between steam and direct-fire heating. The economical and efficient product to use in chemical and petroleum process industries in high-temperature operations.

Products for catalysts

NOX AdBlue® is the additional NOx reduction agent required in every diesel-driven vehicle with an SCR catalytic converter (Selective Catalytic Reduction). It is an aqueous urea solution consisting of 32,5% pure urea dissolved into demineralized water. The chemical is odorless and non-poisonous. The high quality of the urea solution AUS 32 (32,5% Automotive Grade Urea Solution) is defined by ISO 22241.

SulfrZol 54® is the Catalyst Sulfiding Agent for catalyst activation. SulfrZol® 54 is a premium alternative to traditional sulfiding agents. With a higher flash point, low odor, and emissions-improving technology, it offers safer, cleaner and effective catalyst activation that is preferred by refinery managers, operators, and the surrounding community.

Adsorbents & support media

Siliporite® beads are used to trap moisture, VOC and odors, thanks to their superior adsorption capabilities and dust free properties. Siliporite® molecular sieves are widely used to dry natural gas to very low dew points. All commercial pore sizes (3A, 4A, 5A and 13X) will address the different types of impurities, such as H₂S, mercaptans, hydrocarbons, methanol, mercury, chlorine, acids, etc.

Absodan® products absorb all fluids (including carbohydrates, oils and greases) and corrosive chemicals quickly. As a chemically inert granule they are ideal as a universal absorbent for oils, acids, bases, aqueous and organic solvents. Amberlite™ BD10 Dry is a sulfonic acid resin, supplied in the dry form. This resin has been specially developed to remove catalyst, soap and glycerol traces from Biodiesel. It is a ready-to-use resin.

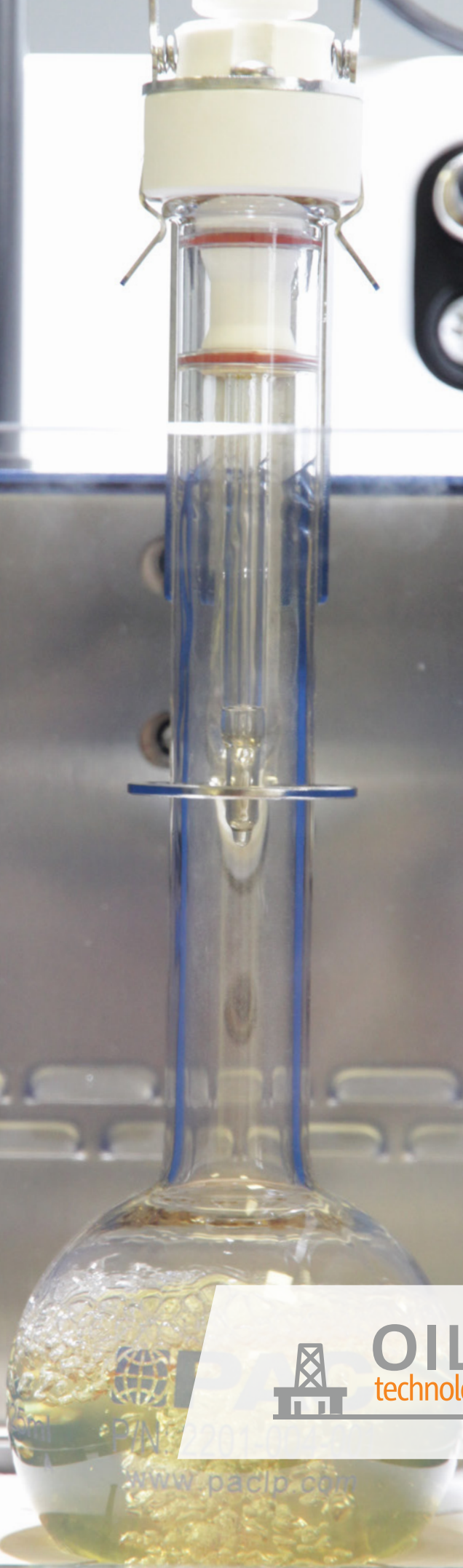
Denstone® support media technologies, designed to fit a range of applications and providing with added security of performance in more demanding environments.

Denstone® 57 support media line prevent poisoning and contamination of a catalyst and also fouling and plugging of the catalyst bed.

Denstone® 2000 support media line is a good choice for operation includes hydroprocessing applications. It's characterized by unmatched survival in rapid depressurization and high thermal shock resistance.

Reliability, safety and responsibility

We set industry standards in areas of workplace / environmental safety and business ethics. Brenntag is respected for good financial performance and rapid growth, but – above all – for efficient organization, modern business and technological solutions.



OIL&GAS
technology and service



PACIP
PN 2201-0242
www.pacip.com



Contact

Brenntag Polska Sp. z o.o.
Oil & Gas Division
ul. Przemysłowa 2, Jankowice
62-080 Tarnowo Podgórne, Poland

Phone: +48 61 893 65 07
Fax: +48 77 47 21 600
ropaigaz@brenntag.pl

www.brenntag-cee.com

