

News Release

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New FCC butylene additive Evolve™ addresses refineries demands

- **Provides measurable improvements in butylene yields**
- **Preserves unit conversion and valuable fuels yields**
- **Helps refiners to reduce sulfur content of gasoline pool**

BASF announced today the launch of Evolve™, a proprietary new Fluid Catalytic Cracking (FCC) additive designed for butylene selectivity. Evolve provides measurable improvements in butylene yields while preserving unit conversion and valuable fuels yields when compared to existing technologies. Refiners worldwide are facing the effects of tightening fuel regulations as stricter sulfur fuels standards continue to be implemented globally.

In 2017, Tier 3 standards went into effect in the United States. Refiners are striving to find ways to reduce the sulfur content of their gasoline pool to meet the 10 ppm requirement. China implemented similar standards also in 2017. In the EU the 10 ppm requirement for Gasoline has already come into effect in 2009. Compliance with tighter sulfur requirements often led to octane loss. Alkylate has become a preferred gasoline blending component, as it contains no sulfur, no olefins, no benzene, and has a low vapor pressure and high-octane number. As a result, many refiners focus on maximization of alkylate production, but struggle due to a butylene shortage, which is important for keeping refineries operating as profitable as possible.

With long-term global fuel demand expected to favor clean, low-sulfur fuels and increasing use of high compression engines requiring higher octane gasoline, Evolve enables refineries to optimize the alkylation plant by increasing selectivity for butylene over propylene compared to conventional olefins additives. Refineries benefit from both the output of butylene and low sulfur, high-octane gasoline.

The technology is the result of a concerted R&D effort dedicated to the development of a new technology to provide a significant increase in butylene selectivity without negatively affecting unit operating yields.

“Cornerstones of this R&D effort were to create an additive that had increased selectivity to butylene over propylene when compared to conventional olefins additives. BASF’s solution provides an effective means for refineries with gas plant constraints to optimize their alkylation unit feedstock,” said Jim Chirumbole, Vice President, BASF Refining Catalysts.

“We are very excited about the performance of this additive and the increased value it will bring to our refinery customers around the world,” said Bilge Yilmaz, Director of Global Technology, BASF Refining Catalysts.

About BASF’s Catalysts Division

BASF’s Catalysts division is the world’s leading supplier of environmental and process catalysts. The group offers exceptional expertise in the development of technologies that protect the air we breathe, produce the fuels that power our world and ensure efficient production of a wide variety of chemicals, plastics and other products, including advanced battery materials. By leveraging our industry-leading R&D platforms, passion for innovation and deep knowledge of precious and base metals, BASF’s Catalysts division develops unique, proprietary solutions that drive customer success. Further information on BASF’s Catalysts division is available on the Internet at www.catalysts.basf.com.

About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. The more than 115,000 employees in the BASF Group work on contributing to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio is organized into five segments: Chemicals, Performance Products, Functional Materials & Solutions, Agricultural Solutions and Oil & Gas. BASF generated sales of €64.5 billion in 2017. BASF shares are traded on the stock exchanges in Frankfurt (BAS), London (BFA) and Zurich (BAS). Further information at www.basf.com.