MAXDIESEL™ Fluid Catalytic Cracking

MAXIMIZE YOUR REFINERY PROFITABILITY WITH INCREASED DISTILLATE PRODUCTION

KBR MAXDIESEL™ Fluid Catalytic Cracking (FCC) is an innovative technology based on KBR's dual riser configuration that can be retrofitted into an existing FCC with simple modifications to the process at modest capital investment.

The features of KBR MAXDIESEL, an engineering process and service, are:

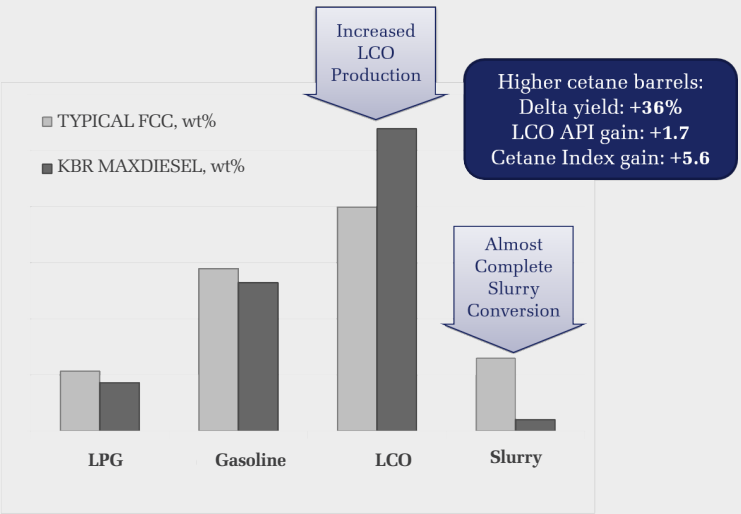
- Higher cetane Light Cycle Oil (LCO) product
- Enhanced flexibility
- Low production cost and low investment cost using a proven, safe and environmentally friendly process.

MAXIMIZING CETANE IN LCO PRODUCT

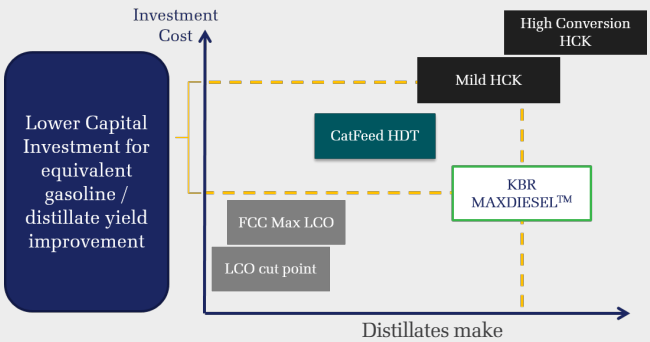
Based on conventional, commercially proven technology, the KBR MAXDIESEL FCC process features a primary riser to convert fresh feed and Heavy Cycle Oil (HCO), a second riser for slurry recycle, ATOMAX™ injection nozzles and an optional quench to adjust temperature and feed vaporization. These features allow controlling of the reaction severity to increase yield of high cetane LCO. While this process maximizes cetane barrels, it retains flexibility to revert to maximum octane barrels or maximum Liquefied Petroleum Gas operation at will.

Application of MAXDIESEL technology offers advantages which include:

- Greater control of reaction severity
- Energy efficient fractionation
- Selective recycle steam operation
- Optimization of LCO hydrotreating



LCO production at the expense of Slurry



KBR MAXDIESEL offers the lowest CAPEX option for maximum distillates production

LOW COST TECHNOLOGY FOR DISTILLATES PRODUCTION

KBR MAXDIESEL offers the lowest capital investment option for maximum distillates production. It can be implemented in exisitng FCC units to increase LCO yield at the expense of slurry and can be retrofitted during a regular FCC turnaround.

The fast implementation schedule allows capturing the current market premium for diesel, while maintaining the flexibility to adjust yields and operation to meet future market requirements. A typical fuels refinery case study for a 60,000 BPD FCC unit revamp to KBR MAXDIESEL technology indicates a simple payback of less than a year with an IRR above 50%.

Typical KBR MAXDIESEL

LEVERAGING KBR'S FCC DESIGN LEGACY

Since its first FCC design started up in Baton Rouge, Louisiana (1942), KBR has provided more than 120 grassroots unit designs globally. The total annual capacity of KBR licensed new FCC plants has reached 2.7 million BPD, while the capacity of KBR revamped FCC units is as high as 7 million BPD.

KBR's know-how through several generations of Orthoflow™ design and more than 80 years experience in FCC technology ensures a fully customized FCC design to achieve your production objectives. KBR's proven FCC technology offers a unique suite of features for maximum flexibility, better yields and more reliable operation.

KBR MAXDIESEL incorporates years of experience in designing innovative, efficient and cost-effective FCC units. This technology repurposes existing FCC units and can be implemented at a fraction of the capital investment required for other grassroots options.

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