

Tulsion® MTBE Catalyst at BPCL

Objective

Bharat Petroleum Corporation is one of the largest refineries in India having operation at two locations Kochi and Mumbai. BPCL is engaged in the manufacturing of MTBE with process technology provided by M/s Snamprogetti- Italy. Snamprogetti technology provides an efficient process to manufacture MTBE by the reaction of Isobutylene from the LPG- C4 stream with methanol in presence of resin catalyst. Conventionally, the acid catalyst is used in this process and BPCL has been using the imported catalyst due to the non-availability of catalyst matching the stringent quality and performance characteristics of the imported catalyst.



This opportunity was taken by Thermax resin team to provide a viable alternative to the imported catalyst with our resin **Catalyst Tulsion® T-8052** that was selected and offered to BPCL based on its good performance record for a similar reaction at Russian refineries.

Approach

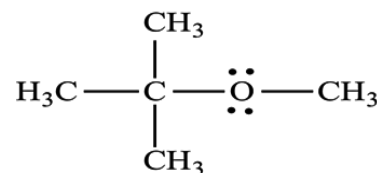
Sample of T-8052 was offered to BPCL for testing at their R&D center in Faridabad who tested the catalyst for the simulated condition of actual MTBE process and approval was granted for commercial use on plant scale.

Customer expectations on catalyst performance

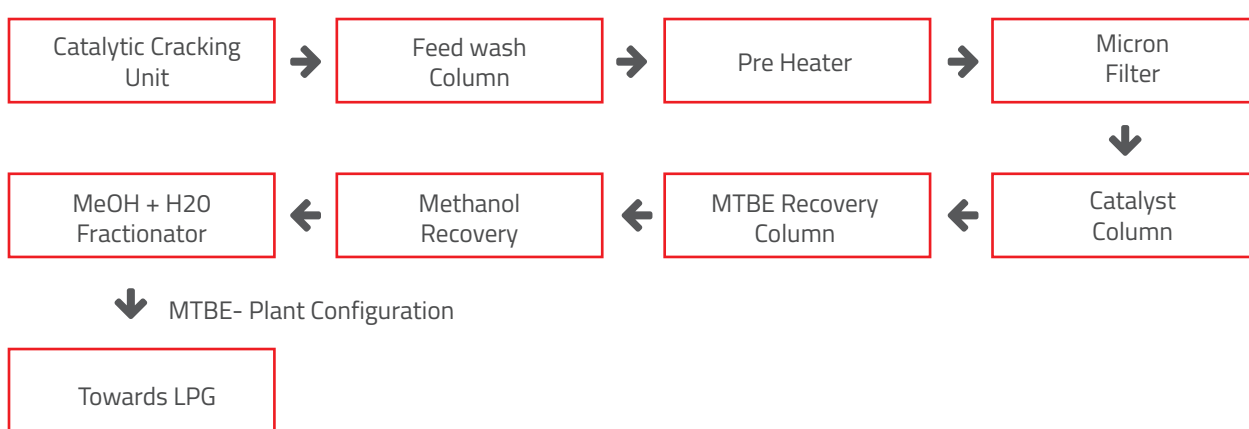
- Catalyst should last at least for 2 years in the continuous process maintaining the desired conversion of 96% at a feed rate of 450 MT/Day
- The pressure drop across the resin bed should be maintained < 2 kgf/cm²
- Isobutene to MTBE conversion should be at least 96% in reactor-1 (R1A) and reactor- 2 (R1B)

Product Description

Methyl Tertiary Butyl Ether (MTBE) is an organic chemical compound that is manufactured by the chemical reaction of methanol and isobutylene. It is used in gasoline as a fuel additive to boost the octane number or oxygen content of fuel to enhance combustion efficiency. It is a polar molecule with chemical formula C₅H₁₂O and the chemical structure of methoxyl ether.



MTBE Manufacturing Process



Reactors

R1A – Isothermal Tubular Reactor
R1B – Adiabatic Fixed Bed reactor

Feed Flow

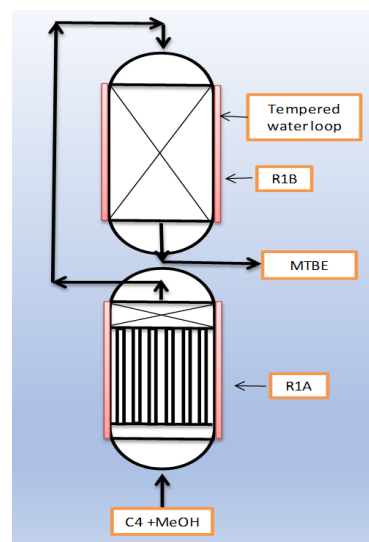
- Source-LPG-C4
- Isobutene + Methanol 463 MT/Day

Performance

Isobutene Conversion to MTBE- 96% minimum.

Catalyst

Tulsion®T-8052 MP



Product Performance

Tulsion® Catalyst used in BPCL refinery replaced the imported catalyst and it marked 96% MTBE conversion as expected by the customer. It has also cleared the initial apprehension of pressure drop over the resin life for continuous process.

This has resulted in a repeat order from BPCL, Mumbai for Tulsion® Catalyst.

Tulsion® Catalyst Advantages

- Strong macroporous structure offering excellent temperature and mechanical stability.
- Optimum surface morphology facilitates easier access of acid sites and therefore, higher selectivity and higher conversion.
- High acid strength - higher conversion and therefore higher yield.
- Optimum particle size distribution resulting in better kinetics and lower pressure drop.