

Catalytic

Distillation

Technologies

Overview The MAPD CDHydro catalytic distillation technology processes C₃₊ streams from steam crackers to produce a C₃ stream that is essentially free of MAPD. The CDHydro process is one of a family of process technologies developed and commercialized by Catalytic Distillation Technologies (CDTECH) for license to the petroleum refining and petrochemical industries. CDTECH is a partnership between Lummus Technology, a CB&I company, and Chemical Research & Licensing, a CRI company.

Selective Hydrogenation of MAPD

MAPD CDHYDRO®

Technology Profile

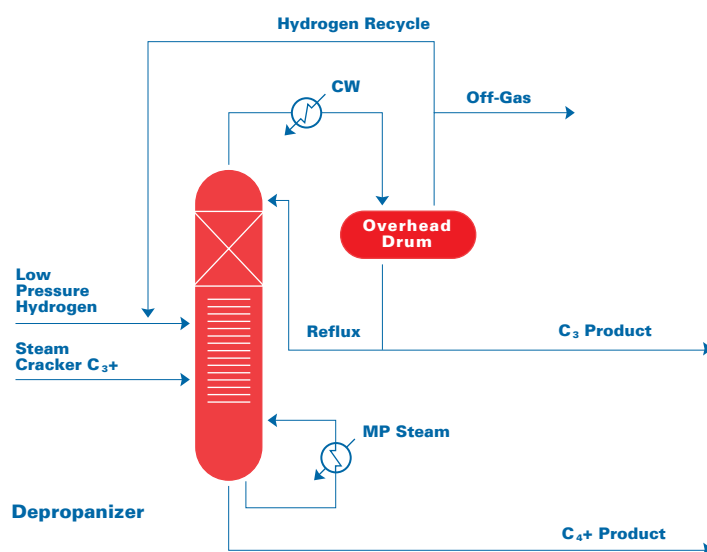
Selective Hydrogenation The patented MAPD CDHydro process achieves selective hydrogenation of methyl acetylene and propadiene to propylene in a catalytic distillation column. Selective hydrogenation increases the propylene content of the C₃ product. The process uses commercially available catalyst in proprietary catalytic distillation structures.

Steam cracker C₃₊ is combined with hydrogen in the catalytic column. Treated C₃ products are taken overhead with MAPD concentration as low as 10 ppm. The washing action of the reflux minimizes oligomer formation, flushing heavy compounds from the catalyst and promoting long catalyst life. Up to 90% of the MAPD can be converted selectively to propylene. Excess hydrogen and lights are recycled and vented from the overhead drum.

The unique catalytic distillation column combines reaction and fractionation in a single unit operation. This constant pressure boiling system assures precise temperature control in the catalyst zone as compared to conventional fixed bed systems. Low reaction temperature, low hydrocarbon inventory, low pressure and isothermal operation enhance safety.

Capital costs are considerably lower than conventional hydrotreaters since the single column design eliminates costs associated with fixed-bed systems. The MAPD CDHydro process would typically be installed in a depropanizer, either as a retrofit or in a new column.

MAPD CDHydro Process Flow Diagram



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Advantages

MAPD CDHydro process offers:

- Low operating pressure
- Low operating cost
- High MAPD conversion
- High selectivity
- Increased propylene potential
- Retrofit to existing columns
- All carbon steel construction
- Increased safety

CDTECH's catalytic distillation offers:

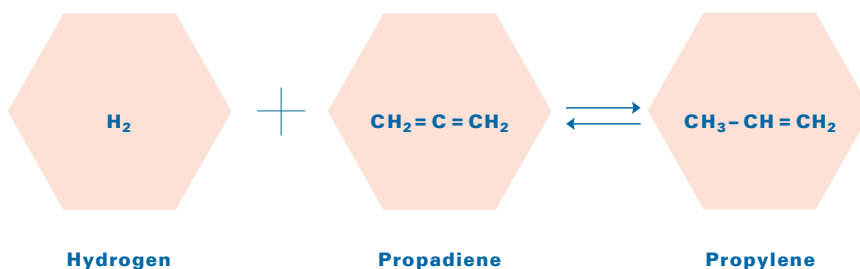
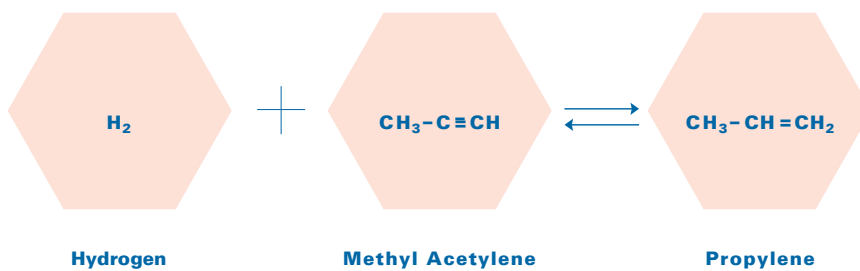
- Isothermal operation
- High conversion
- Low capital cost
- Low utilities
- Long catalyst life with sustained high conversion
- Reduced plot area

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of MAPD

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Process Chemistry

Selective Hydrogenation



Typical Overall Material Balance

Feeds	Component	Wt. %	LB/HR
C ₃ +	Propylene	43.56	100,000
	Propane	1.92	
	MAPD	1.49	
	Hydrogen	100.00	
Products (will depend on separation requirements)			
C ₃	Propylene	94.98	46,655
	Propane	4.87	
	MAPD	<0.01	
	C ₄ 's	0.10	
C ₄ +			53,249

CDTECH

3010 Briarpark Drive
Houston, TX 77042 USA
Tel: 713-821-5181
Fax: 713-821-3587