

Catalyst for C4 Selective Hydrogenation

APPLICATION

The catalysts for the selective hydrogenation of butadiene in raw C4 hydrocarbon streams (typically about 0.3-2.0 %), such as those from FCC units, side streams from butene oxidative dehydrogenation unit, ex MTO, and steam crackers, are designed to achieve high selectivity toward the desired olefins (butenes) while minimizing over-hydrogenation to butane. Typically, the catalyst is used when the diolefin concentration is up to 2% to reduce it to below 500 ppm using almost stoichiometric amount of hydrogen. While the catalyst can also be applied to higher concentrations of diolefins, extractive distillation is often a more economical solution for removing and monetizing butadiene. This process is critical in the refining and petrochemical industry, particularly for the purification of C4 streams used in downstream processes such as the production of synthetic rubber, pretreatment of the feedstock for downstream applications or fuel additives manufacturing.

DESCRIPTION

This is an alumina-based catalyst modified with alkali metal or alkaline earth metal elements as the carrier and a low amount of palladium as the active component. The catalyst operates under mild conditions and demonstrates very high alkyne hydrogenation activity and selectivity to olefins. It also exhibits high efficiency in butadiene removal, excellent anti-coking performance, and a long single-cycle operational lifetime.

The catalyst offers outstanding operational stability and high safety standards. Furthermore, it remains stable and its performance is largely unaffected by oxygenated compound and water impurities commonly present in industrial raw C4 streams.

PHYSICAL & CHEMICAL PROPERTIES

Parameter	Unit	Specification
Form	-	cylinders
Color	-	brown
Mean diameter	mm	2.5×5-10
Bulk Density	g/ml	0.70±0.05
Crushing Strength	N/cm	120
Al ₂ O ₃	%	>99.5
Active component		Pd

PROCESS CONDITIONS & PERFORMANCE

Element	Unit	Specification
Pressure	MPa	0.6-2.0
Temperature	°C	30-60
WHSV	kg _{feed} /kg _{catalyst} ×h	0.4-1.2
Catalyst lifetime	years	>2.5
Residual Vinylacetylene	ppm	<10
Residual Butadiene	ppm	<500