Mitsubishi Chemical Maleic Anhydride Technology

Maleic Anhydride: (MAH)
Maleic anhydride was traditionally manufactured by the oxidation of benzene or other aromatic compounds. Currently only a few smaller plants continue to use benzene due to rising benzene prices, and most Maleic anhydride plants now use n-butane as a feedstock. Maleic anhydride is industrially applied for the production of 1,4-Butanediol, Unsaturated polyester resin, Fumaric acid, Succinic acid, Plastic additives and $\gamma$-Butyrolactone.

Introduction of Mitsubishi Maleic Anhydride Technology
For more than 50 years, Mitsubishi Chemical (MCC) has run Maleic Anhydride business (Production and Sales). MCC has developed its own State-of-Art technology and offered Process Technology (32,000 ton/year up to 60,000ton/year as single line plant) together with Mitsubishi high performance catalyst. MCC currently runs 32,000ton/year MAH plant in Japan and one licensed plant (60,000ton/year world largest scale) is operating in Asia from March 2013. Further MCC also has the production technologies for Maleic Anhydride Derivatives such as $\gamma$-Butyrolactone (GBL) and N-methylpyrrolidone (NMP).

Feature of Mitsubishi MAH process
Mitsubishi MAH process uses n-butane as feedstock and produce Maleic anhydride. Features of this process are as follows:
(1) High Performance Fluidized Bed Oxidation Reactor
(2) Excellent MAH absorption system with Organic Solvent
(3) Efficient MAH purification System
(4) High efficiency energy recovery system
(5) Reliable process safety control system

Especially Fluidized Bed Oxidation Reactor with Mitsubishi high performance catalyst can realize stable, safe and optimum oxidation reaction.

Chemistry of this process

Main Reaction

\[
\text{C}_4\text{H}_{10} + 3.5\text{O}_2 \rightarrow \text{C}_4\text{H}_2\text{O}_3 + 4\text{H}_2\text{O}
\]

Major Side Reaction

\[
\text{C}_4\text{H}_{10} + 5.5\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{CO} + 5\text{H}_2\text{O}
\]
Simplified block flow

N-Butane → Oxidation Fluidized Bed → Absorption → Solvent Separation → Purification (Distillation) → Maleic Anhydride

Air → Oxidation Fluidized Bed → Absorption → Off gas

High Pressure Steam (4MpaG) → Incineration

Absorbent
World MAH Plant Capacity
In 2010, world MAH production capacity is 1,500,000 ton/year and actual production is 1,250,000 ton/year. Each MAH plant capacity in the world is as shown below:
(Single line plant base)

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