

# ACETICA™

## Reliable Acetic Acid Production

A growing middle class in China, India and other large developing nations is driving increased demand for consumer products, such as paints, adhesives, coatings, textiles, plastic bottles (PET) and safety glass, automotive, photographic film, synthetic fibers, architectural applications and household food applications – all of which are derived from acetic acid. Globally, KBR is the only reputable open licensor of ACETICA.

With its safe, cost-effective and reliable process, methanol carbonylation is the preferred technology for acetic acid production. KBR is the only company to license acetic acid production from methanol and carbon monoxide to independent producers.

### A SAFE AND COST EFFECTIVE ALTERNATIVE

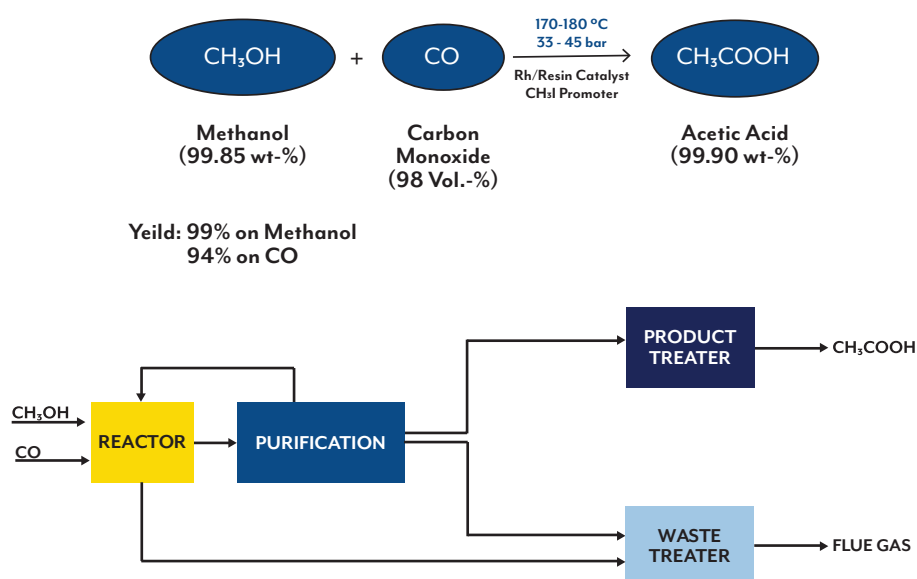
ACETICA is a safe and cost-advantaged technology to produce acetic acid due to its higher reliability, lower energy consumption and lower maintenance cost when compared to other methanol carbonylation processes. Recently, ACETICA growth has been driven by renewable energy, for instance from solar panels.

ACETICA provides multiple advantages to chemical manufacturers:

- The process operates with low water concentration in the reaction phase, requiring less energy for distillation
- No-agitator design consumes less electricity
- Safe and easy to operate due to bubble reactor design with no moving parts that could cause CO leakage
- Proprietary ACETICA catalyst immobilizes Rh in solid-phase resin, making it easy to manage without secondary promoters and with negligible Rh losses

### PROCESS OVERVIEW

Methanol carbonylation (MC) produces acetic acid by reacting carbon monoxide with methanol in the presence of catalyst and a reaction promoter.



Simplified ACETICA flow diagram

## ADVANTAGE

### Lower Energy Consumption

Conventional methanol carbonylation processes use water to stabilize the reaction system, which can produce a number of adverse results.

The higher water content in the product not only leads to higher energy consumption in the purification section, but also frequently causes corrosion issues throughout the system, requiring special metallurgy and higher capital investment.

High-water systems also have lower selectivity, resulting in higher byproduct formation, which affects both raw material yield and energy efficiency.

In contrast, ACETICA's heterogeneous solid-phase catalyst is more stable than conventional homogeneous liquid-phase catalysts, requiring less addition in the reaction system, resulting in lower energy consumption and lower byproduct formation.

### Higher Reliability

The ACETICA proprietary bubble column reactor design is inherently more reliable because it has no moving parts, such as agitators or mixers, which are subject to wear and tear. Higher reliability translates into higher on-stream time, and higher productivity, with lower maintenance costs and fewer safety risks related to CO leaks.

### Easy System Operation

Continuous operation of ACETICA requires less manpower than conventional continuous stirred tank reactor (CSTR) operation because the heterogeneous solid-phase catalyst is easy to manage without the need for periodic addition of Rh or secondary promoters.

In addition, ACETICA uses a closed system where waste liquid or waste gas is treated inside the system, reducing the manpower and capital required to treat and dispose of these waste streams.

### YOUR PARTNERS IN ACETIC ACID PRODUCTION

KBR is the only open-licensor of methanol carbonylation technology for the production of acetic acid.

- Complete licensing and basic engineering design packages (LBED) tailored to your requirements
- Local technical support, ready to respond quickly and effectively to support your operations and ensure maximum uptime
- Proprietary equipment vendor network to provide the best equipment design to meet performance guarantees
- Catalyst vendor network, mitigating the catalyst supply risk by having access to a reliable vendor and distribution network
- Value chain integration with derivatives to provide a more lucrative outlet for the current feedstock or product, and with acetic acid to improve production costs, decrease logistics complexity, and capitalize on economies of scale or a favorable natural gas position

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