



EasyOx™ catalysts

Albemarle's proven line of oxychlorination catalysts

Albemarle's catalysts division manufactures a wide range of catalysts for refineries and chemical processes. For more than 40 years Albemarle has built up an excellent reputation in developing catalysts for the oil refining and chemical industries.

Recognizing the special requirements of the chemical process catalyst market, Albemarle works in partnership with its customers in this area. Our strong position in this market is based on close cooperation with major chemical manufacturers.

Albemarle has been producing oxychlorination catalysts for more than 30 years, both under license and for open markets. In cooperation with strategic partners, we have developed high-performance catalysts for several oxychlorination processes. These well-known open-market catalysts are superior and widely used.

In 1998, we took a further step in meeting the needs of the catalyst market by introducing EasyOx-1. EasyOx-HT was then added to the portfolio to give extra flexibility towards a higher operating temperature regime.

Technical information

Typical characteristics of the EasyOx range of promoted copper chloride catalysts on an alumina-based carrier are shown in Table 1. EasyOx catalysts are fully applicable to oxychlorination technologies licensed by OxyVinyls, LP and Vinnolit GmbH.

Typical characteristics of EasyOx catalysts	
ABD	0.9 g/ml
Attrition	
0 - 5 h	5%
5 - 20 h	3.5%
PaSD	
<80 µm	80%
<60 µm	61%
<30 µm	19%
<20 µm	7%

Commercial experience

EasyOx catalysts are the result of extensive research and were developed in close cooperation with an experienced VCM manufacturer. Since 1997, EasyOx catalysts have been successfully applied in commercial operations. Pilot-plant tests indicated excellent performance. High ethylene efficiencies were achieved because very little by-product was formed: both COx and chlorinated by-products were significantly reduced. Fluidization problems were not observed, even at severe (i.e., high) HCl/C₂H₄ feed ratios, which are usually critical. EasyOx catalysts can also be effectively used for re-fluidization after complete loss of oxygen.

Both EasyOx-1 and EasyOx-HT have been proven in commercial oxychlorination reactors.

Operation

An intensive test-run program was carried out on a commercial unit after four months of operation with EasyOx as the make-up catalyst. The performance of the commercial unit confirmed the pilot-plant tests. No mixing problems were observed, and the sensitivity to stickiness (agglomeration of the catalyst particles) was dramatically reduced.

The consumption of raw materials and the levels of chlorinated byproducts decreased significantly. Ethylene and HCl consumption were reduced by about 3 kg and 2 kg per metric ton of EDC, respectively, and the consumption of caustic soda was decreased by 0.2 kg/t of EDC. The formation of chlorinated by products was reduced by 2.5 kg/t of EDC.

Significant savings in variable costs were demonstrated. For a commercial unit with an annual capacity of 250,000 t EDC/year, more than USD 500,000 per year was saved, based on US Gulf Coast prices.

EasyOx-1 and EasyOx-HT offer you excellent performance:

- Typical range of operating conditions for EasyOx catalysts

Temp (EasyOx-1)	215–235°C
Temp (EasyOx-HT)	230–250°C
HCl/C ₂ H ₄	1.77–1.98
O ₂ /2HCl	0.55–0.80
- Typical range of performance data for EasyOx catalysts

HCl conversion	99.4–99.9%
Combustion rate	1.0–2.5% ethylene feed
EDC purity	99.0–99.3 wt%
- EasyOx catalysts can be operated in oxygen- and air-based units.

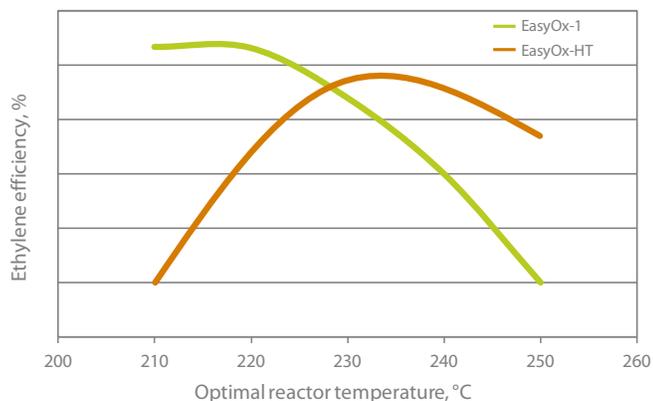


Figure 1: Ethylene efficiency as a function of reactor temperature

The benefits

EasyOx catalysts have

- high activity
- high HCl conversion
- low by-product formation
- high ethylene efficiency
- no sensitivity to stickiness
- low attrition rate.

This results in a superior-performing catalyst for a flexible oxy-chlorination operation.

Technical support

With wide experience in developing, manufacturing and applying oxychlorination catalysts, Albemarle is able to guarantee customers full technical support.

The following services are available:

- predictive pilot plant and reaction modeling experiments
- determination of catalyst characteristics
- technical support during start-up and troubleshooting.

Quality

Albemarle produces all catalysts under strict quality surveillance, including statistical process control. Albemarle's total quality program includes the route from raw materials through production, logistics, administration and technical services. All are certified according to the relevant ISO standards.

➤ For more information on this or other Albemarle products and technologies, please contact your Albemarle representative.

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