

FPC-2LD – Oxychlorination catalysts

Albemarle and the Formosa Plastics Corporation have developed a new generation of improved catalysts for the fluidized bed oxychlorination of ethylene using technology developed and licensed by Mitsui Chemicals. FPC-1 catalyst was developed more than 15 years ago, and since then a successful successor to this grade, FPC-2LD, has been developed. These catalysts are the result of years of intensive R&D efforts by both companies combined with extensive trial periods in commercial reactors.

FPC catalysts have now been successfully applied in commercial units for more than 12 years.

Technical information

A selection of the critical properties of FPC-2LD is shown in Table 1:

Table 1: Properties of FPC-2LD	
Active phase	Copper chloride
Carrier	Alumina-based
Particle size distribution	
<80 µm	65%
<45 µm	13%
<30 µm	3%
<20 µm	2%

Catalyst losses are extremely low owing to the low number of fines and the low attrition rate. Attrition is the erosion of the particles caused by the vigorous conditions in the fluidized bed. Albemarle's manufacturing technology has resulted in strong, evenly shaped particles that ensure low attrition figures.

Commercial experience

FPC-2LD catalyst has been applied for over five years, in more than 20 oxychlorination units worldwide.

Typical operating data for FPC-2LD are shown in Table 2:

Table 2: FPC-2LD operating data	
Operating temperature	210–235°C
HCl conversion	>99.7%
Combustion rate	0.7–1.5%
EDC purity	>99.2%

Commercial experience has shown a low sensitivity to stickiness, i.e., agglomeration of catalyst particles, which can lead to plugging of diplegs or cyclones. The window of process operation conditions turned out to be much wider with FPC-2LD catalyst than for any other competitive catalyst.

The low combustion rate brings about a reduction in ethylene and caustic consumption and gives the large economic benefits shown in Figure 1.

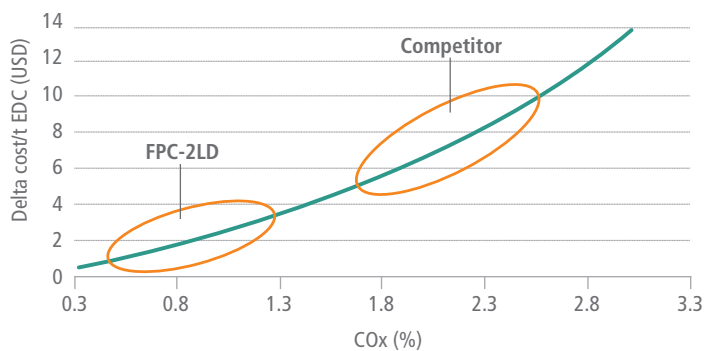


Figure 1: Indication of the shift in variable costs when a competitor catalyst is fully replaced by FPC-2LD (based on commercial data).

Selectivity

An additional advantage to the large economic benefit is that the EDC purity is high owing to the low formation of chloroform and 1,1,2-trichloroethane. See Table 3 for a typical composition.

By-product	FPC-2LD (mg/kg)	Competition (mg/kg)
Ethylchloride	1500	1000
Chloroform	2500	3200
Tetrachloromethane	600	900
1,1,2-trichloroethane	2100	3300
Purity	99.33%	99.16%

References

Several independent companies around the globe have been using FPC-2LD oxychlorination catalyst in more than 20 units for many years. The total oxy-EDC capacity represents more than 60% of the total installed oxychlorination capacity licensed by Mitsui Chemicals.

The benefits

Summary of the key points of FPC-2LD – the five ‘lows’:

- low combustion rate
- low regeneration time
- low sensitivity to stickiness
- low attrition rate
- low fines content.

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 experiments
- determination of catalyst characteristics
- technical support during start-up and troubleshooting.

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

AMERICAS

2625 Bay Area Blvd
Suite 250
Houston, TX 77058
USA

Tel: +1 281 480 4747
Email: catmaster@albemarle.com

EUROPE AND AFRICA

Nieuwendammerkade 1–3
1030 BE Amsterdam
The Netherlands

Tel: +31 20 634 7300
Email: catmaster@albemarle.com

MIDDLE EAST AND INDIA

PO Box 293774
6W Block A, Office 512
Dubai Airport Free Zone
Dubai

Tel: +971 4 701 7770
Email: catmaster@albemarle.com

ASIA PACIFIC

Room 2208, Shui On Plaza
No. 333 Huai Hai Zhong Rd
Shanghai 200021
China

Tel: +86 21 6103 8666
Email: catmaster@albemarle.com

www.albemarle.com

The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Albemarle Corporation. It is the responsibility of the user to comply with all applicable laws and regulations and to provide for a safe workplace. The user should consider any information contained herein, including information about any health or safety hazards, only as a guide, and should take those precautions that are necessary or prudent to instruct employees and to develop work practice procedures in order to promote a safe work environment. Further, nothing contained herein shall be taken as an inducement or recommendation to manufacture or use any of the herein described materials or processes in violation of existing or future patents.

© 2011 Albemarle Corporation. All rights reserved worldwide.

Cat-222181-0612

Quality

Albemarle produces all its 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.