

# BORON TRIFLUORIDE AND COMPLEXES (BF<sub>3</sub>)

YOUR CATALYST - WORLDWIDE!



## ARKEMA - A global supplier of Boron Trifluoride

The company has been producing  $\text{BF}_3$  gas since the early 1950s in France near Lyon (Rhône) and  $\text{BF}_3$  complexes in Moustier in Belgium (close to Brussels).

Arkema is fully backwards integrated into the raw materials for the production of  $\text{BF}_3$ .

Our continuous production process yields a high quality products (> 99.5%  $\text{BF}_3$ ). Our Pierre Bénite (Lyon, France) facility was awarded ISO 9002 certification in 1992 and was certified ISO 14001 in 2000.

# Boron Trifluoride

## $\text{BF}_3$ gas and complexes

### THE PRIME CHOICE FOR AN EFFICIENT CATALYST

Both,  $\text{BF}_3$  gas and  $\text{BF}_3$  complexes, are strong Lewis Acids. They were developed to be used primarily as catalysts in many industrial applications.

In Lewis acid catalysed processes such as the polymerization of  $\alpha$ -olefines, esterification, Friedel & Crafts alkylation and acylation, isomerization etc.  $\text{BF}_3$  and its complexes are today the prime choice for an efficient catalyst.

Consequently,  $\text{BF}_3$  and its complexes have established a strong position as catalysts in almost every segment of the chemical industry e.g. in the:

#### **Pharmaceutical Industry**

$\text{BF}_3$  gas and complexes are used in the synthesis of cephalosporine antibiotics as condensation catalysts and as precursors for diborane based reducing agents.



#### **Flavor and Fragrance Industry**

In the Flavor and Fragrance Industry,  $\text{BF}_3$  complexes are widely used to produce temperature sensitive intermediates.  $\text{BF}_3$  gas and complexes are very efficient esterification catalysts at low temperatures. The most used  $\text{BF}_3$  complex in this industry is the  $\text{BF}_3$  Acetic Acid complex followed by the  $\text{BF}_3$  Tetrahydrofurane, and the  $\text{BF}_3$  Ethyl Ether complex.



#### **Plastic Additives Industry**

Certain polymer stabilisers, such as sterically hindered phenolic anti-oxidants, are made by Friedel Crafts alkylation.  $\text{BF}_3$  gas and complexes are the first choice for catalysts efficiency reasons.



#### **Petrochemical and Downstream Industry**

Poly- $\alpha$ -olefins, important lubricant additives are for the major part produced with  $\text{BF}_3$  gas as polymerization catalyst. Many base resins for adhesives, paints and coatings are produced in the same way.



# BF<sub>3</sub>



## Specifications

The Boron trifluoride gas produced by Arkema (and consequently the complexes derived from BF<sub>3</sub> gas) is high in purity and particularly low in critical contaminants. In multi step synthesis sulphur and SiF<sub>4</sub> contamination are detrimental, particularly when additional metal catalysed steps are carried out subsequently (metal catalyst poisoning). SiF<sub>4</sub> in contact with moisture generates small grains of abrasive Silica that also damages threads and connections.

### ● IF YOU CARE FOR YOUR PROCESS AND PLANT, ARKEMA BF<sub>3</sub> IS THE PRIME CHOICE

Product	CAS No	Guaranteed Properties	Value	Dimension
BF <sub>3</sub> Gas	7637-07-2	Purity Impurities: SiF <sub>4</sub> SO <sub>2</sub> expressed in sulfur Inert Gas	≥ 99,5 ≤ 0,015 ≤ 0,0015 ≤ 0,4	weight % weight % weight % weight %
BF <sub>3</sub> Complexes				
BF <sub>3</sub> Ethyl Ether	109-63-7	BF <sub>3</sub> conc. density	46-48 1098-1126	w/w % kg/m <sup>3</sup> at 20°C
BF <sub>3</sub> Acetic Acid	371-61-5	BF <sub>3</sub> conc. density	34,5-36,5 1330-1350	w/w % kg/m <sup>3</sup> at 20°C
BF <sub>3</sub> Dihydrate	13319-75-0	BF <sub>3</sub> conc. density	64-66 1615-1645	w/w % kg/m <sup>3</sup> at 20°C
BF <sub>3</sub> Phenol	372-44-1	BF <sub>3</sub> conc. density	25-27 1211-1224	w/w % kg/m <sup>3</sup> at 20°C
BF <sub>3</sub> Tetrahydrofurane	462-34-0	BF <sub>3</sub> conc. density	47-49 1249-1270	w/w % kg/m <sup>3</sup> at 20°C

## Logistics and R&D

### As a global supplier our logistics for BF<sub>3</sub> gas and complexes is set up to serve our customers all over the world.

ARKEMA is committed to provide high quality products and services to its customers, particularly the SBU Fluorochemicals, including the BF<sub>3</sub> gas and complexes products. Our production plants in Europe have the ISO 9001 accreditation as well as the ISO 14001.

The technical service and R&D department based in the company's Pierre-Bénite Research Centre (CRRRA) is dedicated to provide all the necessary support to ARKEMA's customers through specific technical brochures or direct contact.

ARKEMA CRRRA – OFA Department  
Rue Henri Moissan – BP 63  
69493 Pierre-Bénite Cedex – France  
Fax: +33 (0)4 72 39 80 28  
Tel: +33 (0)4 72 39 81 46



*A global chemical player, Arkema consists of 3 coherent and balanced business segments: Vinyl Products, Industrial Chemicals, and Performance Products. Present in over 40 countries with 18,600 employees, Arkema achieves sales of 5.2 billion euros. With its 6 research centers in France, the United States and Japan, and internationally recognized brands, Arkema holds leadership positions in its principal markets.*

## CONTACT US

### EUROPE

Arkema  
4-8, cours Michelet  
92081 Paris La Défense cedex  
France  
Tel: +33(0) 1 49 00 76 50  
Fax: +33(0) 1 49 00 53 12

### NORTH AMERICA

Arkema Inc.  
2000 Market Street  
Philadelphia, PA  
19103-3222 - USA  
Tel: 1 215 419 70 00  
Fax: 1 215 419 79 44/75 91

### ASIA

Arkema PTE Ltd.  
53, Tuas Crescent  
Singapore 638732  
Singapore  
Tel: (65) 6862 1228  
Fax: (65) 6869 3350

The information contained in this document is based on trials carried out by our Research Centres and data selected from the literature, but shall in no event be held to constitute or imply any warranty, undertaking, express or implied commitment from our part. Our formal specifications define the limit of our commitment. No liability whatsoever can be accepted by Arkema with regard to the handling, processing or use of the product or products concerned which must in all cases be employed in accordance with all relevant laws and/or regulations in force in the country or countries concerned.

#### US Disclaimer

The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, ARKEMA expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information; NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be applicable when such product is used in combination with other materials or in any process. The user should thoroughly test any application before commercialization. Nothing contained herein constitutes a license to practice under any patent and it should not be construed as an inducement to infringe any patent and the user is advised to take appropriate steps to be sure that any proposed use of the product will not result in patent infringement. See MSDS for Health & Safety Considerations



4-8, cours Michelet  
92081 Paris La Défense cedex  
France  
Tel: +33(0) 1 49 00 80 80  
Fax: +33(0) 1 49 00 83 96  
[www.arkemagroup.com](http://www.arkemagroup.com)