S&P Global
Commodity Insights

Process Economics Program (PEP)

October 2025

Lithium Fluoride

PEP Review 2025-15

Marianna Asaro, **Director, Process Economics Program**

To learn more or to request a demo, visit www.spglobal.com/commodityinsights.

Table of contents

Tables

Figures

Appendix C Figures

Glossary

$/kg	Dollars per kilogram
AHF	Anhydrous hydrogen fluoride
atm	Atmosphere(s)
BFD	Block flow diagram
BG	Battery-grade
BLI	Battery limits investment
BVH	Bed volumes per hour
CAGR	Compound annual growth rate
CIF	Cost, Insurance, and Freight, a waterway shipping term defined by the International Chamber of Commerce's International Commercial Terms, wherein the seller is responsible for packaged goods from the point of the seller's warehouse to their final destination
C.R.	Compression ratio
EG	Ethylene glycol
FBR	Fluidized bed reactor
FFKM	Acronym for Fiombonan'ny Fiangonana Kristiana eto Madagasikara, a class of perfluoroelastomer having especially high fluorine content
FKM	Abbreviation of Fluorkautschukmaterial (fluorine rubber material), a class of fluoroelastomer containing vinylidene fluoride and other monomers. Originally branded as Viton.
FOB	Free on board, a waterway shipping term defined by the International Chamber of Commerce's International Commercial Terms, wherein the buyer becomes responsible for all aspects of transporting packaged goods from the point of the seller's warehouse to their final destination
FRP	Fiber-reinforced plastic
G&A	General and administrative (a cost category)
gal	US gallon(s)
GSAR	General and administrative, sales, and research
h	Hour(s)
HDPE	High-density polyethylene
HPG	High-purity-grade
JV	Joint venture
kg	Kilogram(s)
kJ	Kilojoule(s)
ktpa	Kilotons per annum, thousand metric tons per year
kW	Kilowatt(s)
kWh	Kilowatt-hour(s)
L	Length
L/D	Aspect ratio, (length or height)/diameter
lb	Pound(s)
LCE	Lithium carbonate equivalent
LHM	Lithium hydroxide monohydrate
lpm	Liters per minute
MMlb/y	Million pounds per year
mol%	Molar percent
MS	Mild steel
Nm^3	Normal cubic meter(s)
Nominal	Used in many contexts, this term refers to the value available when operating at 100% of theoretical or nameplate capacity
PCTFE	Polychlorotrifluoroethylene, is a fluorocarbon-based polymer, also known by brand as Kel-F®
PFD	Process flow diagram
PP	Polypropylene
PPS	Polyphenylene sulfide
ppmw	Parts per million by weight
psi	Pounds per square inch
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
PTFE	Polytetrafluoroethylene
PVDF	Polyvinylidene fluoride

RH	Relative humidity
ROI	Return on investment
s	Second(s)
scf	Standard cubic feet
SEI	Solid electrolyte interphase
t or ton	Metric ton, also known as ton
tpa	Metric tons per annum (year)
TFC	Total fixed capital
USGC	United States Gulf Coast
VAT	Value-added tax, levied in some countries on the difference between the product's selling price and the amount paid for raw materials
vol%	Volume percent
wt%	Percent by weight
y	Year(s)

Abstract

This review, Lithium Fluoride, provides process designs and economic analyses for production of high-end, battery-grade lithium fluoride. At 99.986 wt% purity, the product is suitable for use in the production of battery-grade lithium hexafluorophosphate, $LiPF_6$, and for some applications in the ceramics, glass, optics, electronics, and nuclear industries, as well as other molten salt applications.

Production costs for battery-grade lithium fluoride, BG LiF, depend most heavily on raw material costs, followed by factors related to capital costs and production capacity. This first-of-a-kind analysis evaluates design and Level 3 economics for two scales of LiF production. The 6 ktpa scale is representative and sufficient to feed three to four typical new lines producing 8.5 ktpa to 11.5 ktpa of $LiPF_6$ capacity. The 30 ktpa LiF capacity is likely oversized at present and would help satisfy a shortfall forecast for the mid-term. Economics are presented for locations in the US and China.

Global consumption of lithium fluoride in 2024 was estimated at 83,000 tpa. Despite continued demand growth, market prices for lithium chemicals, especially battery-grade lithium chemicals, have been in a slump due to oversupply. The present analysis shows that profitability of BG LiF production is challenging, even in China, during 2025.

The overall market for different grades of lithium fluoride is overviewed, as are production methods for the different grades. Recent patent activity on improved or alternative processes for BG LiF is discussed, and factors going into selection of the raw material and grades used in manufacture of BG LiF are detailed. The analysis also includes the quantification of waste streams and their content, carbon footprint, and water footprint for production of battery-grade lithium fluoride.

The iPEP Navigator LiF interactive module provides an economic snapshot for the process, allowing the user to input alternative values for raw material prices and other key variables, and to compare the dependence of economics on raw material prices, location, and other production factors.

Contacts

Marianna Asaro

Director, Process Economics Program
marianna.asaro@spglobal.com

Rajiv Narang

Executive Director, Process Economics Program
rajiv.narang@spglobal.com

CONTACTS

Europe, Middle East, Africa: +44 (0) 203 367 0681
Americas: +1 800 332 6077
Asia-Pacific: +60 4 296 1125

www.spglobal.com/commodityinsights/en
www.spglobal.com/en/enterprise/about/contact-us.html