

Vinyl Chloride Monomer via Johnson Matthey Davy Process

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Glossary

bara	Bar absolute
BFW	Boiler feedwater
bhp	Brake horsepower
BLI	Battery limits investment
°C	Degrees Celsius
CAS	Chemical Abstracts Service
Capex	Capital expenditure
¢/kWh	Cents per kilowatt-hour
¢/lb	Cents per pound
¢/Mgal	Cents per thousand gallons
¢/TR-h	Cents per refrigeration ton-hour
CW	Cooling water
\$/h	Dollars per hour
\$/Mlb	Dollars per thousand pounds
\$/t	Dollars per metric ton
EDC	Ethylene dichloride
EPC	Engineering procurement and construction
°F	Degrees Fahrenheit
FOB	Free/freight on board
ft	Feet
ft dia	Feet diameter
G&A	General and administrative
gal	Gallons
G/L	Gas/liquid
gpm	Gallons per minute
IARC	International Agency for Research on Cancer
ISBL	Inside battery limits
IUPAC	International Union of Pure and Applied Chemistry
kg	Kilograms
kg/h	Kilograms per hour
$\text{kJkg}^{-1}\text{K}^{-1}$	Kilojoules per kilogram per Kelvin
kJ/mol	Kilojoules per mole
KO	Knockout
kPa	Kilopascals
kWh	Kilowatt-hour
lb	Pounds
lb/h	Pounds per hour
LPS	Low-pressure steam
LTCS	Low-temperature carbon steel
MFC	Mercury-free catalyst
mm	Millimeters
MMBtu/h	Million British thermal units per hour
mmHg	Millimeters of mercury
MMlb/y	Million pounds per year
MMt	Million metric tons
MMt/y	Million metric tons per year
mol%	Molar percent
OSBL	Outside battery limits
OSHA	Occupational Safety and Health Administration
PEP	Process Economics Program
ppm	Parts per million
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
PVC	Polyvinyl chloride
Ref.	Refrigerant

ROI	Return on investment
sq ft	Square feet
SS	Stainless steel
TEM	Transmission electron microscopy
TFC	Total fixed capital
TR-h	Refrigeration ton-hour
t/t	Metric tons per metric ton
t/y	Metric tons per year
USGC	US Gulf Coast
VCM	Vinyl chloride monomer
vol%	Volume percent
wt%	Weight percent
y	Years

Abstract

Vinyl chloride monomer (VCM) is an important chemical intermediate used exclusively to produce polyvinyl chloride (PVC) resins. The Johnson Matthey (JM) Davy process for producing VCM is acetylene-based and uses a novel mercury-free catalyst technology, in response to the Minamata Convention on Mercury, a global treaty aimed at reducing mercury emissions. This Process Economics Program (PEP) review presents a comprehensive technological and economic assessment of the JM Davy technology. The assessment of the production economics in this review is for a plant at a US Gulf Coast location, with an annual capacity of 1,102.3 million pounds, or 500,000 metric tons of VCM. An iPEP Navigator module, an Excel-based computer costing model developed by S&P Global Energy, is also available with this review to allow quick calculation of the process economics for other major regions of the world.

This technoeconomic assessment of the balanced process for VCM production is PEP's independent interpretation of the commercial process based on information presented in the open literature, such as patents or technical articles, and it may not reflect in whole or in part the actual plant configuration. We do, however, believe that our assessment is sufficiently representative of the process and process economics within the range of accuracy necessary for an economic evaluation of the conceptual process design. This review will be a valuable resource for planners, producers, and designers looking for an authentic evaluation of the capital and production costs for VCM production.

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