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Process Economics Program (PEP)

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Vinyl Chloride Monomer

PEP Review 2023-12

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Glossary

$/t	Dollars per metric ton
BLI	Battery limits investment
BP	Boiling point
°C	Degree Celsius
CAS	Chemical abstracts service
CEH	Chemical Economics Handbook
EDC	Ethylene dichloride
°F	Degree Fahrenheit
ft^3	Cubic feet
g	Grams
gpm	Gallons per minute
HCl	Hydrogen chloride
h	Hour
HTC	High temperature chlorination
IARC	International Agency for Research on Cancer
ISBL	Inside battery limits
IUPAC	International Union of Pure and Applied Chemistry
kg	Kilograms
kJ	Kilojoules
kPa	Kilopascals
kWh	Kilowatt-hour
lb	Pounds
LTC	Low temperature chlorination
mgal	Thousand gallons
mlb	Thousand pounds
MMlb/y	Million pounds per year
MMt	Million metric tons
mol%	Molar percent
OSBL	Outside battery limits
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit
PFD	Process flow diagram
ppm	Parts per million
psi	Pounds per square inch
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
PVC	Polyvinyl chloride
ROI	Return on investment
t/y	Metric tons per year
TFC	Total fixed capital
USGC	US Gulf Coast
vol%	Volume percent
VCM	Vinyl chloride monomer
wt%	Weight percent

Abstract

Vinyl chloride monomer (VCM) is an important chemical intermediate, exclusively used to produce polyvinyl chloride (PVC) resins. The balanced process for making VCM, elegantly integrates the exothermic steps of ethylene chlorination and oxychlorination with the endothermic cracking of ethylene dichloride (EDC), while completely recycling the byproduct hydrogen chloride (HCl). This Process Economics Program (PEP) review provides an update on the balanced process since it was last examined in PEP Report RP5D *Vinyl Chloride* (March 2000) and presents a comprehensive technological and economic assessment of the 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, which is an Excel®-based computer costing model developed by S&P Global Commodity Insights, is also attached with this review to allow quick calculation of the process economics for other major regions of the world.

This techno-economic assessment of the balanced process for VCM production is PEP's independent interpretation of the commercial process based on the 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 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 who are looking for an authentic evaluation of capital and production costs for VCM production.

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