Integrated Cumene-Phenol/Acetone/Bisphenol A-Part III: Bisphenol A (BPA)

PEP Review 2020-11

December 2020

Dipti Dave
Associate Director

Process Economics Program

Contacts

Dipti Dave
Associate Director
Dipti.Dave@ihsmarkit.com

RJ Chang
Vice President, Process Economics Program
RJ.Chang@ihsmarkit.com

PEP Review 2020-11

Integrated Cumene-Phenol/Acetone-Bisphenol A-Part III: Bisphenol A (BPA)

Dipti Dave, Associate Director

Abstract

4,4 Bisphenol A (BPA) is the primary driver of the global phenolics market, with almost half of the global phenol production being consumed by this end use. The demand for BPA is driven by demand for polycarbonate (PC) products, and demand from the epoxy resins sector is lower, consuming roughly one-third of the BPA produced. Therefore, BPA is a key intermediate in the phenol value chain. It is produced by acid-catalyzed condensation reaction of phenol and acetone. Traditionally, commercial scale BPA production has been based on a strong mineral acid catalyst, which is highly corrosive and requires expensive corrosion-proof materials of construction and waste treatment. However, more demanding applications, along with the need for environmentally benign processes, have led to the alternative catalyst now widely used—cation exchange resin. This type of catalyst mitigates equipment corrosion. The product is typically isolated and purified from the reactor effluent using one or more crystallization processes. Moreover, the solvents and unreacted acetone are purified using distillation and recycled. An excess of phenol is used to achieve higher BPA selectivity.

Previously, the Process Economics Program (PEP) report RW 2020-09 titled: *Integrated cumene-phenol/acetone/bisphenol A–Part I Cumene* published April 2020 covered the zeolite-base cumene technology by Badger process for 500,000 metric tonnes per year. Then, the RW 2020-10 report titled: *Integrated cumene-phenol/acetone-bisphenol A–Part II Phenol/Acetone* published July 2020 covered phenol technology by Kellogg Brown & Root, Inc.'s (KBR's) Medium Pressure-Dry Oxidation and KBR's Advanced Cleavage System process for 400,000 metric tonnes per year. The process economics from these previous reports, along with this final report on BPA process, are represented in summary section 2 as an integrated phenolics value chain of technologies: *Cumene-phenol/acetone-bisphenol A.* This report presents a detailed economic evaluation for BPA technology by Badger process.

The analysis and technoeconomic results that follow are based on a design capacity of 230,000 metric tonnes (507 million pounds) per year of BPA. While the capital and production cost results herein are presented on a US Gulf Coast basis, the accompanying iPEP Navigator Excel-based data module (available with the electronic version of this report) allows viewing results for other major regions, along with conversion between English and metric units.

Contents

Tables

Figures

Appendix D Figure

IHS Markit Customer Care:

CustomerCare@ihsmarkit.com
Americas: +1 800 IHS CARE (+1 800 447 2273)
Europe, Middle East, and Africa: +44 (0) 1344 328 300
Asia and the Pacific Rim: +604 291 3600

IHS Markit™