

A Review on Phthalic Anhydride Industry and Uses

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Abstract

Phthalic anhydride is the chemical that results from the oxidation of orthoxylene or naphthalene. In the USA, about 9 percent of phthalic anhydride came from naphthalene in 2003. The remainder came from ortho-xylene.

Keywords: Phthalic anhydride, Vacuum distillation system, OX

Introduction

Phthalic anhydride is an organic compound that has a chemical formula $C_6H_4(CO)_2O$. It is the anhydride of phthalic acid. Phthalic anhydride uses enter in many applications such as construction, marine, transportation applications, automotive applications, furniture, fixtures, market declining and it enters in the manufacturing of the following compounds:^{1,2}

Phthalate plasticizers (68%) for PVC compounds

Unsaturated polyesters (17%)

Alkyd resins (12%)

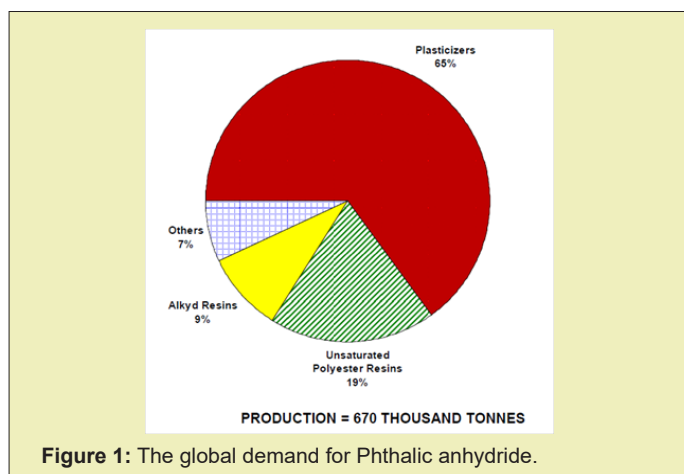


Figure 1: The global demand for Phthalic anhydride.

For the global demand,^{3,4} the Asia-Pacific zone is the biggest consumer for phthalic anhydride as they consume around 60 % of the global production. This is because of increasing presence of many end-user factories. From an environmental point of view, using phthalic anhydride is limited nowadays and in some countries is prevented and substituted by other safe compounds. Therefore, the demand for this product is increasing slowly in Europe and North America. Figure 1 shows the global demand for Phthalic anhydride.

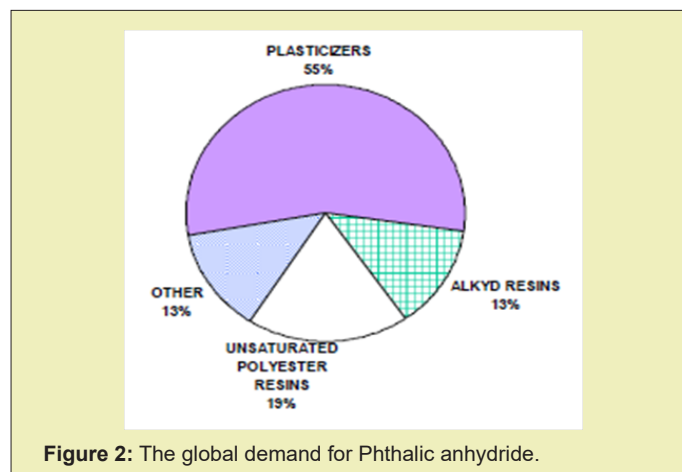


Figure 2: The global demand for Phthalic anhydride.

For the global consumption, the global phthalic anhydride market is predicted to increase at a CAGR of 3.40% within the next five

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years and the demand will be around 5 million ton by 2025. The Asia-Pacific zone is expected to be the largest consumer for phthalic anhydride due to its thriving economies and population. Figure 2 shows the global consumption for Phthalic anhydride.⁵

Phthalic Anhydride Technology

The route via o-xylene (OX) has played a dominant role and has largely superseded naphthalene-based technology, which accounts for about 16% of production. OX is catalytically oxidized in a fixed-bed reactor and the reactor effluent containing PAN vapors is cooled and sublimated in condensers. The crude PAN is purified in a vacuum distillation system and the product is either stored in a molten state or bagged as flakes. There has been little change in process technology, although research continues to focus on catalyst improvements. One development has been the lowering of air to OX weight ratio, which is now 9.5:1, and allows lower capital costs and energy savings.⁶

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Conflicts of Interest

Author declares that there is no conflict of interest.

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