

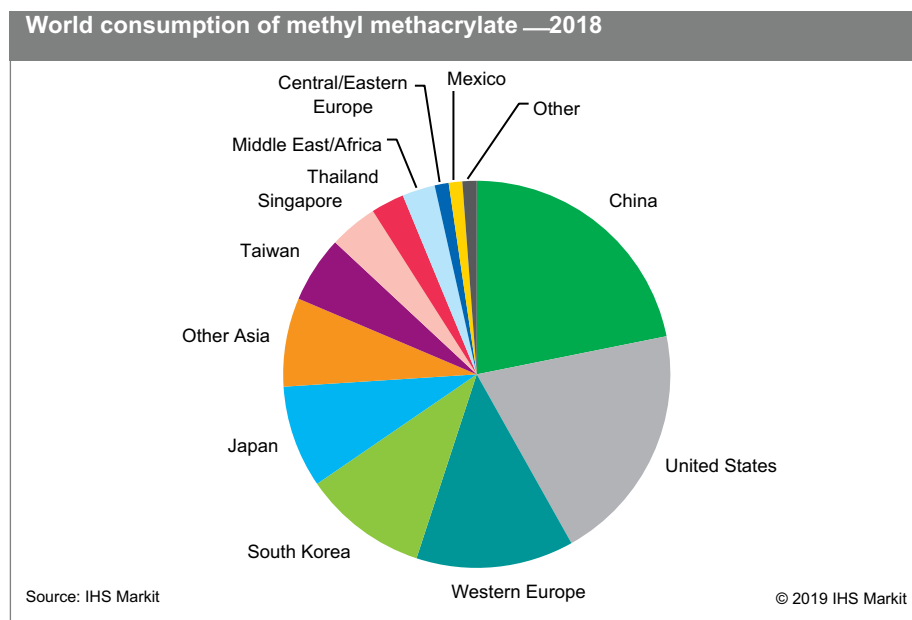
Methyl Methacrylate

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Abstract

Methyl methacrylate (MMA) is by far the most important methacrylic acid ester. It is a colorless, volatile, flammable liquid that is slightly soluble in water. It polymerizes readily upon heating in the presence of a free radical initiator to form polymethyl methacrylate (PMMA) resins, which have excellent transparency, strength, and outdoor durability. MMA is also copolymerized with other monomers (vinyl acetate, acrylate esters, or other methacrylates); the bulk of consumption is in acrylic polymers.

The following pie chart shows world consumption of methyl methacrylate:



MMA is widely used in large amounts for the production of polymethyl methacrylate (PMMA) resins, which are used in applications such as cast and extruded sheet and resins for injection molding and extrusion. MMA is also used extensively in surface coatings (acrylic latexes, lacquers, and enamels) and adhesives. Other important applications for MMA include use for impact modification and as processing aids; as emulsion polymers principally for paper, textiles, leather, and floor polishes; in mineral-filled sheet; polyesters; and polymer concrete. Methyl methacrylate is also used as a starting material to manufacture other esters of methacrylic acid (via transesterification).

Residential and commercial construction, remodeling activity, automotive applications, and original equipment manufacture account for approximately 80–85% of world MMA consumption. Demand for these markets is greatly influenced by general economic conditions. As a result, demand for methyl methacrylate largely follows the patterns of

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the leading world economies. The markets for methyl methacrylate are largely captive; many of the larger producers consume 50–60% of their production captively, mainly for PMMA resins or surface coatings.

In 2018, PMMA accounted for nearly two-thirds of global consumption of MMA. Acrylic surface coatings was next, followed by other uses. Global consumption of MMA will continue to increase during 2018–23, led by consumption in PMMA sheet.

In 2018, China was the largest consumer of MMA, followed by the United States and Western Europe. In 2013, China surpassed the United States as the largest MMA consumer in the world. China, the United States, and Western Europe will maintain their rankings as MMA consumers through 2023.

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