# ISOCYANATE MARKET

**BY TYPE** (MDI, TDI, Aliphatic, Others) **& APPLICATION** (Rigid Foam, Flexible Foam, Paints & Coatings, Adhesive & Sealants, and Elastomers & Binders)

***— Global Trends & Forecast to 2019***

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# 1 EXECUTIVE SUMMARY

The global isocyanates market has been segmented into major geographical regions—Asia-Pacific, Europe, North America, Latin America, and the Middle East & Africa—under various major applications such as rigid foams, flexible foams, paints & coatings, adhesives & sealants, elastomers & binders, and others. The types of isocyanates that are identified and included are MDI, TDI, aliphatic isocyanates, and others.

MDI is predominantly used to manufacture rigid polyurethane foams, and it is used in non-foam applications such as paints & coatings, adhesives & sealants, and elastomers. PU rigid foams are the largest application for MDI and have significantly greater market share than the MDI non-foam applications market share. These rigid foams are predominantly used in construction applications for insulation. Other applications include consumer appliances, packaging, industrial, and insulation. TDI is predominantly used to manufacture flexible polyurethane foams and a small part of it is used to manufacture rigid foams, coatings, adhesives & sealants, and elastomers. Flexible foams are used as cushioning material in furniture and transportation applications, mainly in beds and car seats.

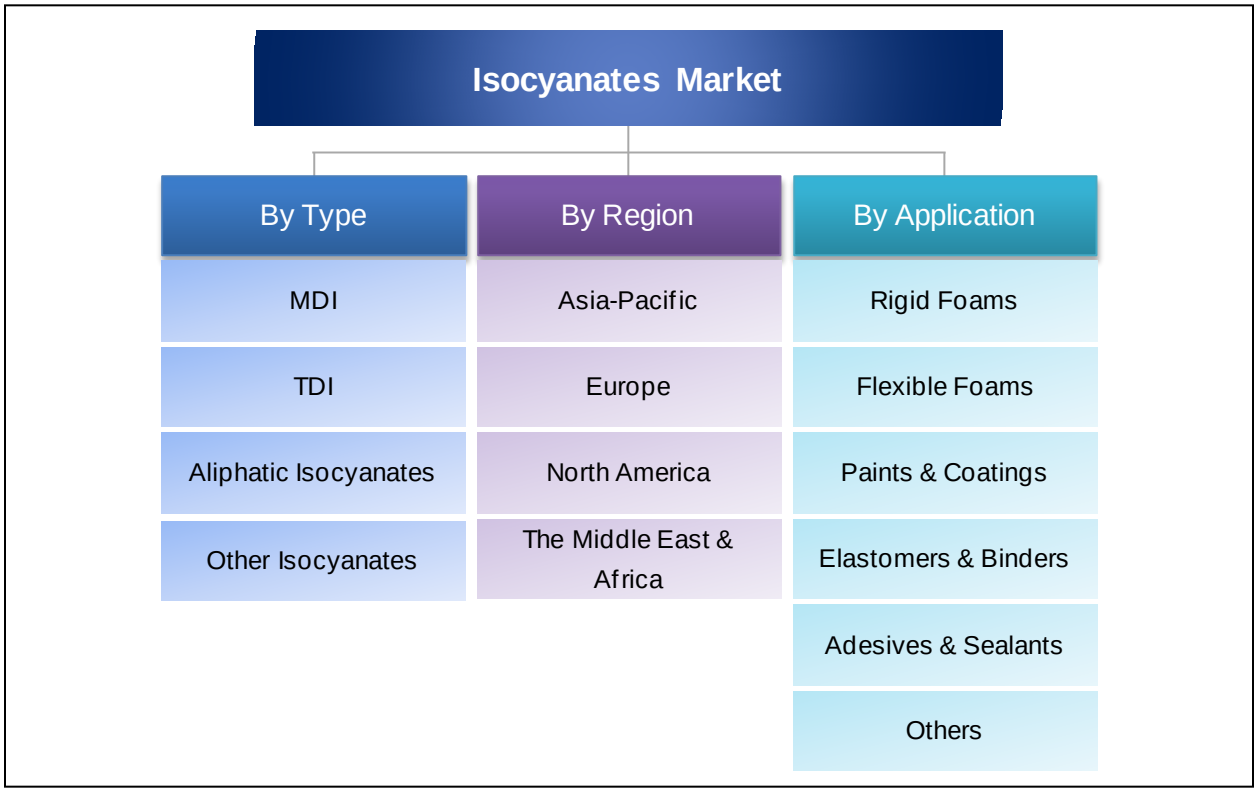
Aliphatic isocyanates are used in the manufacture of paints & coatings, adhesives & sealants, and elastomers. These products have decent demand in construction, housing, packaging, electronics, and transportation industries. There are other isocyanates also such as NDI (naphthalene 1, 5-diisocyanate), m-TMXDI (m-tetramethylenexylene diisocyanate), PPDI (p-phenylene diisocyanate), and MIC (methyl isocyanate). These isocyanates are used in diverse applications such as production of pesticides, rubbers, elastomers, and adhesives. The isocyanates market size in terms of value was $XX million in 2013.

# 2 PREMIUM INSIGHTS

## 2.1 MARKET SEGMENTATION

**FIGURE 1**

**ISOCYANATES: MARKET SEGMENTATION**




Source: ICIS, IHS Chemical, Urethanes Technology International magazine, PCI magazine, EIA, Factiva, Company Websites & Presentations, Press release, Expert Interviews, and MarketsandMarkets Analysis

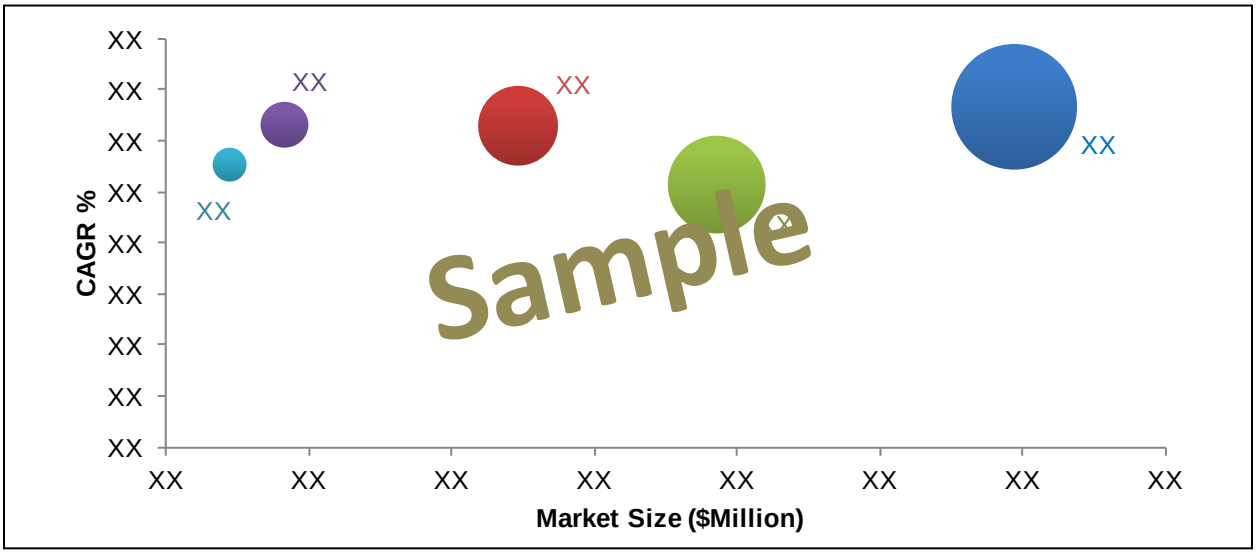
The isocyanates market is analyzed for three major segments—geography, application, and types of isocyanates. The market size was analyzed in terms of value ($million) and volume (KT).

## 2.2 ASIA-PACIFIC– BEST MARKET TO INVEST

Asia-Pacific has emerged as the largest market for isocyanates and is growing at a good rate.

**FIGURE 2**

**ISOCYANATES MARKET GROWTH MATRIX**




Source: ICIS, IHS Chemical, Urethanes Technology International magazine, PCI magazine, EIA, Factiva, Company Websites & Presentations, Press release, Expert Interviews and MarketsandMarkets Analysis

Though the market size is large in Asia-Pacific, it is growing at a fast pace due to rising demand from end-user industries such as construction, automobile, and electronics especially in countries such as China, India, and Japan. The market is growing slowly in Europe, but it will continue to grow at a significant rate in the North American region. The isocyanate market is still in its infancy in Africa and Latin America, but these regions are experiencing high growth on account of increased infrastructure spending and low base effect.

# 3 MARKET OVERVIEW

## 3.1 BURNING ISSUES

### 3.1.1 PRICING & TOXICITY ISSUES

Isocyanates are not only highly toxic and hazardous, and they also result in polyurethanes being heavily dependent on fossil fuels. This poses a serious sustainability issue for market participants which are not only looking to reduce dependence on fossil fuels to reduce environmental impact in order to maintain business continuance.

The highly volatile crude oil price is forcing the isocyanates manufacturers to increase the price of their MDI, TDI, aliphatic isocyanates, and derivatives based on them, which may further result in decrease in demand. Increasing global demand and unrest in the Middle East in recent times have been primarily responsible for this. On the other hand, the market is constantly shifting towards a tighter regulatory structure with prominent regulatory bodies such as the EPA (Environmental Protection Agency) and REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) setting stringent guidelines for industry participants.

Research is already underway to develop toxic-free manufacturing processes for the production of diisocyanates. A prime example of this is market participants such as Dow Chemicals, BASF, and Huntsman have been exploring phosgene free routes to MDI. This will include processes such as by synthesis of methyl phenyl carbamate (MPC) from aniline and dimethyl carbonate (DMC) feedstock and condensation of MPC with formaldehyde to form dimethyl methylene diphenyl dicarbamate (MDC). Also, market leaders, such as Bayer MaterialScience, have been focussing on bio-based polyols that are used to produce polyurethanes. This trend for sustainable polyurethane solutions is expected to strengthen in the next five years as the industry moves towards an environment-friendly business model.

## 3.2 METHYLENE DIPHENYL DIISOCYANATE (MDI)

### 3.2.1 PRODUCTION

Although there are a number of commercial processes to manufacture MDI, all are based on the same chemical principle which involves a two-step chemical reaction. In the first step, aniline and formaldehyde are reacted to produce dephenylmethanediamine (MDA). MDA is then made react with phosgene to produce MDI.

However, the conventional process is controversial in certain aspects. The use of phosgene, which is a highly toxic gas, is much debated while the formation of hydrochloric acid (HCL) as a by-product is a hindrance as it is highly corrosive and increases equipment maintenance costs.

### 3.2.2 DRIVERS

MDI is mostly used to produce rigid foams and is also used in the production of coatings, adhesives & sealants, and elastomers. These products find application in industries such as construction, automotive, and electronics. Rigid foams are used in the electronic industry as insulators, where it is widely used in refrigerators & freezers. It is also used in the automotive industry for manufacturing seats and vehicle interiors, and also as vehicle exteriors to reduce vehicle weight.

Flexible foams are used in furniture and packaging industries. It is used to make cushions, beddings, and so on. In the construction industry, adhesives and sealants are used to bind things together, and coatings are used to protect materials from corrosion and UV. Elastomers are used to provide flexibility to certain infrastructures.

The global MDI market is driven by many factors such as growth in the end-use segments of the polyurethane industry. The market size also increases due to the growing use of polyurethanes in various consumer and industrial applications.

# 4 ISOCYANATES MARKET, BY APPLICATION

## 4.1 INTRODUCTION

Isocyanates are used to make various products such as rigid foams, flexible foams, paints & coatings, adhesives & sealants, and elastomers & binder, and so on. This enables their use in variety of consumer and industrial applications. There are a large number of application areas for isocyanates. Hence, these are used in a number of end-user industries. The major ones are listed in the table below:

**TABLE 1**

**ISOCYANATES: INDUSTRYWIDE APPLICATIONS**

| Industry | Application |
|---|---|
| Automotive | Interior components of automobiles<br>• Seats<br>• Headrests<br>• Armrests<br>• Roof liners<br>• Dashboards<br>• Instrument panels<br>• Bumpers<br>• Side skirts<br>• Roll pans<br>• Wiper cowls |
| Furniture | • Upholstered furniture cushions<br>• Carpet cushion<br>• Mattress padding |

| Industry | Application |
|---|---|
| | • Solid-core mattress core |
| Housing | • Insulator<br>• Interiors<br>• Decorations<br>• Flooring material<br>• Paints and varnishes |
| Construction | • Rockwool or ceramic fibers<br>• Fill gaps<br>• Wood rocking glue |
| Water vessels | • Inflatable boats<br>• Surfboards<br>• Rigid-hulled boats |
| Electronic | • Automotive circuits<br>• sensors |

Source: Secondary Research and MarketsandMarkets Analysis

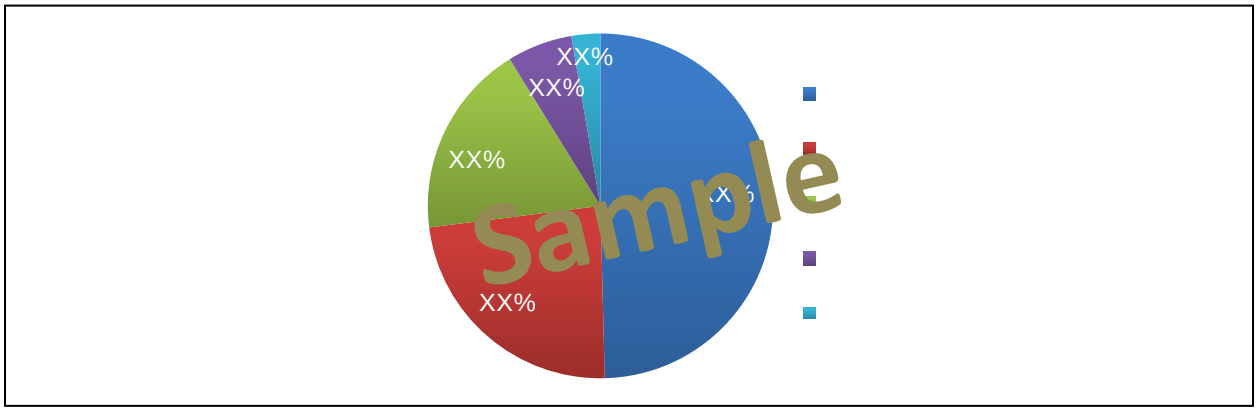
# 5 ISOCYANATES MARKET, BY GEOGRAPHY

## 5.1 MARKET ESTIMATES, BY REGION

This chapter analyzes global isocyanates market and its trends concerning five regions such as North America, Latin America, Europe, Asia-Pacific, and The Middle East & Africa. Asia-Pacific is the growth engine of this market and has significant demand for different types of isocyanates. The below figures show the comparison in percentage split of the isocyanates based on regions, between 2013 and 2019.

**FIGURE 3**

**ISOCYANATES MARKET SHARE, BY GEOGRAPHY, 2013**




Source: ICIS, IHS Chemical, Urethanes Technology International Magazine, PCI Magazine, EIA, Factiva, Company Websites & Presentations, Press Releases, Expert Interviews, and MarketsandMarkets Analysis

# 6 COMPETITIVE LANDSCAPE

## 6.1 INTRODUCTION

This section gives an insight into the significant growth strategies adopted by the companies in the isocyanates market. These are:

- Capacity expansion
- Geographic expansion
- Acquisition
- R&D activities

The isocyanates market is a competitive market. Major players in the market compete on various parameters such as technical innovation, production capabilities, performance, quality, and geographic reach. The major players in the markets are Bayer MaterialScience (Germany), BASF (Germany), Yantai Wanhua (China), Dow chemical (U.S), and Huntsman International LLC (U.S.).

## 6.2 STRATEGIC DEVELOPMENTS

The competitive landscape was analyzed for the top companies that are involved in the isocyanates business. The section has covered around XX major developments in the industry for the last four years. The developments include geographic expansion, capacity expansion, R&D activities, acquisition, and others including price increase and retrenchment.

### 6.2.1 CAPACITY EXPANSION: THE MOST PREFERRED STRATEGIC APPROACH

Capacity expansion is one of the most popular growth strategies adopted by the leading companies in the isocyanates market with an estimated share of XX% from 2009 to 2014. The top players in the isocyanates market are keen on the capacity expansion strategy for developing a better customer penetration and to cater to the increasing demand for isocyanates in the market. In January 2014, BASF announced to expand its production capacity of its TDI plant in Shanghai from XX tons/year to XX tons/year.

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