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Variable Margin Methodology: Isocyanates Europe

ICIS
Independent Commodity Intelligence Services

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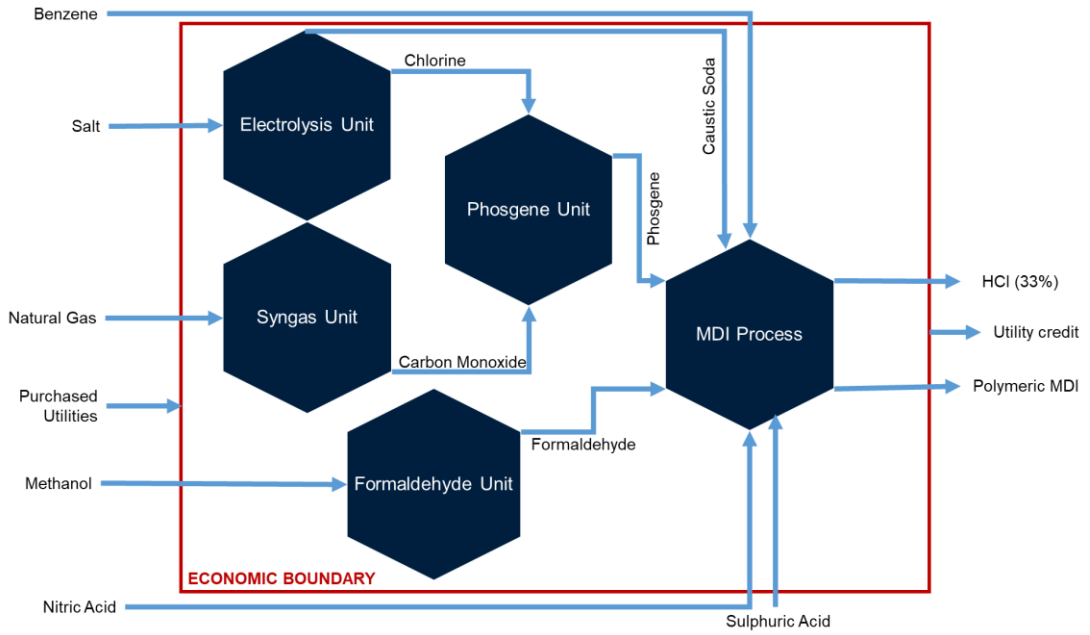
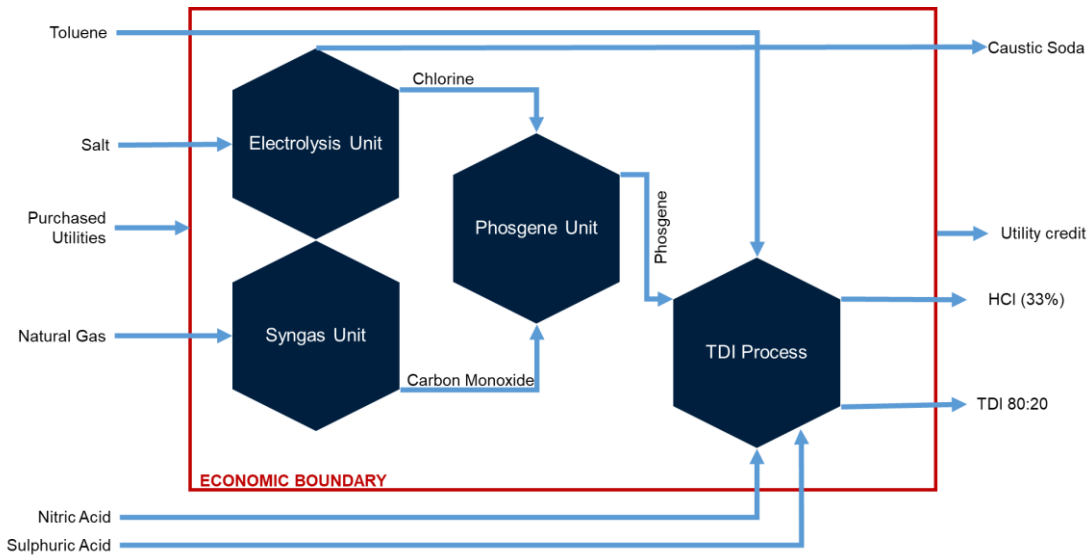
THE BUSINESS MODEL

Isocyanates are made from an aromatic feedstock (benzene for MDI, toluene for TDI), nitric acid, phosgene and in the case of MDI, formaldehyde. Benzene and toluene come from steam crackers and refinery operations and nitric acid is produced industrially from ammonia. Phosgene is created from carbon monoxide and chlorine, which in turn come from the production of syngas from natural gas, and the electrolysis of brine respectively. Formaldehyde is made from methanol.

ICIS has modelled the production process of MDI and TDI.





As carbon monoxide and chlorine have no market price, and formaldehyde pricing is not assessed by ICIS, these units have been included inside the economic boundary, and their feedstocks (like methanol, natural gas and salt) are inputs, as their prices are more easily assessed. This effectively means that carbon monoxide, chlorine and formaldehyde are passed through at their variable cost. This also reflects reality, in that many isocyanate producers will have their own integrated electrolysis, formaldehyde or syngas units to feed these processes.

THE MARGIN CALCULATION

- The margin measure provides an assessment of the ex-works cash margin obtained for the product over raw material costs, credit for selling co-products and key variable manufacturing costs, including power and steam, chemicals and catalysts. This measure can also be termed as a variable margin, contribution or benefit.

- This margin measure provides simple signals on the direction of business margins as dictated by the environment, thus informing market positioning by sellers, buyers and traders.

- ICIS does not model beyond raw material costs, credit for selling co-products and key variable manufacturing costs. Further analysis would cease to be generic to the industry and would be highly specific to individual business operations, their site structure, location, ownership and financial structures. Such detail would not fairly reflect or be applicable in a wider industry context. It may also be more subjective, open to fair challenges and not feasible to reference in commercial discussions.

- ICIS models plant operations for a series of ‘representative’ plants around the world. These representative plants have no flexibility with respect to feedstock or process configuration and ICIS assumes the plants to be purchasing inputs and selling outputs at constant prices.

- As the process model is generic and not based on any individual operation, the contribution measure is indicative. Instead of absolute value terms, it is most valuable as an index and in step-change terms.

- ICIS plant manufacturing and feedstock yield assumptions incorporate data from Intratec (www.intratec.us), an independent provider of chemical production cost reports.

- Ex-works product price assessments are linked to ICIS pricing quotations for large volume commodity products with netbacks assessed using typical logistic cost assessments.

- To estimate representative transport costs, the ICIS logistics model considers a network with nodes at individual production sites connected by streets and ports linking each continent. The logistics model incorporates shipping data from Xeneta (www.xeneta.com), and duties data from SimplyDuty (www.simplyduty.com).

The calculation below shows how ICIS derives the MDI margin for a unit in Northwest Europe. The example is based on contract sales prices, is denominated in US dollars per tonne, and uses average prices for the year 2017.

Polymeric/Crude MDI margin ($/tonne)

MDI contract price	2,915
Logistics costs/netbacks	2
MDI product value	**2,917**
Co-product value	45
Total income	**2,962**
Purchased feedstocks	633
Utilities	598
Variable costs	**1,231**
MDI margin	**2,962 – 1,231 = 1,731**

MODEL YIELD PATTERN AND CALCULATION

Plant manufacturing data relates to the variable cost components of the unit's operations. Yield pattern data relates to the overall material balance of the unit. For example, for one tonne of MDI produced, the process may use approximately 0.3 – 0.4 tonnes of benzene as feedstock. ICIS calculations also take into consideration additional chemicals and catalysts required for the production of MDI.

- The Isocyanate margins are calculated for the following production processes:

  Northwest Europe:

  - MDI phosgenation ex Benzene
  - TDI phosgenation ex Toluene

- Due to the different yield patterns when using different feedstocks, a comparative analysis is not a simple case of comparing feedstock price differences but must take into account co-product credits.

- This analysis demonstrates the volatility of the business and the influence of price floors (as an uneconomic margin generally forces supply reductions).

- Northwest Europe margins are modelled on a FD Europe W basis.

ASSESSMENT INPUTS

The following pricing inputs are used to generate the full content of the ICIS Isocyanate Europe Margins.

NORTHWEST EUROPE

- MDI in Northwest Europe Contract FD Europe W (Crude, ICIS pricing, Contract Price Assessment, Month, Contract Survey, Weekly, €/tonne)
- TDI in Northwest Europe Contract FD Europe W (80:20, ICIS pricing, Contract Price Assessment, Month, Contract Survey, Weekly, €/tonne)
- Ammonia in Europe Hybrid CFR NWE (ICIS pricing, Assessment, Duty Unpaid, 0-8 Weeks, Full Market Range, Weekly, $/tonne)
- Benzene in Northwest Europe Contract FOB NWE (ICIS pricing, Contract Price Assessment, Month, Weekly, $/tonne)
- Toluene in Northwest Europe Contract FOB NWE (ICIS pricing, Contract Price Assessment, Month, Weekly, $/tonne)
- Sulphuric Acid in Europe CFR NWE (ICIS pricing, Contract Survey, Quarterly, €/tonne)
- Methanol in Northwest Europe, Contract FOB R'dam (ICIS pricing, Contract Price Assessment, Month, Contract Survey, Weekly €/tonne)
- Natural Gas, TTF Price Assessment, October '22, Bid/Offer Range, Daily, DEL TTF (€/MWh, converted to $/MmBTU)
- Caustic soda in Europe Spot FOB Northwest Europe (ICIS pricing, Weekly range, $/dry metric tonne)
- Hydrochloric acid (33%) in Europe Domestic FD Germany (ICIS pricing, Weekly range, $/tonne)

Ammonia is used in this context to calculate the nitric acid value.

The methodology associated with each ICIS pricing individual pricing quotation referenced above can be found on the ICIS Compliance and Methodology website.

In addition to the listed ICIS pricing inputs, the model also takes into account logistic costs (calculated through the ICIS logistics model), and utilities costs.

A key objective of the calculation process is to provide a weekly summary that strongly aligns to the reported market price positions on the date of release.

Where inputs are unavailable for individual weeks, e.g. due to public holidays, prior-week data is carried forward to the current week. This is for the specific purpose of populating the model and preventing model inconsistency. This form of data interpolation infers some limited data points that may not be market derived, and customers should be aware of this assumption.

As the majority of petrochemical trades are in US dollars, all data used in the ICIS Margin – Isocyanates Europe model are denominated in USD unless specifically stated otherwise.

ISOCYANATES EUROPE WEBPAGE

Filter data on the website using the following criteria.

- **Area:** Select Northwest Europe.
- **Process type:** Select MDI phosgenation ex Benzene or TDI phosgenation ex Toluene.
- **Price terms:** Variable margins are generated for contract price terms only
- **Frequency:** Viewable with weekly, monthly, quarterly, or yearly granularity.
- **Currency:** Allows prices to be displayed in either EUR or USD.
- **Unit:** Allows conversion from displayed unit to unit of choice in data download only.

Variable margins data are available online from January 2014 onwards. One year of trailing data shows as default.

The website deploys the following data, all per tonne of Isocyanate:

- **Main product value, ex-works:** the estimated isocyanate netback value for the producer, taking into account the ICIS assessed price, shipping costs, handling costs and applicable duties.
- **Co-product credits:** the revenues from the other products generated in a process, also ex-works. This data is also available broken down into co-product types.
- **Feedstock and utility costs:** or total variable input costs for a process. This data is also available broken down into the component feedstock costs and utility costs.

Calculated outputs are:

- Variable cost = [Feedstock and utility costs] – [Co-product credits]
- Variable margin = [Main product value] + [Co-product credits] – [Feedstock and utility costs]

A selected variable margin (i.e. a margin for a specific location, process and price term) is comparable with margins of different process technologies in the same region, and with margins using the same technology in different regions. Subscribers can review margin performance by week, month, quarterly and per annum. Subscribers can view the flows of different products, in terms of their volume and value, into and out of the representative production unit used to calculate the isocyanate variable margin.

PUBLICATION FREQUENCY

The ICIS Weekly Margin – Isocyanate Europe model is based on the latest data at the close of business in UK on Friday and released to customers on the following Monday, along with written commentaries, subject to schedule planning. When the Monday is a public holiday in the UK, commentaries will be made available the following day. Updates are not published on some public holidays. Holiday dates and days of publication may be subject to revision.