Methodology overview

Methodology rationale
Argus strives to construct methodologies that reflect the way the market trades. Argus aims to produce price assessments which are reliable indicators of commodity market values, free from distortion. As a result, the specific currencies, volume units, locations and other particulars of an assessment are determined by industry consensus to facilitate seamless bilateral trade and Argus mirrors these industry conventions. In illiquid markets and time periods, Argus assesses the range within which product could have traded by applying a strict process outlined later in this methodology.

Survey process
Argus price assessments are informed by information received from a wide cross section of market participants, including producers, consumers and intermediaries. Argus reporters engage with the industry by proactively polling participants for market data. Argus will contact and accept market data from all credible market sources including front and back office of market participants and brokers. Argus will also receive market data from electronic trading platforms and directly from the back offices of market participants. Argus will accept market data by telephone, instant messenger, email or other means.

Argus encourages all sources of market data to submit all market data to which they are a party that falls within the Argus stated methodological criteria for the relevant assessment. Argus encourages all sources of market data to submit transaction data from back office functions when and where possible. Throughout all markets, Argus is constantly seeking to increase the number of companies willing to provide market data. Reporters are mentored and held accountable for expanding their pool of contacts. The number of entities providing market data can vary significantly from day to day based on market conditions. Should the number of entities providing market data repeatedly fail to a level that assessment quality may be affected, supervising editors will review the viability of the assessment.

For certain price assessments identified by local management, should more than 50pc of the market data upon which the assessment is based come from a single entity during any assessment period (defined as the minimum period covered, such as a day for a daily assessment), then the supervising editor will engage in an analysis of the market data with the primary reporter to ensure that the quality and integrity of the assessment has not been affected.

Market data usage
In each market, Argus uses the methodological approach deemed to be the most reliable and representative for that market. Argus will utilize various types of market data in its methodologies, to include:

- Transactions
- Bids and offers
- Other market information, to include spread values between grades, locations, timings, and many other data.

In many markets, the relevant methodology will assign a relatively higher importance to transactions over bids and offers, and a relatively higher importance to bids and offers over other market information. Certain markets however will exist for which such a hierarchy would produce unreliable and non-representative price assessments, and so the methodology must assign a different relative importance in order to ensure the quality and integrity of the price assessment. And even in markets for which the hierarchy normally obtains, certain market situations will at times emerge for which the strict hierarchy would produce non-representative prices, requiring Argus to adapt in order to publish representative prices.

Verification of transaction data
Reporters carefully analyze all data submitted to the price assessment process. This data includes transactions, bids, offers, volumes, counterparties, specifications and any other information that contributes materially to the determination of price. This high level of care applies regardless of the methodology employed. Specific to transactions, bids, and offers, reporters seek to verify the price, the timing, the volume, the specifications, location basis, and counterparty. In some transactional average methodologies, reporters also examine the full array of transactions to match counterparties and arrive at a list of unique transactions.

Several tests are applied by reporters in all markets to transactional data to determine if it should be subjected to further scrutiny. If a transaction has been identified as failing such a test, it will receive further scrutiny. For certain price assessments identified by local management, Argus has established internal procedures that involve escalation of inquiry within the source’s company and escalating review within Argus management. Should this process determine that a transaction should be excluded from the price assessment process, the supervising editor will initiate approval and, if necessary, documentation procedures.

Primary tests applied by reporters

- Transactions not transacted at arms-length, including deals between related parties or affiliates.
- Transaction prices that deviate significantly from the mean of all transactions submitted for that day.
- Transaction prices that fall outside of the generally observed lows and highs that operated throughout the trading day.
- Transactions that are suspected to be a leg of another transaction or in some way contingent on an unknown transaction.
- Single deal volumes that significantly exceed the typical transaction volume for that market.
- Transaction details that are identified by other market participants as being for any reason potentially anomalous.
- Transaction details that are reported by one counterparty differently than the other counterparty.
- Any transaction details that appear to the reporter to be illogical or to stray from the norms of trading behavior. This could include but is not limited to divergent specifications, unusual delivery location and counterparties not typically seen.
- Transactions that involve the same counterparties, the same price and delivery dates are checked to see that they are separate deals and not one deal duplicated in Argus records.
Secondary tests applied by editors for transactions identified for further scrutiny

Transaction tests
• The impact of linkage of the deal to possible other transactions such as contingent legs, exchanges, options, swaps, or other derivative instruments. This will include a review of transactions in markets that the reporter may not be covering.
• The nature of disagreement between counterparties on transactional details.
• The possibility that a deal is directly linked to an offsetting transaction that is not publicly known, for example a “wash trade” which has the purpose of influencing the published price.
• The impact of non-market factors on price or volume, including distressed delivery, credit issues, scheduling issues, demurrage, or containment.

Source tests
• The credibility of the explanation provided for the outlying nature of the transaction.
• The track record of the source submitting the data. Sources will be deemed more credible if they
  • Regularly provide transaction data with few errors.
  • Provide data by Argus’ established deadline.
  • Quickly respond to queries from Argus reporters.
  • Have staff designated to respond to such queries.
• How close the information receipt is to the deadline for information, and the impact of that proximity on the validation process.

Assessment guidelines
When insufficient, inadequate, or no transaction information exists, or when a transaction based methodology will not produce representative prices, Argus reporters will make an assessment of market value by applying intelligent judgment based on a broad array of factual market information. Reporters must use a high degree of care in gathering and validating all market data used in determining price assessments, a degree of care equal to that applying to gathering and validating transactions. The information used to form an assessment could include deals done, bids, offers, tenders, spread trades, exchange trades, fundamental supply and demand information and other inputs.

The assessment process employing judgment is rigorous, replicable, and uses widely accepted valuation metrics. These valuation metrics mirror the process used by physical commodity traders to internally assess value prior to entering the market with a bid or offer. Applying these valuation metrics along with sound judgment significantly narrows the band within which a commodity can be assessed, and greatly increases the accuracy and consistency of the price series. The application of judgment is conducted jointly with the supervising editor, in order to be sure that guidelines below are being followed. Valuation metrics include the following:

Relative value transactions
Frequently transactions occur which instead of being an outright purchase or sale of a single commodity, are instead exchanges of commodities. Such transactions allow reporters to value less liquid markets against more liquid ones and establish a strong basis for the exercise of judgment.
• Exchange one commodity for a different commodity in the same market at a negotiated value.
• Exchange delivery dates for the same commodity at a negotiated value.
• Exchange a commodity in one location for the same commodity at another location at a negotiated value.

Bids and offers
If a sufficient number of bids and offers populate the market, then the highest bid and the lowest offer can be assumed to define the boundaries between which a deal could be transacted.

Comparative metrics
The relative values between compared commodities are readily discussed in the market and can be discovered through dialogue with market participants. These discussions are the precursor to negotiation and conclusion of transactions.
• Comparison to the same commodity in another market center.
• Comparison to a more actively traded but slightly different specification commodity in the same market center.
• Analysis of prices in forward markets for physically deliverable commodity that allow extrapolation of value into the prompt timing for the commodity assessed.
• Comparison to the commodity’s primary feedstock or primary derived product(s).
• Comparison to trade in the same commodity but in a different modality (as in barge versus oceangoing vessel) or in a different total volume (as in full cargo load versus partial cargo load).

Throughout this methodology, Argus will explain, in more detail and on a market by market basis, the criteria and procedures that are used to make an assessment of market value by applying intelligent judgment.

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Publications and price data
Argus polymer prices are published in Argus Polymers. Subsets of these prices appear in other Argus market reports and newsletters in various forms, such as Argus Ethylene and Argus Propylene. The price data is available independent of the text-based report in electronic files that can feed into various databases. These price data are also supplied through various third-party data integrators. The Argus website also provides access to prices, reports and news with various web-based tools. All Argus prices are kept in a histori-
Assessments which are reliable indicators of commodity market values.

The overriding objective of any methodology is to produce price estimates, free from distortion and representative of spot market values. As a result, Argus editors and reporters are regularly examining our methodologies and are in regular dialogue with the industry in order to ensure that the methodologies are representative of the physical market being assessed. This process is integral with reporting on a given market. In addition to this ongoing review of methodology, Argus conducts reviews of all of its methodologies and methodology documents on at least an annual basis. Argus market report editors and management will periodically and as merited initiate reviews of market coverage based on a qualitative analysis that includes measurements of liquidity, visibility of market data, consistency of market data, quality of market data and industry usage of the assessments. Report editors will review:

- Appropriateness of the methodology of existing assessments
- Termination of existing assessments
- Initiation of new assessments

The report editor will initiate an informal process to examine viability. This process includes:

- Informal discussions with market participants
- Informal discussions with other stakeholders
- Internal review of market data

Should changes, terminations, or initiations be merited, the report editor will submit an internal proposal to management for review and approval. Should changes or terminations of existing assessments be approved, then formal procedures for external consultation are begun.

Changes to methodology

Formal proposals to change methodologies typically emerge out of the ongoing process of internal and external review of the methodologies. Formal procedures for external consultation regarding material changes to existing methodologies will be initiated with an announcement of the proposed change published in the relevant Argus report. This announcement will include:

- Details on the proposed change and the rationale
- Method for submitting comments with a deadline for submissions
- Notice that all formal comments will be published after the given consultation period unless submitter requests confidentiality

Argus will provide sufficient opportunity for stakeholders to analyze and comment on changes, but will not allow the time needed to follow these procedures to create a situation wherein unrepresentative or false prices are published, markets are disrupted, or market participants are put at unnecessary risk. Argus will engage with industry throughout this process in order to gain acceptance of proposed changes to methodology. Argus cannot however guarantee universal acceptance and will act for the good order of the market and ensure the continued integrity of its price assessments as an overriding objective.
Following the consultation period, Argus management will commence an internal review and decide on the methodology change. This will be followed by an announcement of the decision in the relevant Argus report and include a date for implementation. In addition, publication of stakeholders’ formal comments that are not subject to confidentiality and Argus’ response to those comments will also take place. These formal comments should be published in a manner described by management but must be available to all market participants and stakeholders.

Updates to methodology
The Argus Polymers methodology is constantly updated and revised. The latest available methodology (which may supersede the one you are reading) is available at www.argusmedia.com

Publication schedule
Argus Polymers is a weekly report on the global polymer markets. The report is published every Thursday, with the exception of some public holidays. For a full list of non-publication dates, see Argus’ publication schedule.

Units
Polymer prices are per metric tonne, unless otherwise stated.

US

Contract prices
Contract price assessments reflect a negotiated contract price for general-purpose grades meeting the US polymer specifications listed below, delivered east of the Rocky Mountains during the named month. Assessments are based on validated contract prices negotiated between buyer and seller. In the absence of validated prices, Argus assesses the change in the contract price from the previous month, and derives each price by applying that change to its assessment of the previous month.

Contract prices are published for each of the specifications listed below.

Timing
Argus publishes an assessment of the monthly contract price from the third publication of the month in question until the first publication of the following month, when the final monthly contract price assessment is typically made. The second publication of the following month republishes the final monthly contract price assessment.

In the event that the monthly contract has not settled by the first publication of the following month, the final monthly price assessment will be published in the second publication of the month.

The final monthly contract price assessment is not an average of the previous assessments for the month in question.

Export prices
Export price assessments are for bagged material on an FAS (free-alongside-ship) Houston basis. Assessments are for a volume equivalent to at least one railcar (unbagged), meeting the quality specifications listed below, delivered to buyer up to 30 days from the date of publication, and under export-only conditions.

Export prices are published for HDPE injection, HDPE BM, HDPE HMW film, LDPE liner film, LLDPE butene, PVC pipe.

Specifications
PP homo
Polypropylene homopolymer – injection molding
Material with a melt flow rate in the range 5-30.

PP copolymer
Polypropylene block co-polymer
Material with a melt flow rate in the range of 2-30

LDPE liner film
Low density polyethylene (LDPE) – liner film contract price
Material with a melt index of 0.2-4.

LLDPE butene
Linear low density polyethylene (LLDPE) butene-1
Blown film, butene-grade linear with a melt index of 0.8-2.

LLDPE hexene
LLDPE hexene-1 Film
Hexene-grade linear with a melt index of 0.75-1

LLDPE octene
LLDPE octene-1 Film
Octene-grade linear film with a melt index of 0.4 to 0.85.

HDPE BM
High density polyethylene – blow molding grade
General purpose blow molding HDPE resin with a melt index of 0.22-0.4.

HDPE injection
HDPE IM – high density polyethylene, injection molding grade
General purpose injection molding HDPE resin I with a melt index of 4-20.

HDPE HMW Film
High density polyethylene high molecular weight film
General purpose high molecular weight film with a high load melt index (HLMI) of 6-10.

PVC pipe
Polyvinyl chloride – pipe grade
General purpose rigid extrusion pipe-grade PVC, K-value of 65-68.
GPPS
General purpose polystyrene
General purpose crystal grades material with a melt index of 1-20.

HIPS
High impact polystyrene (HIPS)
General purpose high-impact rubber modified polystyrene with a melt flow index of 2 to 20.

Northwest Europe

Polymer contract price assessments
Argus assesses a monthly contract price range for Europe. There is no one single contract price; independent producers and consumers agree the monthly contract price on an independent arms length basis. Argus surveys participants on the change in contract price from month to month and confirms with them indicative price ranges. The different polymer grades are not assessed in isolation and the premiums and discounts between different polymer grades are used in the assessment process.

Argus publishes a contract price range, in most circumstances no wider than €50/t. There is not a single contract price as each buyer/seller negotiates individually. The contract is typical of the major markets in Germany, Benelux and France, and is based on “general purpose grades” and does not allow for any surcharges associated with more advanced grades. The price assessment does not cover break-bulk activities and does not reflect the geographic variations across the smaller European markets (Spain and Italy typically have lower pricing).

Timing
Argus publishes an assessment of the monthly contract price from the third publication of the month in question until the first publication of the following month, when the final monthly contract price assessment is typically made. The second publication of the following month republishes the final monthly contract price assessment.

In the event that the monthly contract has not settled by the first publication of the following month, the final monthly price assessment will be published in the second publication of the month.

The final monthly contract price assessment is not an average of the previous assessments for the month in question.

General specifications
Although specifications have been included below, most polymer grades are selected by performance criteria rather than measured specification. These values are a guide only.

Terms: gross (before any discounts are applied)
Delivery: Delivered mid-northwest Europe
Load size: “full load deliveries” – typically a 20-25t load depending on local regulations

Specifications

LDPE liner film
Low density polyethylene (LDPE) – liner film contract price
Material within a melt flow index of 0.3-4 and density of 918-920 kg/m³.

LLDPE butene
LLDPE – Butene – Linear Low Density Polyethylene
Blown Film: Butene-grade linear with a melt flow index of 0.8-1, and density of 918-925 kg/m³.

HDPE BM
High Density Polyethylene – Blow Molding Grade
Specification: medium molecular weight material with a melt flow rate of 0.22-0.4, with a typical density of 950-960 kg/m³.

HDPE injection
HDPE IM – high density polyethylene, injection molding grade
Material with a melt flow rate of 4-8, with density of 950-960 kg/m³. Main use is crates and boxes.

HDPE HMW film
High Density Polyethylene High Molecular Weight Film
Uni-modal grade with a high load melt index (HLM) of 8-10.

PP homo
Polypropylene homopolymer – injection molding grade
Material with a melt flow index of 5-30.

PP copolymer
Polypropylene block co-polymer
Material with a melt flow index in the range of 2-30.

Northwest Europe polystyrene
There is no single polystyrene contract price. Independent producers and consumers agree their own starting gross contract prices and negotiate monthly movements on an independent arms length basis.

Discounts to the gross contract may also be negotiated. Discounts may be based on factors such as volume, volume flexibility, delivery, payment terms or any other factor agreed between the buyers and seller. These discounts may be dependent on reaching contract targets, on volume, for example. The exact terms will usually be private and confidential between buyer and seller.

Argus polystyrene monthly delta
Argus surveys participants on the change in contract price from month to month and publishes a low-high range for the movement.

Argus also publishes an assessment of the month-on-month price change designed to capture the monthly change in price most representative of the market as a whole.

Note, this value will not necessarily be the midpoint of the published high and low contract price change.
Argus polystyrene contract price
Rebates within existing contracts and renegotiations of long-term contracts between buyers and suppliers can lead to changes in the outright prices in the market that are not captured by the monthly negotiation process.

Argus assesses an outright price for polystyrene contracts. The price moves in line with the Argus polystyrene delta and is published each month.

An annual reassessment of the outright price level is made in March for publication in first published report in April.

Specifications

General purpose polystyrene (GPPS)
GGPS material with a melt flow index of 1-20.

High impact polystyrene (HIPS)
Material with a melt flow index of 2 - 20.

Delivery: Delivered mid-northwest Europe
Load size: “Full load deliveries” – typically a 20-25t load depending on local regulations

Northwest Europe PVC
There is no single PVC contract price. Independent producers and consumers agree their own starting gross contract prices and negotiate monthly movements on an independent arms length basis.

Discounts to the gross contract may also be negotiated. Discounts may be based on factors such as volume, volume flexibility, delivery, payment terms or any other factor agreed between the buyers and seller. These discounts may be dependent on reaching contract targets, on volume, for example. The exact terms will usually be private and confidential between buyer and seller.

Argus PVC monthly delta
Argus surveys participants on the change in contract price from month to month and publishes a low-high range for the movement.

Argus also publishes an assessment of the month-on-month price change designed to capture the monthly change in price most representative of the market as a whole.

Note, this value will not necessarily be the midpoint of the published high and low contract price change.

Argus PVC contract price
Rebates within existing contracts and renegotiations of long-term contracts between buyers and suppliers can lead to changes in the outright prices in the market that are not captured by the monthly negotiation process.

Argus assesses an outright price for PVC contracts. The price moves in line with the Argus PVC delta and is published each month.

An annual reassessment of the outright price level is made in March for publication in first published report in April.

Specification: PVC pipe
Polyvinyl chloride – pipe grade
rigid extrusion-grade suspension PVC, K-value of 66-68

Delivery: Delivered mid-northwest Europe
Load size: “Full load deliveries” – typically a 20-25t load depending on local regulations

Asia-Pacific

Argus assesses Asian spot prices in the range within which polymers could have traded based on confirmed deals, bids and offers throughout the week before the day of publication. Market information is gained through conversations with buyers, sellers, traders, shippers and other informed industry sources. All trades are based on "general purpose grades".

Timing
Delivered 5-35 days forward from assessment date

Cfr China spot
China’s main ports are mainly located in three regions:

- east China: Shanghai, Ningbo, Nanjing and Qingdao
- south China: Xiamen, Fuzhou, Shenzhen, Huangpu, Guangzhou, Shantou
- north China: Tianjin and Dalian

Argus assessment mainly cover these three regions. PVC cfr prices are based on monthly offers from Taiwan, Japan, South Korea and the US.

Price assessments are for trade of at least 50t
Argus generally maintains a $20-50/t assessment range for polyethylene, polypropylene, polystyrene and polyvinyl chloride cfr China price assessments. Assessment ranges can be widened by $10-20/t when the market is in wide discussion or large volume transactions are concluded out of the mainstream range.

Prices are published for
- LDPE liner film
- LLDPE butene
- HDPE injection
- HDPE HMW film
- HDPE BM
- PVC pipe
- PP copolymer
- PP raffia
- GPPS
- HIPS
Ex-works China spot
Ex-works China spot prices include a 17pc value-added tax.

The Chinese domestic market consists of the following regions:

- east China: Shanghai, Zhejiang, Jiangsu
- south China: Guangdong and Fujian
- north China: Tianjin, Beijing, Hebei and Shandong
- northeast China: Liaoning, Jilin and Heilongjiang
- west China: Xinjiang, Gansu and Shaanxi
- southwest China: Sichuan and Chongqing.

Assessments are for trade of at least 5,000t

Prices are published for
- PP raffia
- PP copolymer
- HDPE HMW film
- LDPE liner film
- LLDPE butene
- PVC pipe
- GPPS
- HIPS

Import parity China spot current
Import parity China spot prices ($/t) are ex-works (Yn/t) adjusted for the currency exchange rate, VAT, tariff, clearance cost. Value-added tax is 17pc in China and the import tariff is 6.5pc for major origins. Clearance cost is at Yn100/t. In that case, the formula is: ex-works adjusted (import parity) = (ex-works-100)/(exchange rate *1.17*1.065)

Cfr southeast Asia spot
Price assessments include deliveries to major ports in Indonesia, Vietnam, Malaysia, Thailand and the Philippines.

Assessments are for 100-500t cargoes.

Polyethylene cargoes originating outside southeast Asia are subject to import duty of between 3pc and 15pc in Indonesia, Malaysia, Thailand and the Philippines. Prices for non-dutiable material generally establish the high end of the assessment and prices for dutiable material generally establish the low end of the assessment.

Prices are published for
- LDPE liner film
- LLDPE butene
- HDPE injection
- HDPE HMW film
- PP copolymer
- PP raffia

Cfr India spot
Price assessments include deliveries to major ports in India.

Cargoes must be for 100-1,000t.

In the absence of trade or bids and offers, Argus will publish an import-parity price, assessed as a domestic market price in Indian rupee/t and converted to $/t.

Prices are published for
- LDPE liner film
- LLDPE butene
- HDPE HMW film
- PP raffia

Specifications

LDPE liner film
LDPE – low density polyethylene
Material within a melt flow index of 0.2-4 and density of 910-925 kg/m³.

LLDPE butene
LLDPE – butene – linear low density polyethylene
Butene-grade linear with a melt flow index of 0.1-2.5 and density of 910-925 kg/m³.

HDPE BM
High density polyethylene – blow molding grade
Material with a melt flow rate of 0.1-0.4 with a typical density of 940-960 kg/m³.

HDPE injection
HDPE IM – high density polyethylene, injection molding grade
Injection mold material with a melt flow rate of 2-20 with density of 940-960 kg/m³.

HDPE HMW film
HDPE FM – high density polyethylene – film grade
HDPE Film grade: material with a melt flow rate of 0.1-0.4 and density between 940-960 kg/m³.

PP raffia
Polypropylene raffia grade
Material with a melt flow rate of 1-4 with no additives.

PP copolymer
Polypropylene block co-polymer
Polypropylene block co-polymer: material with a melt flow index of 2-30.

GPPS
General purpose polystyrene
Material with a melt flow index of 1-20.

HIPS
High impact polystyrene
Material with a melt flow index of 2-20.

PVC pipe
Polyvinyl chloride – pipe grade
Rigid extrusion-grade suspension PVC, K-value of 66-68. Ethylene based PVC exported from northeast Asia and the US. Carbide-based PVC in domestic market.