



Petrochemicals Assessment Methodology

Updated Oct 3, 2016

1. Added wording for China domestic benzene and styrene monomer

Relevance of Rim Assessment Methodology

The purpose of all price assessments in reports issued by Rim Intelligence is to provide an indication to energy market players as to the levels at which transactions can take place so that trades can be done with high transparency and at reasonable prices. To achieve this purpose, we have set up “General Procedures for Price Assessment” as follows, and “Price Assessment Methodology” for each report. Detailed in the “General Procedures for Price Assessment” and “Price Assessment Methodology” for each report are processes and standards that we deem are necessary to achieve the above purpose. By following these processes and standards in making price assessments, we consider our Assessment Methodology to be appropriate.

Chapter 1: General Procedures for Price Assessment

Article 1: Purpose of price assessment

The purpose of all price assessments in our reports is to provide an indication to energy market players as to the levels at which transactions can take place so that trades can be done with high transparency and at reasonable prices.

Article 2: Conducting price assessment

To achieve the purpose outlined in Article 1, we have set up the following guidelines in our “General Procedures for Price Assessment”, and “Price Assessment Methodology” for each report. We follow these guidelines in making price assessments.

- Trades considered for price assessment
- Assessment window
- Priority in price assessment
- Selection of players providing market information
- Method of information gathering
- System of review by supervisor
- Reliability and adequacy of market information
- Policy of maintaining consistency in price assessment
- Trades not considered for price assessment
- Process of regular reviews and amendments to Assessment Methodology
- Changes/Amendments to price assessments
- Quantity
- Reasons for using specific units for quantity (barrel etc.)

Article 3: Transactions considered for price assessment

For each price index, our price assessment is based on quantities, delivery period and areas with the most liquidity. Further, details such as the value and quantity on which the assessment is based, market information which is used as a reference, and other platforms such as the Rim Trading Board and specific markets including trades carried out in Exchanges are included in the methodology of each report.

Article 4: Assessment window

For each price index, the time window considered appropriate for our price assessment is that which is deemed to be the most convenient and effective during trading hours in Asia, including Japan.

Article 5: Priority in price assessment

For each price index, among traded prices in transactions that take place between agreed parties or in other markets, bids and offers, the priority as to which price is considered first for assessment is determined and details are given in the methodology of each report.

Article 6: Selection of players providing market information

When selecting players to obtain information from, we take into account the quantity handled and the amount of influence on the market, without any bias towards buyers or sellers. We gather market information from many players including Majors, oil and gas producers, oil companies, traders, dealers and end-users. Each report team determines that there is no bias in the players it obtains information from in terms of area and the type of information they have. Should the player be deemed biased, the reporter and team leader may, after obtaining approval from the president, remove him from the list of players providing market information.

Article 7: Method of information gathering

Our reporters possess suitable quality and skill from a fair and neutral standpoint. Reporters carry out information gathering mainly by telephone but also by email and chat. To ensure the credibility of the player from whom information is gathered, the reporter will call the player's company directly to confirm that the player is indeed working for that company.

Article 8: Role of Supervisor

Two or more supervisors are assigned to each report. Before each report is issued, at least one of the supervisors checks if the price assessment and its basis are in line with the Assessment Methodology and to ensure that consistency is maintained. After the review is conducted, a proof of the review in the form of an email sent by the supervisor to each report team is kept in the folder of each team.

Article 9: Selection of supervisor

When assigning a supervisor other than the president, in principle, the supervisor is selected from outside the relevant report team and has knowledge and experience in the product and market for which price assessment is conducted. The selection of supervisors requires approval from the board of directors.

Article 10: Maintaining quality of supervisor review

For reports for which the supervisor is not the president, the president conducts spot checks to maintain the quality of the supervisor's review. After a spot check, a proof of the spot check in the form of a PDF document signed by the president will be kept in the president's folder.

Article 11: Maintaining consistency in price assessment

Besides reviews by supervisors, assessment simulation is conducted regularly to maintain consistency among reporters in price assessment.

Article 12: Reliability and adequacy of market information

Each reporter performing price assessment determines whether a trade was done by the parties involved and whether the information was suspicious or unusual by checking with the relevant parties and other multiple parties, with further investigation carried out if necessary. If unusual market information regarding a trade by parties involved or suspicious information is found, additional information gathering will be carried out before making a judgment as to whether or not to remove the information for consideration for price assessment. Major issues are to be reported promptly to the supervisor and the president. Of these, important professional judgments will be recorded in each report team's information gathering memo, assessment process sheet etc. If it is necessary to check whether the information provided is suspicious, we may consider obtaining information from the back office.

For certain markets with low liquidity, market information for price assessment may be obtained from a single source. Even in such a situation, we follow processes detailed in our

Assessment Methodology to determine if such market information can be used for price assessment. We do not disregard the information in making price assessment merely because it is obtained from a single source.

Players giving market information are expected to provide all relevant information that meets the conditions for price assessment stated in our Assessment Methodology, which is published on our website.

Article 13: Making our Assessment Methodology available

The Assessment Methodology approved by the board of directors is published on our website, whereby external market players involved in trading, players providing market information and our subscribers can access.

Article 14: Regular review of Assessment Methodology

Our Assessment Methodology is reviewed at least once a year (during the board of directors' meeting held in October) or when substantial changes have taken place in the market. After each review, we may consider making amendments to our Assessment Methodology if deemed necessary. When reviewing our Assessment Methodology, we may consider views obtained from external market players and our subscribers.

Article 15: Amendments to Assessment Methodology

If amendments to our Assessment Methodology that affect the price assessment process are deemed necessary, discussions are conducted within each report team and amendments are submitted to the board of directors for approval. After the amendments are approved, a notice of the amendments and the effective date will be placed in our reports in principle one month before, but at least two weeks prior to the effective date.

After the amendments are approved, the Assessment Methodology with the amendments reflected has to be approved by the board of directors by the effective date.

When making amendments to our Assessment Methodology that affect the price assessment process, we accept inquiries regarding such amendments from external market players and our subscribers. These inquiries are, in principle, published in our reports or on our website, but if the party making the inquiries requests us not to do so, we may not disclose the details for confidentiality reasons.

For amendments to our Assessment Methodology that do not affect the price assessment process, after approval by the board of directors, the amendments will be announced in our reports and effected promptly.

Article 16: Amendments/Changes to price assessment

Price assessments in our reports will not be amended after they are published, except for typing and spelling mistakes.

Chapter 2: Price Assessment Methodology for Petrochemicals Report

Assessment Window:

Assessment window closes each business day at 18:30 Tokyo time

Purpose of price assessment:

The purpose of price assessment is to reflect the actual market in which standard spot buying and selling take place on the day of publication.

Definition of price:

Even if no transactions take place, the value of a commodity may change. The price reflects the changing values of a commodity. The value of a commodity may change depending on supply/demand, production costs, the situation in other markets, and players' perspectives.

Assessment method:

Price assessment basically takes into account information on deals done, bids/offers and supply/demand situation obtained on the day of publication. Top priority is given to the latest deals done and bid/offer levels within the assessment window. In the absence of deals, bids and offers, buying and selling indications are used as a reference.

Values of commodities are determined by competition among sellers and buyers. Higher bids to be closer to market values than lower bids, and lower offers are considered to be closer to market values than higher offers.

Standard conditions such as cargo volume, loading or delivery period, quality and payment period are taken into account in price assessment.

Assessment Timing:

A month is divided into two half-months:

First half (H1): first 15 days of the month

Second half (H2): all days after the 15th of the month

Unit Price:

In line with industry practice, unit prices are in US dollars (\$) per metric ton (mt). For China domestic market, unit prices are in Yuan per metric (mt).

Structure of Petrochemicals Market:

Rim understands that petrochemical markets are structured with three groups of business parties: Producers, Traders, Importers/Consumers.

Producer: Procures feedstock to manufacture petrochemical products using its own facilities, and sells the products in the market.

Trader: Buys and sells petrochemical products in the international market

Importer/End-user: An end-user procures petrochemical products for use as feedstock at its own petrochemical facilities, or imports petrochemical products for the purpose of reselling them in the domestic market. Some end-users use their own facilities to import petrochemical products and resell them in the domestic market.

Rim defines a standard spot market transaction as follows:

- producer sells to trader
- producer sells to importer/consumer
- producer sell to another producer
- trader sells to producer
- trader sells to importer/consumer
- trader sell to another trader
- importer/consumer sells to a producer
- importer/consumer sells to a trader
- importer/consumer sells to another importer/consumer

Aromatics Markets:

Benzene:

Assessment: FOB Korea, FOB East Japan, FOB West Japan, CFR Japan, China domestic

Standard loading and delivery points:

- **FOB Korea:** main ports in South Korea that can handle 3,000mt cargoes
- **Japan:**
 - FOB East Japan:** Tokyo Bay
 - FOB West Japan:** locations on the Inland Sea of Japan
 - Other loading points considered in FOB Japan prices assessments are Kashima in Ibaraki prefecture, Sendai in Miyagi prefecture, Muroran in Hokkaido and Omuta in Fukuoka prefecture.
 - CFR Japan:** standard is Mizushima in Okayama prefecture, a port on the Inland Sea of Japan.
- **China domestic:** East China market (ex-tank)

Time Window:

If publication is in the first half of the month;

- **FOB Korea:** first half and second half of the next month and first half of the month after the next
- **FOB East Japan:** second half of the month, first half and second half of the next month
- **FOB West Japan:** second half of the month, first half and second half of the next month
- **CFR Japan:** second-half of the month, first half and second half of the next month

If publication is in the second half of the month;

- **FOB Korea:** second half of the next month, first half and second half of the month after the next
- **FOB East Japan:** first half and second half of the next month and first half of the month after the next
- **FOB West Japan:** first half and second half of the next month and first half of the month after the next
- **CFR Japan:** first half and second half of the next month and first half of the month after the next
- **China domestic:** Within 15 days of publication of Rim Petrochemicals report

Rim Index:

For FOB Korea, FOB E-Japan, FOB W-Japan, CFR Japan: the average of the second and third half-month periods as indicated in the physical and forward price assessments.
For China domestic: price assessment is used directly as index with no calculations required.

Standard Volume:

- **FOB Korea:** 3,000mt
- **FOB East Japan, FOB West Japan and CFR Japan:** 1,000mt with smaller quantities also considered if deemed to fall within the market range.
- **China domestic:** 1,000-3,000mt

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: ASTM D-2359

Toluene:

Assessment: FOB Korea

Standard loading points:

- **FOB Korea:** main ports in South Korea that can handle 2,000mt cargoes

Time Window:

If publication is in the first half of the month;

- **FOB Korea:** first half and second half of the next month and first half of the month after the next

If publication is in the second half of the month;

- **FOB Korea:** second half of the next month, first half and second half of the month after the next

Rim Index: the average of the second and third half-month periods as indicated in the physical and forward price assessments.

Standard Volume: 2,000mt

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: ASTM D-841

Isomer Mixed Xylene:

Assessment: FOB Korea, CFR Taiwan

Standard loading and delivery points:

- **FOB Korea:** main ports in South Korea that can handle 3,000mt cargoes
- **CFR Taiwan:** main ports in Taiwan that can handle 3,000mt cargoes

Time Window:

If publication is in the first half of the month;

- **FOB Korea:** first half and second half of the next month and first half of the month after the next
- **CFR Taiwan:** first half and second half of the next month and first half of the month after the next

If publication is in the second half of the month;

- **FOB Korea:** second half of the next month, first half and second half of the month after the next
- **CFR Taiwan:** second half of the next month, first half and second half of the month after the next

Rim Index: the average of the second and third half-month periods as indicated in the physical and forward price assessments.

Standard Volume: 3,000mt

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: ethyl benzene < 20%

Styrene Monomer:

Assessment: FOB Korea, CFR China, China domestic (East China market ex-tank on a cash on delivery basis)

Standard loading and delivery points:

- **FOB Korea:** main ports in South Korea that can handle cargoes of 2,000mt and above
- **CFR China:** main ports in China that can handle cargoes of 2,000mt and above
- **China domestic:** East China market (ex-tank)

Time Window:

If publication is in the first half of the month;

- **FOB Korea:** first half and second half of the next month and first half of the month after the next
- **CFR China:** first half and second half of the next month and first half of the month after the next

If publication is in the second half of the month;

- **FOB Korea:** second half of the next month, first half and second half of the month after the next
- **CFR China:** second half of the next month, first half and second half of the month after the next
- **China domestic:** on the day of publication of Rim Petrochemicals report or the next day

Rim Index:

For FOB Korea, CFR China: the average of the second and third half-month periods as indicated in the physical and forward price assessments.

For China domestic: price assessment is used directly as index with no calculations required.

Standard Volume:

- 2,000-3,000mt for FOB Korea & CFR China
 - 500mt and above for China domestic
- Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: ASTM D-2827

Paraxylene

Assessment: FOB Korea, CFR Northeast Asia

Standard loading and delivery points:

- **FOB Korea:** main ports in South Korea that can handle 5,000mt cargoes
- **CFR Northeast Asia:** main ports in China, Taiwan that can handle 5,000mt cargoes

Time Window:

If publication is in the first half of the month;

- **FOB Korea:** second half of the month, first half and second half of the next month
- **CFR Northeast Asia:** second half of the month, first half and second half of the next month
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If publication is in the second half of the month;

- **FOB Korea:** first half and second half of the next month and first half of the month after the next
- **CFR Northeast Asia:** first half and second half of the next month and first half of the month after the next
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Rim Index: the average of the second and third half-month periods as indicated in the physical and forward price assessments.

Standard Volume: 5,000mt

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level $\geq 99.7\%$

Olefins Markets:

Ethylene:

Assessment: FOB Korea, CFR Northeast Asia, CFR Southeast Asia

Standard loading and delivery points:

- **CFR Northeast Asia:** main ports in South Korea, Taiwan, Japan, China
- **CFR Southeast Asia:** main ports in Indonesia, Philippines, Malaysia, Thailand
- **FOB Korea:** main ports in South Korea

Time Window: within two to six weeks of publication of Rim Petrochemicals report

Standard Volume:

- 3,000-3,500mt for material of Asian origin
- 3,000-5,000mt for material of Middle Eastern origin are also considered depending on circumstances while material that originates out of Iran is not always reflected in the assessment as market participants who can trade in Iranian cargoes are limited. Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.9%

Propylene:

Assessment: FOB Korea, CFR Northeast Asia, CFR Southeast Asia

Standard loading and delivery points:

- **CFR Northeast Asia:** main ports in South Korea, Taiwan, Japan, China
- **CFR Southeast Asia:** main ports in Indonesia, Philippines, Malaysia, Thailand
- **FOB Korea:** main ports in South Korea

Time Window: within two to six weeks of publication of Rim Petrochemicals report

Standard Volume:

- 1,500-1,800mt cargoes with 3,000-9,000mt cargoes also considered for CFR Northeast Asia, CFR Southeast Asia and FOB Korea. Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.5%

Butadiene:

Assessment: FOB Korea, CFR Northeast Asia, CFR Southeast Asia

Standard loading and delivery points:

- **CFR Northeast Asia:** main ports in South Korea, Taiwan, Japan, China
- **CFR Southeast Asia:** main ports in Indonesia, Malaysia, Thailand
- **FOB Korea:** main ports in South Korea

Time Window: within two to six weeks of publication of Rim Petrochemicals report

Standard Volume:

- 1,000-5,000mt for CFR Northeast Asia, CFR Southeast Asia and FOB Korea.

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level $\geq 99.5\%$ and dimer content is $\leq 1,000$ parts per million (ppm)

China Domestic Market:

Propylene:

Assessment: East China & Shandong markets

Standard delivery points:

- **China Domestic:** East China & Shandong markets (ex-tank)

Time Window:

- within one week of publication of Rim Petrochemicals report

Standard Volume:

- 50-500mt for China domestic, ex-tank on a cash on delivery (COD) basis
Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.5%

Butadiene:

Assessment: East China market

Standard delivery points:

- **China Domestic:** East China market (ex-tank)

Time Window:

- within one week of publication of Rim Petrochemicals report

Standard Volume:

- 50-200mt for China domestic, ex-tank on a cash on delivery (COD) basis
Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.5% and dimer content is \leq 1,000 PPM

Styrene-Butadiene Rubber (SBR):

Assessment: East China market

Standard delivery points:

- **China domestic:** East China market (ex-factory or warehouse)

Time Window:

- within one week of publication of Rim Petrochemicals report

Standard Volume:

- 20-500mt for China domestic, ex-factory in East China or ex-warehouse of importers (included tax) on a cash on delivery (COD) basis.
Values for contracts for smaller or larger volumes may also be considered.

Quality Standard:

- 1502-grade

Butadiene Rubber (BR):

Assessment: East China market

Standard delivery points:

- **China domestic:** East China market (ex-factory or warehouse)

Time Window:

- within one week of publication of Rim Petrochemicals report

Standard Volume:

- 20-100mt for China domestic, ex-factory in East China or ex-warehouse of importers (included tax) on a cash on delivery (COD) basis.

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard:

- BR9000

Polymer Markets:

Polyethylene (PE) / Polypropylene (PP):

Assessment: CFR China, CFR Southeast Asia, China domestic

Standard delivery points:

- **CFR China:** main ports in China
- **CFR Southeast Asia:** main ports in Indonesia, Vietnam
- **China domestic:** East China market (ex-factory or warehouse)

Time Window:

- **CFR China and CFR Southeast Asia:** within two to four weeks of publication of Rim Petrochemicals report
- **China domestic:** within one week of publication of Rim Petrochemicals report

Standard Volume:

- 100-1,000mt for taxable cargoes on a CFR China basis and a CFR Southeast Asia basis (tax-exempt LLDPE material for the CFR China market that originates out of Southeast Asia is also reflected in the assessment with all applicable taxes included).
- For CFR Southeast Asia, all PE and PP material that originates from member nations of the Association of South - East Asian Nations (ASEAN), except Vietnam, are also considered. These cargoes are tax-exempt.
- 25-100mt for China domestic, ex-factory in East China or ex-warehouse of importers (included tax) on a cash on delivery (COD) basis.

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard:

CFR China and CFR Southeast Asia

- LDPE-Film, LLDPE-Film, HDPE-Film, HDPE-Yarn, PP(Homo)-Bopp, PP(Homo)-Yarn/INJ, PP(Block Co)-INJ

China Domestic

- LDPE-Film, LLDPE-Film, HDPE-Film, HDPE-Yarn, PP(Homo)-Yarn/Inj

PVC and Feedstocks:

Polyvinyl chloride (PVC):

Assessment: CFR China

Standard delivery points:

- **CFR China:** main ports in China

Time Window:

- within two to four weeks of publication of Rim Petrochemicals report for CFR China

Standard Volume:

- 100-1,000mt for cargoes out of Taiwan while cargoes originating from other countries are also reflected in the assessment

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard:

- Suspension grade

Ethylene dichloride (EDC):

Assessment: CFR China

Standard delivery points:

- **CFR China:** main ports in China

Time Window:

- within one month of publication of Rim Petrochemicals report for cargoes out of Asia while for cargoes out of US within one to two months

Standard Volume:

- 3,000-5,000mt for cargoes out of Asia while 5,000-10,000 metric tons cargoes that originate out of US also reflect in the assessment

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.0%

Vinyl Chloride Monomer (VCM):

Assessment: CFR China

Standard delivery points:

- **CFR China:** main ports in China

Time Window:

- within 15 – 30 days of publication of Rim Petrochemicals report for CFR China

Standard Volume:

- 3,000-4,000mt

Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.0%

Intermediates Markets:

Phenol (PH):

Assessment: CFR China, CFR Taiwan

Material with 5.5% tax reflects the assessment for CFR China while tax-exempt material of Southeast Asia origin are also considered after imposing 5.5% tax

Standard delivery points:

- **CFR China:** main ports in China
- **CFR Taiwan:** main ports in Taiwan

Time Window: within four to six weeks of publication of Rim Petrochemicals report

Standard Volume:

- 1,000mt of material for CFR China and CFR Taiwan
Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.0%

Bisphenol A (BPA):

Assessment: CFR China

Material with 5.5% tax reflects the assessment for CFR China while tax-exempt material of Southeast Asia origin are also considered after imposing 5.5% tax

Standard delivery points:

- **CFR China:** main ports in China

Time Window: within four to six weeks of publication of Rim Petrochemicals report

Standard Volume:

- 500 – 1,000mt
Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: polycarbonate-grade and epoxy resin-grade

Acrylonitrile (AN):

Assessment: CFR China

Prices on an CFR Korea and CFR Taiwan basis are also considered as a reference. Basically for material of Northeast Asia and Southeast Asia origin.

Material that originates out of the West such as US, Mexico, Brazil, Belarus, Russia on a CFR China may be reflected as forward cargoes as time to deliver is longer than cargoes of Asia origin.

Deals on cargoes from Northeast Asia, US or Europe done into India are not directly reflected in assessment as the port is different. Nevertheless, as such trades have some relation to those in China and Northeast, if no deals, bids or offers are heard on a CFR and Northeast Asia basis, they may be used as a reference.

Standard delivery points:

- **CFR China:** main ports in China.

Time Window: within two to four weeks of publication of Rim Petrochemicals report

Standard Volume:

- 500mt and above
Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.85%

Caprolactam (CPL):

Assessment: CFR China, CFR Taiwan

Standard delivery points:

- **CFR China:** main ports in China
- **CFR Taiwan:** main ports in Taiwan

Time Window:

- within two to four weeks of publication of Rim Petrochemicals report

Standard Volume:

- 500-1,000mt for both CFR China and Taiwan
Values for contracts for smaller or larger volumes may also be considered.

Product grade:

- Both molten and flake material
- Moisture content limit: 100 parts per million (ppm)

PET and Feedstocks:

Purified terephthalic acid (PTA):

Assessment: CFR China, China domestic

Standard delivery points:

- **CFR China:** main ports in China
- **China domestic:** East China market (ex-warehouse)

Time Window:

- within one to four weeks of publication of Rim Petrochemicals report for CFR China
- within one week of publication of Rim Petrochemicals report for China domestic

Standard Volume:

- 1,000-3,000mt for CFR China
- 500-1,000mt for China domestic, ex-warehouse on a cash on delivery (COD) basis
Values for contracts for smaller or larger volumes may also be considered.

- Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: purity level \geq 99.0%

Mono ethylene glycol (MEG):

Assessment: CFR China, China domestic

Standard delivery points:

- **CFR China:** main ports in China
- **China domestic:** East China market (ex-warehouse)

Time Window:

- within 20 to 40 days of publication of Rim Petrochemicals report for CFR China
- within three days of publication of Rim Petrochemicals report for China domestic

Standard Volume:

- 1,000-3,000mt for CFR China
 - 200-1,000mt for China Domestic, ex-warehouse on a cash on delivery (COD) basis
- Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: Fiber grade, purity level \geq 99.8%

Polyethylene terephthalate (PET) Bottle grade:

Assessment: FOB Northeast Asia

Standard loading points:

- **FOB Northeast Asia:** main ports in South Korea, China

Time Window:

- within 15 to 30 days of publication of Rim Petrochemicals report for FOB Northeast Asia

Standard Volume:

- More than 500mt for FOB Northeast Asia
- Values for contracts for smaller or larger volumes may also be considered.

Quality Standard: Intrinsic viscosity (IV) =0.8