Argus *Benzene and Derivatives*

Formerly Argus DeWitt Benzene and Derivatives

argusmedia.com

Issue 23-9 Thursday 2 March 2023

HIGHLIGHTS

Americas

- Benzene falls slightly as weak demand outpaces snug supply.
- Styrene liquidity stagnates in favor of ethylbenzene demand.

Europe

- Benzene fell as exports to the US slowed.
- Styrene slid to more than two-year lows on oversupply and weak demand.

Asia-Pacific

- Market awaited cfr China benzene demand, with the Asia-US arbitrage closing.
- Styrene demand remained weak.

Contents

Global prices 2
Americas 3
Europe 8
Asia-Pacific 11

MARKET SNAPSHOTS

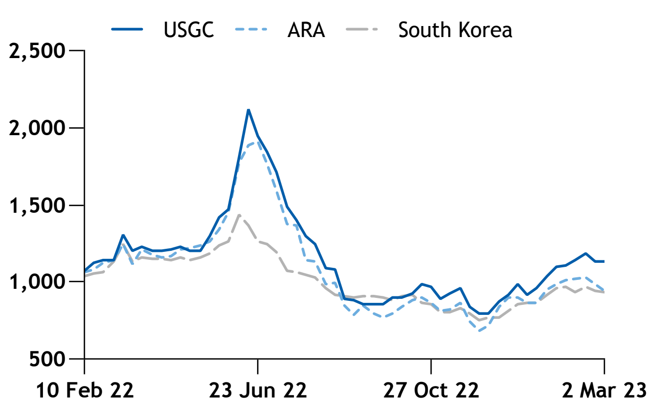
Global benzene prices $/t

	Timing	Low	High	Mid	±
Americas					
fob USGC contract	Mar	1,128.36	1,128.36	1,128.36	
USGC spot	Prompt	1,083.47	1,182.24	1,132.86	-2.99
Europe					
cif NWE contract	Mar	970.00	970.00	970.00	
cif ARA spot weekly average	Prompt			942.10	-39.70
Asia-Pacific					
cfr South Korea contract	Mar	950.00	950.13	950.07	
cfr Taiwan contract	Mar	950.00	970.13	960.07	
cfr Asean contract	Mar	950.00	952.13	951.07	
fob South Korea	Marker			929.94	-12.14
cfr China	Prompt	940.00	959.00	949.50	-11.50

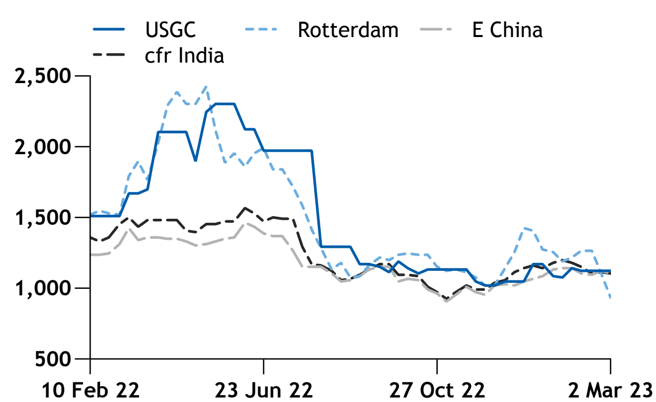
Benzene breakeven price from toluene conversion $/t

Process	Asia-Pacific	Western Europe	US Gulf coast
STDP	924.81	887.77	1,065.91
TDP	821.60	1,023.63	1,120.95
HDA	1,131.25	1,271.88	1,408.41

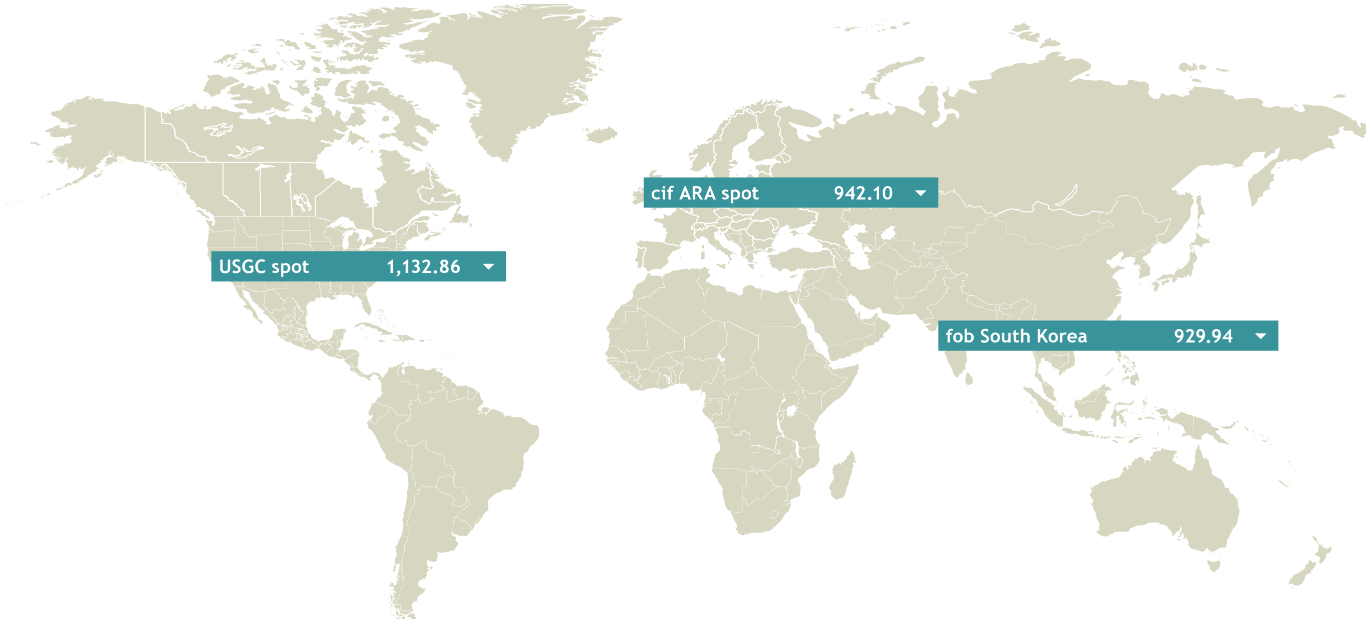
Global benzene prices $/t



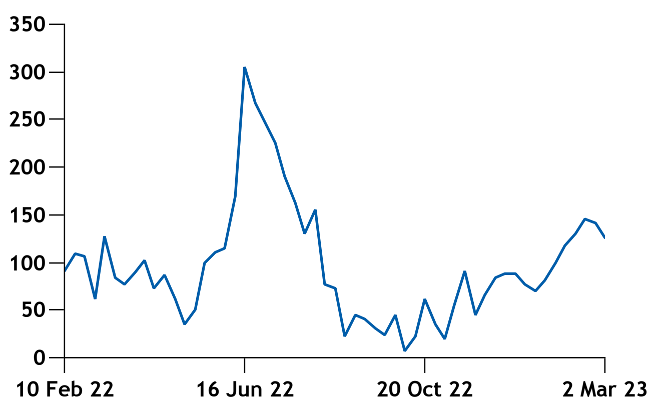
Global styrene prices $/t



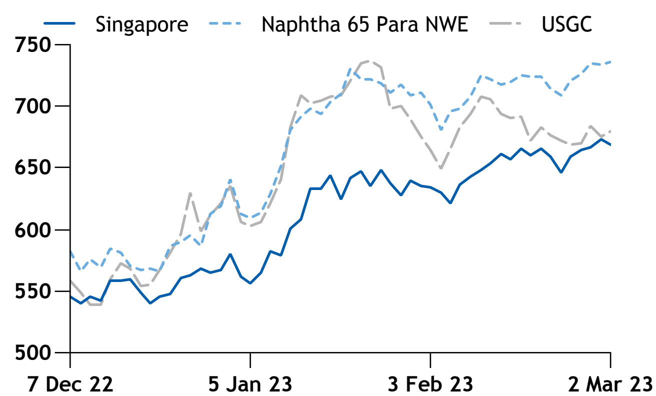
GLOBAL PRICES *$/t*



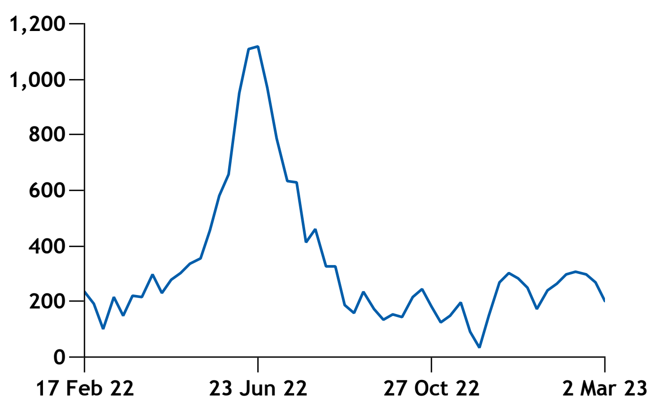
USGC benzene premium to USGC gasoline *¢/USG*



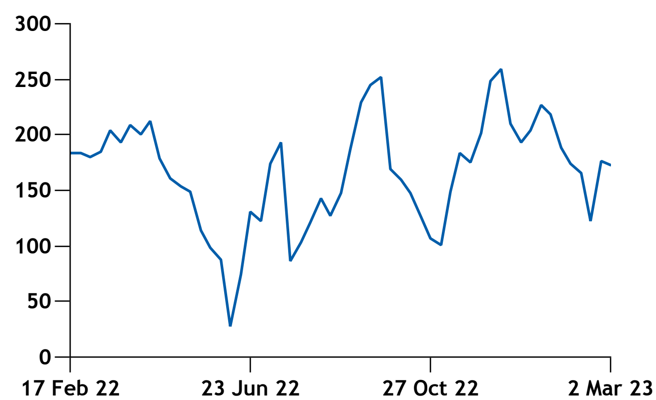
Global naphtha prices *$/t*



ARA benzene premium to NWE naphtha *$/t*



East China styrene premium to benzene *$/t*



AMERICAS

Benzene

The US March benzene contract price settled 19¢/USG ($57/t) higher at 377¢/USG ($1,128.5/t) amid prompt tightness catalyzed by delayed import arrivals. The contract settled above initial expectations, which pegged it closer to 372¢/USG. A surge of late spot business during the 10-day, 10-24 February trade window to inform the contract price pushed the volume-weighted average of trades higher to 376-377¢/USG, according to *Argus* data.

US benzene spot prices fell slightly this week as weak derivative demand outpaced ongoing front-month supply tightness, coupled with ongoing efforts to cover prompt needs. The prompt assessment, inclusive of late February and March trades only prior to the 15th of the month per the established methodology, fell by 1¢/USG to a traded range of 362-395¢/USG. April traded in a range of 338-340¢/USG over the course of the week. Traded volume totaled 335,000 bl this week or 47,000t, an increase in volume from the prior week. March benzene closed at a midpoint of 370¢/USG and April benzene closed at a midpoint of 345¢/USG. May discussions remained muted. Lower Mississippi River benzene retained a 1-2¢/USG premium over Houston-Texas City barrels this week. Benzene supply remains snug as inventories stand below average levels for producers, buyers and traders in a steeply backwardated market. Wide intermonth spreads resulted from delayed vessels slated to arrive in February that were pushed into March arrival on the US Gulf coast. Buyers in need of that volume sought to cover the missing barrels, increasing prompt and front-month benzene prices ahead of contract negotiations. However, an overarching weakness in styrene demand in the domestic and export markets as feedstock costs rise, has begun to weigh in on benzene in the current market until more robust high-octane, low RVP aromatic blendstock emerges. Still, as more benzene imports are due for arrival in March and April, a more bearish tone has emerged to start second-quarter 2023.

On hydrocarbon supply and processing, total US crude inventories, excluding SPR, rose by 1.2mn bl to 480.2mn bl. Non-SPR inventories are now 66.8mn bl or 16.2pc above year-ago levels. US domestic net crude supply fell by 1mn b/d upon higher production in response to a shortage in imports and a surge in exports. Imports fell by 0.1mn b/d to 6.2mn b/d while exports rose by 1mn b/d to 5.6mn b/d. On refining operations, total crude runs saw little change and remained at

Americas prices

	Timing	Low	High	Mid	±
Benzene ¢/USG					
fob USGC contract	Mar	377.00	377.00	377.00	
USGC spot	Prompt*	362.00	395.00	378.50	-1.00
Styrene ¢/lb					
fob USGC contract	Jan	71.32	78.76	75.04	nc
fob USGC spot	Prompt*	50.80	50.80	50.80	nc
fob USGC VWA	Feb			50.38	nc
USGC large buyer index	Feb			57.51	nc
Cumene formula ¢/lb					
fob USGC contract	Feb	42.20	42.20	42.20	
Phenol ¢/lb					
fob USGC contract	Feb	64.13	67.64	65.89	
Cyclohexane ¢/USG					
fob USGC contract	Mar	353.03	353.03	353.03	
Marker with NG escalator	Mar	362.92	362.92	362.92	

**Prompt refers to current month, but if the publication date is on or after the 15th of a given month, then the spot posting will include current month and next month trades*

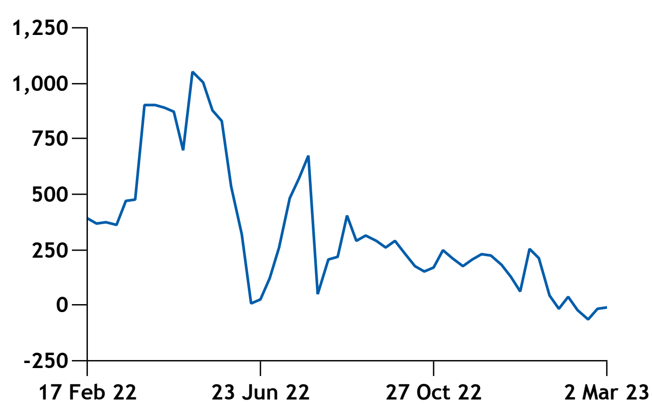
Benchmark margins *¢/USG*

	Margin	±
BTX US reformate extraction vs floor contract	24.38	-1.88
BTX US reformate extraction vs floor spot	24.60	-4.74
BT US reformate extraction vs floor contract	10.15	+13.25
BT US reformate extraction vs floor spot	10.52	+8.25

US polystyrene markets *¢/lb*

	Timing	Contract marker	Low / High ±	Argus Δ
GPPS	Feb	121.0	3.0 / 3.0	+3.0
HIPS	Feb	132.0	3.0 / 3.0	+3.0

USGC styrene premium to benzene *$/t*



AMERICAS

15.5mn b/d, with average utilization down by 0.1 percentage points at 85.8pc. Average gasoline yield across the US fell by 1.3 percentage points to 56pc, with actual production volume up by 0.3mn b/d to 9.7mn b/d. Implied gasoline demand was up by 0.2mn b/d to 9.1mn b/d. Inventories fell by 0.9mn bl to 239.2mn bl. Inventory cover was nearly a day lower at 26.3 days of use at current consumption levels. Gasoline component inventories rose by 0.4mn bl to 30.7mn bl and remain 1.6mn bl or 4.8pc below year-ago levels. Diesel inventories were up by 0.2mn bl at 122.2mn bl and remain 30.6mn bl or 20pc lower than year-ago levels. Jet inventories are up by 0.3mn bl at 37.6mn bl. Fuel oil inventories are down by 0.9mn bl and are down by 9.6mn bl or 4.1pc from year-ago levels.

On costs across the hydrocarbon complex, oil prices rose as crude exports surged to their highest amount on record at just over 1mn bl, US Department of Energy data show. Specifically on US crude futures, the front-month WTI (NYMEX) benchmark has traded up on the week. From the last reporting week's close at $75.39/bl, futures were up going into the weekend over $76.30/bl and rose to nearly $77.70/bl by midweek. The market contract ended the reporting week today (Thursday) at about $78.15/bl, up by almost $3/bl from the last report. Cash market crude prices (WTI, Houston) have increased by about $2.40/bl from last week's close at $77.765/bl to end today (Thursday) at nearly $80.14/bl. On gasoline, RBOB futures rolled into April assessment this week, shifting the front-month futures curve upward by about 21¢/USG. April RBOB futures increased this week from last week's close at 258.48¢/USG. Futures were down slightly going into the weekend, around 258.10¢/USG and climbed to nearly 267.50¢/USG by midweek. RBOB futures closed Thursday at about 270¢/USG – an increase of about 11.5¢/USG. Cash market gasoline prices (conventional, 87 Houston) also rose this week compared to last week's close at 237.605¢/USG. Going into the weekend, prices rose slightly to about 237.90¢/USG and by midweek were just over 247.10¢/USG. Prices closed today (Thursday) to almost 251.85¢/USG, up by over 14¢/USG from last week. On gasoline blending, octane-based alternative values for aromatic conversion feed finished down this week. The reformate spread over unleaded (conventional) fell sharply from last week's close at 85.65¢/USG. The spread rose slightly going into the weekend to about 86.80¢/USG, and by the middle of the week fell to about 64.10¢/USG. The spread closed today (Thursday) just under 62¢/USG, down by over 23¢/USG decrease from last week. Absolute reformate market values (waterborne, Houston) have risen from last week's close at 301.48¢/USG. Going into the weekend, reformate prices fell slightly to about 301.10¢/USG and then by midweek rose to nearly 309.50¢/USG. Reformate closed Thursday around 312¢/USG for an increase of about 11.5¢/USG. Lastly, natural gas futures (Nymex) rebounded this week from last week's close at $2.314/mnBtu. Futures were up going into the weekend at around $2.45/mnBtu and climbed above $2.81/mnBtu by midweek. Natural gas futures closed Thursday at about $2.77/mnBtu, a 0.45¢/mnBtu increase from close last week. In cash market natural gas (all-day ahead, Houston), prices strengthened this week from last week's close of $1.84/mnBtu. Prices were up going into the weekend at nearly $2/mnBtu and climbed to over $2.37/mnBtu by midweek. Prices closed Thursday at $2.50/mnBtu exactly, an increase of over 65¢/mnBtu.

On production operations, US reformers continue to run fairly hard, but at an estimated 75pc operating rates the spread above historical norms is much narrower than it was during the fall. However, benzene yields from reformate remain below historical norms. Benzene from reformate comprised roughly 70pc of total US benzene production in recent months. The heavy spring refinery turnaround season has continued to keep reformer operations at sub-80pc industry wide. That said, Europe is currently working its way through diesel inventories purchased in excess from Russia ahead of the Russian EU ban on crude oil and products in February. Subsequently, expected increased demand for US diesel from Europe has not commenced yet – a phenomenon anticipated by the US market after the trend seen in 2022 in response to the Russia-Ukraine conflict. As a result, light naphtha spreads over gasoline remain comparatively narrow. However, once Europe depletes its diesel inventories, a resurgence in diesel buying is expected to re-initiate the trend at refineries seen last year – such that heavy naphtha is dropped into the diesel pool to increase volume and excess sub-octane light naphtha is blended in gasoline, increasing appetite for high-octane aromatic blendstocks. For now, US benzene remains snug despite reformers still running at steady rates, due in part because selective toluene disproportionation (STDP) units are still either offline or at significantly reduced operating rates. This has reduced overall benzene production since last year by upwards of 90,000 t/month. A brief forthcoming turnaround at a US Gulf coast aromatics complex is set to take a limited amount

AMERICAS

of benzene production offline, but ample imports anticipated to arrive in March when the scheduled turnaround commences is anticipated to have a net bearish impact.

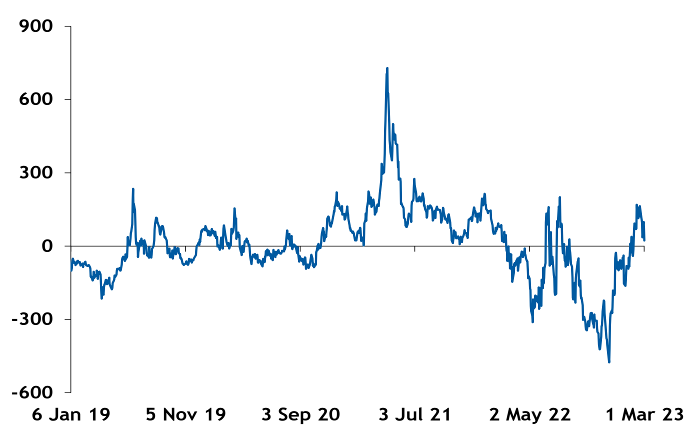
On feedstocks, LyondellBasell's 1.134mn t/yr mixed-feed cracker in Corpus Christi, Texas, experienced an unplanned process issue on 26 February that resulted in flaring. US imports of pyrolysis gas from Europe continue to be minimal as cracker operating rates remained reduced there on weak demand. Meanwhile, in the US, a strong preference for lighter feeds for ethane crackers has kept benzene extraction from pygas below 25pc of domestic production, even with disproportionation at a very low clip.

On consumption, ethylbenzene (EB) discussions surfaced for March at April Rbob gasoline +50-95¢/USG before trading at April Rbob+65¢/USG for 25,000 bl for March loading, normalized to 331.5¢/USG. The same day, commercial-grade toluene traded at April Rbob+65 (332.50¢/USG) and again at April Rbob+66 (333.50¢/USG) for March loading for 25,000 bl each. In contrast to last week, EB is beginning to trade at a discount to the typically preferred CGT blendstock, making it cost-advantaged and more competitive. EB sales remain ongoing as blenders look to build inventories ahead of a strong high-octane, low RVP blending season as the RVP specification switch commences this month. Styrene demand has proven lackluster to start March, both in the domestic and exports markets, and so those US producers able to continue selling intermediate EB into the blending pool to capture value in the wake of poor styrene margins are, as discussed below. In downstream cumene, word emerged that strong headwinds from higher feedstock benzene and refinery-grade propylene costs could be difficult to digest in derivative acetone and phenol markets. Following a spate of winter storms in the US, together with higher interest rates, the construction sector is off to a slow start – impacting the phenolic resins market. Looking to MDI and polyurethanes, a two-week scheduled turnaround is expected mid-month for two weeks an MDI unit on the US Gulf coast. One line will be offline for seven days and then at reduced rates for seven days. Overall demand for MDI and polyurethanes has proven stable to weaker compared to the same time in 2022 amid uncertainty in the housing market. Still, the outlook moving into second-quarter 2023 remains cautiously optimistic. Cyclohexane demand has proven steady but operating rates remained low.

The arbitrage with Europe opened on paper this week to the US. By close, April US benzene stood at an $82.5/t premium over March Europe benzene, which covered estimated freight costs at $65/t on paper. Europe remained well supplied benzene, even after two derivative styrene unit startups in February, as derivative operating rates hold at low levels. Still, even as benzene supply remained available in Europe, vessel space for transatlantic movements remained tight, limiting what the US could import. So far, an estimated 15,000t was heard fixed from Europe to the US for first-half March loading and mostly April arrival. Many shippers favored bringing petrochemicals to the US in effort to bring diesel back to Europe, but most of these backhaul vessels are too large to load benzene in Europe. The arbitrage from South Korea to the US remained open on paper for midrange vessels but closed for 5,000t and 20,000-30,000t parcels. South Korea benzene exports to the US in February totaled an estimated 110,000t due for April arrival. This was above initial expectations for imports for the month. Total February US benzene imports were estimated at 111,000t, accounting for slipped vessels, and up to 150,000t is expected to arrive in March – roughly at parity to pre-Covid monthly benzene imports. Benzene has proven long globally, with the US as the highest among the regions and subsequently drawing in imports. This continues to support a steeply backwardated US benzene forward curve.

The adjacent chart captures the spread between spot toluene and spot benzene on the US Gulf coast. Historically, when benzene stands at a wide 30¢/USG minimum premium over toluene for roughly a month or so, coupled with margin for co-product paraxylene (PX), operating STDP units ramp up rates. In 2021, the benzene premium over benzene widened to

US daily spot FOB BZ vs spot FOB toluene *$/t*



AMERICAS

over $700/t or 233.88¢/USG, which supported STDP units. But in 2022, toluene conversion units remained largely offline due to poor margins, as demand for benzene derivatives EB and cumene into octane rather than chemical demand resulted in a sustained discount to toluene – which is often valued higher as an octane blendstock amongst aromatics components. Briefly in February 2023, benzene increased to over a 50¢/USG premium over toluene due to structural tightness in the market, but little change in STDP unit operations was confirmed as the spread was short lived. March toluene stands roughly at parity to March benzene currently, erasing margins for STDPs. Meanwhile, co-product paraxylene demand remains soft as PX producers continue to import price-advantage feedstock mixed xylenes (MX) and PX from Europe and Asia in lieu of running MX-PX units hard at poor margins due high-cost feedstock MX.

Styrene

US styrene resisted change for a second consecutive week at $1,120/t, based on where spot last traded, as domestic sell ideas and trader buy ideas remained wide. Traders were heard long volume for March and feeling increased pressure to sell. Meanwhile producers remained at breakeven costs at well over $1,100/t for EBSM units. The arbitrage to Europe was closed on paper, and so liquidity proved scarce with South America demand sated and demand from Turkey and India largely covered from the Mediterranean, the Middle East and Asia. EB sales remained ongoing as a proxy for styrene sales, as mentioned in the benzene section above, and SM sales into Mexico remained ongoing from the US. Still, murmurings of a reverse arbitrage from Europe to Mexico could encroach on US market share into the Mexican market, which historically is the largest single destination country by volume. That said, high feedstock costs for styrene in March are staving off downstream purchases in a market that remains steeply backwardated. March styrene stood at $900-$1,050/t in discussions absent liquidity, with April styrene pegged notionally at a $50/t discount to March in tandem with a 25¢/USG backwardation from March to April benzene.

On feedstock costs, February Mont Belvieu, Texas, ethylene closed Wednesday at 21.75-22.75¢/lb, or $479.5-$501.5/t. The traded range for Choctaw ethylene stood at a 4¢/lb ($88.25/t) discount to Mont Belvieu ethylene, wider than the 3.75¢/lb spread seen the week prior. US ethane prices stood at two-year lows and cracker rates remained reduced, making for strong ethylene margins. The net transaction price for ethylene settled at 31¢/lb for February, down 0.25¢/lb from January. The higher March benzene contract price at 377¢/USG is set to increase costs for styrene production. Spot March benzene holds at a discount to the benzene contract settlement.

On US styrene production, operating rates were estimated at 65pc in February. Many units are unable to operate efficiently much below this level. The higher March benzene contract price, coupled with only a slight decline in the ethylene contract price for February, is poised to push ethylbenzene-styrene monomer (EBSM) margins firmly into structural negative territory this month. Propylene oxide styrene monomer (POSM) units are another route to making styrene, but these run in response to PO demand rather than for styrene, which is a co-product. Those economics generally remain more favorable than EBSM units but are under pressure when styrene is priced below feedstock benzene. Spot styrene stands at a significant discount to benzene in March, which has turned styrene production margins negative.

On styrene consumption, softening domestic styrenics demand into polystyrene, expandable polystyrene (PS) and acrylonitrile-butadiene styrene (ABS), in addition to weak export styrene demand and high feedstocks costs, is causing styrene producers to consider reducing operating rates in March or shutting down reactor capacity. Downstream PS operating rates stood at 57.2pc in January, according to American Chemistry Council data, and ABS operating rates stood under 55pc over the same time frame.

The US styrene export arbitrage to Europe — typically the highest netback on paper — remains shut based on styrene discussions at $900-$1,050/t for March fob US Gulf coast. By contrast, the netback to Europe stood at $960/t, assuming freight, storage and throughput at $85/t. US March styrene stood at a $70/t discount to April Europe styrene, assuming a month lifting window. This failed to cover freight costs on paper for US traders looking to export styrene. That said, some US producers were considering buying back styrene given the significant discount to breakeven costs to produce styrene.

The adjacent chart shows the styrene spread over benzene from 2021 to date. Usually, as a derivative, styrene retains a spread over benzene, which producers prefer typically at a minimum of $150-200/t to cover breakeven costs and margin. This week, spot styrene dipped to an all-time low relative to benzene at a $159/t discount on Wednesday before rebounding to a $136/t by close on Thursday. Most US styrene producers

AMERICAS

price their styrene based on specific term agreements, which can reference feedstock and production costs, freely negotiated prices and market indexes, but feedstock cost impacts are normally incorporated. *Argus* estimates EBSM breakeven production costs at $1,150/t for March, assuming fixed costs at 6¢/lb over variable feedstock costs, well over spot discussions for styrene at a midpoint of $925/t. Most styrene production units in the US are EBSM units. Some EBSM producers have looked to sell EB to gasoline blenders opportunistically as a high octane, low RVP blendstock. Many producers have sold EB forward into March and some into April, while buying feed benzene and ethylene to lock the return. But forward sales are increasingly limited as octane imports from Asia due for arrival in April are poised to keep aromatics blendstocks readily available in the US. Some EB units are larger and run at higher operating rates than styrene units, allowing for up to 50,000 t/month of additional ethylbenzene for sale cumulatively among US EBSM producers when styrene units run at average industry rates of 85pc. Demand for EB has maintained some ongoing consumption of feedstock benzene despite reduced derivative styrene operating rates. Participants continue to monitor whether demand for benzene-derived gasoline blendstocks, such as EB and cumene, will support benzene prices in second-quarter 2023. This could continue to elevate costs for styrene producers and challenge production margins. Otherwise, weak styrenics demand may place downward pressure on feedstock benzene, which is typically a supply-driven market. Even with a steep backwardation in spot benzene from March to April, styrene production economics are poised to stay in the red.

US daily spot FOB BZ vs spot FOB styrene *$/t*

Polystyrene

The US polystyrene (PS) market remains on track to implement a 3¢/lb increase for February contract prices with at least one producer nominating a similar increase for March. Benzene contract prices have risen over the last two months, driving the PS price increase at a time when resin demand is weaker.

US Gulf coast benzene contract prices settled for March at 377¢/USG. This is a 19¢/USG increase from February's price and has triggered at least one PS producer to announce an increase for March contract prices of about 3¢/lb. On Thursday, prompt spot benzene prices for March ddp Houston-Texas City (HTC) traded at a range of 362¢/USG to 395¢/USG. April traded in a much narrower range of 338¢/USG to 340¢/USG. May discussions were limited.

The market remains quiet as March has arrived, with even more limited PS production in the US not disrupting orders for most buyers. Even as producers push to raise prices in February and March, multiple downstream participants have said producers have simultaneously been accommodating on prices on a case-by-case basis. This has been especially true for spot prices, with steep discounts compared to contract prices.

This dynamic has led some buyers over the course of February to shop for resin between the different producers, with one in early February saying they had cancelled orders from one producer who had been firmer on their pricing, instead opting to buy more from a more flexible supplier.

A lack of surging demand has relieved buyers from pressure to purchase more volume and has also allowed imported material to play more of a factor. Multiple downstream participants have indicated over recent weeks that material out of east Asia remains plentiful.

One buyer at the beginning of February had said they were unsure how long the availability would last as China reopened, but a distributor this week said resin remains plentiful and that importing has been on the rise among some segments of the market. Even with transportation costs, the spread between imported material and domestic contract prices remains wide.

For now, buyers can source what they want from imported material, according to the distributor. However, much like with domestic producers, this is more likely because of weak demand rather than an overabundance of resin.

According to the American Chemistry Council's (ACC) preliminary data, January's sales improved from November and December 2022 but remained lower than any other month in 2022. It was also 17.8pc below January 2022, according to the

AMERICAS

ACC's Plastics Industry Producers' Statistics Group as compiled by Vault Consulting.

For US producers, production has improved but remains more strictly aligned with inventory management. Despite steep cuts to operating rates toward the end of 2022, inventories remain high. Some downstream participants have highlighted this dynamic as the reason for the continued offering of much cheaper spot product even in the face of contract price increases.

As producers need to maintain some minimal level of operations at their facilities, the cheaper spot offerings are made to move inventory out of warehouses. As demand remains weak, producers find themselves strained to move material either with larger contract volumes or spot material unless discounts are offered.

Nevertheless, production costs are rising with benzene contracts increasing, putting further pressure on producers to raise prices. Most producers and buyers alike have little confidence in any predictions for the next couple months. Some expect March and April to be similar to the start of the year with limited activity.

However, some buyers, particularly in the food service sector, see the potential for a stronger recovery in the summer as inflationary pressure has not dampened consumer spending as much as some in the market had been fearing for much of 2022.

EUROPE

Benzene

Oversupply returned to Europe as exports to the US slowed and underlying demand remained weak, dragging spot prices to near two-month lows. Overall trading slowed during the *Argus* assessment week starting 24 February, halfway through the five-day trading period for the March contract price (CP). A few March cargoes changed hands at $930-955/t, with the latest deals done on the low end of the range. The *Argus* daily assessment for the front month (March) retreated further to end at $942.50/t on 2 March. The March-April spread was mostly discussed at a $5-10/t backwardation, but no April deals were reported.

The March benzene CP was agreed on 28 February at $970/t and €919/t, down by $33/t and €1/t, respectively, from February. The conversion was based on the ECB reference rate of $1.0554/€1, against $1.0903/€1 in the February CP settlement. Almost 20,000t of benzene changed hands during the five-day, CP-linked trading period that ended on 27 February. Most of the deals were completed on 21-22 February. March traded at $955-970/t, while parcels for the first half of March were booked at $1,010/t. Cargoes for 1-5 March and 1-10 March were sold at $965-990/t and $980/t, respectively.

Around 30,000-35,000t of US-bound benzene departed Europe in February, with another 10,000-15,000t booked for the first half of March. Freight costs are estimated to have increased to $70-75/t. Benzene flowing into the US, which has absorbed surplus supply of benzene since the second half of last year, eased since January as the arbitrage narrowed and the backwardation in the US market widened. Exports to the US stepped up in the fourth quarter of 2022 when more than 50,000 t/month of benzene departed Europe for the US, peaking at 105,000t in November before easing to 37,000t in December. Northwest Europe's net exports of benzene to the US surged to 200,000t in the whole of 2022, from net imports of 66,000t in the previous year and less than 30,000t of net imports in 2019.

Overall, northwest Europe's net imports of benzene were halved to 660,000t last year from 1.3mn t in the previous year and pre-pandemic levels, mainly reflecting increased exports to the US and reduced imports from traditional origins such as India and the Mideast Gulf.

Crackers across Europe are running steadily, albeit at a reduced 75pc of capacity, with no major production disruptions or operational problems emerging. A cracker in France remains off line and is expected to be back on stream by mid-March. Extraction margins eased, with benzene's premium over naphtha hovering around $180/t so far in March, against an average of $284/t in February and $244/t in January. Gasoline blending demand slowed, limiting alternative outlets for pygas. Refineries are running hard at above 85pc of capacity since December, supported by firm middle distillate margins. Refinery runs eased in February and are expected to slow in March-April because of the spring maintenance season, although operating rates are likely to hold above 80pc. Reformers are heard

EUROPE

not to be running as hard as refineries, possibly because of some feedstock constraints and as by-product hydrogen costs ease alongside gas prices. Reformate supply has tightened in recent weeks. Russia has stopped crude exports to Poland via the Druzhba pipeline. Kazakh oil is instead flowing through the Druzhba system towards Poland for further delivery to Germany, Russia's pipeline operator Transneft said. Polish oil group PKN Orlen is unaffected by the shift as Russian oil now accounts for only 10pc of the company's crude slate. It is aiming to replace the remaining Russian volumes by crude from other sources. EU sanctions do not cover Russian crude supply via Druzhba, but Germany has already stopped taking Russian crude. The Druzhba pipeline supplies Poland and Germany on the northern branch, and Ukraine, Hungary, Slovakia and the Czech Republic on the southern leg. The PCK refinery in Schwedt, Germany, is running at reduced rates of less than 60pc of capacity following Germany's ban on Russian crude. The Schwedt side has a benzene capacity of 65,000 t/yr.

Styrene

Spot styrene prices fell to their lowest levels in more than two years, under pressure from oversupply and consistently weak demand.

The *Argus* daily assessment for the front month (March) dropped throughout the week to end at $939/t on 2 March. Sellers steadily reduced their offers but buying interest was generally subdued. March cargoes traded at $930/t later in the week. Confidential deals are believed to have been done within the assessed ranges. April was mostly discussed at premiums of $20-40/t to March early on, with the contango widening to $80-90/t later in the week. No April deals were reported. The contango stretched to May which is tentatively showing premiums of $10-20/t to April.

Europe prices

	Timing	$/t	€/t	Volume t
Benzene				
cif NWE contract	Mar	970	919	
cif ARA spot weekly average	Prompt	942.10	888.40	
Styrene				
fob ARA contract	Feb	1,633	1,540	
fca ARA spot	Prompt	1,050-1,092	990-1,030	
fob ARA spot	Prompt	930	877-877	
Argus fob ARA VWA	Feb	1,237.27	1,150.66	22,000
Argus fob ARA VWA	Jan	1,298.57	1,217.54	7,000
Phenol				
delivered ARA contract	Mar	1,462	1,379	
Cyclohexane				
fob ARA contract	Mar	1,303	1,229	

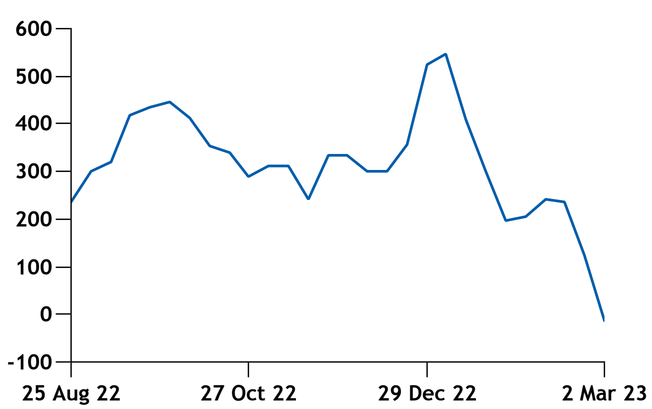
Supplementary benzene transaction data (cif ARA)

	Timing	Volume weighted average $/t	Min $/t	Max $/t	Total volume t
Week 9	Prompt	942.50	930.00	955.00	2,000.00
Month to date	Mar	963.46	930.00	985.00	13,000.00
Previous month	Feb	1,000.69	980.00	1,040.00	18,000.00

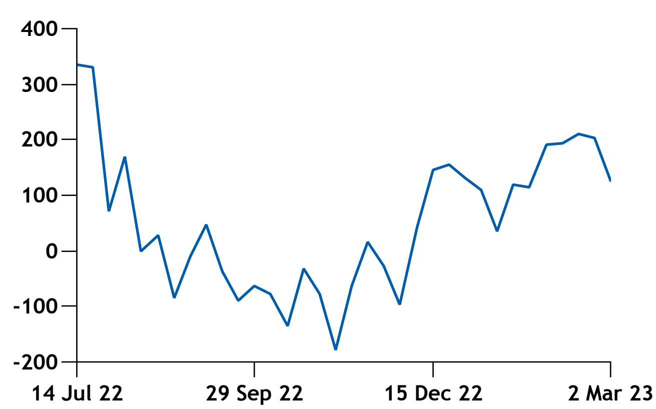
Western Europe polystyrene markets €/t

	Timing	Contract marker	Low / High ±	Argus Δ
GPPS	Feb	2,005.0	0.0 / 20.0	+10.0
HIPS	Feb	2,115.0	0.0 / 20.0	+10.0

NWE styrene premium to benzene *$/t*



cif ARA benzene premium to Eurobob *$/t*



EUROPE

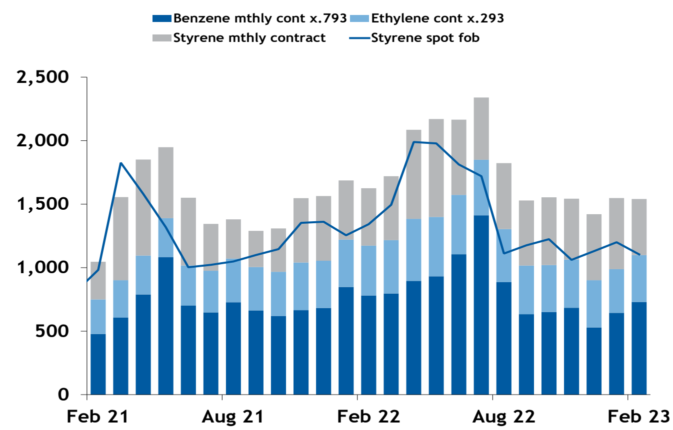
Production units in the Netherlands – which have a combined styrene capacity of 1.3mn t/yr, have restarted, having been offline since November-December. They are unlikely to operate at full rates. Other ethylbenzene-styrene and POSM-SMPO units are similarly operating at reduced rates, which were generally aligned with their contractual obligations. Production economics continue to deteriorate, hitting non-integrated producers, with styrene's margins over feedstock benzene turning negative later in the week, against $153/t in February and $326/t in January. The styrene-naphtha spread has also fallen to $230/t so far in March from $436/t last month and $560/t in January. Demand fundamentals are weak, with the industry generally cautious about whether the seasonal restocking in the spring ahead of the peak summer market will materialise. Packaging demand has stabilised but at low levels. The downturn in construction activities has somewhat slowed as supply chain bottlenecks ease. But the decline will persist as high interest and inflation rates weigh on new orders and put a number of projects on hold.

Elsewhere, Synthos has announced it will halt emulsion styrene-butadiene-rubber (ESBR) production in Kralupy, Czech Republic, in the second quarter and reduce its ESBR capacity to 320,000 t/yr from 430,000 t/yr. Synthos cited high gas and utility costs as main factor behind its decision. Production of butadiene rubber in Kralupy, as well as output at sites in Germany and Poland, remain unchanged.

Europe is struggling to absorb styrene imports, particularly now that the two large units in the Netherlands are back online. Imports from the US have slowed as the arbitrage closed but shipments from Mideast Gulf -- which have nearly doubled to around 20,000 t/month -- continue. Around 40,000-45,000 t/month of US-origin styrene arrived in Europe in the fourth quarter of 2022, peaking at almost 80,000t in November before easing to less than 30,000t in December. The arbitrage economics from the US have been unworkable since the second half of January, with products still arriving in February. Overall, northwest Europe saw net imports of styrene reaching almost 200,000t in 2022, against net exports of 45,000t in the previous year and net imports of less than 10,000t in 2019.

A range of settlements for the March barge styrene CP was reported to *Argus* at €1,430-1,455/t fob, down significantly from previous *Argus*-assessed €1,540/t. *Argus* has yet to confirm the latest monthly CP, pending confirmation from other industry participants. The ethylene CP rose by €30/t to €1,290/t, the highest since December, tracking the rise in feedstock naphtha cost. Cracker margins were barely breaking even while demand remains weak, making it difficult for derivative producers to pass on further price increases downstream.

Styrene raw material costs and pricing *€/t*



Polystyrene

The European polystyrene market remains broadly balanced into March.

We will be finalising our contract deltas for February supply of general-purpose polystyrene (GPPS) and high-impact polystyrene (HIPS) in northwest Europe at + €10/t this week.

March negotiations are commencing against a backdrop of lower spot benzene and styrene prices so far this month, relatively stable energy prices across Europe and cautious offtake of polystyrene resin among big-ticket applications and segments.

At least one polystyrene producer has entered March negotiations with a price increase of €70/t on both GPPS and HIPS March contracts, and while we are at an early stage of price discussions, buyers will strongly argue that the current market dynamics and feedstock developments throughout February do not justify such price increases at this stage. Another northwest European producer is instead proposing to decrease March contract prices by €80/t, while other producers had yet to communicate their initial March polystyrene CP intentions at the time of writing.

EUROPE

Cyclohexane

The March reference price for CX eased by €1/t from the previous month to €1,229/t, mirroring the fall in feedstock benzene contract values.

Downstream, BASF has decided to permanently shut down its caprolactam unit, with a capacity of 260,000 t/yr, along with one of two ammonia units and associated fertiliser facilities, in Ludwigshafen, Germany. Its caprolactam production in Belgium will continue to run, with output from the Antwerp site adequate to fulfil demand in Europe. BASF will also reduce adipic acid production capacity and close down the cyclohexanol, cyclohexanone and soda ash units at Ludwigshafen. Adipic acid production at BASF's joint venture with Domo in Chalampe, France, will continue and has sufficient capacity to supply the business in Europe. The polyamide 6.6 unit at Ludwigshafen and the 180,000 t/yr CX unit in Mannheim are not affected by the production revamp and will continue to operate.

Phenol

The monthly reference price for phenol dropped slightly by €1/t in March to €1,379/t, tracking the modest falls in feedstock benzene CP. The March CP for propylene, another main feedstock in phenol-cumene production, rose by €30/t to €1,185/t, mirroring the increase naphtha values, but with the rise moderated by weak demand and oversupply.

ASIA-PACIFIC

Benzene

Benzene prices declined with the arbitrage spread closing on paper. Market participants are awaiting potential cfr China demand this week after data from the National Bureau of Statistics show China's official purchasing manager index increased to 52.6 in January from 50.1 previously.

The *Argus* Asia benzene marker averaged $929/t in the first three days of the week, compared with last week's $941/t. This ran counter to the movement of crude prices. Ice Brent averaged $83.55/bl in the first three days of the week, compared with last week's $82.62/bl.

Arbitrage opportunities narrowed fast in the latest assessment week. The spread between the *Argus* Asia benzene marker and second-month benzene ddp Houston averaged $85/t in the first three days of the week. This was lower than freight costs to transport 12,000t of benzene from South Korea to Houston that were quoted at $110-120/t.

In China, demand emerged for cfr China cargoes arriving in April. Bids for April cargoes were placed at $10/t premiums to published cfr China assessments. Offers were placed at $20/t premiums. A wide bid-offer gap remained, with discussion levels moving below the contract price level.

Inventory build-up continued in China, with continued oversupply of styrene monomer (SM) in the domestic market. Inventory levels rose by 2pc to close at 267,400t this week, according to estimates from market participants. Domestic prices in China rose to 7,133 yuan/t, or to an import parity equivalent of $893/t, in the first three days of the week. This compared with last week's average of Yn7,073/t, or an import parity equivalent of $891/t.

Demand for benzene in Taiwan emerged. State-owned CPC issued a tender to buy 6,000t of benzene arriving in April. The tender is due to close on 7 March, with bid validity until 8 March. CPC's previous tender for benzene arriving in March was awarded at $15-20/t premiums to published fob South Korea assessments on a landed basis. CPC has potentially ceased discussions for 2023 term contracts after receiving offers at mid- to high-$20s/t premiums to published fob South Korea assessments.

Taiwanese demand for benzene was driven by higher domestic SM requirements, with Formosa to shut its SM unit for maintenance for 50 days starting from the first half of April.

In southeast Asia, Lotte Titan sold a 3,000t benzene cargo for loading in the second half of March at $45-48/t discounts to published fob South Korea assessments. The previous tender to sell a benzene cargo that is due to load in the first half of March was awarded at $46-49/t discounts.

JG Summit in the Philippines awarded its tender to sell 3,500t of benzene for loading in March, likely at $40-50/t discounts to published fob South Korea assessments. The price level could not be confirmed with the firm. JG Summit shut its naphtha cracker in mid-February because of margin concerns and the tender was likely concluded as part of an inventory management exercise.

ASIA-PACIFIC

In Indonesia, state-owned Pertamina shut its TPPI facility on 22 February for maintenance that is expected to last 30 days. The scheduled turnaround was supposed to take place in November last year, but the shutdown was delayed as Pertamina was obligated to supply gasoline to Indonesia's under a tolling arrangement. Pertamina typically supplies domestic PX and benzene consumers with output from TPPI and exports the surplus. The facility has been operating on gasoline mode, thus limiting PX and benzene exports. Market participants expect limited impact from the shutdown as narrow styrene monomer margins have curtailed benzene demand.

Producer economics are tilting towards the production of gasoline this week. The premium that PX-naphtha and benzene-naphtha spreads carried against the gasoline crack averaged $17/bl and $8/bl, compared with last week's $17/bl and $9/bl respectively.

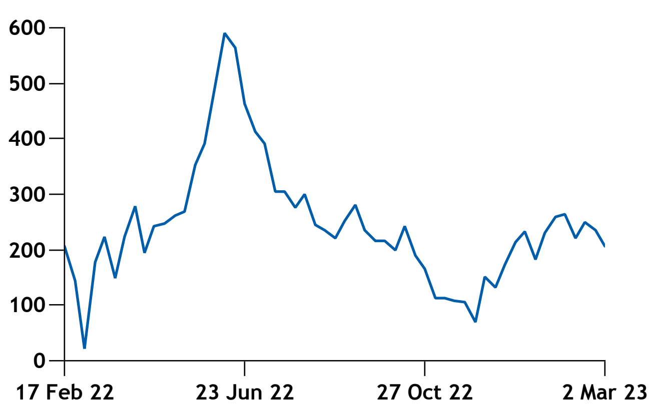
Styrene

Asia-Pacific styrene monomer (SM) prices dropped alongside benzene this week. The oversupply situation in China persisted, with weak demand continuing for most downstream products.

Demand in China remains low, with consumers preferring to buy domestic supplies that are priced lower than imported products. Bids were sporadically placed at $1,070-1,095/t cfr China for cargoes arriving in April, against offers at $1,090-1,110/t.

Domestic prices in China, on the other hand, have decreased. Prices averaged 8,487 yuan/t, or an import parity

South Korea benzene premium to Japan naphtha *$/t*



Asia-Pacific prices	Timing	Low	High	Mid	± $/t
Benzene					
cfr South Korea contract	Mar	950.00	950.13	950.07	
cfr Taiwan contract	Mar	950.00	970.13	960.07	
cfr Asean contract	Mar	950.00	952.13	951.07	
fob South Korea	1H Apr	925.00	936.00	930.50	-7.50
fob South Korea	2H Apr	925.00	936.00	930.50	-7.50
fob South Korea	1H May	922.00	933.00	927.50	-5.50
fob South Korea	2H May	922.00	933.00	927.50	-5.50
fob South Korea	1H Jun	919.00	930.00	924.50	
fob South Korea	Marker			929.94	-12.14
cfr China spot	Prompt	940.00	959.00	949.50	-11.50
cfr China month avg	Feb	964.70	970.75	967.73	+36.70
fob southeast Asia	Prompt	875.00	896.00	885.50	-13.00
ex-tank E China *Yn/t*	Prompt	7,090.00	7,170.00	7,130.00	+85.00
ex-tank E China	Prompt	864.90	874.66	869.78	+13.38
ex-works Sinopec *Yn/t*	Prompt			7,100	+300.00
ex-works Sinopec	Prompt			829.52	+2.90
Styrene					
cfr Taiwan contract	Feb	1,115.00	1,115.00	1,115.00	
cfr China	Mar	1,070.00	1,130.00	1,100.00	-10.00
cfr China	Apr	1,070.00	1,130.00	1,100.00	-10.00
cfr China	Marker			1,103.13	-14.87
fob northeast Asia	Mar	1,065.00	1,125.00	1,095.00	-10.00
cfr South Korea/Taiwan	Prompt	1,080.00	1,155.00	1,117.50	-2.50
ex-tank China *Yn/t*	Prompt	8,410.00	8,550.00	8,480.00	+25.00
ex-tank China	Prompt	1,025.93	1,043.01	1,034.47	+6.66
cfr India	Prompt	1,070.00	1,130.00	1,100.00	-10.00
ex-tank India Rs/kg	Prompt	94.00	95.00	94.50	-4.00
ex-tank India	Prompt	1,140.21	1,152.34	1,146.28	-43.10

Benzene freight rates	Size *t*	23 Feb	2 Mar $/t
South Korea to China	3,000	36	36
Thailand to mid China	6,000	49	50
South Korea to Houston	6,000	155	155
South Korea to Houston	12,000	112	115

Asia-Pacific polystyrene markets	*Yn/t*	±	Import parity *$/t*	±
China ex-works				
GPPS	8,950-9,000	25.0	1,070-1,076	6.0
HIPS	9,700-9,800	0.0	1,161-1,173	4.0
China spot cfr CMP price *$/t*				
GPPS			1150.0 / 1180.0	5.0
HIPS			1235.0 / 1265.0	5.0

ASIA-PACIFIC

equivalent of $1,062/t, in the first three days of the week. This compared with last week's average of Yn8,530/t, or an import parity equivalent of $1,074/t. Inventory levels of SM at east China ports were at 201,000t this week compared with 215,000t last week, according to estimates from market participants.

State-controlled PetroChina's Guangdong Petrochemical refinery has started up and is expecting to achieve on-specification production of SM in early March. LyondellBasell ZRCC's propylene oxide/SM (POSM) unit in Ningbo is undergoing a turnaround at the moment and expected to restart in the second half of April. The POSM unit is capable of producing 650,000 t/yr of SM.

Market participants noted a slight increase in SM demand from the acrylonitrile butadiene styrene (ABS) sector in China. Changke New Material started up its 500,000 t/yr ABS unit at the end of February. Domestic operating rates of ABS plants in China averaged 98pc, according to market participants. This was a stark contrast to ABS operating rates outside China that averaged 65-70pc.

Demand emerged outside China. Consumers in South Korea and Taiwan are gearing up for cargo purchases arriving in April and May respectively. Selling indications for April cargoes were placed at $10-35/t premiums to published cfr China assessments for cargoes arriving in South Korea. The last April cargo of Chinese origin for arrival in South Korea was traded at $25/t premiums to published cfr China assessments. Demand for SM in Taiwan has emerged largely because of Formosa's planned 50-day turnaround that is starting in the first half of April.

In India, latest SM arrivals from Kuwait, Singapore, South Korea and the US have led to inventory pressure in the country. Rising temperatures have led to suppliers attempting to accelerate sales that have resulted in lower domestic prices in India. Domestic prices decreased to 94 rupees/kg, compared with last week's Rs98-99/kg.

SM production margins averaged $161/t in the first three days of the week, with the persistent oversupply of SM in China and weak demand from the polystyrene sector. This compared with $182/t last week.

Polystyrene

Polystyrene (PS) prices in China remained relatively stable. Demand for home appliances in domestic China and abroad remained weak, putting pressure on PS.

The release of China's latest purchasing manager index (PMI) showed an expansion in manufacturing activity. The country's PMI rose to 52.6 in January, compared with 50.1 the previous month, according to the National Bureau of Statistics.

Market participants expected latest PMI numbers to shore up confidence, but the impact of the numbers have not yet been observed in the PS market. Operating rates of PS units in China averaged 64pc at the end of February, compared with 52pc in the end of January.

Domestic Chinese general-purpose PS (GPPS) was transacted at 8,950-9,000 yuan/t, or an import parity equivalent of $1,073/t. Fob China GPPS cargoes dropped to $1,140-1,200/t, compared with last week's discussions at $1,200-1,210/t.

High-impact PS (HIPS) was transacted at Yn9,700-9,800/t, or an import parity equivalent of $1,167/t. Fob China HIPS cargoes were discussed at $1,300-1,320/t.

Market participants are refraining from taking positions as they are awaiting the conclusion of the National People's Congress that starts on 5 March. There have been increasing expectations among market participants that new stimulus policies could be introduced.

Phenol

China's phenol market reached a three-month high of 8,250-8,300 yuan/t ex-tank Jiangsu on 23-24 February before falling slightly to Yn8,050-8,150/t at the close of the assessment week.

Curtailed supply lent major support to the market earlier in the week. Major Chinese producers have continued production cuts owing to negative margins.

Average run rates at Chinese phenol plants slipped to 80pc this week from 85pc in mid-February. Yangzhou Shiyou shut its 200,000/120,000 t/yr phenol/acetone plant on 28 February for a week-long maintenance. Some producers are planning turnarounds in April-May, including Shanghai Cepsa and Sinopec Shanghai Gaoqiao.

The two new plants that started operating in January-

ASIA-PACIFIC

February — Sinochem Ruiheng and Shenghong Petrochemical — have maintained low rates of 50-70pc because of margin concerns. *Argus* has started including the two new phenol plants in calculations of operating rates since the week to 15 February.

Import supplies rose slightly with port inventories in east China climbing to 22,000t, up by 7,000t from two weeks earlier.

With feedstock propylene and benzene prices falling, non-integrated phenol margins in China rose to -$16/t this week compared with -$75/t two weeks earlier. Other Asian producers' margins were estimated at -$123/t this week, halving losses from two weeks earlier.

Demand has been increasing, but at a slow pace. The rapid expansion of the major downstream bis-phenol A (BPA) sector — which outpaced phenol capacity growth — has supported phenol demand but also curbed BPA prices. BPA prices traded around Yn9,850/t this week, a marginal increase from a multi-year low of Yn9,650/t in early January.

Argus *Benzene and Derivatives* is published by Argus Media group

Registered office
Lacon House, 84 Theobald's Road, London, WC1X 8NL
Tel: +44 20 7780 4200

ISSN: **2399-9136**

Contact: Simon Palmer
Tel: +1 281 602 0759
benzenedaily@argusmedia.com

Customer support and sales:
support@argusmedia.com
sales@argusmedia.com

London, Tel: +44 20 7780 4200
Houston, Tel: +1 713 968 0000
Singapore, Tel: +65 6496 9966