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Argus Benzene and Derivatives

Formerly Argus DeWitt Benzene and Derivatives

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HIGHLIGHTS

Americas

- US benzene contract price settled at 311¢/USG (\$931/t) for January; spot prices weakened on some styrene shutdowns.
- Spot styrene prices lifted above \$1,200/t on some prompt buying but then faded below \$1,150/t.

Europe

- Benzene oversupply is returning on weak demand and a closed arbitrage to the US.
- Styrene rose as reduced production & imports curb supply.

Asia-Pacific

- The Asia-Pacific benzene market saw heightened volatility and liquidity over the week.
- Styrene prices drew support from reduced output in South Korea.

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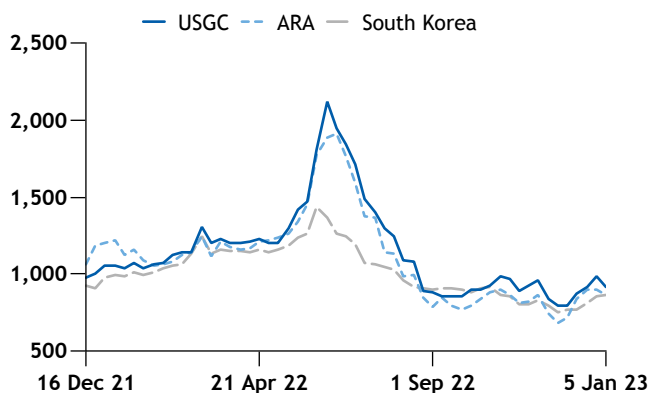
MARKET SNAPSHOTS

Global benzene prices					\$/t
	Timing	Low	High	Mid	±
Americas					
fob USGC contract	Jan	930.82	930.82	930.82	
USGC spot	Prompt	912.87	915.86	914.37	-73.33
Europe					
cif NWE contract	Jan	863.00	863.00	863.00	
cif ARA spot weekly average	Prompt			864.00	-36.83
Asia-Pacific					
cfr South Korea contract	Dec	807.28	810.00	808.64	nc
cfr Taiwan contract	Dec	810.00	828.28	819.14	nc
cfr Asean contract	Dec	810.00	823.28	816.64	nc
fob South Korea	Marker			863.25	+5.87
cfr China	Prompt	860.00	936.00	898.00	+11.50

Benzene breakeven price from toluene conversion				\$/t
Process	Asia-Pacific	Western Europe	US Gulf coast	
STDP	765.68	621.89	699.11	
TDP	749.71	908.71	881.24	
HDA	993.75	1,128.13	1,224.30	

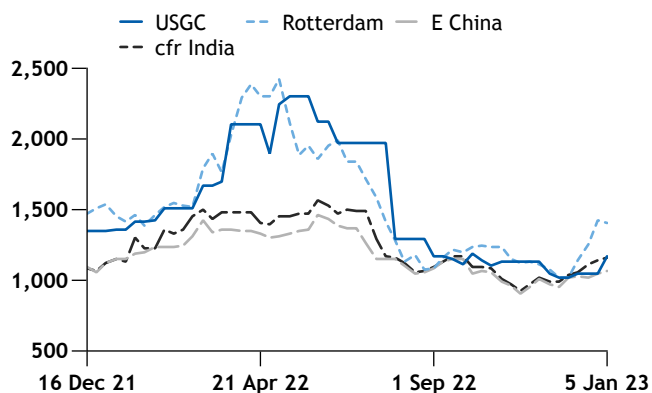
Global benzene prices

\$/t



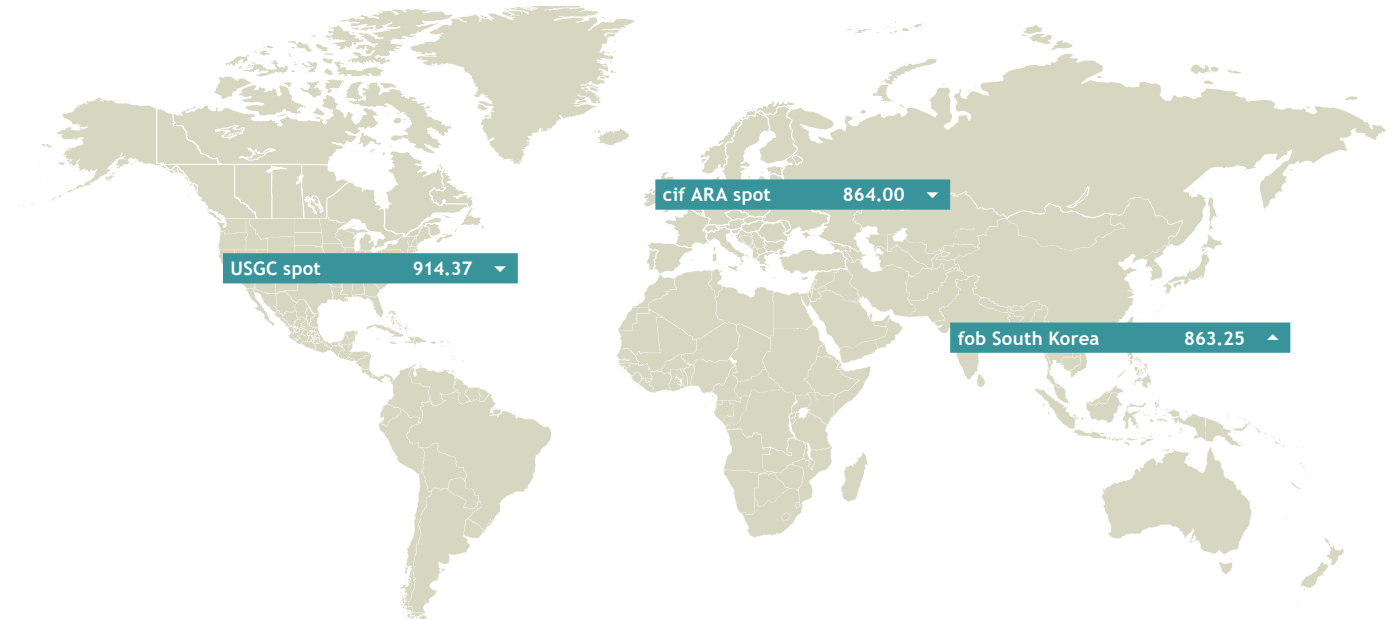
Global styrene prices

\$/t



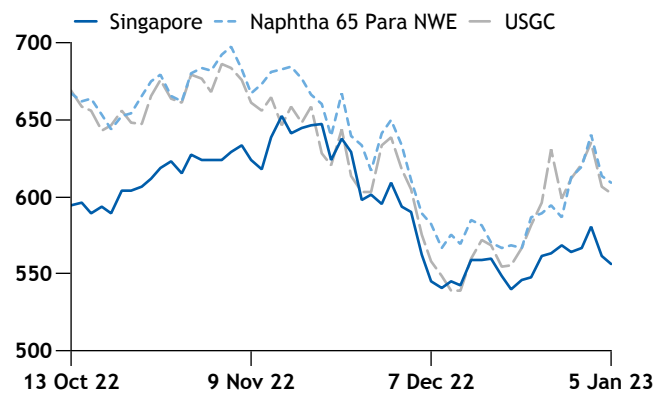
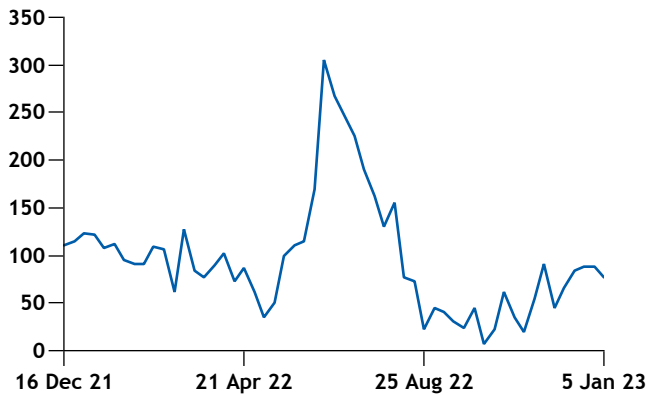
GLOBAL PRICES

\$/t



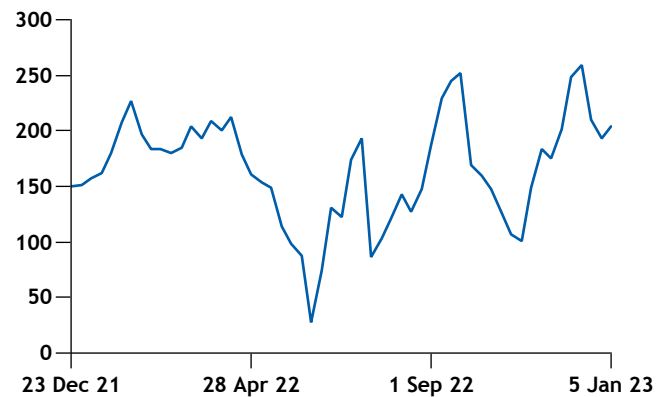
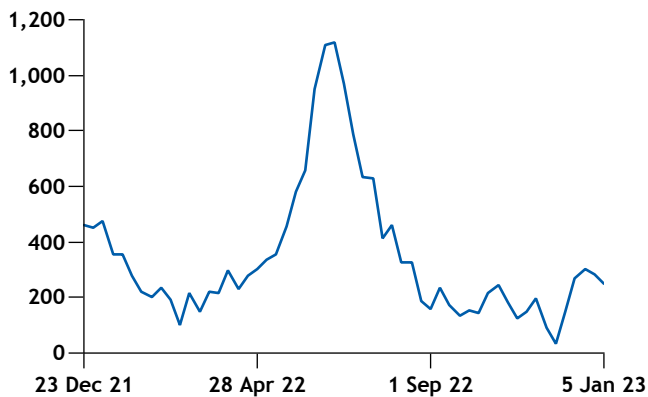
USGC benzene premium to USGC gasoline *¢/USG*

Global naphtha prices *\$/t*



ARA benzene premium to NWE naphtha *\$/t*

East China styrene premium to benzene *\$/t*



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Benzene

The US Gulf coast benzene contract price for January 2023 settled at 311¢/USG (\$931/t). This represents a 4¢/USG (\$12/t) increase from the agreed price of 307¢/USG (\$919/t) for December. The final tally for calendar year 2022 showed an average contract price for the year of just under 393¢/USG (\$1,176/t), with the average monthly FOB spot price at just under 389¢/USG (\$1,164/t).

The US benzene spot market got off to a rather sluggish start as many digested the fallout from the recent winter storm. Most of the issues impacting benzene production were perceived to be of limited duration, while prompt purchasing of styrene indicated more prolonged issues for the consumption side of the ledger. Correspondingly, offers started to appear and the market made some pretty speedy adjustments lower. For the week as a whole, January spot deals were done between 305 and 306¢/USG (\$913 - \$916/t), with February done between 303 and 313¢/USG (\$907 - \$937/t). March business was also concluded at 302.5¢/USG (\$905/t). This week's spot posting covers January business only, as per our established methodology prior to the 15th of the current month. Total spot volume was rather light at 200,000bl or 28,000t. Closing ranges are either side of 304¢/USG for DDP January, 304 for DDP February, and 303.50 for DDP March. Most recently, the lower River has been bid slightly above Houston levels, with the offers 3 to 4¢/USG above, depending on timing.

On hydrocarbon supply and processing, total US crude inventories, including SPR, fell by a modest 1.05 million barrels since last week's report. Total inventory, excluding SPR, rose by 1.7 mn bl to just over 420.50 mn bl. Despite the recent increases, inventories remain at the low end of the five-year range and at parity with year-ago levels. US domestic net crude supply contracted this week as production rose 0.1 mn b/d to 12.1 mn b/d, but imports fell 0.54mn b/d to 5.7 mn b/d and exports rose 0.74 mn bl to 4.2 mn b/d. On refining operations, runs decreased by 2.24 mn b/d from last week to 14.34 mn b/d, with average utilization 12 percentage points lower at 79.4pc. Refinery feed volume was way below the lows of the five-year range, while utilization cratered to levels not seen since the end of 2020. Throughput on the Gulf coast fell by 1.6 mn b/d to 7.5 mn b/d due to the winter storm, with utilization down 16.6 percentage points at 77.7pc. Midwest (Padd 2) throughput was also down 0.56 mn bl at 3.3 mn b/d, with utilization down 12.1 percentage points to 79.2pc. Average gasoline yield across the US dropped 1.2 percentage points to

Americas prices					
	Timing	Low	High	Mid	±
Benzene ¢/USG					
fob USGC contract	Jan	311.00	311.00	311.00	
USGC spot	Prompt*	305.00	306.00	305.50	-24.50
Styrene ¢/lb					
fob USGC contract	Dec	74.68	76.12	75.40	
fob USGC spot	Prompt*	50.80	55.11	52.96	+5.47
fob USGC VWA	Dec			46.11	nc
USGC large buyer index	Dec			54.04	nc
Cumene formula ¢/lb					
fob USGC contract	Dec	35.78	35.78	35.78	
Phenol ¢/lb					
fob USGC contract	Dec	63.23	66.74	64.99	
Cyclohexane ¢/USG					
fob USGC contract	Jan	298.58	298.58	298.58	
Marker with NG escalator	Jan	323.82	323.82	323.82	

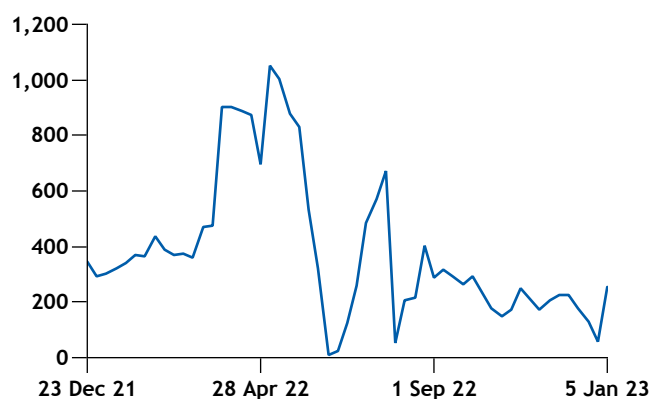
*Prompt refers to current month, but if the publication date is on or after the 15th of a given month, then the spot posting will include current month and next month trades

Benchmark margins		¢/USG	
	Margin		±
BTX US reformat extraction vs floor contract	27.99		+29.32
BTX US reformat extraction vs floor spot	27.20		+25.24
BT US reformat extraction vs floor contract	-14.75		-24.63
BT US reformat extraction vs floor spot	-16.13		-31.76

US polystyrene markets				¢/lb	
	Timing	Contract marker	Low / High ±	Argus Δ	
GPPS	Dec	118.0	0.0 / 0.0	0.0	
HIPS	Dec	129.0	-4.0 / 0.0	0.0	

USGC styrene premium to benzene

\$/t



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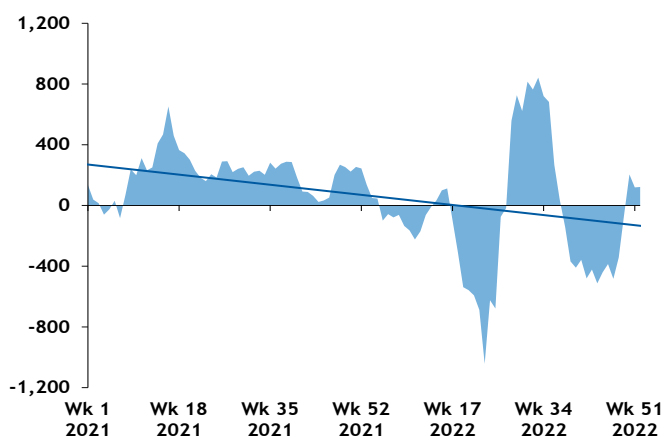
52.4pc, with actual production volume down 1.7 mn b/ to 8.5. Implied US gasoline demand was reported 1.8mn b/d lower at 7.5 mn b/d. Inventories fell 0.3 mn bl to 222.7 mn bl. Inventory cover was higher at 29.7 days of use at current consumption levels. Absolute inventory levels have faded over recent weeks from the middle of the five year range down to the lows. On the Gulf coast, gasoline inventories moved sharply lower, with absolute levels just over 80 mn bl. This inventory level is now back at the low end of what is typical for this time of year. Nationwide, gasoline component inventories moved slightly lower but continue to be mid-pack versus the five-year seasonal range. On the Gulf coast however, component inventories stepped sharply lower but again are close to the middle of the seasonal range. Diesel inventories fell slightly again this week, while jet inventories moved sharply lower. Fuel oil inventories also moved lower this week and remain lean.

On costs across the hydrocarbon complex, oil prices have had an unsteady start to the year, with weak macro-economic indicators and surging Covid-19 cases in China weighing on sentiment. Continued use of interest rates to curb inflation also underpinned concerns for oil demand. Specifically on US crude, the front-month WTI (NYMEX) benchmark traded mostly higher over the holidays but then lost its footing and ended up pretty much where we left off in mid-December. From the last close at \$77.28/bl on December 15, prices dipped below \$75 before steadily increasing and breaking above \$80 right before new year. Since then some macro-economic weakness has afflicted the markets. The contract ended the reporting week to Thursday at \$73.67/bl, down \$3.61/bl from our last report. Cash market prices (WTI, Houston) started out a little lower compared to the futures markets but moved into pretty close alignment going into the holidays. After closing out our last full report at \$76.735/bl, prices moved slightly lower to \$75, before rising steadily as we approached the holidays. Prices stabilized around \$80.60/bl just before Christmas, before rising to end the year at close to \$80.75/bl. Since then, prices have succumbed to some pressure, closing today (Thursday) at \$74.545/bl, reflecting a net decrease of \$2.735/bl for the multi-week period since our last report. On gasoline, Rbob futures prices have also trended mostly higher through the holidays, but again have encountered some high level weakness in recent days. Prices moved slightly lower from the past reported settlement at 216.68¢/USG, testing 213¢/USG before embarking on a steady upwards track to hit 246¢/USG going into the new year. Prices have been weaker since, breaking below 237¢/USG, then 216¢/USG and finally breaking 224¢/USG in

the middle of the week. The contract settled today (Thursday) at just under 227¢/USG, an increase of 10¢/USG for the week. Cash market gasoline prices (conventional 87, Houston) have tracked upstream prices pretty closely over the holiday period. Prices closed out our last report at just over 205.50¢/USG and moved down towards 200¢/USG before starting a steady comeback. Prices moved up to 220, before jumping higher to over 238 just before the Christmas holiday. After the holiday prices moved up again to just above 253 going into the new year break. This week has seen some pressure, with prices settling today (Thursday) at 229¢/USG, an increase of 23.50¢/USG for the three weeks since our last full report. On gasoline blending, octane-based alternative values for aromatic conversion feed have moved largely in parallel with absolute gasoline prices over the holiday period. This followed an initial weakening of the differential to regular unleaded, from just under 50.4¢/USG down to the mid-30¢/USG range. Since then, the differential has hovered in between 35 and 40¢/USG. The spread closed today (Thursday) at 59¢/USG, up 8.6¢/USG since the middle of December. Reformate market values (waterborne, Houston) have generally tracked modestly higher over the holidays. Initially prices were flat following our last full report in mid-December starting at just below 255¢/USG. The market ticked higher to 272¢/USG just before Christmas, and then again to 286¢/USG going into the new year break. Prices then succumbed to some pressure as the new year started, drifting below 279¢/USG. Today's close at just below 287¢/USG is up 32¢/USG over the three weeks. Lastly, natural gas futures (Nymex) prices have moved mostly lower since our last reported close in mid-December at \$6.97/mmBtu. Values moved down to around \$5/mmBtu going into the Christmas holiday, and then broke below \$4.50 as the new year approached. Prices then tested \$4 as business got going again after the new year, but firmed towards \$4.20/mmBtu around the middle of the week. Today (Thursday) prices were weaker again, with the settlement at \$3.72/mmBtu being around \$3.25/mmBtu lower than our last full report. In the cash markets, prices (all day-ahead, Houston) spiked above \$6/mmBtu on cold incoming weather just before the holidays but then fell back to below \$5/mmBtu as the arctic air rolled through. Much warmer temperatures after the Christmas break saw prices collapse further to \$2/mmBtu going into the new year holiday. Benchmark values have recovered a small portion of the lost ground, and started to close in on \$3/mmBtu. Prices then ticked lower today to close at \$2.85/mmBtu, down \$2.575 over the intervening three week period.

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US benzene spot price versus STDP breakeven \$/t



On production cost metrics, the adjacent chart illustrates the spread between spot benzene prices in the Gulf coast and breakeven values for benchmark STDP economics. With spreads having turned positive over the past week or two, the question arises as to whether this is sufficient to catalyze some restarting of idled conversion capacity. The long and the short of it is that for now, we think not. The operation of these units is largely predicated on the appetite for paraxylene, rather than the dynamics at play in the co-product benzene market. Many of these units have been idle since late summer, with supply chains adapting to the constrained domestic make of paraxylene. Whilst this has had some impact on spot paraxylene prices, there is still not the confidence in the sustainability of the margin above feed toluene to commit to a wholesale restart of these conversion plants. This is not wholly unsurprising in that seasonal cost pressures are likely to build over the next few months and producers will want to avoid restarting units only to potentially idle them again if feed costs close the conversion margin up again. A more pragmatic approach suggests waiting on the true shape of post holiday paraxylene demand, while tracking feed costs closely over the next few weeks.

On production operations, the cold weather prompted some preemptive refinery shutdowns, some somewhat preemptive shut-ins of refinery units and some outright operating issues on feed units to BTX recovery. Most of the direct impacts on BTX operations appear to have been short in duration, at least when compared to many of the steam cracker outages. Most units have restarted on fresh feed, although

many remain feed limited. As it happens, those impacted directly have also seen their receivers impacted and reduced benzene recovery has been mirrored by reduced benzene consumption on the other end of the supply line. Timing adjustments have been made on both sides of the ledger, without undue trauma. Logistics issues however have shown signs of applying stress to some supply chains, as specific vessel rotations needed to be adjusted at short notice. This distorted inventory levels at some locations, prompting some quick footwork to keep benzene flowing to those derivative units which were running through the freeze. The result of all this pushing and pulling has been a rather mixed bag. There is more benzene than planned in some locations, while others are still on the short end of the stick. The net, net of all this is frankly difficult to decipher, but once again timing and flexibility appear to be key rather than absolute production or consumption volumes.

For incremental benzene recovery feedstocks, the freezing weather which hit the Gulf coast just prior to the Christmas holidays was also a major event. Over a dozen steam crackers were impacted, either with preemptive shutdowns or operational issues as a result of the depth and duration of the freeze, together with the deeper than forecast wind chills. As operators embarked on repairs and restarts, pygas transactions were relegated to the back burner. On reformate, the winter storm was somewhat less disruptive, although several large refineries did take the decision to shut in some units ahead of the arrival of freezing temperatures. In hindsight, this may have been the smarter decision as temperatures and wind chills turned out to be more severe in some locations than had been forecast. The resulting disruption did not have a huge impact, and most downtime was relatively short in duration. As a result, reformate values appeared to be little distorted from their established trajectory relative to the complex at large.

On consumption, all well-made plans went out the window as the extent of the blast of cold air began to sink in. Some sites were preemptively shut-in, while others adjusted operations to run through. Initial forecasts indicated that wind chills would not be a major factor, but this turned out to be optimistic. As a result, several Houston area styrene production complexes did shut down and are now in the process of bringing back their styrene reactors. Others chose a different course through the storm, but most are back to producing nor-

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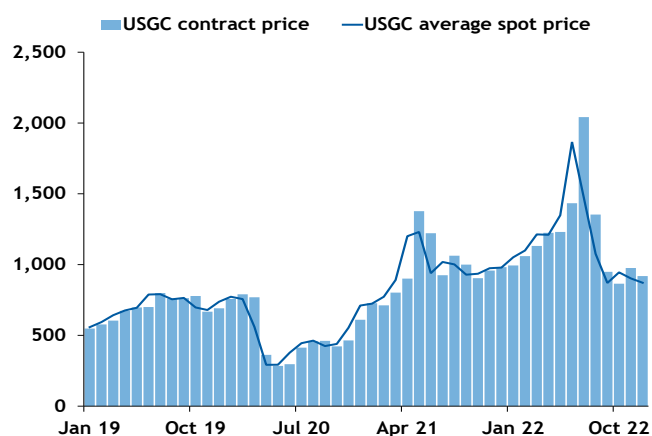
mally again. Some capacity which was idled ahead of year-end to manage inventories is also returning in the face of robust order volumes for January. On other derivatives, the knock-on impacts of the cold weather took some cyclohexane capacity down due to feedstock supply issues, and led to reduced feed rates to cumene at one location. Most all are back and running normally.

On arbitrage trade, near-month benzene bid-asks in Asia ebbed and flowed over the course of the week, but ultimately succumbed to high inventories in China and selling pressure for lifting ahead of lunar new year. On a net basis, midpoint bid/offer levels fell by \$26/t compared to this time last week, closing at \$833/t. The market initially pushed higher towards \$900/t, without the markets in the Atlantic Basin to reference to, but eventually weakness washed over the market. Shipping quotes FOBK-USGC have eased slightly since our last report to between \$175/t and \$205/t depending on parcel sizes. Full vessel enquiries however have shown a greater propensity for owners to engage and the easing of rates is perhaps of more significance. This being said, the arb to the US has remained closed, especially as benchmark prices in Asia turned higher as western prices eased. Assessed spot benzene prices in north-west Europe have fallen pretty steadily over the course of the week. This restores Asia as the lowest priced regional market by a margin of around \$15 to \$20/t. Prices in NW Europe fell by \$50/t overall, from \$900/t all the way to a nominal \$850/t by the end of the reporting week. The decline in prompt prices has introduced a degree of contango into 1Q23 pricing, while the US has a pretty flat price curve. The prompt month-to-prompt month spread started around \$70/t this time last week but now the US is trading at a more modest premium to ARA of around \$60/t.

The adjacent chart updates US monthly benzene pricing for the calendar year 2022. As mentioned earlier, the average contract price for the year came in under 393¢/USG (\$1,176/t), with the average monthly spot price at just under 389¢/USG (\$1,164/t). Considering the record levels of price volatility seen during the summer, an average delta of 4¢/USG or \$12/t between contract and spot for the year does not seem too awfully bad in terms of alignment. Now by some measures the spread will be wider, particularly if one chooses to reference the delivered spot market, rather than the FOB market, but for all intents and purposes this alignment reinforces use of the current contract price mechanism rather than undermin-

US benzene monthly price history

\$/t



ing its validity. As can be seen clearly from the chart, spot market prices always lead contract prices, so during periods of wild price swings, large deltas can open up. This past summer we saw record deltas greater than 400¢/USG or \$1,200/t open up above contract price but given the pressure from gasoline this was largely inevitable. This being said, the market always corrects and corresponding negative deltas open up as prices fall. All in all, the current contract price mechanism has been largely equitable over the long run, which has also made it durable over a period of now more than twenty years. The participation it receives is the envy of many other product markets which are dogged by patchy industry support and high levels of uncertainty. This allows the benchmark to also be successfully utilized both in feedstock and derivative markets, facilitating a broad array of enduring pricing mechanisms.

Styrene

Styrene spot market activity picked up over the end of the year on some prompt co-producer buying to cover the fallout from the winter storm which hit the Gulf coast just prior to Christmas. There was also some trader buying for January lifting for export. Spot business was concluded flat-price for prompt December between \$1,175/t and \$1,215/t, while January was done between \$1,120/t and \$1,200/t.

Styrene feedstock prices have been a rather mixed bag this week, with ethylene spot pricing remaining pretty much flat but with benzene pricing easing. The Ethylene Net Transaction Price settled this week at 32.50¢/lb for December. On benzene, spot prices started to lose their luster going into the new year holiday,

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but activity was very thin indeed. As the new year got started, offers started to come out on news of the disruption to styrene production from the storm. Prices quickly slid to, and then broke below, 310¢/USG. January prices then hit 305¢/USG mid-week and remained under pressure. Closing ranges are either side of 304¢/USG for DDP January, 304 for DDP February, and 303.50 for DDP March. Most recently, the lower River has been bid slightly above Houston levels, with the offers 3 to 4¢/USG above depending on timing. The US benzene market remained the highest priced regional market, showing a \$60/t premium over Europe and close to \$80/t over Asia. On ethylene upstream costs, cash market natural gas prices (all day-ahead, Houston) spiked above \$6/mmBtu on cold incoming weather just before the holidays but then fell back to below \$5/mmBtu as the arctic air rolled through. Much warmer temperatures after the Christmas break saw prices collapse further to \$2/mmBtu going into the new year holiday. Benchmark values have recovered a small portion of the lost ground, and started to close in on \$3/mmBtu. Prices then ticked lower today to close at \$2.85/mmBtu, down \$2.575 over the intervening three week period. Ethane prices were rather more chill over the holidays, steadily drifting from our last full report close at around 39¢/USG to 33¢/USG going into the Christmas break. Much lower natural gas prices saw ethane prices continue under pressure, breaking below 30¢/USG, and then testing 28.75¢/USG by the new year holiday. Prices closed today (Thursday) at just under 27¢/USG, down just over 12¢/USG over the last three weeks. On ethylene, the spot market saw a drastic increase in activity as a result of the winter storm which blew into the Gulf coast just before Christmas. At least a dozen steam crackers were impacted, some were preemptively shutdown and others encountered operational issues as a result of the dramatic changes in temperature and wind chills. Through all this, prices in Mont Belvieu, Texas remained largely unchanged, in part due to the comfortable ethylene balance but also due to the substantial declines in natural gas prices seen immediately following the storm. The spot market remained largely range bound between 19 and 19.50¢/lb. Spot prices closed today (Thursday) pretty much flat at 19¢/lb. Choctaw, Louisiana, has been trading at around 1.75 to 2.00¢/lb under Mont Belvieu through most of the holiday period. It closed at 17.75¢/lb today, 1.25¢/lb under Texas prices. A summary of higher level hydrocarbon costs is included in the Americas Benzene section of this report.

On styrene production operations, end of year plans went out the window as the extent of the blast of cold air began to sink in. Some EB-SM sites were preemptively shut-in ahead of the front, while others adjusted operations and took precautions to run through. Initial forecasts for most of the Gulf coast indicated that

wind chills would not be a major factor, but this turned out to be overly optimistic. As a result, several Houston area styrene production complexes were impacted and are now in the process of bringing back styrene production. Others chose a different course through the storm, but most are either back to producing normally again, or on the cusp thereof. Others ran through without incident. Some capacity which was idled well ahead of year-end to manage inventories is also returning in the face of strong order volumes.

On styrene consumption, early indications are that January orders are looking robust for some sectors, although this is an incomplete picture and may not be wholly representative. Hopefully we will be able to fill in some of the gaps as the month proceeds.

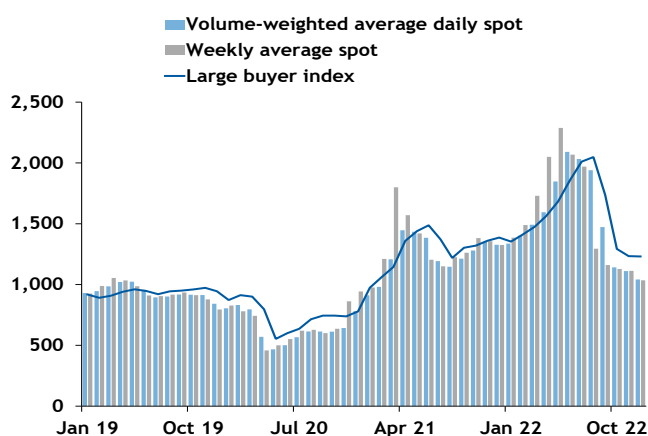
On arbitrage trade, long-haul freight rates continued to be mostly firm through the holiday period, although rates out of Asia have eased again slightly. Conversely, eastbound trans-Atlantic rates remain elevated with reports of quotes at upwards of \$125/t for 5,000t parcels. In the international styrene markets, spot prices started off the week in decent fettle but again lost some of their composure as the week progressed. The early trading sessions in Asia saw benchmark spot prices rise towards \$1,090/t, but later succumbed to slowing buying interest. On a net basis for the week, bid-offer midpoints were about flat, opening and later closing at \$1,045/t. As a result of ultimately weaker pricing in the US, the spread between spot pricing for styrene in Asia and the US fell, with Asia now at a discount of \$80/t, compared to \$130/t last week. The styrene spread to benzene in Asia expanded this week as benzene prices eased and SM prices tracked mostly flat. The spread rose from \$186/t to \$212/t. In Europe, spot styrene prices fell this week. Overall, prompt month bid-offer ranges decreased \$150/t to \$1,350/t. The market appears to have retained its backwardation despite the fall in near-month pricing. Benzene also fell in Europe this week, losing a more modest \$50/t. Accordingly the spread over benzene contracted from \$600/t to \$500/t net for the week. US bid-offer levels ended up logging a net decrease of \$50/t when compared to this time last week. For the week as a whole, the USGC-ARA spread contracted from \$325/t to \$225/t, with Europe of course commanding the premium. The US styrene spread over benzene has expanded very slightly this week and ended up at \$215, compared to \$205/t this time last week.

The adjacent chart updates US monthly styrene pricing for the month of December. The graphic is intended to provide a perspective of 2022, which as we all know was a year of price uncertainty and volatility. The restrained production environment during the first half of the year, then the extreme cost-push of the summer octane, took prices to unprecedented highs and opened the spreads between the various pricing mechanisms. Spot prices

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US styrene montly price history

\$/t



always lead term pricing, whether it be up or down, but the speed and magnitude of the changes made it tough for even the *Argus* Large Buyer Index to keep pace. Accordingly, the average spot indices for the year came out slightly lower than the average Index prices, as the Index prices were still catching up as the year closed.

Polystyrene

The US polystyrene (PS) market remains on track to implement a rollover to its contract prices for December while producers have announced a rollover for January as well.

January ddp Houston-Texas City (HTC) was assessed at 305¢/USG after bids and offers both closed in at that price level on 4 January. February ddp HTC was assessed at 304.67¢/USG following trades at 305¢/USG and 306¢/USG at 20,000bl each after initially opening between 301¢/USG and 315¢/USG on the day. March ddp HTC was assessed at 303¢/USG.

Benzene contracts were concluded for January at 311¢/USG, a 4¢/USG increase from the previous month. Nevertheless, due to weaker demand, PS prices are holding steady in initial contract offerings from at least some producers.

The likelihood of rollovers for December PS prices has not been universally accepted, as some market participants reported instances of price decreases for high impact polystyrene (HIPS) during the end of December. These decreases were isolated, however, and with some being as much as 4¢/lb discounted, they likely did not reflect the broader sentiment of market negotiations.

Nevertheless, the existence of such decreases points to the continued weakness within the PS market. One buyer this

week stated that while demand for them was fairly steady, other buyers were reporting a broader lightness in activity.

Final data from the American Chemistry Council (ACC) adjusted previous November data. Total November sales were corrected to 254mn lb, a near 13pc decrease from the previous month and the fourth month out of the last five to see declining sales.

Total production for November was adjusted to 266.2mn lb, a 9.4pc decrease from the previous month, according to the ACC's Plastics Industry Producers' Statistics Group as compiled by Vault Consulting. The last four months have seen production fall, with each month declining more than the previous, yet sales have remained stubbornly below production since June.

With supply surpassing demand, producers added 12.2mn lb to inventories. Days of supply reached 37 days, the highest mark all year and a significant outlier from the year's monthly average of about 27.5 days.

Capacity usage fell to the second lowest rate all year, hitting just 60.4pc. These low operating rates faced challenges as a cold snap swept through the US Gulf region and threatened operations, particularly for benzene.

However, while some operational tightening in the PS chain did occur, it did not seem to cause too much prolonged damage. With sizable inventories and souring demand, any disruptions were likely minimal and were entirely manageable.

End uses highlighted the struggles PS demand has experienced over the end of 2022. In the year-to-year category, food packaging fell 26.6pc from November 2021. Consumer and institutional goods like medical products fell 19.6pc. Electrical and electronic products fell 13.9pc.

Only building and construction materials performed well, growing 25.7pc on much smaller volumes compared to other market sectors.

The year-to-date view showed a milder decline, buoyed by strong performances across most sectors earlier in the year. Food packaging fell 2pc from 2021 to 2022 for the year through November. Electrical and electronic products fell by 10pc.

Consumer and institutional products grew by 0.7pc and building and construction grew by 35.1pc once again on smaller volumes.

The PS market in the US is in its typical range of seasonal activity to start the new year. Producers have worked to curtail operations to a degree to manage high inventories,

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but buying patterns have not picked up to help rebalance the market. Even as benzene inched up to start the month, poor

demand is making it difficult for producers to push for any sizeable increase to begin 2023.

EUROPE

Benzene

Spot benzene prices eased at the start of the new year, ending two weeks of gains, under pressure from the steep falls in crude and the broader energy markets. Oversupply is again developing in Europe as demand down the value chain has remained weak and arbitrage opportunities to the US diminished.

Overall trading was thin during the shortened week as many participants were still on holiday. January traded at \$862.50/t, broadly in line with contract values. The Argus daily assessment for the front month (December) steadily edged lower throughout the week to end at \$841/t, with buying interest driven by arbitrage possibilities to the US. The January-February spread flattened, but no other deals were reported. March was tentatively discussed either in line with or at a \$10/t premium to February.

The January benzene contract price (CP) was confirmed on 28 December at \$863/t and €812/t, up by \$172/t and €145/t, respectively, from December and the highest since September 2022. The conversion was based on the ECB reference rate of \$1.0624:€1, against the \$1.0366:€1 used in the December CP settlement. Deals, involving almost 40,000t of benzene, were concluded during the five-day, CP-linked trading period that started on 19 December. January traded at \$820.00-874.40/t. Cargoes for 1-5 January and 1-10 January changed hands at

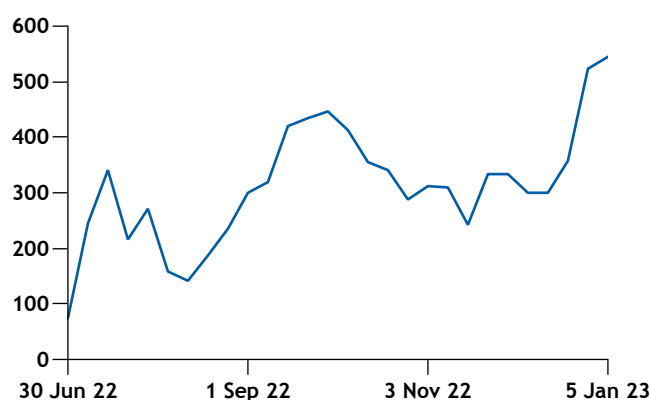
Europe prices				
	Timing	\$/t	€/t	Volume t
Benzene				
cif NWE contract	Jan	863	812	
cif ARA spot weekly average	Prompt	864.00	820.80	
Styrene				
fob ARA contract	Dec	1,496	1,421	
fca ARA spot	Prompt	1,421-1,474	1,350-1,400	
fob ARA spot	Prompt	1,400-1,420	1,330-1,349	
Argus fob ARA VWA	Dec	1,060.63	1,023.72	8,000
Argus fob ARA VWA	Nov	1,158.89	1,161.32	9,000
Phenol				
delivered ARA contract	Jan	1,339	1,272	
Cyclohexane				
fob ARA contract	Jan	1,181	1,122	

Supplementary benzene transaction data (cif ARA)					
	Timing	Volume weighted average \$/t	Min \$/t	Max \$/t	Total volume t
Week 1	Prompt	862.50	862.50	862.50	1,000.00
Month to date	Jan	876.50	860.00	900.00	5,000.00
Previous month	Dec	684.38	620.00	900.00	36,000.00

Western Europe polystyrene markets				€/t
	Timing	Contract marker	Low / High ±	Argus Δ
GPPS	Dec	1,875.0	-130.0 / -100.0	-110.0
HIPS	Dec	1,985.0	-130.0 / -100.0	-110.0

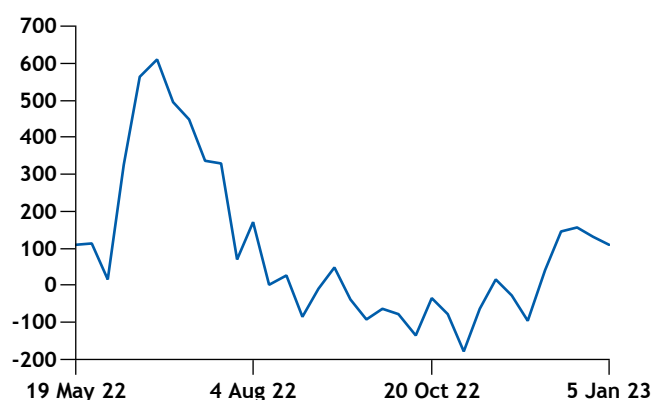
NWE styrene premium to benzene

\$/t



cif ARA benzene premium to Eurobob

\$/t



EUROPE

\$830-900 and \$860-880/t, respectively, while parcels for the first half of January were sold at \$825-900/t. The latest deals were done at the upper end of the range. The CP discussions were held against a backdrop of increased exports to the US that helped rebalance an oversupplied market, with more than 100,000t estimated to have left Europe in September-November, and partly offset the decline in demand. The arbitrage to the US has been closed for most December and the start of January. Estimated freight rates to the US are \$65-70/t for a minimum 5,000t cargo.

Cracker output remained heavily reduced, although there are reasons to believe that December marked the low for the market in terms of demand and operating rates for crackers and derivative units. Destocking pressures looked to have eased by the end of December but cracker operators will continue to manage operating rates, with demand visibility remaining limited and short-term. No new cracker problems emerged during the holidays. The Dunkirk cracker in France remains down following a fire during a restart process in December after planned maintenance. Extraction margins slightly improved, with the benzene-naphtha spread averaging \$240/t so far in January, against \$234/t in December and \$182/t in the fourth quarter. Pygas moved to the US in December and interest in export remains. Gasoline blending demand is increasing and this could provide an alternative outlet for pygas. Refineries continue to operate at above 80pc of capacity despite easing margins for middle distillates in December. Diesel and gasoil stockpiles are rebuilt ahead of the 5 February EU ban on Russia for these products, with prices expected to spike as the start of sanctions approaches. Europe relies on Russia for about half of its diesel and gasoil imports, about a tenth of overall consumption. Jet fuel demand in Europe has slowed, allowing supply to build up, but confidence in air passenger demand will allow demand to pick up as the month progressed. The 226,000 b/d Schwedt refinery has run down its operating rates to 55pc of capacity after Germany ended imports of Russian crude through the Druzhba pipeline on 1 January, even though these deliveries are exempt from the EU's 5 December ban. Increased crude supply through Poland, with additional shipments from Kazakhstan being under discussion, will enable the refinery to ramp up its run rates. Reformer operating rates remain high for by-product hydrogen.

North Sea Dated crude prices slid to \$75/bl before slightly picking up to \$77/bl on 5 January as the surge in the number

of Covid-19 cases in China sparked renewed concerns about an economic slowdown. Naphtha retreated with crude, to a low of \$613/t, with the decline tempered by increased gasoline blending demand.

Styrene

Spot styrene prices breached \$1,400/t for the first time in six months, well supported by supply curbs from reduced domestic production and imports.

January traded at \$1,400-1,420/t, levels last seen in July 2022. The *Argus* daily assessment for the front month (January) lost momentum later in the week, ending at \$1,385/t on 5 January, as feedstock benzene retreated. The backwardation in the January-February market surged to nearly \$200/t during the holidays following delays in the arrival of US imports, but has since eased to \$50-100/t at the start of the new year. No other deals were reported in a broadly illiquid and thin market. Offers for March were tentatively showing discounts of \$50-100/t to February, but buying interest was scarce.

Operating rates at styrene producers in Europe remained reduced, with some units still offline. A POSM unit and an ethylbenzene-styrene unit, both in the Netherlands, have been down since November and December, respectively. Production margins have improved, with the benzene-styrene spread well above \$500/t this week, against \$369/t in December and \$331/t in the fourth quarter. Styrene's premium to naphtha also hovered at above \$800/t this week, up from \$603/t in December and \$513/t in the fourth quarter. Producers will probably wait to see whether the increase in margins is sustainable before ramping up. Demand down the polymers chain is low and the usual stocking up at the start of the new year has yet to materialise. Some downstream producers have extended their usual downtime during the Christmas holidays and have yet to restart. Gas and electricity prices have fallen, potentially relieving some cost pressures for downstream producers. Mild weather across Europe curbed gas demand, as has lower industrial use. With gas inventories relatively high at the start of this year, forward prices have fallen to their lowest since April 2022, converging at €65-70/MWh later this week.

Europe is the price leader globally for styrene since the second half of December, but arbitrage economics from the US and Asia-Pacific, including China, have been impaired by limited vessel availability and high freight costs, estimated at \$120-150/t and more than \$200/t, respectively. The heavy

EUROPE

backwardation in the European market and the long lead time of at least eight weeks are also dampening trading firms' interest in importing from the far east. Some fixtures from the US, involving 10,000-15,000t, are expected to arrive in late January at the earliest.

A range of settlements for the January styrene barge CP was reported to Argus at €1,520-1,575/t fob, up from the Argus-assessed December CP of €1,410-1,432/t. Argus has yet to confirm the latest monthly CP, pending confirmation from other industry participants. The January CP for ethylene dropped by €95/t from December to €1,175/t as feedstock naphtha costs and demand fell.

Polystyrene

The European polystyrene market is seeing the usual return to activity after the new year, with monthly order entries rising as the industry focuses on restocking.

The degree of restocking efforts remains somewhat lower than that observed in previous years, driven mainly by an uncertain demand outlook. Buyers continue to purchase on an ad-hoc basis where possible, while producers manage inventories and output against volatile energy costs and rising styrene prices.

We will be finalising the general-purpose polystyrene (GPPS) and high-impact polystyrene (HIPS) contract deltas for December at minus €110/t this week.

January negotiations are underway, with at least two producers publicly announcing price increases of €140-150/t on

monthly GPPS and HIPS supply contracts. While this remains supported by rising feedstock styrene prices, easing energy costs in Europe have helped ease some pressure on production margins and buyers will be looking to relieve some of the cost pressure over the course of monthly negotiations given minimal offtake.

Cyclohexane

The January reference price for cyclohexane has been assessed at €1,122/t, up by €100/t from December. This took into account the increase in feedstock benzene CP for January and the first-quarter 2023 delta contract, which was agreed at €310/t, down by €45/t from the fourth quarter of 2022.

Phenol

The monthly reference price for phenol rose by €145/t to €1,272/t in January, tracking the increase in the feedstock benzene CP. The January CP for propylene, another main feedstock for cumene-phenol production, fell by €95/t from the previous month to €1,075/t, reflecting the decline in feedstock naphtha costs and low demand.

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ASIA-PACIFIC

Benzene

The Asia-Pacific benzene market saw heightened volatility over the past week, with some deals briefly breaching the \$900/t mark on 3 January before prices plummeted in the second half as sellers sought to liquidate February-loading cargoes.

Asian benzene kicked off the year on a bullish note as sellers hiked offers for February-loading cargoes, encouraged by strong gains in the downstream styrene monomer (SM) futures market. Asia also lacked cues from the US market, which had yet to reopen. This paved the way for a spike in spot prices on the first day of trade in 2023. But the sharp increase lacked fundamental demand support, with sentiment in the key Chinese market undermined by the rapid spread of Covid-19 infections. Benzene prices eventually saw a sharp downward correction on 4 January, as the US market reopened on a downbeat note because of lower crude futures. Suppliers in Asia then attempted to liquidate stocks fearing further price erosion, leaving the spot market well-offered.

The increase in price volatility was accompanied by a spike in liquidity, with a flurry of trades taking place at the start of the year. Several deals were transacted over 3-4 January. BASF InterTrade sold a February cargo to GS Caltex at \$893/t on 3 January. Offers and bids for February further increased, following the conclusion of the deal. A second deal was done on the same day, with PTT selling to SK Geo Centric at \$903/t.

Three more deals were concluded the following day. A deal was done in the morning session at \$883/t for February arrivals. But this price was no longer workable for buyers in the afternoon session as a result of an abundance of offers. Two deals for February were eventually done, the first at \$854/t and the second at \$853/t. The buying and selling parties in both cases were not disclosed.

In the Chinese domestic market, Sinopec raised its benzene list price by 150 yuan/t to Yn6,650/t on 3 January, or at an import parity equivalence of \$837/t. Ex-tank cargoes in east China were discussed at Yn6,620-6,650/t on the last day of trade in 2022, and domestic prices peaked for the week at Yn6,820-6,860/t after the market reopened.

Inventories in east China continued to build, with stock levels having risen over nine consecutive weeks since early November. Major port inventories rose by around 6pc from late December to 216,700t on 4 January, marking the highest level in almost a year. Benzene inventories were last higher at 240,800t in early February 2022.

Asia-Pacific prices					\$/t
	Timing	Low	High	Mid	±
Benzene					
cfr South Korea contract	Dec	807.28	810.00	808.64	nc
cfr Taiwan contract	Dec	810.00	828.28	819.14	nc
cfr Asean contract	Dec	810.00	823.28	816.64	nc
fob South Korea	1H Feb	832.00	903.00	867.50	+11.50
fob South Korea	2H Feb	832.00	903.00	867.50	+11.50
fob South Korea	1H Mar	831.00	901.00	866.00	+12.00
fob South Korea	2H Mar	831.00	901.00	866.00	+12.00
fob South Korea	1H Apr	831.00	901.00	866.00	
fob South Korea	Marker			863.25	+5.87
cfr China spot	Prompt	860.00	936.00	898.00	+11.50
cfr China month avg	Dec	824.29	831.38	827.84	-0.81
fob southeast Asia	Prompt	802.00	863.00	832.50	+13.50
ex-tank E China Yn/t	Prompt	6,620.00	6,860.00	6,740.00	+190.00
ex-tank E China	Prompt	805.40	834.60	820.00	+33.39
ex-works Sinopec Yn/t	Prompt			6,650	+150.00
ex-works Sinopec	Prompt			790.80	+10.19
Styrene					
cfr Taiwan contract	Dec	1,030.00	1,030.00	1,030.00	
cfr China	Jan	1,040.00	1,095.00	1,067.50	+20.00
cfr China	Feb	1,040.00	1,110.00	1,075.00	+22.50
cfr China	Marker			1,067.19	+17.19
fob northeast Asia	Jan	1,040.00	1,105.00	1,072.50	+35.00
cfr South Korea/Taiwan	Prompt	1,070.00	1,135.00	1,102.50	+20.00
ex-tank China Yn/t	Prompt	8,190.00	8,460.00	8,325.00	+80.00
ex-tank China	Prompt	996.41	1,029.25	1,012.83	+22.66
cfr India	Prompt	1,120.00	1,195.00	1,157.50	+20.00
ex-tank India Rs/kg	Prompt	98.00	99.00	98.50	nc
ex-tank India	Prompt	1,184.32	1,196.41	1,190.37	-0.08

Benzene freight rates				\$/t
	Size t	29 Dec	5 Jan	
South Korea to China	3,000	43	40	
Thailand to mid China	6,000	61	59	
South Korea to Houston	6,000	205	205	
South Korea to Houston	12,000	175	175	

Asia-Pacific polystyrene markets				
	Yn/t	±	Import parity \$/t	±
China ex-works				
GPPS	8,700-8,900	0.0	1,039-1,063	14.0
HIPS	9,800-10,000	0.0	1,171-1,196	16.0
China spot cfr CMP price \$/t				
GPPS			1160.0 / 1180.0	45.0
HIPS			1300.0 / 1320.0	30.0

ASIA-PACIFIC

Burgeoning inventory levels at major Chinese ports contributed to a dearth of cfr China buying interest, with no bids or discussions. Market participants remain focused on digesting on-hand cargoes ahead of the approaching lunar new year holidays.

In southeast Asia, Malaysia's PRefChem is likely offering a 3,000t benzene parcel loading in late-January from Pengerang. But the cargo is yet to be sold and discussions are likely to continue on 6 January.

An offer for a southeast Asian origin cargo was made between parity to \$3/t discount to posted fob South Korea prices, on a cfr southeast Asia basis for February arrivals. Bid expectations from some traders sunk to around \$50-60/t discounts to fob South Korea prices, but these were deemed too low for sellers and no deals were concluded.

Vietnam's Nghi Son Refinery and Petrochemical (NSRP) likely cut benzene output following a possible leakage at its upstream residual fluid catalytic cracker (RFCC). The NSRP aromatics unit has a benzene production capacity of 250,000 t/yr and had previously experienced unplanned outages in March and May 2022.

Styrene

Asia-Pacific styrene monomer (SM) prices saw sharp increases in the first half of the week to 5 January, but eventually retreated owing to losses in the upstream benzene and crude markets.

Demand in China remains sluggish in the lead up to the lunar new year holidays, as restocking activity was dampened by a surge in Covid-19 cases after the country's zero Covid-19 policy was lifted.

Cfr east China discussions were brisk, with several offers and bids tabled primarily for January-arrival cargoes. But no deals were confirmed. SM prices averaged \$1,067/t for the week to 5 January, up from around \$1,048/t in the last week of December 2022.

Uncertainties remain about the post-lunar new year outlook given the recent volatility in the upstream market, leaving little buying interest for February-arrival cargoes. Continued losses in upstream crude values also served to undermine sentiment in the SM spot market in the latter half of the week.

Domestic cargoes in China were traded at 8,190-8,460 yuan/t during the week, or at an import parity equivalence \$1,013/t. Prices rose by around Yn80/t compared to prices in late December.

SM prices fob northeast Asia increased despite generally lukewarm demand in the cfr east China market, given concerns over near-term supply. Market participants estimate that operating rates at SM makers in South Korea have dipped to around 60-70pc, primarily as a result of increasingly squeezed margins. Suppliers consequently hiked export offers, with fob northeast Asia values discussed at parity to \$10/t premiums to cfr east China prices.

The India market saw limited trade, as discussions got off to a slow start in 2023. Domestic SM prices were rolled over owing to muted negotiations, while workable prices for imports continued to be at around \$20/t premiums to published cfr China assessments.

Polystyrene

Domestic polystyrene (PS) prices in China were steady this week, despite slight gains in the global market.

Reductions in upstream styrene monomer (SM) operating rates could curb price declines, but the lack of demand support continues to cast a shadow on the outlook for the rest of January.

Narrower PS-SM margins in China further limited demand, as spreads declined to around 475 yuan/t.

Domestic General Purpose PS (GPPS) prices in China held stable owing to lukewarm buying, as most consumers have already stockpiled sufficient volumes to last until the lunar new year holiday. Trades took place at Yn8,700-8,900/t, stable from late December 2022 and equivalent to \$1,050/t on an import parity basis.

South Korea benzene premium to Japan naphtha \$/t



ASIA-PACIFIC

Domestic High Impact PS (HIPS) prices were also unchanged at Yn9,800-10,000/t, or around \$1,183/t on an import parity basis.

GPPS was traded at \$1,170/t cfr China, while transactions for HIPS took place at \$1,310/t.

Phenol

China's phenol market remained on an extended downward that has lasted for three months. Ample supplies, weak demand and up-coming capacities have exerted downward pressure on prices.

East China prices slipped to Yn7,400-7,450/t ex-tank Jiangsu (\$901-925/t on an import parity basis) this week, the lowest since December 2021. Prices were down by Yn150-250/t from the previous week, a decline of Yn550-650/t or 7pc on the month.

Import supply was limited with port inventories falling back to 12,000t this week after a build of close to 20,000t in late December. A major Saudi supplier cut December exports because of a month-long turnaround that started in early December.

Domestic production was on higher because of a light maintenance schedule. Average operating rates at Chinese phenol/acetone plants rose to a 10-month high of 93pc this week, compared with 87pc a month earlier. Ningbo Formosa restarted its two units, comprising 400,000/243,000 t/yr of phenol/acetone capacity in late December after a two-month turnaround.

In addition, a wave of new startups weighed on market sentiment. Three new phenol/acetone units are expected to be put into operation in the first quarter of 2023, including Sinochem Ruiheng's 400,000/250,000 t/yr unit, Shenghong Petrochemical's 400,000/250,000 t/yr unit and Guangxi Huayi's 175,000/105,000 t/yr unit.

Non-integrated phenol makers in Asia started seeing negative margins from late December. Margins at non-integrated Chinese producers fell to a five-month low of -\$64/t from \$74/t a month earlier. Producers' average margins in 2022 were \$102/t. Other Asian producers' margins deteriorated to -\$165/t this week from \$15/t a month earlier and compared with average margins of \$10/t in 2022.

ANNOUNCEMENTS

Change to price formulas for benzene and derivatives

Following consultation, Argus on 19 January will change the fixed production cost adders in its price formulas for Americas cumene, the USGC styrene large buyer index, the USGC fob cyclohexane contract and the USGC cyclohexane market with NG escalator, to variable adders reviewed quarterly by Argus and announced to subscribers in Argus Benzene and Derivatives when adjusted.



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