

Water treatment specialties resurface

Water scarcity, recyclability, regulation, new technologies drive return to growth

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The water treatment specialty chemicals sector is expected to recover from the COVID-19 pandemic and achieve growth in 2021 and beyond, driven by the industry's role in battling water scarcity, and by demand for clean water and the essentiality of water as a resource in many manufacturing industries. New chemicals and technologies that enable water recyclability, in parallel with regulation, are also likely to drive a rebound in consumption.

COVID-19 hurt demand for water treatment chemicals last year, the leading producers say. "The global pandemic had quite a big negative impact on industrial activity and associated consumption of industrial water treatment specialty chemicals," says Mark Eyers, vice president/global advanced water solutions business unit at Italmatch.

According to the Water Management Chemicals report, published recently by IHS Markit's Specialty Chemicals Update Program (SCUP), worldwide demand for water treatment specialties declined by at least 3% in 2020 owing to COVID-19 with gradual recovery expected to begin in 2021. Consumption of water treatment specialties is estimated to grow 3.5%/year from 2020 to 2025, the report says.

Mainland China and North America were the major consumers of specialty chemicals for water treatment in 2019, accounting for 43% and 29% of global consumption, respectively, according to IHS Markit. The rate of consumption is slowing in developed regions because the emphasis there is increasingly on minimizing dosing levels and cost reduction, while emerging markets, especially mainland China, have the best potential for growth, IHS Markit says.

The pandemic's impact varies between end-use segments, Eyers says. The beverage industry "has been negatively affected a lot, while other food industries have even seen a boost," he says. "Primary industries like the steel industry and in particular the oil and gas [O&G] upstream and downstream industries have seen a strong negative impact."

Meanwhile, "the municipal markets have not been negatively impacted by the pandemic

situation and during the first half of 2020 we have even seen pre-buying activities in order to increase safety stock levels," he adds.

According to Antti Salminen, president/industry and water, and a board member at Kemira, the pandemic has been "a resilience test for many businesses." He says that demand was solid throughout 2020, despite the oil industry's sharp downturn in the first half of the year.

The essential nature of applications for water treatment chemicals has ensured robust demand, says Edward Connors, senior vice president/industrial water technologies at Solenis. "Our business has remained strong, owing to the essential markets we serve, which include consumer packaging, tissue and towel, municipal, and many other essential goods producers," Connors says. He notes that "in areas like bath tissue and packaging for e-commerce, our customers have ramped up production significantly as a result of COVID-19."

Alexander Scheffler, head of global marketing at Lanxess's liquid purification technologies business unit, says demand for the company's water treatment specialties has been strong and this is expected "to continue also in 2021. Especially the demand for potable water products is growing. Also we see a growing interest in specialties for the removal of specific substances from drinking and wastewater," he says.

Meanwhile, Kemira's focus since the beginning of the pandemic has been sharply on the reliable and on-time delivery of the company's water treatment specialties used in applications such as drinking water production and wastewater treatment, Salminen says.

Recyclability of wastewater to battle water scarcity is one of the major trends driving the demand and use of water treatment specialty chemicals, according to the IHS Markit

report. Other trends include emerging markets, customer consolidation and globalization, an emphasis on the middle market with large water service companies redirecting their focus on middle-tier market clients through acquisitions and the restructuring of their sales force,

increased regulatory costs, green products, the use of hydraulic fracturing to produce oil and natural gas from shale, consumption optimization, combined technologies, membranes technology, sludge reduction, and wireless communications and remote monitoring, IHS Markit says.

Reuse of water and saving resources are becoming "more and more essential," says Scheffler. Stricter regulatory requirements are expected to boost demand for specialty ion exchange resins, he says.

According to Connors, "the two biggest trends are undoubtedly changes in customer expectations around service and sustainability initiatives."

Global megatrends such as a growing middle class and urbanization in developing countries continue to drive the need for water treatment and hygiene products, says

Salminen. "The increasing scarcity of resources and comprehensive efforts to enable a circular economy will additionally grow the demand of sustainable products and technologies in which our chemicals already today play a key role," he adds.

Water recyclability, scarcity

The use of water treatment specialties to recycle wastewater is driven mainly by efforts toward a circular economy. This includes authorities' initiatives to conserve and reuse wastewater, as well as "the increase in demand for chemically treated water by end-market industries," says Eyers. Companies are aiming to optimize existing water



SCHEFFLER: Reuse of water is becoming essential.



SALMINEN: COVID-19 has been a resilience test for businesses.

treatment specialties and develop new products to enable recyclability of wastewater. Recovering phosphorous from wastewater sludge or ashes is a major focus area for Italmatch, Eyers says.

Salminen says that Kemira together with a consortium of partners has developed a phosphorus-recovery technology for recycled phosphorous fertilizer. “Since phosphorus [is] on the list of critical raw materials for the EU, increasing efforts can be noted to recover these phosphorus sources from urban wastewaters to build more independence from virgin sources outside the EU,” he says.

Reliable purification and disinfection of wastewater are necessary for the safe and sustainable reuse of water, says Salminen. “With the recently adopted Regulation on Water Reuse, the EU has enabled a harmonization of the quality criteria for reused water and thus provides a strong impetus for widespread acceptance and EU-wide



GUPTA: Automation, digital tools pave the way ahead.

Water, an Ecolab subsidiary, highlights the importance of recycling and reusing water to a circular economy and the potential to improve water supply by better managing wastewater. “With increasing water scarcity, particularly in certain geographic regions, the

reuse of water from operational processes is progressively being driven as an alternate source of water supply. Water reuse as an alternate source would be synergistic with the principle of a circular economy,” Gupta says. Water scarcity is an issue of growing concern because it afflicts, in multiple ways, numerous regions including southern Europe, the southwestern US, parts of China, India, Australia, and the Middle East.

“The availability of fresh water is essential for life and socioeconomic development, [and] access to water and sanitation is a basic human right,” says Scheffler. “Driven by the increasing competition for the scarce resource, water, between industry, household consumers, and agriculture, the demand for

chemicals are more effective in controlling the fouling and microbial problems that can reduce efficiency, such as heat transfer, in many industrial applications.”

Connors notes that the role of companies developing water treatment specialty chemicals is “to engineer products that can minimize water consumption by meeting the high stresses generated by maximizing efficiency and recycling. Deposit inhibitors, anti-foulants, and dewatering aids all play a crucial role,” he says.

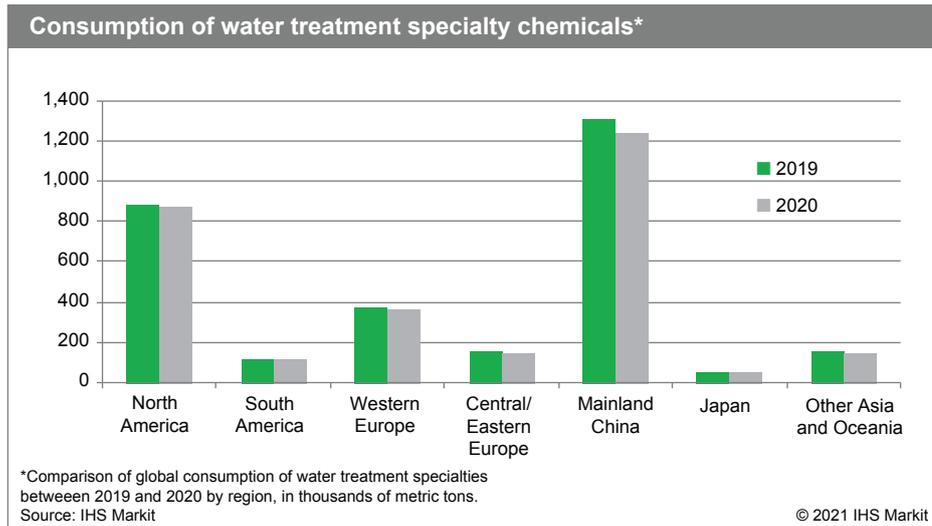
The growing need for specialty chemicals is also driven by the efforts of many industries to achieve closed industrial water cycles and zero liquid discharge (ZLD), as a means of tackling water scarcity, IHS Markit says. ZLD is a water treatment process in which all wastewater is purified and recycled, leaving zero discharge at the end of the cycle. ZLD and the closing of industrial water cycles result “in more complex and concentrated water streams in which deposits, corrosion, and microbiological growth have to be controlled. Hence increased use of water treatment [specialties] and requirement for new active ingredients that can deal with the more extreme conditions,” Eyers says.

Sustainability, digitalization, regulation

Increasing demand for green products is another major trend that has resulted in growing consumption of products such as microbiocides that are less toxic and products that are biodegradable. Water treatment firms are spending significant R&D resources developing products to meet that demand, IHS Markit says.

The demand for greener products “is affecting our business ... [and] we are continuously expanding and improving our product portfolio to offer our customers ever more efficient grades for ever more environmentally friendly applications,” says Scheffler. “We will further expand our ion exchange resins business and plan to build a new production facility, as announced in 2020.”

Italmatch has developed sustainable products in recent years to support new market needs in various industrial applications such as O&G water treatment in Norway, Eyers says. “Brand new sustainable and green new chemistries include phosphonated amino acid derivatives [biodegradable phosphonate with increased sustainable raw material content] and inulin derivatives [chemically modified biological polymers extracted from chicory roots].”



dissemination of this technology,” he says. Reusing wastewater in industrial processes does create new challenges, which of course need to be addressed, notes LaMarr Barnes, CEO of Kurita Americas, the Americas division of Japan’s Kurita. “If you are using gray water in areas where you had previously used fresh water, then you’ll have a different set of issues,” he says. “The chemistry will have to be more robust, flexible, and targeted when you are working with gray water.” Amit Gupta, senior staff scientist at Nalco

water treatment chemicals will be increasing,” he says. Water scarcity threatens the viability of economies and businesses around the world, and water treatment specialties can address the issue by helping improve water management. “Water is critical in almost all production processes. Using water for manufacturing means heating, cooling, moving, and treating it ... Corporations actually consume 40% of all water used in the developed world,” says Gupta. “Specialty

In addition to customers demanding solutions to improve operational sustainability, “we are seeing significant pull for solutions to improve the sustainability of our customers’ finished products,” says Connors.

Sustainability also has a major impact on company strategy. Gupta says it is a driving force in everything Nalco does. “There is a lot riding on the water treatment specialty chemical industry’s ability and resiliency to help operations meet [customer] needs while protecting the public health and preserving natural resources. The decisions we make in this decade are crucial to creating a sustainable way of life,” Gupta says.

Sustainability has reached an inflection point, with customers seeking more support to achieve their goals, says Connors. Solenics’ mandate “has always been to help our clients around the globe reduce their energy and water footprints, minimize waste, and optimize the use of resources,” he says.

Likewise, Kemira’s “company purpose is to enable our customers to improve their water, energy, and raw material efficiency. This purpose anchors sustainability into our strategy by recognizing that our biggest impact can be realized through enabling our customers to achieve their sustainability ambitions,” says Salminen.

He also notes that according to results from Kemira’s own market research in Europe, there is a clear “customer trend toward more digitization and the demand for more sustainable solutions in the water industry.” Kemira clearly sees “various developments that will further increase the need for effective and sustainable water chemistry in combination with data-driven application technology,” Salminen says.

COVID-19 has sped up the digital transformation in the water treatment chemicals industry. “There was sharp movement to more remote monitoring and control of our chemistries, collaborative problem-solving with experts having easy access to data remotely, and increased use of data analytics to solve problems,” Connors says.

Many companies now rely on digital tools and technologies such as the Internet of Things (IoT) to keep operating and avoid partial or total shutdowns, Gupta says. “Through this process they are learning that IoT and digital tools are increasing efficiency, optimizing operations, improving product quality, bolstering safety, and generating real value,” he says.

In addition, “IoT and digital tools aren’t just

providing short-term cost savings,” says Gupta. “They are changing the way that companies operate, and this will continue long past the pandemic. Automation tied back to chemistry, equipment, and all other specialty offerings will be the driver,” he says.

Nalco’s main technological focus moving forward is on combining IoT-enabled devices with artificial intelligence and automation that enable companies to adjust chemical and mechanical processes in real time, Gupta says.

IHS Markit says that process-water, drinking-water, and wastewater plants are increasingly implementing wireless communications and remote monitoring, reducing the need for personnel on site and allowing for 24-hour remote control and adjustment of plant operations, including chemical use. This opens up opportunities for reduced stocks of water treatment chemicals, as delivery can be exactly timed, it says.

Water reuse increases the need for control systems to ensure water quality, says Kevin Milici, executive vice president at Kurita Americas. “The control of the chemistry inside the system has to be tighter. Monitoring and proactive alerts are important to ensure that recycled water remains fit for purpose,” he adds.

Growth of the water treatment specialty chemicals industry is also dependent on regulatory drivers, IHS Markit says. The cost of complying with European regulations such as the Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH), which impacts the world as well as the EU, has reduced the chemicals entities available for water treatment. Small companies are put under severe pressure by the cost of registering active ingredients, IHS Markit says.

REACH entails high costs, especially in relation to maintaining registrations for commercially available chemical substances in lower-volume bands, says Evers. The very narrow definition of substances, such as different neutralization levels of the same substance with the same counter ion, also significantly increases the number of dossiers to be supported with regulatory data, he says.

Italmatch says it has nevertheless had a good experience with the Product and Process Oriented Research and Development process of REACH for launching new experimental chemistries in the market. “The procedure has allowed us to fully proof the value of new substances/chemistries in the market before having to spend large amounts of money on REACH registration,” Evers says.

Registration processes are long and expensive, so “it is crucial to consider aspects such as additional costs and an extended registration timeline already during the business case evaluation and planning phase,” says Salminen. “An early evaluation of the regulatory status saves time, money, and resources,” he says.

As regulation tightens, water treatment requires more water chemistry to reach increasing purity targets, Salminen says. “In the UK for example, the latest Asset Management Period 7, which defines the new investment cycle and performance goals for British water companies, sets a new and very ambitious target for wastewater treatment applications, such as nutrient removal. We trust that this can serve as a model for the rest of

Europe, where the urban wastewater treatment regulation is also currently being reviewed,” he says.

Water treatment in food production and food packaging is under increasing scrutiny, and COVID-19 has changed food supply chains dramatically, Connors says. This means that “water quality in packaging mills and processing plants has to meet a very high standard. We are at the early stages of increased regulation in this regard,” he says.

Meanwhile, in China, rapid industrialization and growth of the urban population have spurred an unprecedented increase in demand for clean water and since 2015 the government has been expanding its emphasis on improving the quality of the country’s water supply, IHS Markit says. As a result, the Chinese government has introduced stricter regulations on water quality and use that will bring opportunities for chemical growth in water treatment, IHS Markit says. ■



CONNORS: Sustainability has reached an inflection point.



EYERS: EU REACH substance registration entails high costs.