

Valves

VAT's Valves segment provides the industry's broadest range of high-precision vacuum valves and sells mainly to original equipment manufacturers (OEMs). The segment comprises three business units: Semiconductors, serving the semiconductor sector; Display & Solar, serving the high-end flat-panel display and solar photovoltaic markets; and Advanced Industrials for customers in a variety of industries and in scientific research. The Valves segment operates manufacturing facilities in Switzerland, Malaysia and Romania, with sales, product development and engineering support in all major markets*.

Demand in 2021 was substantially stronger than the previous year, mainly reflecting a 40% increase in investments into new wafer fabrication equipment (WFE) in the semiconductor sector compared with the previous year, to a record USD 85–90 million. This was driven in part by long-term growth trends, such as cloud computing, the Internet of Things and 5G wireless communications. Additionally, semiconductor manufacturers continue to develop new chips with smaller node sizes for coming generations of digital devices, which drives investment in new production platforms. WFE investments grew further in response to a supply shortage in 2021 that resulted from pandemic-related logistical bottlenecks and sharp increases in data generation reflecting the shift to home office and increased e-commerce activities.

The segment's other markets also developed positively in 2021. Vacuum process technologies continued to expand into more industries, such as precision coatings and metrology, while demand in the solar photovoltaic sector grew strongly on the back of new and more efficient solar cell technologies. The displays market reached a cyclical low in 2021 but began to recover towards the end of the year.

Semiconductor demand at record levels

The Semiconductor business unit accounts for some 70% of VAT's total sales and reported record orders and net sales in 2021. Orders increased by 86% to CHF 772 million, partly reflecting additional orders placed in 2021 in anticipation of continued supply bottlenecks in 2022. Net sales grew 40% to CHF 535 million. Demand growth was driven primarily by investment in data centers and the production of logic and memory chips, both current generations and new chip generations with smaller node sizes and more complex chip architectures. The expansion of new technologies, such as EUV (extreme ultraviolet) lithography, and particularly new capital investments in China to build local semiconductor manufacturing capabilities, also drove higher orders and sales.

VAT's technology lead in the manufacture of the most advanced chips was reflected in a record year for specification wins in 2021. This allowed VAT to increase its share of the global semiconductor valve market in 2021 to 75%. Specification wins are agreements between VAT and its customers on product designs for upcoming generations of new equipment. They lay the foundation for sales growth over the following two to five years, and include a growing share of adjacent products, such as motion components and advanced modules.

VAT continued to bring new products to market in 2021, including control valves used in leading edge applications and transfer valves that allow particle-free movement of wafers in the entire wafer path. Both product families help chip manufacturers increase yield and productivity. New advanced modules, which comprise multiple valves and other components, such as lifters, shutters, and heating and cooling components were launched for selected customers on latest WFE architectures, increasing throughput by up to four times in critical applications. VAT continued to develop connected valve solutions that integrate control, computing and communication capabilities, allowing them to be used in new generations of process automation and smart factories.

* As of January 2021, VAT integrated the former Industry segment into the Valves segment and created a new business unit within the segment called Advanced Industrials (formerly General Vacuum). The change better aligns VAT's valves offering with the needs of its industrial customers. As a result, VAT now reports in two segments, Valves and Global Service.

Key figures Valves

In CHF million	2021	2020 restated ¹	Change
Order intake	1028.8	592.4	73.7%
– Semiconductor	772.2	414.3	86.4%
– Display & Solar	93.3	67.3	38.6%
– Advanced Industrials	163.3	110.8	47.4%
Net sales	729.2	565.1	29.0%
– Semiconductor	534.7	383	39.6%
– Display & Solar	65.6	77.9	-15.8%
– Advanced Industrials	128.9	104.3	23.6%
Inter-segment sales	75.0	57.0	31.6%
Segment net sales	804.2	622.1	29.3%
Segment EBITDA	269.7	198.7	35.2%
Segment EBITDA margin	33.5%	31.9%	
Segment net operating assets	737.7	675.2	9.3%
of which net trade working capital	191.0	138.7	37.7%

¹ The restated figures reflect the integration of the former Industry segment into the Valves segment, and the creation of the Advanced Industrial business unit within the segment, effective January 1, 2021. All reported segment figures have been restated accordingly.

The semiconductor business unit also continued to qualify its latest valves and high-volume modules for production at VAT's plant in Penang, Malaysia, which increased factory output by more than 70% compared with 2020, to around CHF 170 million. This included the introduction of new manufacturing technologies in the plant as well as the expansion of engineering and product management resources. This is part of VAT's strategy to better support its strong customer base in the region and to improve the overall flexibility and efficiency of its global manufacturing and supply footprint.

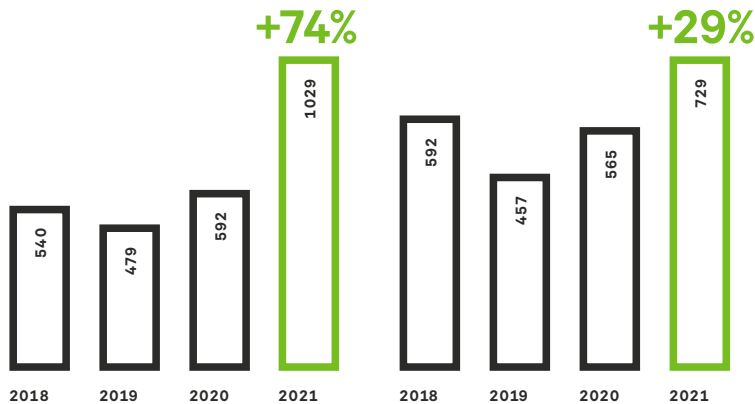
Strong solar demand, displays show signs of recovery

In 2021, the Display & Solar business unit witnessed two very different halves. While orders in the first six months remained flat, a sharp acceleration in the second half led to a full-year order intake of CHF 93 million, up 39% over 2020. As the display and solar markets are driven mainly by large projects, orders typically take longer to translate into revenues. As a result, sales declined by 16% compared to a year earlier.

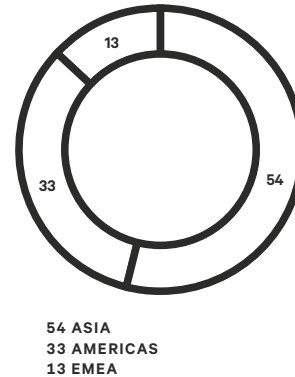
The display market remained in a cyclical low for most of 2021 but started to show signs of recovery in the second half of the year. LCD (liquid crystal display) remains the dominant technology, followed by OLED, which continues to expand its share in premium applications for phones and TVs. VAT also won initial valve orders for manufacturers of mini-LED displays, a new backlight technology that enhances the performance of traditional LCD screens. VAT also launched a new generation of control valves from VAT's Malaysia plant for major display customers in Japan, South Korea and China.

The solar photovoltaic business had a strong 2021, with growth again largely driven by the implementation of PERC (Passivated Emitter and Rear Cell) technology that produces more energy than conventional solar cells. A number of other solar energy conversion technologies that promise even higher efficiencies – and require high-vacuum manufacturing – are also under development but face some ongoing cost challenges.

Order intake & net sales in CHF million



Net sales by region %



Advanced Industrials expands VAT's market

The Advanced Industrials business unit (formerly General Vacuum) achieved record order intake in 2021 of CHF 163 million, up 47% compared with the previous year, while net sales increased 24% to CHF 129 million. Demand was strong across several markets, especially high-end coating applications, electron beam-related scientific instruments and the research segment, where VAT supplied valves for major upgrades of particle accelerators in both the US and Asia.

Demand was highest in Asia, with volumes doubling in China as the result of targeted growth initiatives and improved distribution channels. Orders reached a record level in the core European market, led by the scientific instruments sector. Growth was also driven by demand for silicon carbide crystal production equipment used in the manufacture of wide bandgap semiconductors. This technology is expected to open significant new opportunities for high-efficiency power electronics used to integrate renewable energy sources into existing power grids, as well as in trains and electrical vehicles – all essential steps to lowering carbon emissions.

Performance review 2021

Net sales in the Valves segment in 2021 amounted to CHF 729 million, 29% higher than the year before, as strong growth in the Semiconductor and Advanced Industrials business units more than offset the sales decline in Display & Solar. The segment EBITDA increased by 35% to CHF 269 million and the EBITDA margin was 33%, one percentage point above the level achieved in 2020 as positive volume effects, operational improvements and the ongoing shift in demand towards more advanced products offset higher costs incurred to support volume growth.

Market outlook 2022

For 2022, VAT expects its semiconductor-related markets to continue to grow across all segments – logic, foundry and memory. While the markets for VAT's Display & Solar business unit are forecast to remain mixed, the strong order intake in the second half of 2021 is expected to drive higher net sales in 2022. VAT also expects higher sales in its Advanced Industrials business unit in 2022, as growth initiatives targeted at specific industries – where VAT can tap its advantages in its core valves business – gain further traction.

Global Service

VAT's Global Service segment supplies customers with original spare parts, valve maintenance and service, and technical support and training. In addition, the business helps customers improve equipment performance with customized product upgrades and retrofits. Demand is driven primarily by customers' needs to improve the performance of their existing installed base of equipment. With more than one million serviceable VAT valves installed worldwide, the company's service business contributes to stronger customer relationships and is an important sales channel for VAT products.

The Global Service segment had a record year in 2021, with significant growth in all major activities: spare parts, upgrades & retrofits, and repair. This was the result of record levels of factory utilization as the industry struggled with a global chip shortage and supply constraints in some areas. This in turn drove heavy demand for spares parts, repairs and consumables. Capital investments into new semiconductor fabs drove demand for the subfab valve portion of the service business. Subfab systems protect the process vacuum chambers from the pumping and abatement systems operating in harsh conditions below the fabrication floor.

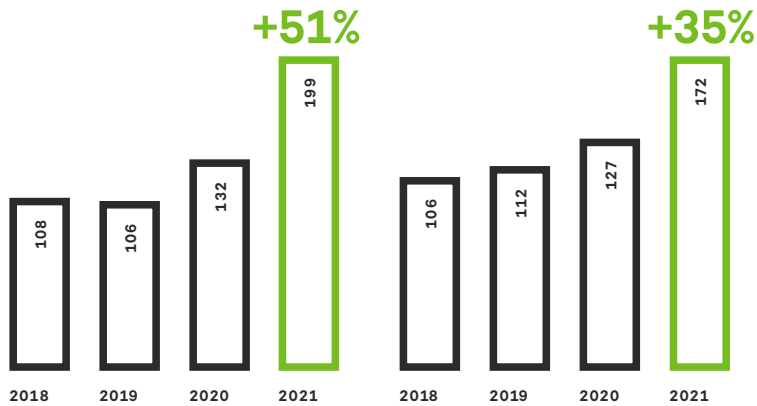
New product development in 2021 centered on the upgrade and retrofit portfolio. In particular, VAT expanded its product offering from the traditional focus on transfer valves to new control valve upgrades that allow for faster and smoother valve reaction times and improved gas flow uniformity. These are critical improvements for customers aiming to improve cycle times and yield from their existing manufacturing assets.

VAT also implemented improvements to its global service footprint with the opening of a new and larger repair center in Japan. This is to be followed by improvements to its service and repair facilities in South Korea and Taiwan. These steps, including supply and process improvements to speed up response times, are expected to significantly increase VAT's repair capabilities for many of its largest customers in Asia.

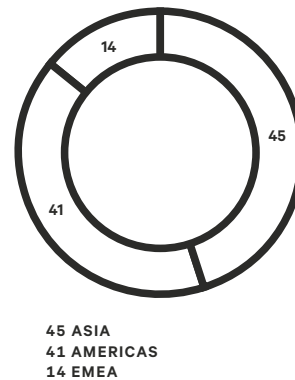
Key figures Global Service

In CHF million	2021	2020	Change
Order intake	199.1	132.2	50.6%
Net sales	172.0	127.3	35.1%
Inter-segment sales	-	-	-
Segment net sales	172.0	127.3	35.1%
Segment EBITDA	77.8	53.2	48.1%
Segment EBITDA margin	45.3%	41.8%	
Segment net operating assets	122.3	119.4	2.4%
of which net trade working capital	27.6	23.7	16.5%

Order intake & net sales in CHF million



Net sales by region %



Performance review 2021

Orders in the Global Service segment increased 50% year-on-year to a record CHF 199 million and sales grew 35% to a record CHF 172 million. Growth was reported in all businesses and was strongest in upgrades and retrofits, capturing the opportunities opened by the new product offering in control valve upgrades. EBITDA grew 48% versus the year before to CHF 79 million. The EBITDA margin increased to 46%, mainly reflecting differences in product introduction costs between the two years.

Market outlook 2022

VAT expects the market for its Global Service business to continue to grow in 2022 as semiconductor manufacturers continue to invest in both new capacity and in upgrading their existing vacuum equipment assets. In addition, VAT expects higher sales as its installed base increases, including some specific products that are entering their first larger repair cycle. The company expects its service footprint expansions and the roll-out of new control valve upgrades to further support sales growth in 2022.