



**EXPECT**  
STORIES FROM THE  
AVK WORLD

Expect... **AVR**







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### Chief editor

Anne-Mette Kjær – amk@avk.dk

Michael Ramlau-Hansen – mrh@avk.dk

### Content

Katrine K. Sørensen – kakl@avk.dk

Christina Villumsen – chrvil@avk.dk

### Frontpage image

AVK valves have been donated to a development project in Madi, Nepal, which is still under construction.

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# DEAR READER

## **The Value of Water**

At the UN 2023 Water Conference held at UN's New York headquarters in March, the Danish Water Forum held a side-event in collaboration with the World Bank called "The Economics of Ground Water in Times of Climate Change". At the side-event, the World Bank's new report "The Hidden Wealth of Nations" was revealed, which focuses on our problematic handling of groundwater. The report states that approximately 49% of the world's water supply for drinking water comes from groundwater, along with 43% of all water for irrigation, covering approximately 38% of the irrigated agricultural land.

The report further states: "Groundwater also sustains ecosystems that depend on it almost everywhere, especially in climate frontier areas. Yet its importance has been underappreciated, undermining its potential for boosting growth, reducing poverty, and buffering against climate shocks. Hidden below the Earth's surface, this common-pool resource is subject to barely visible depletion, with impacts that can be difficult to reverse.

Undervaluing this natural capital undermines tapping its potential for development and threatens some hard-won gains in regions that have heavily relied on it."

Groundwater is found all over the globe; it is only a matter of availability and quality. In some places, groundwater supply is challenged due to overexploitation, and in other places it is abundant without being exploited. An example of the first is entire cities that are sinking; the second example is the Horn of Africa, where reportedly cubic kilometres of groundwater are waiting at a depth of 800 metres.

But groundwater's value is one thing, water in general is another. I miss a water sector that draws attention to water's value to a much greater extent. Water is inextricably linked to all the other major agendas and challenges our world is facing. Water and energy are interlinked, as water demands energy, and energy demands water. Water shortage and excess is heavily linked to and climate change. Water is completely essential in the world's increasing food production.

Water is vital for human health and liveability, and for community development.

We need politicians and policymakers to understand the value of water, and to prioritise the investment in proper water infrastructure, and in that way contribute to a sustainable way of managing our precious water resources.

It could be interesting to set up a formula in order to be able to calculate the value of water. In the booklet "Water in the World – local and global challenges" a few statements are made regarding the value of water. One of these is: If the entire world's population had access to clean drinking water, sanitation and hygiene, the total global scale of diseases could be reduced by up to 10%.

As you can read in the case stories throughout this edition, water holds value in so many different ways. Common for them all are that they are completely essential in upholding the infrastructure around us.

Enjoy reading,  
Michael Ramlau-Hansen

# GATE VALVE INSTALLED MORE THAN A CENTURY AGO **STILL OPERATES PERFECTLY**

# INDIA

A lot has happened in the world since 1914. But some things remain the same, which is also the case for a Glenfield gate valve installed on a treatment plant in Chennai, India and it still operates flawlessly.

*By Deepak Baliga,  
Managing Director,  
AVK India*



The valve in question is a DN 650 (26") Glenfield gate valve, measuring DN 650 (26"), and it is still working perfectly after more than a century of service. The valve is installed in the common header of the Kilpauk water treatment plant in Chennai and has been in continuous operation.

In the AVK Group, we take pride in our commitment to quality and reliability. We believe that our customers deserve the best possible products, and we strive to deliver on that promise every day. Our team of engineers and

technicians works tirelessly to design and manufacture products that meet the highest standards of quality and durability.

### **Expect quality in everything we do**

The remarkable fact that one of our valves has lasted for over a century is a testament to our commitment to excellence. It is proof that our products are built to last and that our customers can rely on them to perform year after year, decade after decade. We are honoured to have played a small part in the success of the

Kilpauk Water Treatment Plant and to have contributed to the well-being of the people of Chennai. We are proud to have demonstrated the value of investing in quality and reliability, even in an age where planned replacements have become the norm.

We remain committed to delivering the best possible products to our customers and to maintaining our reputation for quality and reliability. Thank you to the team at the Kilpauk Water Treatment Plant for their trust in our products, and we look forward to



serving them and other customers for many years to come.

### Introducing water treatment in the area

The Kilpauk water treatment plant, where Chennaites (people living in Chennai) first got the taste of treated water, is set to enter its 110th year of service this year.

The 66 acres where the plant was built by engineer JW Madley, the man behind the project, has all the remnants of the British era and most of the machinery are considered an engineering marvel. The regulated water supply system to Chennai City was established in 1872 on commissioning of the scheme formulated by British engineer James Fraser.

To be able to tap the water from the Korataliar River, a six feet high dam was built across the river at Tamaraipakkam, about 27 km from the city. The surplus water flowing in the Korataliar got diverted into a nearby lake, the Cholavaram. From there, water was diverted to Red Hills Lake through a 4 km lower supply channel. The proposal of James Fraser confirmed that the Red Hills Lake would remain as the terminal storage point of water drawn from Korataliar River.



### A safe solution was needed

The plant's construction became a necessity after the open canal that was previously supplying water from Red Hills to Kilpauk shaft got polluted, which resulted in water-borne diseases.

JW Madley developed 14 slow sand filters which are still part of the plant today. This approach followed the principle that bacteria will eat bacteria, and it is said that water through this process has a 99.9% purity.

In 1927, Chennai got chlorinated water after JW Madley introduced it. In 1954, it was shifted to a rapid gravity filtration system. After 1954, several schemes for improvements and expansion of the

system had been implemented and commissioned.

Despite the many improvements of the plant, the gate valve is still in place and working perfectly.

The plant currently provides 270 million litres each day to Chennai.

UK-based Glenfield Invicta (a merge of the former companies Glenfield and Invicta) is part of the AVK Group, and are leading providers of valve solutions for dams, reservoirs, hydropower, and wastewater applications.



26" Glenfield Gate valve



# MONITORING VALVES' POSITION IN DUTCH WATER SUPPLY NETWORK

## THE NETHERLANDS

VIDI Positioners have been installed on valves in the supply network of the Dutch drinking water company PWN. The Positioners collect information about the valves' open/close position, thus increasing the reliability of data measurements from the distribution network.

*By Gerner Knudsen,  
Business Development Director,  
AVK Smart Water  
&  
Hans Bos,  
Account Manager,  
AVK Nederland B.V.*



PWN supplies drinking water to more than 800,000 consumers, who have a total consumption of around 110 billion liters of drinking water every year. Almost half of the amount of water supplied by PWN is purified from surface water in the North Holland dunes.

PWN has 33,000 valves in their water distribution network managing the drinking water in North Holland.

All valves are important, but for some valves it is critical to know with

absolute certainty whether the valve is open or closed. Worst case scenario, a wrongfully opened or closed valve can influence other measurements such as flow or pressure, and thereby give incorrect information about the distribution network. As this can affect the ability to ensure a fully functional water network and the best service for consumers, it is valuable information for PWN – as for any other utility – to know if their valves at critical points are open or closed.

As a pilot project at PWN, VIDI

Positioners have been installed on three valves for digital monitoring of the valve open/close positions, and a test environment was built to monitor data from the Positioners. The installation gives PWN the opportunity to react





quickly in case of incidents requiring their attention, and also allows for optimisation of maintenance activities in the network.

The project was scheduled for six months and was completed successfully and to the satisfaction of the utility. PWN and AVK Nederland have had an excellent relationship for many years, and we look forward to a continued successful collaboration.



#### About AVK Smart Water

The AVK Smart Water concept consists of battery-operated wireless IoT sensors for data collection directly from the network. The complex data

is turned into valuable insights when integrated into either the existing IT system or into AVK Smart Water's dedicated software platform.

The VIDI Positioner detects the open/close position of a gate valve and transmits the data wirelessly. The measuring device is installed in combination with an AVK extension spindle on the valve, making it easy to detect if the valve is rightfully opened or closed.

# THE IMPORTANCE OF CORRECT CONFIGURATION TO AVOID CAVITATION

# ITALY

Our control valves, series 872 and 879, are ideal allies in ensuring optimal valve performance and efficient cavitation control. Through a specialised tool, we can evaluate the potential need for a specific accessory to ensure accurate configuration.



*By Luca del Negro,  
Marketing Graphic Designer,  
AC.MO S.r.l.*

Article continues on the next page >



In the field of control valves, the operating conditions of the system are not always optimal for the proper functioning of the equipment. In many cases, it is necessary to significantly reduce the pressure value in the pipeline or deal with extremely slow or fast flow rates.

These extreme conditions can lead to improper operation of control valves. An excessively closed valve may experience rapid wear or, in extreme cases, be destroyed by cavitation incidents.

Cavitation consists of rapid vaporisation and condensation of a liquid. When local pressure falls to vapor pressure, vapor bubbles are formed and when these bubbles travel to an area of higher pressure, they collapse and create great local stress.

The most dangerous effect is the erosion and corrosion that occur within the valves and downstream piping. Furthermore, the shock waves produce pressure fluctuations and vibration with consequent noises. In the most extreme scenarios, the effects can resemble explosions, reaching noise levels exceeding 100 dB.

### Specialised tool to configure the optimal product

AC.MO, a dedicated member of the AVK Group, has examined the study of these incidents, and has transformed its expertise into a specialised software. This cutting-edge tool simulates a wide range of operating conditions, pinpointing critical scenarios with precision. Through this innovative approach, AC.MO evaluates the potential need for tailored accessories to ensure optimal valve performance and effective cavitation control.

For our needle valves series 872, various accessories can be configured, ranging from simple backpressure orifice to anti-cavitation cages and air

inlets. In cases where critical conditions only affect maximum flow rates, proper sizing of a backpressure plate can restore sufficient downstream pressure to avoid cavitation.

However, if the entire operating range is affected, it would be ideal to install a variable-sized diffuser plate. The anti-cavitation cage addresses this need by gradually modifying the downstream section based on the valve's opening degree. Alternatively, if the downstream pressure is very close to atmospheric pressure, cavitation can be eliminated by introducing air from the outside of the pipeline through an air inlet.

To address this challenge, cavitation cages are the most employed solution. AC.MO offers a standard cage design that is seamlessly integrated with the valve piston, smoothly sliding outside the valve when fully closed. For special applications, an internally integrated cavitation cage has been developed. Shapes and dimensions of both standard and internal versions are tailored to meet the specific needs of our customers and their plant.

For the diaphragm automatic control valves, series 879, v-port throttling plugs can be integrated onto the standard obturator which guarantee stability and increases opening grade at low flow or in case of high differential pressures. Just like for the needle valves series 872, AC.MO also offers a specialised software for hydraulic design of the operating conditions for the series 879 diaphragm valves. In the presence of incipient or choking cavitation, it is possible to mitigate its effects by installing two cavitation cages. For this type of valve, one cage remains fixed on the valve seat while the other moves inside it, in perfect alignment with the obturator.

With these versatile options, AC.MO provides effective solutions to manage cavitation in different operating scenarios.

AC.MO is a reliable partner that empowers companies to navigate complex operational environments with confidence, while attaining exceptional efficiency and reliability through cutting-edge technologies and customised solutions.





# AVK INTERNATIONAL SALES CONFERENCE 2023

## EUROPE



*By Lene Mark  
Head of Marketing, Continental Europe  
AVK International*

On 7-8 June, we hosted our annual sales conference at our headquarters in Skovby, Denmark. 66 colleagues from across our region spent two days with inspiring talks, social networking and discussions about future sales and marketing perspectives.

This year, we focused on the fast-growing markets within irrigation, biogas, hydrogen and desalination, since AVK has several products suitable for such applications, which can contribute to solving global water and climate challenge. We were also inspired

by new case stories from customers using AVK smart water products to monitor and improve their network management and by case stories of big projects and fruitful initiatives in Germany, Romania, Hungary, Balkan and the Baltics. We learned about the many initiatives and efforts to measure and reduce AVK's environmental impact, and our sales companies were inspired to implement lean principles to eliminate waste, improve processes and in that way improve customer service.

And not least, we were updated on the many current and future product developments, we were introduced to the great range of electrofusion fittings from Fusion Group, and we gained



exciting insights into the "AVK journey" of the successful sales company AVK Belgium celebrating its 30 years anniversary this year as well as insights into our latest representative office established last year in the Ivory Coast.

Thanks to all our great colleagues for joining us!

# AVK IN BRAZIL PARTICIPATES IN THE FITABES FAIR 2023

# BRAZIL

The International Fair of Environmental Sanitation Technologies – FITABES is one of the largest fairs of environmental sanitation technology in all of Latin America.

It brings together the leading companies within the sector, who bring their latest technologies, products, services, and equipment to a highly qualified audience. With each edition, the fair is further consolidated in the international market.

*By Juliana Cristine Celestrim,  
Marketing Analyst,  
AVK Válvulas do Brasil*



Held every two years, FITABES 2023 was held in the city of Belo Horizonte, Minas Gerais on May 22-24.

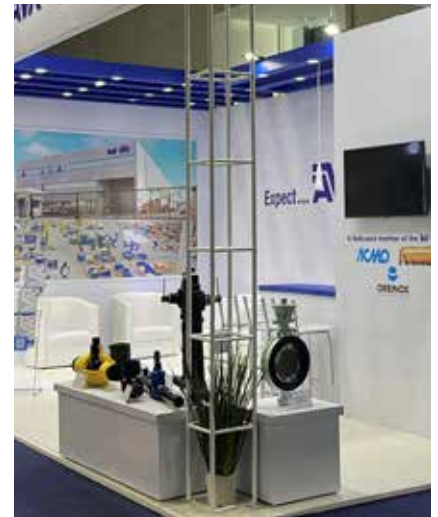
The highlight of the fair, and what gained the most attention was the HDPE valves of the Fusion brand. Especially the new AVK MAGNUS™ PA12 ball valve with its impressive working pressure of 18 bar.

Also, the bi-eccentric butterfly valve from VCW was getting attention. Here in Brazil, most companies require that the valve is standardised according to its specification. COPASA, the water company of the state of Minas Gerais, has a very precise standard, so we made sure to bring this valve to the fair. It is a butterfly valve with a fully

rubberised body, stainless steel disc and COPASA standard paint, which is green.

It was a very productive week, and it generated a lot of business for AVK Válvulas do Brasil. Thank you to all who participated.





**The following products were on display:**

- AVK gate valve, flanged, series 06/75
- AVK disc check valve, wafer, brand: VCW, series 928/10
- AVK swing check valve, flanged, brand: VCW, series 927/00
- AVK dual door swing check valve, brand: VCW, series 932/10
- AVK double eccentric butterfly valve, flanged, brand: VCW, series 926/00
- AVK butterfly valve, wafer, brand: VCW, series 931/10
- AVK CERTUST™ PE ball valves, gas mop10 / water pn16, brand: Fusion, series 85/30
- PE ball valves, mop10, brand: Fusion, series 85/50
- Ball valves AVK MAGNUST™ PA12, gas mop18, brand: Fusion, series 85/50
- AVK Repico® slip type coupling, brand: Repico®, series 745/20
- AVK Repico® hinge type repair coupling, brand: Repico®, series 747/81
- AVK repair clamp type FS10, series 748/01
- AVK repair clamp type FS20, series 748/02
- AVK repair clamp type FS30, series 748/03
- Electrofusion coupler, brand: Fusion, series 1200/01
- Electrofusion reducer, brand: Fusion, series 1202/01
- Electrofusion 90° elbow, brand: Fusion, series 1203/01
- Electrofusion reducing tee, brand: Fusion, series 1205/01





# DEVELOPING AND SUPPORTING THE LOCAL WATER SECTOR FOR FUTURE DESIGN CRITERIA

# NEPAL

*By Katrine Klejnstrup Sørensen,  
Global Marketing and Communications,  
AVK Holding*

The water supply solution in Madi, Nepal was not able to deliver enough water to the residents, who were relying on surface water and wells without knowing if the water is safe to drink. Previous attempts had been made to create a feasible water solution, but it has been impossible to drive any of the solutions to a point where it gained sufficient local support. Without support and local capabilities, even the most well-designed system will be destined to fail.

in March 2022, the final contracts for the Water2Nepal development project's construction were signed, and the site has since been buzzing to prepare the new and innovative water solution.

## **Developing a solution for now, and a criterion for tomorrow**

The project aims to supply clean and safe drinking water to approximately 4,000 citizens of Madi Municipality. Apart from delivering clean water, the project also aims to conduct a study and research on water supply







systems in Nepal in reference to the project, water consumption patterns in the country, and ultimately support the local water sector by revising the design criteria based on reliable data. Further, the project collaborates with universities to train Nepalese engineering students in designing and executing water supply systems. Since the system will be entirely new and advanced, the project will also train local plumbers and technicians on the operation, maintenance, and repair of water supply systems.

The project brings quality design through proper hydraulic modeling and quality execution through high-end pipe welding techniques, world-class valves, smart water meters for monitoring consumption and checking water balance, and smart billing and payment systems – something that has never been seen before in Nepal.

Several large Danish water companies including Grundfos, Envidan, Kamstrup and AVK are bringing their expertise to

deliver a model drinking water project in Nepal, and the project is coordinated by a Danish non-profit organisation called Jysk landsbyudvikling i Nepal in collaboration with a local partner organisation in Madi Municipality, Nepal.

#### **Latest update from the construction site**

The construction of the Water2Nepal solution, which is commonly known as 'Hamro Paani, is moving fast.

Almost 95% of the 16 km long main pipeline systems were completed by the end of February 2023. Fifty percent of the service connections were joined to the main distribution system. Project Engineer from Envidan, Mr. Surya Prajapati, shares that the system will be up and running once the pipelines, valves, and service connections are completed, and the service valves, gate valves, check valves, and hydrants which have been donated by AVK will be crucial in the long-term operation and the project's success.

The push-in valves are used for service connections, as shown in the pictures above, whereas the gate valves will be installed soon.

#### **Sustainable operation**

The complete solution will include the distribution network, a water tower, a solar panel installation as well as a technical facility near the water tower where panels can display an overview of the current supply details in terms of quantity and quality. To ensure the water quality, there will be performed tests from the network several times a year.

To have their home connected to the main pipeline, the residents will be paying a one-time fee corresponding to 60 USD to ensure a sustainable foundation for operation.

The system is expected to be completely finalised by the beginning of 2024.

# SUPPORTING THE LOCAL COMMUNITY'S PASSION FOR FOOTBALL

# QATAR



By *Dias Thottan*,  
General Manager,  
AVK Flow Control LLC

## **U15 Training Programme: Cultivating Young Talent**

VSSC, a youth football training club established in 2015 by passionate local football enthusiasts from the Government Engineering College of Thrissur Alumni in Qatar, has been making significant strides in nurturing young talent. Presently, the club caters to 100+ children between the ages of 5 and 15, who are enthusiastic about pursuing their hobby or aspiring to become future football stars. With dedicated coaches and weekly training programmes, VSSC enters its 8th year with a promising outlook, witnessing an increase in the number of participants and greater parental involvement.

AVK FC proudly supports these budding stars by sponsoring their training kits such as jerseys and footballs, providing

them with a well-deserved boost as they step onto the field to train and compete.

## **AVK FC: Impressive Run in Men's Championship 2023**

In the highly anticipated third edition of Engineers Cup Men's Championship 2023, organised by the Keralite Engineers Forum (KEF), AVK FC's team, AVK Flow Control, delivered an impressive performance. Held at the College of the North Atlantic - Qatar (CNA-Q) grounds, the tournament featured 16 Engineering College Alumni teams competing fiercely over three weeks.

In an exhilarating final match that kept the crowd on the edge of their seats, AVK Flow Control showcased their skills and determination. The intense

game extended to a penalty shootout, eventually ending the match in the competitor's favour. Though AVK Flow Control narrowly missed out on the championship title, they secured a remarkable second-place finish, solidifying their reputation as a strong contender in the tournament.

Mr. Dayan from KEF's organising committee shares: "I take this opportunity to congratulate and express our gratitude to all teams who participated in the KEF ENGINEERS CUP 2023. You guys are passionate about football and supportive. We look forward to having you all for the next cup."



# AVK PRODUCTS SUPPLIED TO THE 10-YEAR SIGNATURE DEVELOPMENT PROJECT IN MAKKAH

# SAUDI ARABIA

By Randa Abu Mazen,  
Marketing Coordinator,  
AVK Saudi Valves Manufacturing  
&  
Imran Kazi,  
Area Sales Manager,  
AVK Saudi Valves Manufacturing.

for our company and its stakeholders, as this prestigious project is one of the largest infrastructure developments underway in the Kingdom of Saudi Arabia.

The goal of the project is to ensure comfortability for the city's visitors, to enhance the image of Makkah as a global destination, and to support the local economy by generating jobs for Saudis.

### **Regulating valves, joints and fire hydrants**

As part of this project, SVMC Manufacturing Valves Company has been contracted to provide control valves which play a crucial role in regulating the flow of fluids. They are essential components of any automated control system and can be used in water treatment solutions as well.

Also, we supplied series 27 fire hydrants (DN150) which is designed to provide excellent fire protection of the complete project as well as being local civil defence approved. It has been tested to withstand extreme conditions and heavy usage, making it ideal for project specification such as industrial sites and commercial buildings.

Another advantage of the hydrant is its adaptability. It can be customised to meet specific requirements, whether it be an alternate inlet or outlet size or different materials for corrosive environments. It is the perfect choice for customers seeking a reliable, efficient, and customisable hydrant. With its quality, durability, and ease of maintenance, it is a top-performing product that will provide peace of mind and long-lasting value.



Being the supplier to a massive project is an exciting experience. It means that you have been chosen as one of the key players in securing the success of a major endeavour, and it is a testament to your expertise and reliability in your field. However, it also comes with a great deal of responsibility and pressure, as the future of the project depends on your ability to deliver the very best solutions and services on time and within budget.

AVK Saudi has recently been supplying the Masar Makkah project, which is a 10-year plan extending over 1.2 million m2 with a strategic location at the centre of Makkah. Makkah is the official name for Mecca, Islam's Holiest city.

### **Supplying to a national signature project**

The project aims to improve transportation and hospitality facilities, as well as add amenities to the Holy Mosque area in Makkah, including hotels, shopping centres, pedestrian pathways, and more. This is great news

Dismantling joints were also supplied, allowing for easy maintenance of pipeline networks by providing a break in the line where repairs or modifications can be made without disrupting the entire system. The joints also help reduce stress on surrounding components, extending the life of the pipeline, and reducing repair costs.

One of the key benefits of AVK's products is their long lifespan. The components are built to last, and to withstand extreme temperature, pressure changes, erosion, and corrosion. They are also designed to be low maintenance, reducing the need for frequent repairs and replacement. AVK is a trusted supplier of high-quality valves, hydrants, and joints for water and wastewater infrastructure projects around the world. Our commitment to excellence, reliability, and durability has secured our reputation as a top manufacturer in the industry.

# 1,500+ BUTTERFLY VALVES IN SINGAPORE'S LARGEST DESALINATION PLANT

# SINGAPORE

To secure the country's future water needs, Singapore will rely heavily on desalinated water. Desponia® butterfly valves from InterApp will help to secure smooth operation at the country's largest plant.

*By Irene Quek,  
Senior Sales and Marketing Manager,  
AVK Singapore*



The Public Utilities Board (PUB) is a statutory board under the Ministry of Sustainability and the Environment of the Government of Singapore. PUB is responsible for ensuring a sustainable and efficient water supply in all of Singapore, and therefore also oversees and regulates the country's water catchment systems, drainage systems, water works, pipeline network, water reclamation plants and sewage systems.

The country's demand for water is about 400 million imperial gallons (1.8×10<sup>6</sup> m<sup>3</sup>) a day – a number that is expected to double by 2060.

PUB is set to meet 80% of this demand through its NEWater (highly treated reclaimed wastewater) and desalination technologies.

### **Safe tap water is a priority**

The PUB's watershed management and treatment processes has ensured a continuous supply of clean and quality water for Singaporeans over the last four decades. The island's clean and drinkable tap water exceeds the drinking water standards set by the World Health Organization, and Singapore was named the top Asian city in water sustainability development in 2015, with the nation boasting the

highest drinking water and sanitation standards in the region.

### **An energy-intensive process**

Desalination is an energy-intensive water source. Singapore currently uses reverse osmosis for its desalination, which uses about 3.5kWh/m<sup>3</sup> of energy to make seawater drinkable. This process produces pure drinking water by pushing seawater through membranes to remove dissolved salts and minerals.

PUB is constantly exploring ways to reduce the energy required to ensure the sustainability of desalinated water,





**Products supplied to the project:**

- 1140 pcs Desponia® wafer butterfly valves, DN 50-350, Halar coated disc c/w festo pneumatic actuators
- 509 pcs Desponia® wafer butterfly valves, DN 50-350, Halar coated disc c/w manual levers and gear boxes

and their goal is to reduce the energy requirements; first by more than 50% from the current 3.5kWh/m<sup>3</sup> to 1.5 kWh/m<sup>3</sup>, and further down to 1 kWh/m<sup>3</sup> in the future.

In Singapore's 50 years of independence, we have turned our water vulnerability into a strategic asset. We created the Four National Taps source strategy, which means that we draw water from local catchments, including NEWater (highly treated reclaimed wastewater) and desalinated sea water, which are two weather-resilient sources and therefore more reliable. This investment saw us through one of Singapore's driest periods in early 2014. But still, challenges lie ahead, and one of these is energy supply. As we produce more desalinated seawater and NEWater, which are energy-heavy processes, our energy demand is expected to rise. Also, our population and economy growth apply further demand for energy in general – and for water.

**Finding the suitable valve solution**

As we forge ahead in the next 50 years, our vision is to ensure that our water supply continues to be robust, sustainable, and affordable. In this regard, upgrading of the membrane filtration arrangement and valve solution replacement on the largest desalination

plant in the country, Tuas South, was essential.

Establishing the appropriate valve solution makes a great difference to the end user in terms of the overall cost savings that they will be enjoying in the long run.

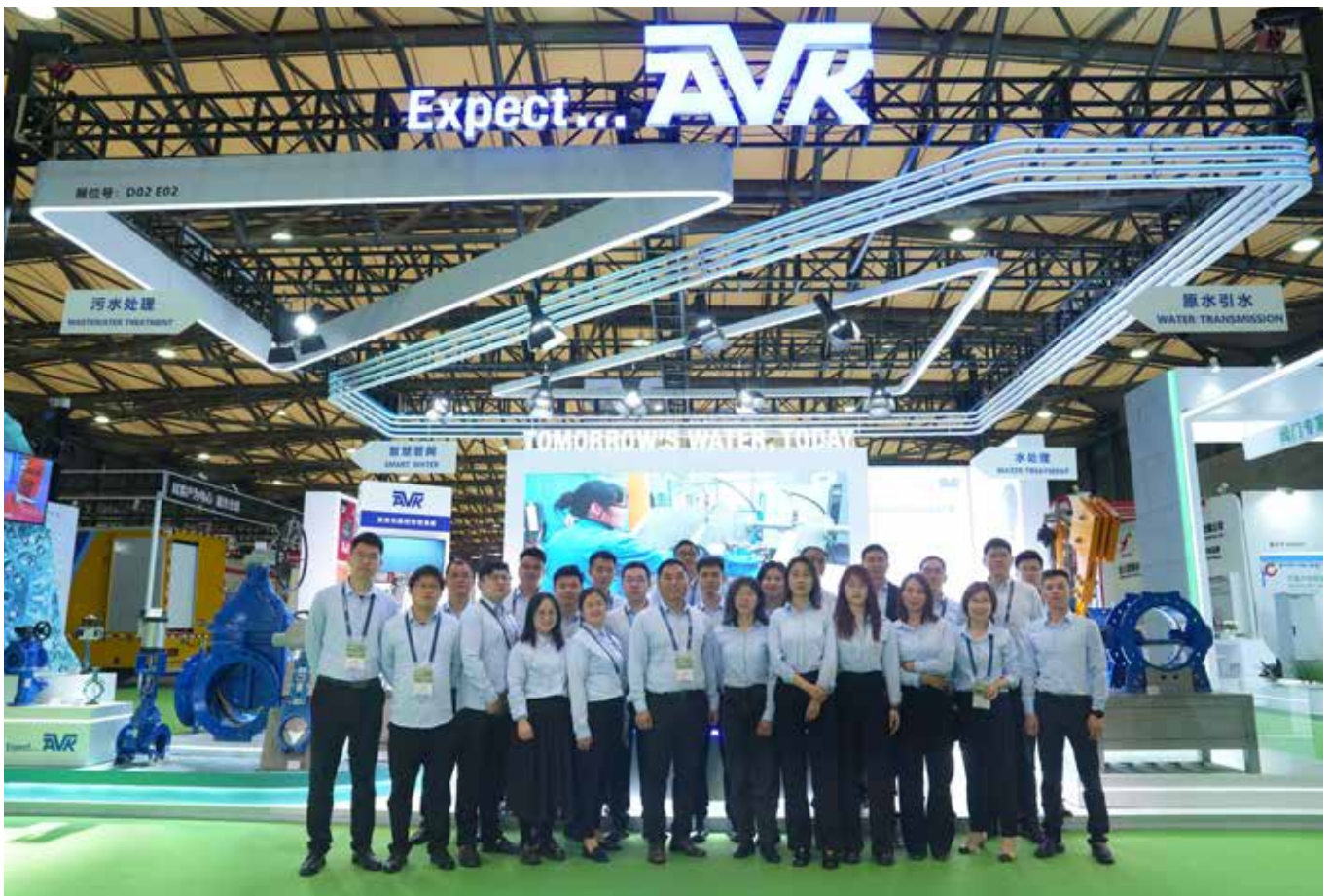
From the beginning, we at AVK Singapore have been working closely with the end user as well as the contractor, Memiontec, which is a water treatment company with more than 20

years of experience in the field of water and wastewater management services. Together, we identified the required specifications on the valve solutions, meeting all technical compliance as needed. Through detailed technical assistance prior to the approval of our submission, the end user was convinced that InterApp's Desponia valve with Halar coated disc was their preferred choice to a high-quality performance that was needed for the critical processes at the plant. The InterApp company is a member of the AVK Group.



# AVK PRESENTS SOLUTIONS FOR SUSTAINABLE WATER RESOURCE DEVELOPMENT

# SHANGHAI



By Ken Yan,  
BD & Marketing Director,  
AVK Valves Shanghai

The IE expo Asia's flagship event, the 24th China International Environmental Protection Exhibition & Conference, was grandly kicked off on April 19 at the Shanghai New International Expo Center.

This year's exhibition was unprecedented in scale, bringing together 2,407 global environmental

protection enterprises to showcase cutting-edge technologies and solutions within water and wastewater treatment, water supply and drainage, solid waste treatment and disposal, air pollution control, polluted site restoration, environmental monitoring, and much more. The event acted as a powerful engine for high-quality transformation in the environmental protection industry and attracted more than 91,000 visitors from 68 countries and regions.

As one of the top 100 participating

exhibitors, AVK displayed its leading position in the industry with an exhibition area of 110 m<sup>2</sup> located in a prime position in the exhibition hall. Under the theme of "Tomorrow's Water, Today," AVK actively responded to China's ecological civilisation construction requirements and the United Nations' Sustainable Development Goals by incorporating high quality, low energy consumption, and sustainability into exhibition designs and on-site presentations.



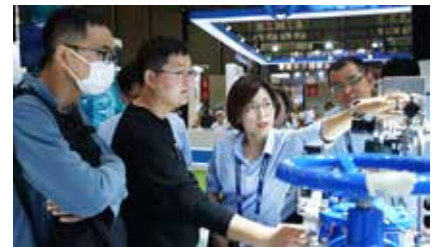
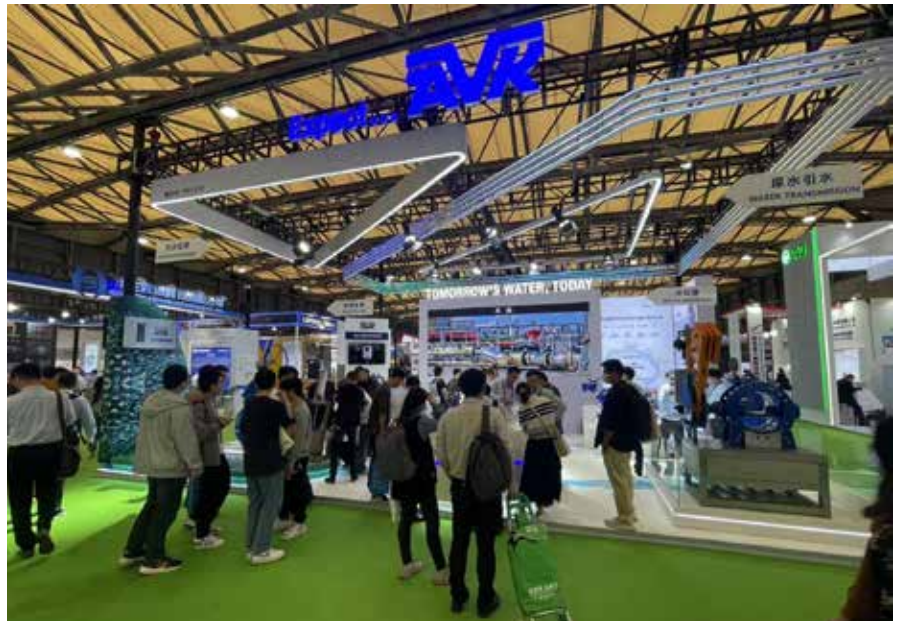
### Hands-on demonstrations

Across the areas we showcased more than 40 of our core valve products, full ranges of product solutions, and combined dynamic on-site demonstrations with 3D animations to help users fully understand AVK's performance advantages and application scenarios.

We were happy to be able to present our unique concept, our technological innovation capabilities and our persistent pursuit of efficient infrastructure to a global audience. As a company committed to providing high-quality valve solutions for customers, AVK will continue to help customers achieve sustainable development and make outstanding contributions to global water resource challenges.

We divided our booth into four of our core areas:

- Raw Water and Water Transmission
- Water Treatment Plants
- Smart Water Distribution
- Wastewater Treatment



# COMMITMENT TO EFFICIENT AND DURABLE WATER MANAGEMENT SOLUTIONS

# MALDIVES

By Rachel Lim,  
Regional Marketing Manager,  
AVK Malaysia

Male' is the capital island of the Maldives situated in the north-central Indian Ocean.

For over a decade, AVK gate valves with PE ends have been supplied, installed, and successfully operated in all of Maldives by water and sewage



Article continues on the next page >

company Male' Water & Sewerage Company, MWSC. MWSC is diligently providing the people of Male' with potable water and wastewater management, and at present, it serves more than 50% of the Maldivian population.

**High durability and easy installation**

AVK is the sole supplier for water works and wastewater valves to MWSC, and the local customer categories are stretched across domestic, commercial, and institutional. Across the numerous projects, our gate valves with PE ends have proven full integration to the design and build of water supply networks based on MWSC's water resources management approach. The product is designed with built-in safety in every detail and manages to reduce the risk of leakage while sustaining high durability and proven ease of installation which has made it the only choice throughout the years.



**Our series 36/80 valves with PE ends**

AVK's series 36/80 gate valves with PE ends is a fully welded pipe system up to Ø630 mm. It is fully vulcanised with our own drinking water approved EPDM rubber compound, which has the ability to regain its original shape, and a strong wedge design. The unmatched reliability is safeguarded by triple safety stem sealing, strong stem material and thorough corrosion protection.

Our focus on high quality answers to MWSC's promise to provide safe water and adheres to the standards set by

Environment Protection Agency (EPA) in the Maldives.

In 2016, MWSC opened its flagship store in Male' City for the customers to experience first-hand the extensive products and services they can offer. The showroom features impressive high-end products including water testing equipment, equipment for sewerage systems, RO Spares, PVC and PE pipes, along with various other water related products from different international brands. Here, MWSC being the sole distributor of AVK valves in Maldives, displayed an extensive product offering from AVK. MWSC is



well-stocked with AVK valves to cater for the entire Maldives market.

"It is at the core of MWSC to continue strengthening the foundations that make our communities thrive, and AVK has walked with us in making these milestones for the past 20 years.

Today, MWSC has become a multi-disciplinary engineering and manufacturing organisation, providing engineering solutions for integrated utilities and as a manufacturer of its own range of products. In business, I see shared values and commitments between MWSC and AVK; we never lose sight of what all were built on, and never stop striving to supply our customers with quality services and safe

water for everyone, always. With AVK, there are many new beginnings to build on. I am positive and looking forward to it." Says Mr. Hassan Shah, Managing Director of MWSC.

AVK Malaysia sees exponential growth in revenue from the collaboration with MWSC over the past five years, which marks great success despite the economy and supply chain challenges resulting from the Covid-19 pandemic. We are very positive on the business journey with MWSC and on the future collaboration.

"With over 5,000 units of valves with PE ends installed in Maldives in the past seven years, we have witnessed MWSC's commitment to supply quality water consistently with utmost excellence. AVK Malaysia is honoured to be a part of MWSC's economic and sustainability growth over the years.





# STATE GOVERNOR VISITS THE AVK MANUFACTURING FACILITY IN NEVADA

# USA

By Anne Paine,  
Training Manager,  
American AVK

American AVK was honored to have Nevada's Governor Joe Lombardo visit our manufacturing facility in Minden, Nevada in April.

Governor Lombardo and his team toured the facility as Production Manager Randy Nelms provided a detailed overview of each area.

During the tour, he spoke with several AVK employees about their roles and responsibilities and was very interested in how we manufacture our products.

Governor Lombardo was impressed with all operations and was especially interested in the machine shop. He had several questions and was intrigued by our thread rolling process.

He was particularly interested in the unique thread rolling machine and understood not only the time saving aspect but the strength that was added to stem as well.

Thread rolling is a cold-form press operation used to form threads in i.e. a stem for use in a valve. Thread rolling hardens the stem's material, resulting in an increased resistance to wear and fatigue.

The Governor was also impressed with the knowledge our employees shared about the manufacturing processes and the quality of our products.

Having Governor Lombardo tour our manufacturing facility was a great honor for American AVK. We are extremely proud of our company and appreciate the interest from our governor.



*"American AVK is part of our state's economic engine, and I'm grateful that they call Nevada home," said Governor Joe Lombardo. "American AVK's facility and management team are top notch, and I look forward to their upcoming expansion in Minden. I hope to visit again soon."*



# DOUBLING THE TREATMENT CAPACITY TO SECURE FUTURE SUPPLY

## VIETNAM

Two key treatment plants were operating beyond their capacity to meet the local water needs, and with an increasing demand, a new solution was needed.

Now, valves from AVK and Wouter Witzel make sure that the water supply solution of Ba Ria is ready for the future.

*By Chuong Ngoc Anh,  
Internal Sales Manager,  
AVK Vietnam*

The water supply system of Ba Ria, located in the Vung Tau province, was formed in the early 20th century. In 1982, the Ba Ria Water Supply and Sewage Enterprise (BWACO) was established as an independent unit operating on the basis of two previous water production plants. BWACO has constantly grown in both scale and production capacity, and now supervises six water plants providing clean water for domestic and production purposes to customers in Ba Ria. The company is rated as one of the most efficiently managed units in the water supply industry in Vietnam.

With a building acreage of 8 hectares, Ho Da Den Water treatment plant is the largest surface water plant in Phuoc Hung area, Ba Ria city. It was constructed over two years with a total investment of about 300 billion Vietnamese Dong (VND).



The Hoa Da Den plant is also the place where BWACO organizes extra-curricular trips and learning sessions for the students of secondary schools in the province to create awareness of protecting water resources and the environment for future generations.

### **Operating beyond capacity**

The Ho Da Den water treatment plant is taking on the role of BWACO's main production plant with a designed capacity of 110,000 m<sup>3</sup>/day, along with Dinh River water treatment plant with a capacity of 45,000 m<sup>3</sup>/day. Previously, both water treatment plants were operating beyond their designed

capacity to supply water to the population of Vung Tau city, Ba Ria city and the Long Dien district.

Therefore, a needed expansion project was planned and initiated. The aim was to increase the capacity of the Ho Da Den water treatment plant by 125,000 m<sup>3</sup>/day, resulting in a total capacity of 225,000 m<sup>3</sup>/day.

It was implemented to meet the annual growth of urban water demand and at the same time contribute to attracting investors for future similar projects. The project was approved with a total estimate of around EUR10 million and



was completed in September 2021. After the project was appraised, approved and bid, BWACO selected contractors with full capacity and experience to implement the project. Accompanying BWACO in this project was Phuong Dong Infrastructure Investment and Consulting Joint Stock Company (project design consultant),



No. 5 Construction Investment Joint Stock Company (the unit in charge of the construction bidding package), Saigon Water, Environment and Infrastructure Joint Stock Company (project constructing supervision consultant).

#### Identifying the optimal solution

AVK Vietnam and our distributor, D&B, participated in consulting and proposing to BWACO to provide reliable, efficient, and optimal valve solutions for the project, especially in the technology and automation installation bidding package.

With the support of the AVK Group members such as Wouter Witzel and ACOMO S.r.l. we were able to come up with the optimal solution as well as high-quality products to archive the strict technical requirements of the project. The project has paved the way for similar and important water projects in the nearby districts.

Investing in high-quality valves with widely approved certifications for drinking water by independent international authorities such as WRAS/

#### Products supplied to the project:

Butterfly valves from Wouter Witzel:

- 1 pc EVUS U-section valve, fixed liner, electric actuation, DN1200
- 74 pcs EVS wafer valves, fixed liner, electric actuation, DN80-1200
- 55 pcs EVS wafer valves, fixed liner, manual actuation, DN80-600
- 10 pcs EVFS/EVUS with fixed liner, manual actuation, DN700-1200

Other products:

- 6 pcs tilting disc check valve, DN600
- 9 pcs ECV wafer check valve, DN100-200

DVGW/KIWA, etc., customers are completely reassured of the durability and longevity; benefits that ensure optimal operation costs, reduce water loss, and keeps the water quality safe from contamination in order to fully meet the demand of safe and reliable water supply.

# OUR 100-YEAR VALVE GAINED TRACTION AT CZECH EXHIBITION

This year, we participated in the prestigious water and sewage exhibition VOD-KA 2023, which took place in Prague on May 23-25. It was the 22nd edition of this exhibition, which brought together more than 300 exhibitors from 7 countries.

*By Petr Kužela,  
Managing Director,  
AVK VOD-KA*

Our stand at this exhibition was well-visited, and many of the customers were interested in learning more about our products and services. They were particularly interested in our Supa Lock™ service connection system, and in one of our more recent innovations, the PREMIUM100 gate valve, which is built to last a century. Overall, our participation at the exhibition was very successful and we



greatly appreciate the positive response from our customers, and we are looking forward to further opportunities to present our products and services.

# HOW CAN A VALVE MANUFACTURER HELP THE GLOBAL WATER SECTOR SAVE WATER AND ENERGY?

# GLOBAL

At AVK we have always focused on high quality and longevity. We have always had in mind that our products should be able to lay in the ground together with the water distribution network for a minimum of 50 years.



*By Michael Ramlau-Hansen,  
Public Affairs,  
AVK Holding*

## **The 100-year valve – built to last a century**

Now we have taken it a step further, as we have developed a 100-year valve in collaboration with a major Scandinavian water supply. Yes, you did read that right: the valve is designed to be able to live for 100 years on the underground pipe network. This will remove the

utility's need for costly replacement, and at the same time help the water utility on their journey towards sustainability and reduction of CO2 emissions.

A replacement of parts in a pipe network is costly and involves excavation, driving away soil, driving in new stability material, new asphalt, or tiling, etc. All are things that today require black energy.

But it is not just about longevity. It is also about functionality. Valves should be able to close drop-tight in closed position. The valves that are placed as zone boarder line valves in connection

with the DMA-technology (district metering areas) should especially have a drip-tight shut off.

By dividing the supply network into smaller sections (DMA's), the utility has the opportunity to carry out water balance models in real-time and thereby keep track of potential leaks, have them located, and finally having them repaired. Speed of repair is a key factor when it comes to fighting water loss.

## **Control the zone boarder line valves**

From time to time, you hear of water supplies that discovers - more or less by coincidence - that a valve which



was supposed to be closed is in fact open. A major water supply has recently discovered that a zone boarder line valve had been left open for three years(!), thus supplying water to a DMA in the same amount that was lost through leakages. Therefore, the utility has carried out water balance calculations on an incorrect basis for three years. This underpins the importance of being able to monitor the position of your zone boarder line valves; are they open or closed? And can you get an alert if someone unintentionally changes the position of the valve?

The answer to this simple question is YES.

AVK has developed a position indicator which is extremely simple to retrofit on the valve, either directly or in the street cover on the spindle extension. The device communicates with SCADA or GIS via the publicly available mobile phone network.

**Pressure and lost amount of water**

It is a fact that the higher the pressure

in a water pipe, the more water is lost through a potential burst pipe og leaking asset.

A way to combat the amount of leakage is by controlling the pressure in a DMA, also known as pressure zone, in relation to the consumption. There is no reason to supply the network with a higher pressure than necessary. Therefore, there is a lot to save by introducing intelligent pressure management, where the pressure is constantly controlled by the flow into the zone corresponding to the consumption. There is no reason to keep a high pressure if there is no water consumption, i.e. by night when most people are sleeping or in the middle of the day where people are at work. By managing the control valve in the section by use of a bulk meter in the DMA inlet chamber together with a pressure sensor, it can regulate the pressure in relation to consumption, and thereby compensate for the pressure fluctuations that will occur if the control valve is manually set to maintain a constant high pressure.

Pressure fluctuations have another

disadvantage: it stresses the pipes to such an extent, that pipe breaks occur. By introducing intelligent pressure management, the pressure fluctuations in the zone are eliminated so the pipes are not affected, and the lifetime of the network can be extended considerably. By extending the pipe network's lifetime, there are significant savings on maintenance and replacements.

AVK offers an intelligent pressure management system that has several options in the form of stand-alone as a local unit, a connection to SCADA, or a timer solution - just to name a few options.

Find more information about intelligent pressure management solutions on our Global website here:



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# AC.MO REGULATION NEEDLE VALVES TAILORED TO THE CUSTOMER'S NEEDS

ITALY

Our needle valves guarantee precise regulation of water flow and pressure, and AC.MO is able to supply the correct valve for the specific needs of the plant and the customer.



Article continues on the next page >

By Luca del Negro,  
Marketing Graphic Designer,  
AC.MO S.r.l.

The AC.MO needle valve series 872 offers exceptional versatility and finds applications across multiple sectors, including water distribution and treatment, dams, tanks, power plants, and the industrial field.

The valves provide precise control flowrates and pressures by adjusting the piston that partially restricts the valve outlet. They play a vital role in various applications, such as turbine bypass valves, pump start-ups, free discharges, tank fillings, and regulating air blowers.

The valve is designed to effectively manage a broad range of pressure levels, encompassing standard ratings up to PN40 and offering the possibility of customization to PN100 upon specific request. With a size range spanning from DN80 to DN2200, these valves are perfectly suited for regulating flow in pipelines of different diameters and a wide range of pressure conditions.

#### Detailed sizing and tailoring

Each needle valve within this series is defined based on relevant selection criteria specific to its application. Utilising an exclusive dedicated AC.MO software, the valve can be accurately



sized to ensure optimal performance for the given installation. Additionally, a selection of accessories is available to address specific requirements,



such as cavitation cages, air inlets or backpressure orifices, which effectively prevent cavitation phenomena.

Complete solutions are offered, including various actuation configurations to cater to diverse customer needs. Whether it's a traditional handwheels, a modern electric actuator a powerful hydraulic actuator or a versatile pneumatic actuator. These actuation systems can be integrated and controlled using both analogic and digital signals, providing flexibility to adapt to the unique characteristics of each installation.

#### New releases for superior corrosion resistance

To meet specific project requirements, AC.MO offers customisation even at the level of internal component materials. To ensure superior corrosion resistance, even with aggressive fluids, standard

materials can be replaced with special versions in duplex or AISI 316. The choice of coating type and thickness for valve painting allows seamless integration with the plant.



Considering the significant demand for these options, which currently accounts for approximately 50% of orders, AC.MO released specific technical datasheets for variants with duplex and AISI 316 internals, namely the products 872/00-011 and 872/00-012.

Rest assured, the 872 series is a reliable product, meticulously designed to meet the specific requirements of its intended applications.



# OPEN HOUSE AT OUR AVK FACILITIES

# DENMARK

Saturday, June 10th was a great day at our headquarters here in Denmark, where we had Open House at our AVK facilities.

More than 250 employees, family members and friends from AVK Holding and AVK International were gathered for a cosy lunch in the sun outside our facilities in Skovby.

Throughout the day, guided tours were organised to various offices, distribution warehouses and production lines for all to experience what is going on at our different locations.

A fun and interesting day for both young and old, and for our employees to be able to show just a bit from our everyday lives at work.

Also, we got the opportunity to show off our newest building in Søndergade, which was finalised in December 2022, and now holds our departments responsible for Group IT, IT security, digital processes, sales, marketing, e-learning, leadership, and internal/corporate communications.



# SUPPORTING GREEN ENERGY PRODUCTION FOR MORE THAN A CENTURY

# SCOTLAND

*By Robert Milligan,  
Marketing Manager,  
Glenfield Invicta*



Glenfield Invicta has a heritage going back 170 years for providing specialist engineering for a broad range of water projects including dams, reservoirs, hydropower as well as non-utility water infrastructure.

Our valves and penstocks have been used across the world and we pride ourselves in our commitment to producing quality products that last and contribute to the AVK Group's sustainability goals.

## **Glenfield valves in key power station**

Kinlochleven Hydropower Station uses the Blackwater dam to create a high head of water with considerable potential energy. The large volume of water passes through the turbines and creates a significant amount of clean energy: over 20 megawatts of electricity, equivalent to the power usage of approx. 20,000 average households.

Hydropower provides a valuable source of 'green energy' and is environmentally friendly. This method of renewable energy is proven, reliable, and sustainable and is also a critical contributor to the UK's carbon reduction targets.

Our relationship with the Kinlochleven Hydropower Station goes back to its original construction in 1909, when Glenfield & Kennedy designed, manufactured, and supplied several





valves.

Fast forward to 2015, and we were contacted by the owners and asked to conduct an inspection. By that time our valves had been operating for nearly 110 years, tribute to the craftsmanship and quality that they would still be in operation over a century later.

**Tracing the original design specifications**

With access to our extensive archives, we were able to trace the original design specifications. The two valves were 9” cast steel pressure relief valves, used in the operation of a 39” automatic self-closing sluice gate valve. We used the historical valve specifications to provide exact replacement components and secured the order to refurbish the valves.

In the left side images, you can see the original valve design, one of the original valves handed in for refurbishment, and a new valve ready to be installed in its place.

Indeed, our relationship in providing innovative valves for the hydro-electric power sector goes all the way back to circa 1900. The above images reflect some of our contributions throughout the first hundred years.

To this day we continue to maintain a strong relationship with Kinlochleven Hydropower Station, which is currently owned and operated by SIMEC (Part of GFG Alliance group of companies) which operates renewable energy sites across the UK and Australia.

We apply our knowledge and expertise to conduct both on-site and off-site services, including refurbishing valves we originally supplied (as far back as 1909), as well as installing new valves. This enables the hydropower station to run efficiently and ensuring it continues

to produce clean energy for generations to come. Now that’s sustainability in action!

Our engineers have over the years surveyed, designed, removed, refurbished and re-installed countless numbers of valves necessary to keep the Hydropower station functioning, and we take pride in playing our part to help deliver clean energy to the industries and homes across Scotland.



# COMPLETE SOLUTION SECURES THE CONTRACT FOR AN EXTENSIVE INDUSTRIAL ZONE PROJECT

## KUWAIT

For a new industrial area in Al-Shadadiya, in the south-west part of Kuwait, AVK was selected as the complete solution provider in the ongoing establishment of water infrastructure management.



*By Anurima Roy,  
Regional Marketing Manager,  
AVK in the Middle East*

### **Securing sufficient infrastructure**

The Al-Shadadiya Industrial Zone project is the first of several new industrial areas to be established in Kuwait, which will be used to relocate

existing industries away from densely populated areas.

The construction of the new industrial site aims to attract many industries with the provision of a sufficient infrastructure for future development.

Undertaken by the Public Authority of Industry (PAI) in Kuwait, the project was commenced on June 30th, 2022, and is scheduled for completion in December 2023.

Soor Engineering Bureau acts as the project's consultant, while United Gulf Construction Co. W.L.L. serves as the

contractor.

### **Key elements in the water management systems**

With a contract value of USD316 million, the project's scope includes the design, construction, and completion of the new zone, which covers an extensive area of approximately 4.9 million m<sup>2</sup>. The zone comprises industrial plots, general services areas, utilities, a technological park, and various administrative offices, among other facilities.

AVK's responsibility includes supplying valves and hydrants for multiple applications such as potable water,



stormwater, sewage, industrial wastewater, irrigation, and fire protection networks. The products will be key components in a sewage treatment plant, pumping stations for water and irrigation, two elevated water tanks, and four underground reservoirs - one for freshwater, one for irrigation, and two for firewater. The irrigation system alone has a capacity to pump 251,240 gallons of water/day.

### Efficient chain of supply

AVK was selected as a complete solution provider of a comprehensive package tailored to meet the project's needs based on our know-how and experience with projects of this size.

At AVK Gulf, our primary focus is customer satisfaction. Therefore, ensuring that the solution delivered matches the project specifications, budget, and tight timeframe, is paramount. Hence local value engineering solutions were used to optimise requirements and deliver them within the agreed delivery schedule.

Unlike other manufacturers, our distinct advantage in winning this project lay in our ability to offer a complete package, being the only manufacturer able to supply all valves, fire hydrants and accessories required under one umbrella.

AVK's production facilities in Saudi

Arabia proved to be a significant advantage by facilitating quick delivery within 3-4 days by road, compared to the standard 4-6 weeks via sea freight from distant locations. This proximity to Kuwait enables efficient and timely delivery, meeting the fast-track nature of the project.

This streamlined approach not only simplified the sourcing process for the client, but also ensured compatibility and consistency across the project, and solidified us as the client's preferred choice.

Our team strategically planned product deliveries aligning with the project's needs and site activities in agreement with the client and implemented a rigorous inspection process known as the Factory Acceptance Test (FAT) with independent third-party inspection agencies (TPI) in both Saudi Arabia and Anhui manufacturing facilities. This was done to guarantee that all shipments undergo a thorough inspection each time before a shipment is dispatched to the site, ensuring stringent quality standards and project specifications are always met.

A Bureau Veritas third party inspection (TPI) was appointed to attend the FAT at AVK's manufacturing facility in Saudi Arabia, while a DNV Germanischer Lloyd TPI oversaw the inspection

process at the Anhui factory. These inspections, which were conducted regularly, provide a robust quality assurance mechanism, and ensures confidence in the client.

The project is a good example of our Group's commitment to our core values of quality, innovation, reliability, customer service and sustainability. It has also been a further solidifying element to our long-term relationship with valued partner Al Arabi Company WLL in Kuwait. AVK's contracted value to the project is around USD 2,5 million.

### Products supplied to the project:

- 32 pcs butterfly valves
- 189 pcs metal seated gate valves
- 46 pcs resilient seated gate valves
- 97 pcs non-return valves/check valves
- 2 pcs diaphragm control valves
- 2 pcs air valves
- 1,150 pcs fire hydrants
- 1,633 fire gate valves
- 9 pcs y-strainers
- 2 pcs ball float valves



# COMPETITION



We are happy to announce that the winners of the competition in AVK InterLink no. 62 are:

- Michael Hurley, Technical Director (Services UK & Netherlands), RPS Group
- Morten Høegh-Guldberg, Group Supply Chain, AVK Holding
- Julius Frauendorf, Group Technical Manager, AVK Valves Southern Africa

Gifts are on their way.

The correct answer is: The size of the bonneted gate installed on the Angat Dam is DN1400, supplied by AVK Philippines.

New competition:

How many fire hydrants can you spot in the installation image from the Al-Shadadiya industrial zone project?

Send an e-mail with the correct answer in which you state your address and the gift you would like to receive - if you win.

E-mail to: [kakl@avk.dk](mailto:kakl@avk.dk)

Choose between:



Beach towel with AVK valve



Picnic grill in a cooler bag



Ocean bottle

## AVK Holding A/S

Søndergade 33  
8464 Galten  
Denmark

Tel.: +45 8754 2100  
Fax.: +45 8754 2120  
[www.avkvalves.com](http://www.avkvalves.com)

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Expect... **AVK**



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