

**Kingspan
Water & Energy
Sustainability
eBook 2018**

Efficient, innovative, and sustainable: a closer look at the Kingspan catalogue



When it comes to rainwater tanks and wastewater management, few companies are as established and knowledgeable as Kingspan Water & Energy. As the largest manufacturer of rainwater tanks in Australia, the company understands that rainwater harvesting is an essential component of sustainable development and can help meet elevated aesthetic and performance standards. Over the years, Kingspan has earned a global reputation for reliability, toughness, and quality,

and has established itself as an Australian leader in the design and manufacturing of residential, commercial and rural tanks. This expertise in rainwater harvesting and storage is bolstered by over 60 years of experience in wastewater treatment for both commercial and residential applications.

For over 80 years, Kingspan have proudly supplied a broad range of Australian-made long lasting, high quality water tanks and accessories for local homes and businesses. With manufacturing facilities in

Sydney, Brisbane, Melbourne, and Perth, Kingspan has complete control over every aspect of their tanks from manufacturing to installation. Since acquiring Rhino Tanks in 2017, Kingspan has remained faithful to the brand's Australian heritage and ensured that all tanks and their major components are still made and fabricated in Australia. The full Rhino range – including the INFINITY Liner – is fabricated in Kingspan's Western Australia factory, ensuring the utmost degree of quality control.

Below, we explore the key characteristics that set Kingspan Water & Energy products and systems apart from the competition.

Innovation

A rigorous design process and comprehensive innovation agenda ensures that all Kingspan products and systems meet real needs with a high degree of sophistication and creativity. For example, Kingspan's unique High-flow filter, an Australian first, is specially designed to address concerns

of overflow from traditional tank filter baskets during heavy rainfall. The High-flow captures high rainwater flows directly from the roof in commercial and residential environments, and channels this to stormwater without spillage. The High-flow has the ability to handle water collection from an entire roof area, and can handle four times the volume of water when compared to other standard tank filters.

The Kingspan focus on innovation is also evident in the Evolution MkIII pump. The revolutionary pump uses high performance sensor technology to provide high-pressure, filtered rainwater and automatically switches to a mains water supply in the event of a power failure or rainwater shortage in the tank. The Evo MkIII avails of Grundfos electric pumps – some of the most reliable pumps in the world. Installation time is cut in half if you order a Kingspan tank with the Evo MkIII. The whole unit fits neatly on top and inside of the tank (instead of the wall) as an integrated unit, improving the overall appearance of the whole system.

Similarly, the Kingspan drive toward innovation is reflected in the company's manufacturing processes, which include full customisation of their range of made to measure corrugated steel water tanks. The skilled Kingspan manufacturing team fabricates all tanks according to the exact dimensions and shape required by customers, ensuring that the right tank is provided for any space. These extensive customisation capabilities – which are unmatched by any other water tank manufacturer – ensure that Kingspan remains ahead of the competition at every turn.

Performance

As high performance as they are innovative, all Kingspan water tanks meet the relevant Australian Standards. Water tanks within Kingspan's made to measure range are fully compliant with AS4020 and are best practice certified in accordance with IS9001 and meet the stringent Watermark government standards for water products in Australia; beyond this, they offer a 10-year construction warranty and 20-year warranty against corrosion. Kingspan Rhino tanks are ISO 9001 certified and supplied with a 20-year conditional warranty. All Kingspan tanks are engineer certified to Australian standards.

Reiterating their focus on high performance, holistic management systems, the Kingspan



Image: Inge Maria (Unsplash)



BioDisc® Wastewater Treatment Plant is favoured around the world for its unrivalled efficiency and sustainability. Offering the lowest energy consumption in its product class, the noise-free and odourless tank is appropriate for domestic and commercial environments alike. A fully removable lid allows for easy de-sludging and maintenance, while durable construction and premium materials enable minimal service requirements.

Custom capabilities

Kingspan's custom manufacturing capabilities are evident in their made to measure range, which includes water tank solutions for residential and commercial applications alike. Tanks within this custom range are available in four different shapes – Slimline, Modline, Round, and Square – and in capacities ranging from 560L to 29 000L. They can be specified with a galvanised finish or in any Colorbond colour. Designers and homeowners wishing to specify a Kingspan custom water tank can use Kingspan's "Size-a-lator" web tool, a design aid that streamlines the specification process to six easy steps and provides a comprehensive project quote.

Learn more about Kingspan and view their full range of innovative products and systems at kingspan.com.au/water.



Kingspan harnesses rainwater for a more efficient future



The need for clean, readily accessible water is universal. Around the world, a reliable, high quality water supply is essential for the most basic human needs of drinking, cooking, bathing and sanitation. Unfortunately, securing such a supply is not always straightforward. In Australia – the driest continent on earth – surface water and groundwater remain the two largest sources of water, with periods of drought and water scarcity placing pressure on an already overstretched system. Against this backdrop, consumers and the design and construction industry alike have begun to investigate alternate options for water sourcing, including rainwater harvesting, which has emerged as the third largest water source in the country.

Data from the ABS shows that at present, 1 in 4 Australian homes are fitted with a rainwater tank, with rainwater now accounting for 9% of total residential water across the country. Rainwater harvesting is gaining particular traction in Sydney where in conjunction with water efficiency measures rainwater has high annual yields of 90 gegalitres (GL) – the equivalent of the annual yield of an average desalination plant. Across Australia, it is estimated that rainwater harvesting provides annual water savings of 513GL, which translates to a water infrastructure saving of \$299 billion.

In large part, the growing popularity of rainwater harvesting is grounded in research identifying

the reliability and water quality, health, and economic benefits of rainwater and highlighting its importance as the most accessible source of water in Australia. This is bolstered by a broader attitudinal shift as the general public becomes more aware of the value of holistic rainwater harvesting systems that include the roof, gutters, tank, pump, and appliances.

In response to this shift and the growing importance of water preservation in today's increasingly resource scarce climate, the design and construction industry is taking note. A number of innovators are now working toward developing more efficient harvesting technologies and refining existing ones for maximum utility.

At the forefront of these efforts is Kingspan Water & Energy Australia, a regional leader in innovative environmental products and technologies. With a history of over 80 years in Australia, the company has now evolved into a strong team of experts who are committed to enhancing the built environment through innovation and good design. Every aspect of Kingspan Kingspan Water & Energy Australia's operations is driven by the company's core belief that efficiency, sustainability, style, and safety are not mutually exclusive but rather can – and should – be achieved in tandem.

Sustainability in particular is at the heart of Kingspan Water & Energy Australia, whose state of the art facilities across the country are setting the company on track to achieve its goal of 100% renewable energy by 2020. Across the country, Kingspan tanks are integral components of a breadth of sustainable water management solutions including rainwater systems, rural fire fighting facilities, and potable water storage.

Drawing from years of diverse, global experience, Kingspan has the knowledge, skills, and resources to genuinely invest in a rainwater harvesting agenda. Their research and development operations are targeted toward producing new products and product improvements that enhance the overall reliability, attractiveness, and cost effectiveness of rainwater harvesting and storage.

Kingspan's sustainability efforts also extend beyond the supply of efficient products and services. The company's deserved reputation as a key thought leader within the global rainwater management sectors means that they are well positioned to educate professionals of the critical nature of rainwater management.

Learn more about Kingspan and their holistic approach to sustainability at kingspan.com.au/water.



Q+A With Kingspan's Michael Smit



Kingspan Water & Energy, the energy and water division of global building solutions specialist Kingspan, is proud to present the Green Building of the Year category of this year's Sustainability Awards. Coming to Sydney this October, the Awards will once more celebrate the projects, products, and thought leaders bringing the Australian design and construction industry into a new age of sustainability.

With an annual global turnover of 3.7 billion Euros and a strong focus on sustainable building products like insulation panels, rainwater tanks and wastewater systems, Kingspan is truly a market leader and fitting partner for this year's Awards.

We sat down with Michael Smit, Kingspan Water & Energy Technical and Sustainability Manager, to learn more about rainwater harvesting and the Kingspan approach to sustainability.

Q: Kingspan is a major global player with suppliers and facilities around the world. Can you tell us a bit about the history of Kingspan in Australia?

MS: Kingspan is a multinational building material company which purchased a rainwater tank company called Tankworks in 2016, an Australian company dating back to the 1930s. In 2017 Kingspan purchased Rhino Water Tanks, one of the biggest

rural and commercial tank manufacturers in Australia. Kingspan also makes wastewater treatment systems and energy products.

Q: You've been involved in the design and construction industry for many years. Over time, how have you seen the industry attitude and approach to sustainability evolve?

MS: There has consistently been a number of great examples over the last 20 years: there are always developers and landowners who have done some outstanding projects that use technology and good building materials really well together with excellent design and integration into the environment. But the overall standard of development has not kept pace over the last 20 years due to a lack of sustainable building regulations on water and energy efficiency. NSW probably has the best energy and water targets in Australia but it is the exception that proves the rule.

This is a crucial issue at the moment because there are plans for major growth in South East Queensland, Sydney, and Melbourne: In each of those cities, we're looking at something in the order of a million new houses by 2035. The standard at which we build these houses will determine the energy and water needs of our cities for the next 100 years.

Q: In line with these industry changes, have you seen consumer demand for products like rainwater tanks change over the past few years?

MS: Yes, there have been clear patterns. There was pushback against rainwater tanks in the 70s

and 60s and a lot of tanks were either declared illegal or closed down. About halfway through the millennium drought, it became clear that our centralised water supply system was not going to manage. So the government supported water efficiency and rainwater harvesting, and subsidies for rainwater harvesting systems. Because of this, we saw very significant increases in the ownership of rainwater tanks to such an extent that about 26% of all Australian houses now have a water tank.

Since the end of the drought, we've seen history repeating itself, with the water utilities making it a bit harder for people to have rainwater harvesting systems.

Rainwater is an efficient water supply for buildings because rain falls on the roof of where it is needed. This makes treatment and transport costs very low and a utility water can be a reliable backup option. The Federal Health guidelines describe rainwater as good quality water that, with a reasonably low level of management, can be used for a wide range of purposes including food preparation, bathing, laundry, toilet flushing and garden watering.

Q: Please walk me through Kingspan's overarching sustainability strategy. How has this taken shape and changed over the years?

MS: The overall Kingspan strategy is to promote sustainable buildings, which is strategically important because the way that our buildings use water and energy determines the sustainability of an entire city. If you make your buildings efficient then your cities are efficient, which is why it's important that government and policymakers

set performance targets and look at sustainable buildings as an investment in our future.

Internally at Kingspan Water & Energy Australia, state of the art facilities across the country are setting the company on track to achieve its goal of 100% renewable energy by 2020. Across the country, Kingspan tanks are integral components of a breadth of sustainable water management solutions including rainwater systems, rural fire fighting facilities, and potable water storage.

Our strong interest in building materials is linked to a strong innovation agenda, so we're continually striving and looking at what works in one part of the world and applying this elsewhere.

Q: In terms of these innovative technologies, Kingspan is currently focusing a lot of its efforts on rainwater harvesting and stormwater. Can you provide some more detail about this?

MS: Kingspan is part of Rainwater Harvesting Australia, a chartered committee of Irrigation Australia. The committee has produced a best practice design specification for rainwater harvesting, which we've turned into a CPD course for architects. We're interested in taking some of the best practice ideas to the market and informing builders and architects as to how they can use this new technology in their buildings.

Kingspan has what we call a "made to measure

approach", so we respond to the custom sizes that our customers need and make all of our tanks in Australia. We have factories in Melbourne, Sydney, Brisbane, and Perth, so all of our tanks are Australian made. We don't import our tanks from anywhere else in the world: we make them in the cities that they are ordered in.

We also develop our own technology, such as the High-flow filter, an Australian first innovation exclusive to Kingspan. Traditional tanks can overflow, so we've designed a system where if there is too much flow it just goes into the stormwater without spilling. This is not only important for Australian homes but also essential for commercial applications where you don't want flooding in a storm event.

We also have the Evolution MkIII pump, which is an automatic bypass system. If there is a power failure or if your tank runs dry, the system automatically switches across the mains water so that you get mains water pressure and can still meet your washing machine, toilet, and hot water system needs.

Recently we have seen a lot of interest in using rainwater tanks for stormwater management through our Kingspan onsite detention systems which reduce both the volume and peak flow of stormwater.

Q: What are the broader benefits of rainwater harvesting for home and other property owners?



Image: Shyamanta Baruah (Unsplash)

MS: If you have an urban system where a rainwater tank is connected to every house, you can reduce the water demands of the whole city, which in turn reduces the amount of infrastructure you need. So overall you would need fewer dams, fewer treatment plants, fewer pipes, fewer pumps, fewer reservoirs, and less of a distribution system. There is a marked urban benefit and it is in everyone's best interests to manage water efficiently.

The cost of operating water services per house in South East Queensland is \$800 a year. In Sydney, meanwhile, where there are rainwater harvesting and water efficiency, the operating cost is \$400 a year. You can see that this makes an incredible difference to household expenses, we often talk about affordability in terms of what it costs to buy a house, but we should also be looking at what it costs to live in the house.

Q: What do you believe are the next steps that the Australian industry must take in terms of sustainability?

MS: We need to have performance targets on all buildings for water and energy in all states and territories. These need to be built into the land use planning and building systems so that you cannot get permission to build a house unless you can demonstrate that you have met these targets. This is essential if we want to avoid creating a financial crisis for ourselves and an intolerable energy and water load for future generations.



Four Kingspan Round Rainwater Tanks in corrugated steel with galvanised finish



Image: Nikolay Zakharov (Unsplash)

The original 'Argyle' Victorian heritage house used a 2,500-litre tank for vegetable garden watering and flushing toilets.

For the contemporary, sustainable living project, S2 design chose to install a maximum of rainwater storage to fit into the new basement to fulfil the aim of achieving (almost) total water independence from mains water.

A thorough water study identified the project required sufficient water for a family of four, a large dog and an Australian-first 'roof farm', a new approach to sustainable inner city living and a new interpretation of permaculture.

A visually spectacular design in contemporary

architecture, the project was also significant for its social, functional and environmental considerations.

Application Kingspan manufactured 4 made-to-measure round water tanks of 10,850 litres (2.4m diameter x 2.4m high) to fit precisely within the constraints of the tight basement space and supply almost 45,000 litres of rainwater to the home and garden.

The flat tops on the steel tanks allowed more water storage than alternative tank types, which often feature domed or angled tops.

The surface finish of the tanks is a perfect complement to the exposed galvanised finish of the building structure and construction details.



2018 Sustainability Awards

The 2018 Sustainability Awards were in many ways a milestone. These 12th awards were also the first to be held at The Star, Sydney – a venue noted for its sustainability as well as its style, glitz and glamour.

The 2018 awards also represented the culmination of decades of research and industry application for many of our entrants, the fruits of which were patently evident with the winners on the night across all of the 15 categories.

This is underlined by what is happening across the world in the corporate sector. For example, Professional services giant PwC recently pledged to source 100 percent renewable electricity for its global operations and to offset all emissions accounted for by flights taken by employees for business purposes.

The multinational, which has operations in 158 countries and more than 236,000 employees, recently joined The Climate Group's RE100 initiative to source 100 percent clean power for its global operations – an aim it has committed to achieve by 2022 across its 21 main territories, which

account for 88 percent of its revenue streams. “We believe business has a key role to play in solving societal challenges alongside other stakeholders,” PwC's global chairman Bob Moritz says.

“This commitment is for us a recognition of the need to accelerate the pace of change, and individual business commitments, collectively, will make a critical difference to that.”

For companies like Kingspan, who are active and willing participants in the drive to introduce best practice solutions for the effective and, ultimately, sustainable removal of waste from the built environment, it would be easy to say that sustainability is at the very core of their business. Therefore in order to achieve their sustainability goals, companies like Kingspan put a huge amount of effort and forethought into the design and application of their products to ensure they not only comply with all national standards and expectations, but that they also out-perform what is required.

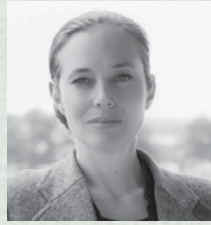
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Mike Faine
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Jeremy Mansfield
Lendlease



Rory Martin
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Robin Mellon
Supply Chain School



Caroline Pidcock
Pidcock



Suzanne Toumbourou
Australian Sustainable Built
Environment Council



Jeremy Spencer
Positive Footprints



Steffen Welsch
Steffen Welsch Architects



Kerryn Wilmot
University of
Technology Sydney





The Winner

The Prince's Terrace Adelaide
Defence Housing Australia



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Building Award



The Shortlist



The Beehive
Luigi Rosselli Architects



The Burcham
Stable Innovations Rosebery Pty Ltd

From the judges: "The philosophy behind the design was to blend rich, local heritage with contemporary living according to the architects. Mission accomplished I would think."

Image from Left To Right:



This 3D printed concrete house combines revolutionary tech with Italian design details



3D Housing 05 is made of 35 modules. The curved walls were printed before the roof, windows and doors were added. While the 3D printing process took two days, the house was completed within a week.

Massimiliano Locatelli of Italian studio CLS Architetti, in collaboration with Italcementi Heidelberg Cement Group, Arup and Cybe, has 3D printed a 100sqm house in just 48 hours at Milan's design festival, Salone del Mobile.

Located at the Piazza Cesare Beccaria, 3D Housing 05 is the first 3D printed concrete house in the EU. It was built on site by Cybe Construction's mobile 3D concrete printer, the Cybe RC 30p, and includes a living room, bedroom, kitchen and terrace roof.

The Cybe RC 30p printer moves on caterpillar tracks, and features a high printing speed



The heritage of Italian design and details are combined with technological innovation to create a home that looks almost move-in ready.

and range that goes up to 450m in height. It uses a special mortar, produced with far less CO2 emissions than traditional Portland cement. Italcementi, one of the world's largest cement suppliers, advised the team on the base mix for the concrete used.

"3D concrete printing is build up layer by layer, and the layers will be visible when we don't apply any finishing," Cybe explains.

"The dimensions of a printed layer vary according to the use of a particular nozzle. We work with different nozzles for various applications.

"Although we can apply different methods of finishing, this is not always used."

This was the case for 3D Housing 05, whose 3D printed layers are displayed in full glory. The concrete composite is juxtaposed with timeless materials—brass for the window frames, marble of the bath fixtures, smoothed plaster as one of the possible wall finishes, and sheets of polished brass in the industrial-style kitchen.

At the same time, the stratification of the concrete features a pattern that allows climbing plants to grow spontaneously toward the roof, which is transformed into an urban garden.

Designed and engineered in two months, the prototype aims to demonstrate the possibilities of 3D printing in the realm of sustainable architecture.

"The construction industry is one of the world's biggest users of resources and emitters of CO2. We want to bring a paradigm shift in the way the construction industry operates and believe that 3D printing technology is critical to making buildings more sustainable and efficient," Guglielmo Carra, Europe Materials Consulting Lead at Arup, said.

"It creates less waste during construction and materials can be repurposed and reused at the end of their life."

3D Housing 05 will be disassembled and reconstructed at the Italcementi headquarters on the outskirts of the city, where it will be subject to a series of tests that monitor how its structure performs over time.



World's largest wooden building designed to be updated over time



Smart, circular, high-tech and radical. These words describe The Dutch Mountains (TDM), a new project in the Netherlands that's set to be the world's largest timber building.

Located in the region of Eindhoven, a famous tech and design hub and the birthplace of Philips, TDM is the vision of Rotterdam-based developer BLOC, architecture practice Studio Marco Vermeulen, and consultancy firm Urban Xchange.

The 80,000sqm multi-functional building will be constructed with Cross Laminated timber (CLT), and feature a mix of users, functions and activities—from workspaces for tech companies and meeting places such as auditoriums and a park, to hotel and short-stay apartments.

Unlike many mixed-use developments today, TDM isn't designed to soar into the sky. Instead of competing with the world's tallest buildings, it's focused on a generation of the longest buildings. This horizontal character, which spans 440m, aims

to facilitate collaboration and knowledge sharing between multiple companies—both established businesses and smaller start-ups—within one facility, and beyond.

“Instead of individual expression on a limited scale, businesses will become part of something much bigger they can derive their identity from,” the TDM project team says.

However, the project goes far beyond sustainable building materials and the re-imagination of the office of the future. The structure itself is also designed to be upgradeable. Take for instance the building’s proposed energy-generating façade. In the event that a greener façade system is invented, the team will be able to replace this existing exterior, which will be recycled or processed.

“From its inception the concept has been developed by tech companies and service providers who are normally only involved much further down the development chain. Together they are developing a new ‘white label’ service concept: an integral ‘ecosystem’ of services and technologies built around the user,” the team explains.

“This new service concept enables individual users to reside as pleasurably, comfortably and healthily

as possible in the building—every user can regulate their own personalised environment.”

This distinct service model means spaces and rooms are adaptable, while software and hardware, including light, heating, food, furniture and installations, are to be replaced over time. The data-driven and experience-directed nature of the complex adds to its upgradeability.

This resulting unprecedented level of flexibility ensures the building is able to adapt to business, social and technological changes.

At the same time, TDM will be entirely self-sufficient, with closed cycles in energy, water, waste and materials. This is possible, thanks to a survey developed in the project’s exploratory stage that covered over 100 technologies that could be integrated into the building.

The Dutch Mountains is expected to commence construction in mid-2019, with an end-2020 completion date. Joining the core team are developing partners Asito, Beveco, Dell Technologies, HEYDAY, SPIE and Strukton. Arup and Off Road Innovations are the project’s knowledge partners.



‘Tesla of construction industry’ delivers energy-positive school in Norway



The greenest school in Norway, the Powerhouse Drøbak Montessori lower secondary school, will produce more energy than it consumes when it opens its doors next year.

Delivered by Powerhouse, a coalition of sustainability-minded companies the Zero Emission Buildings Centre have likened to Tesla, the project is located in Drøbak, and designed with optimal solutions that allow for drastic cuts in energy use.

Solar panels will help the school to generate 30,500 kWh of energy each year, with the body of the structure intersected by an angular, ‘solar plate’.

According to Powerhouse, this plate uses the stack effect to draw in fresh air, and is oriented directly to the south with a 33-degree incline.

Similar to Powerhouse’s first energy-positive project, Powerhouse Kjørbo, the Drøbak school features two external ground wells that provide a renewable source of geothermal energy for heating, water, ventilation, as well as cooling in the summer. These energy wells have been drilled 300m into the ground.

Further minimising energy consumption are passive design measures, such as the building’s



compact volume, favourable U-values, and specified materials with “little bound energy”. In all, Drøbak is expected to use less than 25% of the usual energy requirements for schools of the same size.

“The design arises from the energy concept, the qualities of the site and the Montessori pedagogy, in addition to a strict financial scope,” Kjetil Trædal Thorsen, co-founder at Snøhetta, one of the practices that make up Powerhouse, says. “The architecture is intended as a social and educational tool, built around the Powerhouse concept as the central design element.”

The new rectangular structure, containing 900sqm of heated space, will sit on the edge of a forest, creating strong connections between the indoors and nature.

“It is particularly gratifying to see that this energy-positive building takes the environment and nature into account,” Managing Director of the Powerhouse collaboration and Chief Innovation Officer at Skanska Norway, Kim Robert Lisø, adds.

Joining Skanska and Snøhetta in forming Powerhouse are developers Entra, environmental NGO ZERO, and consulting practice Asplan Viak. Together, the team seeks to build a new standard for sustainable buildings around the world, beginning in cold Norway. All Powerhouse buildings must meet a strict definition of being energy positive.

This includes taking into account every stage of a building’s life cycle, from the transport and manufacture of its materials, to its eventual demolition. To find out more about the Powerhouse standard, [click here](#).

“We want to show that energy positive buildings can pay off, even commercially. Energy positive buildings can be profitable, both for those of us who develop the solutions, and for the users. The users will benefit from the lack of electricity bills,” the team explains on their website.

“[But] no one can build energy positive buildings alone. We have to rethink to succeed. We need to become better at utilising our expert knowledge.”

Students at Drøbak will begin using their new, sustainable school premises in summer 2019.



For more resources:

1300 736 562

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