Borealis' PP-RCT materials the preferred solution for demanding construction projects

Case Study

Illustration: Henning Larsen Architects

The King Abdullah Financial District

The King Abdullah Financial District (KAFD) is a development launched in 2007 near King Fahad Road in the Asahafa area of Riyadh, Saudi Arabia.

The area will consist of 34 towers in an area of 1.6 million square metres. It will provide more than 3 million square metres of space for various uses, 62,000 parking spaces and accommodation for 12,000 residents. In 2011 it was the largest project in the world seeking green building accreditation.

The project is in response to the rapid population growth of the region and in order to house the large community of professionals working within the financial sector and related industries, hosting the headquarters of the Capital Market Authority, the Stock Exchange, banks, financial institutions and other service providers such as accountants, auditors, lawyers, analysts, ratings agencies, consultants and IT providers.

With the first tenants due to move in during 2013, the King Abdullah Financial District provides the next generation of development and will ensure the sustained dominance of Saudi Arabia as one of the larger economies and financial centres within the region.

A world class challenge

Due to current rapid population growth, increased construction activity means increased need for efficient and sustainable piping. The hot and cold water pipelines needed for cooling systems in the buildings constructed are a key application of this in the Middle East.

Ranging from 20 to 80 floors, the buildings of the KAFD include many world class skyscrapers with the very highest demands on their piping networks. Planners are looking for an efficient pipe concept offering high performance and capacity with easy handling and installation.

The benefits of plastics play in with PP-R

Traditional steel and cast iron pipes are becoming outdated due to their high weight, difficult handling and questionable performance over time.

These are only a few of the reasons why plastics have rapidly become the preferred pipe material over the last few decades. During the last 30 years, polypropylene random copolymers (PP-R) have been developed and successfully approved in many countries worldwide for the full range of plumbing and heating system applications.

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Plastic pipes are roughly 1/3 of the weight of steel pipes, making installation and handling much easier. These benefits, together with extended durability and safe and reliable operations, make PP-R pipes the ideal choice for projects such as the KAFD construction complex.

Considerable savings and enhanced performance with PP-RCT

Recently a new high performing pipe class, PP-RCT (Polypropylene random crystallinity temperature) has been established on the market. PP-RCT has an improved hydrostatic pressure resistance especially at elevated temperatures resulting in a beneficial pipe design with, for example, higher hydraulic capacity.

Bänninger, the company selected by the building consultants as exclusive supplier for these high quality plastic piping systems for the KAFD complex, is a leading German innovative piping company using high quality Borealis PP-RCT pipe resins.

The PP-RCT pipes supplied spanned a diameter range of 20-250 mm and cover all water distribution requirements for the cooling systems of the KAFD complex. Especially demanding are the large mains needed for the skyrises with pressures of up to 20 bars and reaching up to 80 floors. The job of these mains is to transport the cooling water need for the climate control systems. It is in these areas that PP-RCT has been established as the preferred solution.

PP-RCT pipes are able to meet and exceed the requirements due to their increased hydraulic capacity, easy handling and installation as well as improved operability as demonstrated, for example, through the absence of condensation on the pipe surface which is otherwise commonplace for steel pipes transporting cold fluids in hot environments.

As Bänninger's Christoph Stamm put it, "We have been using the PP-RCT compound from Borealis since 2005. It allows weight savings of a minimum 17% compared to the types of material we have used previously and the pipes have been approved for a higher pressure class as well, in spite of their lower weight".

Optimised wall dimensioning with the same outer diameter also offers a 17% increase in the flow volume together with reduced sound levels.

Borealis
Borealis has over 30 years of experience in PP-R materials. It founded the PP-RCT pipe class in 2004 with its RA7050 grades. Since then, PP-RCT has been included in the global EN ISO 15874 standard and has been in high demand on the market as the preferred pipe material. Borealis' range of RA7050-materials has a track record of nearly 10 years with materials produced using a special multiple-reactor technology and beta-crystallisation. The materials, ready compounded for maximum quality, are offered in two distinct colours, green and steel grey.

Borouge
Borouge is a joint venture between Borealis and Abu Dhabi National Oil Company (ADNOC), and offers a full range of solutions to its local markets in pipe infrastructure and hot and cold water pipe including PP-R and PP-RCT.

Bänninger Kunststoff-Produkte GmbH
Bänninger is well known as an innovative and reliable company in the field of PP-R pipe production. These pipes, manufactured from a special polypropylene random copolymer, are mainly used for transporting hot and cold drinking water and for heating systems. For more than 20 years, Bänninger has been manufacturing complete PP-R piping systems including all types of fittings, fixtures, pipe tooling and other accessories. The pipe sizes range from diameters of 16 to 630mm. 80% of the pipe systems manufactured are exported, primarily to Saudi Arabia and other Middle Eastern countries.

	RA7050-GN	RA7050
RAL Colour code	Green (6024)	Steel grey (7042)
CRS at 70°C/50 years	5.0 MPa	5.0 MPa
MFR (230/2.16)	0.3 g/10 min	0.3 g/10 min
Modulus of Elasticity	900 MPa	900 MPa

Borealis and Borouge are leading providers of innovative plastics solutions that create value for society. Building on the unique Borstar® and Borlink™ technologies and 50 years of experience in polyolefins, Borealis and Borouge support key industries including **infrastructure, automotive and advanced packaging.** Their manufacturing capacity reaches over 5.4 million tonnes of polyethylene and polypropylene per year. **Borealis** is headquartered in Vienna, Austria, and operates in over 120 countries with around 6,200 employees worldwide. **Borouge**, its joint venture with the Abu Dhabi National Oil Company (ADNOC), employs approximately 1,700 people, has customers in more than 50 countries and its headquarters are in Abu Dhabi in the UAE and Singapore. Together, both companies provide services and products to customers around the world. Borealis offers a wide range of base chemicals, including melamine, phenol, acetone, ethylene and propylene servicing a wide range of industries. Together with Borouge the two companies will produce approximately 6 million tonnes of Base Chemicals in 2014. Borealis also creates real value for the agricultural industry with a large portfolio of fertilizers. The company distributes approximately 2.1 million tonnes per year. This volume will increase to around 5 million tonnes by the end of 2014. Borealis and Borouge proactively benefit society by taking on today's challenges and are working to drive ideas forward. Both companies are committed to the principles of Responsible Care®, driving improved safety performance within the chemical industry and contributing to addressing the world's water and sanitation challenges through product innovation and their Water for the World™ programme. **For more information visit:** www.borealisgroup.com, www.borouge.com, www.waterfortheworld.net

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