

CASE STUDY

BORSTAR® RA140E ENABLING HIGH PERFORMING WATER PIPES FOR MEGA PROJECTS IN ABU DHABI



Waterfront Towers, Abu Dhabi.

BACKGROUND

Polypropylene Random (PP-R) co-polymer grades were first introduced in hot and cold pressure pipe applications in 1974. Since then, they have steadily replaced conventional materials such as cast iron, copper, steel and clay.

In the Middle East, PP-R is commonly used for heating, plumbing and domestic water systems in large, prestigious high-rise buildings. Such buildings may contain more than 50 floors' length of pipes in sizes up to 160mm in diameter, therefore designers usually prefer lightweight piping systems.

Due to rapid population growth in the UAE, increased infrastructure development has led to a rising demand for efficient and sustainable piping solutions.

RAKtherm, one of the most well-known suppliers of plumbing solutions in the wider Middle East region, was selected by consultants as the supplier of high quality PP-R piping systems for very prestigious projects in the UAE such as Waterfront Towers and Cleveland Clinic Abu Dhabi.

CHALLENGES

Good processability is essential for manufacturing pipes efficiently and economically without compromising any of the materials' excellent properties or taxing existing materials to the limit.

Older generation polymers have a limited balance between mechanical performance and processability, which can manifest in poor pipe surface quality as well as low production speeds.

As such, planners and contractors involved in prestigious projects often have very high demands on their piping networks, and they look for efficient solutions offering high performance and capacity with easy handling and fast installation. Clients are often either government agencies or well-known private companies, whose main priority includes timely project completion and reliable plumbing systems.

THE SOLUTION

Borstar® RA140E is a third generation, high performing PP-R known for its excellent balance of mechanical and physical properties.

Its multi-modal polymer concept allows tailoring of the appropriate high molecular weight fraction in the co-monomer distribution which leads to excellent stiffness-toughness balance and improved impact performance at brittle temperatures without negative effects on modulus.

Our nucleation technology increases the crystallisation temperature for a finer crystalline structure. Material shrinkage is constant (approximately 1.8-2.0%) and independent of the colour master batch (1.0-2.0%) used.

This enables faster colour changes without additional adjustments to processing conditions, leading to 20% shorter cycle times in injection moulding fittings and significantly higher extrusion rates (without extra cooling capacity) compared to non-nucleated PP-R material.

In both projects, the developers had been in touch with RAKtherm during the planning stage to discuss the design, supply, installation, testing and even future maintenance. This was to avoid potential design and installation issues, especially if the client was running on a very tight deadline.

Pipes made of Borstar® RA140E, with their superior properties, were able to exceed the most challenging requirements due to the exceptional balance of mechanical properties as well as easy handling and installation. This makes Borstar® RA140E the most preferred solution for demanding construction projects.

Mr Ali Hashim, Chairman of RAKtherm, said, “Borstar® RA140E is a third generation PP-R with an excellent balance of mechanical properties and processability. The collaboration with Borouge played a significant role in the success of PP-R plumbing pipes in the UAE and the GCC region. We started our PP-R production with Borouge as our partner as we demanded only the highest quality materials and the Borstar® range of PP-R materials was already well-known in the plumbing market.”

SUMMARY

Project name	Mega projects such as Waterfront Towers and Cleveland Clinic
Project location	United Arab Emirates
Project owner and producer	RAKtherm
Project completion date	2019
Application	Hot and cold water for plumbings
Project requirements	Robust design, fast installation, maintenance free system
Solution	Borstar® RA140E, a third generation high performing PP-R
Solution benefits	Exceeds the requirements of demanding construction projects with its exceptional balance of mechanical properties as well as easy handling and installation

About Borouge A joint venture between ADNOC and Borealis. Borouge is a leading petrochemicals company that provides innovative plastics solutions for the energy, infrastructure, mobility, packaging, healthcare and agriculture industries. With 4.5 million tonnes of annual capacity, Borouge has the world's largest integrated polyolefin complex, with the ambition to double its current capacity by 2030.

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