Polypropylene (PP-R) for pipes and fittings in hot and cold water systems
Polypropylene (PP-R) for pipes and fittings in hot and cold water systems

Borouge is a joint venture between the Abu Dhabi National Oil Company (ADNOC), one of the world's major oil and gas companies, and Austria based Borealis. Building on Borealis’ unique Borstar® technology and experience in polyolefins for more than 50 years, Borouge provides innovative, value creating plastics solutions for infrastructure (pipe systems, and power and communication cables),automotives and advanced packaging.

In 2010 Borouge tripled its annual production capacity in Ruwais, Abu Dhabi to 2 million tonnes and together with Borealis has an annual manufacturing capacity of over 5.4 million tonnes of polyethylene and polypropylene. The current Borouge 3 expansion project will be completed at the end of 2013 resulting in an additional capacity of 2.5 million tonnes per year being fully operational by mid-2014. Borouge is also investing in plants and logistics hubs in Asia and an Innovation Centre in Abu Dhabi.

Focused on our company mission, Value Creation through Innovation, we ensure that our customers throughout the value chain, around the world, can always rely on superior products and security of supply.

One product to be produced in the new polypropylene plant in Ruwais in 2011 was Borouge RA130E PP-R for hot and cold systems. Based on the well established grade from Borealis this material is produced and tested to the highest quality standards and meets all the essential national and international standards. All the monomers and additives used in the production of Borouge RA130E fully comply with the regulations and in addition, testing of the organoleptic properties is carried out on a quarterly basis by the independent test Institute Technologiezentrum Wasser (TZW) in Germany. Indeed the high purity of the feedstock in the Middle East means that the taste and odour properties of Borouge RA130E are second to none.

Advantages of Borouge RA130E for hot and cold water plumbing systems

- Service lifetime with low maintenance
- Practical experience gathered over more than 30 years
- Light weight material reducing transportation and storage costs
- No corrosion in contact with water and air
- No contact corrosion when exposed to iron particles
- Environmentally friendly

Borouge is dedicated to the philosophy of value selling and continuously supports the complete value chain to get the best of its high quality materials and support the market development of our customers’ products.
**Present and Future**

**La Scala**, perhaps the finest opera house in the world, was built in 1778. In January 2002 it was closed for a major refurbishment including the replacement of the old galvanized iron heating system with a new PP-R system. The system chosen was produced by Aquatechnik S.p.A. using PP-R RA130E.

**Marina Bay Sands** is an integrated resort fronting Marina Bay in Singapore. Developed by Las Vegas Sands, it is billed as the world’s most expensive standalone casino property at US$6.5 billion. It is fitted with hot and cold water systems from Kekelit in Austria using PP-R RA130E.

With innovation being part of Borouge’s values, we continue to develop new PE and PP products to stimulate continuous market growth for the benefits of the entire value chain. This is supported by our Innovation and Centres in Borouge and Borealis. Just imagine the office buildings of the future, like the one designed by the innovative team at **ICON Consultant Engineers** in Abu Dhabi, powered by renewable solar energy and using PP-R piping systems for its heating and plumbing services.
Please use this pocket to collect supporting Borouge technical papers, case studies and TechNotes
PP-R Grades

RA130E
This is a natural PP-R compound produced by Borouge in Ruwais, Abu Dhabi, which is ideal for hot and cold water systems. Borouge RA130E offers a number of benefits compared to competitor materials such as a higher output rate and an improved hydrostatic strength.

Beta PP-R
This new range of Beta PP-R pre-coloured compounds manufactured by Borealis in Europe can be supplied by Borouge. These high specification materials can produce a high quality range of pipes and fittings for hot and cold water systems. Technical details are contained in other literature which can be supplied upon request.

<table>
<thead>
<tr>
<th>Commercial Reference</th>
<th>Material Type</th>
<th>Colour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA130E</td>
<td>PP-R</td>
<td>Natural</td>
<td>PP-R material for plumbing, heating and industrial pressure pipes and fittings</td>
</tr>
<tr>
<td>Beta-PPR™ RA7050</td>
<td>PP-RCT</td>
<td>Grey*</td>
<td>Beta PP-R material for plumbing, heating and industrial pressure pipes and fittings</td>
</tr>
<tr>
<td>Beta-PPR™ RA7050-GN</td>
<td>PP-RCT</td>
<td>Green*</td>
<td>Beta PP-R material for plumbing, heating and industrial pressure pipes and fittings</td>
</tr>
</tbody>
</table>

*other colours are available upon request

Crosslinked Polyethylene (PEX) Grades

PEX-a
Cross linking polyethylene is an alternative way of producing a plastic material with improved high temperature performance. PEX-a materials, such as BorPEX HE1878E, can be blended with organic peroxide and additives and extruded using a twin screw extruder. As the pipe emerges from the die head it can be immediately crosslinked by heating with high power short wave length infrared radiation.

PEX-b
BorPEX ME2578 is a co-polymerised PEX-b with silane added during the polymerisation process. The incorporation of silane within the polymer results in longer continuous runs, significantly higher productivity compared with traditional PEX-b materials and high storage stability. Moreover, ME2578 also exhibit outstanding visual properties, providing pipes with an excellent glossiness.

<table>
<thead>
<tr>
<th>Commercial Reference</th>
<th>Material Type</th>
<th>Colour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BorPEX™ HE1878E*</td>
<td>PEX-a</td>
<td>Natural</td>
<td>PEX-a material for plumbing and heating, drinking water and industrial applications</td>
</tr>
<tr>
<td>BorPEX™ ME2578</td>
<td>PEX-b</td>
<td>Natural</td>
<td>PEX-b material for outer layer of multilayer pipes for plumbing and heating systems</td>
</tr>
<tr>
<td>BorPEX™HE2590</td>
<td>PEX-c</td>
<td>Natural</td>
<td>PEX-c material for plumbing and heating, drinking water and industrial applications</td>
</tr>
</tbody>
</table>

*other PEX-a and PEX-c grades are available upon request

Borouge’s team of Technical Service Engineers can also help you to get the best of these materials.
About Borouge

Borouge is a leading provider of innovative, value creating plastics solutions. A joint venture between the Abu Dhabi National Oil Company (ADNOC), one of the world’s major oil and gas companies, and Austria based Borealis, a leading provider of chemical and innovative plastics solutions; Borouge is a groundbreaking international partnership at the forefront of the next generation of plastics innovation.

With its base in the United Arab Emirates and Marketing & Sales head office in Singapore, Borouge employs approximately 1,700 people representing more than 40 nationalities and serving customers in more than 50 countries across the Middle East, Asia-Pacific, Indian sub-continent and Africa.

Building on Borealis’ unique Borstar® technology and experience in polyolefins for more than 50 years, Borouge provides innovative, value creating plastics solutions for infrastructure (pipe systems, and power and communication cables), automobiles and advanced packaging.

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Borouge is committed to the principles of Responsible Care® and together with Borealis proactively contributes towards addressing the world’s water and sanitation challenges through their Water for the World™ initiative.

Visit www.borouge.com and see how we are Shaping the Future with Plastics.

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For more information contact: info@borouge.com
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