Producing structured wall PP sewage and drainage pipes

What are structured wall sewage pipes?

The main structural requirement for a non pressure pipe is its resistance to the compressive load of the soil or the “ring stiffness” of the pipe. In order to develop maximum pipe stiffness class with the minimum amount of material, a number of so called structured wall pipe designs have been developed over recent years.

The two most common systems are ribbed pipes and twin wall pipes. Whilst Uponor’s “ULTRA-RIB” design remains very popular in Scandinavia and some other countries, twin-walled pipes are the most important structured wall pipe design.

Which materials are best for producing twin wall pipes?

Many manufacturers use high melt flow index HDPE materials for producing twin wall pipes as these materials are easy to process and provide a moderately high stiffness.

However for the optimum performance, PP-B materials are far superior as the basic stiffness of the material is up to 50% higher which means that for the same product stiffness the weight per metre is typically 15% lower. Recent research work also shows that the durability of PP-B pipes is far superior to that of HDPE pipes due to their greater resistance to cracking (1).

What equipment do I need for the production of twin wall pipes

Preferably two extruders with a single common die head fitted with pipe size specific mandrels. The upstream material handling system can be common or separate depending on the material selection for the two layers. The pipe then passes through a corrugator equipped with the mould blocks to form the outer pipe profile. The pipe is then cooled prior to cutting and stacking.

The socket can be produced on line or an injection moulded socket can be friction welded to the pipe prior to stacking. The rubber gasket can be installed manually or by using automated device. Throughout the process it is important to employ the correct quality control and safety systems and use only reliable hand tools.

Can I use a standard PE extruder for PP TWP pipe production?

Yes, provided you have a modern single screw extruder you can produce both PE and PP solid wall pipes on the one machine. Normal process adjustments will be required to account for the differences in viscosity and some of the other properties. To ensure smooth changeovers from processing PE to PP, it is of course important to control the procedures well and thoroughly clean the machine.

What about profile design – can I use the mould blocks I use for PE

During the introductory stage, it is common to manufacture PP pipes using mould blocks designed for PE. The PP pipes will be considerably stiffer than the PE pipes made on the same line which provides an opportunity to use the same line to produce two different products and test out some of the benefits of PP. However the design of the PP pipe will not be optimal and new dedicated mould blocks will eventually be required to produce the desired stiffness class at the minimum weight per metre.

What about the availability of fittings?

Fittings are an important part of a sewage system and can be readily injection moulded in PP. However the investment in tooling for the complete range can be quite high and therefore initially it may be better to source the fittings from an established fitting producer – for more information about potential suppliers ask your local Borouge representative or contact us at infopipe@borouge.com

What PP-B grades does Borouge supply?

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Type</th>
<th>Modulus</th>
<th>Typical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>BorECO™ BA212E</td>
<td>PP-HM</td>
<td>1700</td>
<td>Solid wall PP sewage pipes</td>
</tr>
<tr>
<td>BorECO™ BA415E</td>
<td>PP-B</td>
<td>1500</td>
<td>Twin wall PP sewage pipes</td>
</tr>
<tr>
<td>BA202E</td>
<td>PP-B</td>
<td>1300</td>
<td>General purpose PP-B grade</td>
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If you have any further questions or would like a brochure describing the range of PP materials that are available from Borouge please contact us on infopipe@borouge.com

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