

Project Report

Fresh Water Supply for Zhoushan Group of Islands



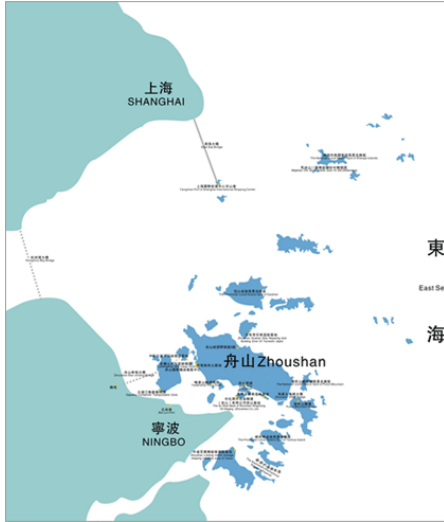
With the completion of a successful under-the-sea water channeling project, fresh water supply capacity for the Zhoushan Group of Islands has increased to 350,000 tons per day. In 10 to 20 years, an expanded pipeline network will supply approximately 85% of the inhabited islands with fresh water, thanks to the installation of a non-digging pipe system produced using *Hostalen* CRP100 black resins, a PE 100 pressure pipe material from polyolefins industry leader LyondellBasell.

Seven years ago, the Zhoushan Water Company (ZWC) and China UST Pipe began a project to supply fresh drinking water to the remote Zhoushan Group of Islands. Located in Zhejiang Province, south of the Yangtze River and near

Hangzhou Bay in the East China Sea, the 1,390 islands encompass an area of 22,000 square kilometers (20,800 square kilometers of sea area and 1,440 square kilometers of land area) and include a population of 970,000.

Among the 103 inhabited islands are the main islands of Dingshan as well as Xiaogan, the latter being home to more than 1,000 people. A piping system was installed in May of 2009 to supply fresh

drinking water between the main islands, which was produced through close cooperation among China UST Pipe (DN560 SDR13.6), the Shanghai China UST Plastic Co., Ltd., and LyondellBasell.



Choosing the Right Material Was Critical

Fresh water pipe located under the sea must be installed as a non-digging project. The installation included the construction of two openings on each side of the channel, and installation required that the pipe be dragged across the channel under the seabed. Total length of the pipeline is about 770 meters.

This type of installation poses a risk. The pipes can be scratched by sharp rocks or shreds during the pipeline dragging progress. Small notches in the pipe could reduce the long-term strength of the pipe and lead to premature failures (leakage). To meet the non-digging requirements of this installation, strong performance pipes were required. The pipe performance requirements included a long service life, with low environmental stress cracking resistance and good flexibility. *Hostalen CRP 100* black resin, a PE 100 pressure pipe material from polyolefins leader

LyondellBasell, met all of the requirements.

Concrete, GRP and steel pipelines were rejected at the early planning stages due to cost and service time considerations. The pipes must be able to withstand water erosion for at least 25-30 years, and these materials could not meet this stringent requirement.



Laboratory quantities of individual HDPE pipes produced by LyondellBasell have been subjected to continuous shelf life tests since 1956. These systems have achieved a service life of over 50 years at 20°C. The test results confirmed that the Arrhenius law is applicable to plastics.

Based on the Arrhenius law, the international standard ISO 9080 provides extrapolation methods based on scientific predictions regarding the long-term hydrostatic strength of thermoplastic pipe materials.

Piping systems manufactured by *Hostalen CRP 100* black HDPE multimodal resins are more resistant to notches and stress cracking. The pipes are also more resistant to pressure loads and mechanical stresses, compared to conventional HDPE materials. Tests conducted at independent laboratories have shown that pipes produced with this *Hostalen* grade have a design service life

of up to and potentially exceeding 100 years.

Fast and Easy Pipe Installation

The good flexural modulus and exceptional impact properties offered by *Hostalen CRP 100* black enabled easy installation and high performance. Because of their light weight, the pipes were easily transported to the installation sites at low cost compared to pipes produced with conventional materials. The easy jointing also helped the customer transport shorter pipe segments and connect them using the butt fusion process on site.



Milestone for China Water PE Pipe Industry

The use of black compounded HDPE pipe grades is not a fully established

practice in the Chinese pipe industry, especially for water pipes. Some convertors mix the PE and carbon black together in the feeder, and then extrude the finished pipe. While this is a less expensive method, achieving the required homogenous distribution of additives and pigments in combination with high output pipe extrusion is nearly impossible by

single-screw extruder mixing. Moreover, uneven dispersion of additives and/or pigments will increase the risk of premature failures.

China UST is a key customer of LyondellBasell in China, which always insists on using compounded *Hostalen CRP 100* black HDPE. In addition to gas

pipe production, China UST has been expanding into water pipe manufactured using black compounded PE, an approach that will help to improve the quality of pipe in China. LyondellBasell is focused on the development of high-quality performance products for the China PE water pipe industry.

Contacts:

Hou Shubin

Shanghai ChinaUST

Business Manager

No.3 Huachang Industrial Area, Huaxin Town, Qingpu, Shanghai China

Tel: +86 (21) 5979 0555

Email: houshubin@126.com

Web: www.ChinaUST.com

Li Sandro

Basell Asia Pacific Consulting (Shanghai) Co. Ltd, a LyondellBasell company

POS, Business Unit Pipe & Infrastructure

Room 2208, The Center, No.989 Changle Rd, Shanghai China

Tel: +86 (21) 6121 0152

Email: Sandro.li@lyondellbasell.com

Web: www.lyondellbasell.com

Before using a product sold by one of the LyondellBasell family of companies, users should make their own independent determination that the product is suitable for the intended use and can be used safely and legally. SELLER MAKES NO WARRANTY; EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) OTHER THAN AS SEPARATELY AGREED BETWEEN THE PARTIES IN WRITING. This product may not be used in the manufacture of any US FDA Class III Medical Device or Health Canada Class IV Medical Device and may not be used in the manufacture of any US FDA Class II Medical Device or Health Canada Class II or Class III Medical Device without the prior written approval by Seller of each specific product or application.

Users should review the applicable Material Safety Data Sheet before handling the product.

Hostalen is a trademark owned and/or used by LyondellBasell group companies and is registered in the U.S. Patent and Trademark Office.

