

# MILLENNIUM

## PIPELINE DESIGN

### EXPERT OPINION

The claims and information contained within this document have been reviewed by specialist plastic pipe consultant Mr Michael Stahmer MIE (Aust) CPEng. Mr Stahmer's professional opinion and comments support Millennium® pipe's claimed benefits in terms of cost, handling, flow characteristics and consequential jointing time reduction.

8 May 2017  
The Technical Manager  
Iplex Pipelines (Aust) Pty Ltd  
PO Box 5160  
Brendale QLD 4500

**STAHMER CONSULTING**  
**82 LUDSTONE STREET**  
**HAMPTON 3188**  
**AUSTRALIA**

Dear Sir/Madam

Ref: Millennium HSCR PE100 Pipe Design Factors

On the basis of the research and testing that has been undertaken, it is my professional opinion that the enhanced slow crack growth resistance inherent in Millennium pipe, utilising Qenos HCR193B resin (HSCR PE100), provides greater protection against potential long-term failure due to slow crack growth than that afforded by increased wall thickness.

This is particularly important for harsh installation conditions, such as trenchless construction, especially involving pipe cracking, HDD, submarine installations and in sand-less bedding applications with bedding material of maximum 20 mm particle size.

In order to account for the potential effects of installation technique on MAOP, design factors are available to apply to the PN rating - e.g. AS/NZS 4130 Appendix B, AS/NZS 4645.3 Appendix B and APGA Code of Practice V4.0 Section 4.4.


These factors are not scientifically derived however, but are rather estimates based on experience. In particular, long term experience is somewhat lacking with respect to trenchless and submarine applications, especially when considering the various techniques used in these.

The use of HSCR PE100 enables design factors of 1.0 for f2 and f3 in AS/NZS 4130, f0, f1, and f3 in AS/NZS 4645.3, and f1 and f3 in APGA Code of Practice, gas and water.

Note that AS/NZS 4645.3 is a "deemed to comply" solution in accordance with AS/NZS 4645.1, which is performance based and specifically allows for the introduction of new materials.

The APGA CoP V4.0 allows for "fit for purpose" design for gas and water - Section 4.6.

The resulting reduced wall thickness of Millennium pipe confers benefits in terms of cost, handling, flow characteristic and jointing time, provided design is based on the use of HSCR materials, such as Qenos HCR193B, complying with PIPA POP004 and POP016.



Michael Stahmer MIE (Aust) CPEng (Ret)  
Specialist Consultant Plastics Pipes

*The information contained in this document should serve as a guide only and is subject to change without notice. For more information please contact Iplex Pipelines Australia Pty Ltd.*

