

TESTING GUIDELINES FOR HDPE WATER PIPELINES

A. High Co-efficient of Expansion of HDPE Pipes

Since PE pipe has a relatively high co-efficient of expansion, the pressure test should not be carried out in a hot afternoon. In high temperature surroundings, the volume of make up water required is relatively large. If there is a sudden cooling of the pipeline during the test (due to cloudy skies or rain), then the pressure in the pipeline could rise critically over 2 times the rated pressure. Therefore, test should preferably be carried out in the cool hours (i.e. very early morning) to prevent excessive expansion of the pipeline.

B. Pressure Reduction Factor

An additional factor needed to be considered in the testing of PE pipes is the Pressure Reduction Factor. *Please see overleaf for the Reference Chart.*

The implications are as follows:-

a) The Recommended Maximum Working Pressure (in bars) is not the same figure as the Pipe Pressure number. For example, at our normal Malaysian temperature of 30 Deg C, a PN10 pipe is designed for a recommended maximum working pressure of 8 bars only. Conversely, if the working pressure is 10 bars at normal temperature, then the recommended pipe should be PN12.5 instead of PN10.

b) During testing of the pipes after pipes jointing has been done, the testing pressure should not be selected based on the pressure rating of the pipe at 20 DegC (i.e. the Pressure No.) For example, if the ambient temperature is about 30 deg C, then the recommended maximum working pressure for a PN6 pipe would be 4.8 bars. Then the appropriate testing pressure should be 1.5 times 4.8 bars or 7.2 bars or 106 psi.

c) Since temperature plays such an important role in the pressure rating of the PE pipe, it also inevitably means that pipe-testing needs to be done at the correct temperature. It is advisable that testing should not be carried out in the middle of the day or even towards the late afternoon because heat accumulation by the pipe and the water inside the PE pipe can cause the water temperature to rise very high (heat absorption is accelerated by the black colour of the pipe). The pipe and the water temperature can rise so high at different positions of the pipe that the testing would be out of control and the pipe may even fail unnecessarily. Hence, it is more proper to have the pipe-testing done in the early morning hours when the pipe and the water in the pipe have not accumulated much heat yet and the temperature of the pipe material is not high.

PRESSURE REDUCTION FACTOR

Diagram 1 shows the pressure reduction factors for use in temperatures above 20 deg. C and up to 40 deg. C. This is applicable for water and other fluids which do not adversely

affect the long term properties of the PE material up to 40 deg. C. For use at 30 deg. C, the maximum recommended working pressure are tabulated in Table A.

Diagram 1 : Working pressure reduction factor versus temperature.

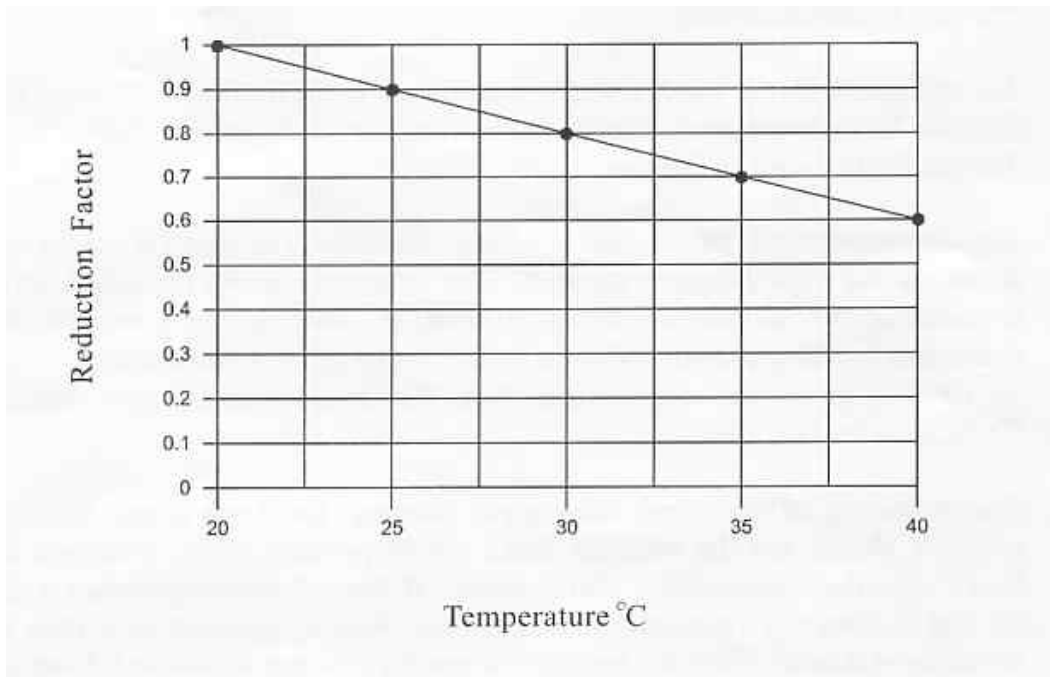


Table A. Recommended Maximum Working pressure at 30 Deg. C

PIPE MATERIAL TYPE	NOMINAL PRESSURE (PN)	SERIES S	RECOMMENDED MAXIMUM WORKING PRESSURE (BAR)
	16.0	S-4	12.8
	12.5	S-5	10.0
PE80	10.0	S-6.3	8.0
	8.0	S-8	6.4
	6.3	S-10	4.8