

Oxygen Permeability of Pex heating pipes

1. Foreword

1.1 Plastic pipes have been in use for many years in heating systems including underfloor heating.

The cross-linked polyethylene (PEX) controls over 70% of this market sector.

Since a certain oxygen diffusion may occur through the pipe wall to the water in the pipes, this oxygen diffusion into the water in closed water systems (such as underfloor heating system) may cause corrosion in the metal parts of the system such as: pumps, valves, connectors etc.

1.2 The rate of oxygen diffusion depends on the plastic material.

It is also directly influenced by the water temperature in the system.

The higher the water temperature the higher the oxygen diffusion rate.

2. Standards

2.1 The German DIN 4726 standard has determined that an oxygen diffusion rate of less than 0.1 mg/l/day at a water temperature of 40°C is considered as a safe level to prevent corrosion.

2.2 SKZ's specification HR 3.2 and DIN 4726 require a periodical oxygen diffusion tests (at least once a year at an acknowledged lab: TUV, Germany, MPA-NRW, Germany, Kiwa Holland) to determine compliance with standard requirements.

3. Solutions for oxygen diffusion

3.1 In plastic pipes (e.g. "Pexgol")

In order to eliminate the problem of corrosion due to oxygen diffusion in closed loop plastic tubing, an oxygen diffusion barrier layer is applied to the pipe.

This oxygen barrier layer reduces oxygen diffusion rate to a level which is acceptable and even lower than what is required in the standard.

The common barrier material is an EVOH layer.

About 95% of all underfloor heating piping in Europe has an EVOH barrier layer.

3.2 Multilayer (“MultyGol”) pipes:

The aluminum layer in the plastic pipe provides a perfect and absolute oxygen tight pipe as no oxygen molecule can diffuse through it. Therefore currently there is no requirement for oxygen diffusion testing in most of the standards.

The sales of multilayer (with aluminum) pipes in Europe are steadily growing during the last years.

4. Golan’s Pexgol and MultyGol pipes

The “Coated” Pexgol pipe (with a barrier ayer) is tested annually in test instiutes in Germany and Holland for oxygen permeability to comply with the standard requirements of the various countries (in addition to the periodical audits conducted at Golan by the representatives of these standard institutes).

The seamless welding of the “MultyGol” pipe together with the oxygen tightness of the aluminum layer provide a perfect protection for oxygen diffusion and accordingly protects the metal parts of the closed loop system.

Best Regards
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