+GF+ GEORG FISCHER PIPING SYSTEMS

Oxygen Diffusion

Oxygen diffusion from the surrounding environment into the pipe system increases the potential for corrosion in metal components. This “problem” was first identified in heating systems in the late 70’s. Since the 80’s plastic pipes used in heating systems are co-extruded to include an “oxygen barrier” into the pipe, this is usually aluminium. Metals are impermeable to oxygen diffusion but plastic pipes allow, over a period of time, oxygen to diffuse into the fluid.

The DIN 4726 has been specifically developed to evaluate and assess this phenomenon, written for under floor heating systems.
For cooling and refrigeration systems, working at lower temperatures there is no specific standard to measure the oxygen diffusion. Although fluids working at lower temperatures certainly do not have the potential for corrosion that a hot fluid has nevertheless refrigeration systems often use salt solutions and salt together with water in contact with oxygen is corrosive.

The attached test reports have been performed “in general accordance” with DIN 4726. The 2 primary differences being the dimensions and temperatures, see test reports, we have tested d50 carrier pipe at +16C, to be representative of the cooling systems where our product is used (DIN 4726 defines d25 and +40C).

For evaluation of the test results we can use as a basis the values used in the DIN 4726. In chapter 3.5 there is a statement concerning the evaluation of the test results, namely – “an oxygen barrier pipe is defined as pipe having a value < 0.1 g/m3.day”. This means that for an under-floor heating pipe system the oxygen diffusion can be neglected if the value is less than 0.1 g/m3.day.

Summary of Results

	Oxygen Diffusion g/m3.day (grams per cubic meter fluid per day)
ABS	**0.36***
COOL-FIT ABS	**0.063***

*** Tests in general accordance with DIN 4726. Criteria per DIN 4726 Oxygen Barrier = diffusion of < 0.1 g/m3.day.**