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To whom it may concern

Attendorn, 11. January 2006

Use and suitability of plastic pipe systems in heating installations

We would like to thank you for the customer inquiry sent by you, giving us the opportunity to comment on the above subject as follows.

Since **aquatherm** was one of the first three manufacturers of floor heating systems throughout Europe more than 30 years ago, we could play a decisive role in the development of plastic pipes in heating systems. With the increase of findings, especially in the field of such pipe systems in closed heating systems, the respective state of the art was permanently optimised and improved. Our target, as manufacturer, to always keep the state of the art with our **aquatherm** floor heating system or to be even one step ahead, not only led to a competitive advantage, but also to the development of such a high-quality and thermally loadable plastic pipe which has already been used under the brand name **fuiotherm** for more than 20 years in drinking water installations, too.

Beside the striving for optimising the pressure and temperature resistance of plastic pipes in the heating technology, isolated corrosion problems occurred on non-precious metal components in floor heating systems over the years. Only some time later it got obvious that the non diffusion-tight floor heating pipes made of plastic had a considerable influence on these problems. Whereas for the flow and return connection of all radiators in a project 150 m of pipes were only required in the classical split system heating-cooling, ten times the pipe quantity were required for a floor heating system in the same project. Systems with such a pipe quantity offered a considerably bigger surface by which an absorption of oxygen through the pipe walls could be effected. Today it is out of question that this became a negative disturbance in connection with faulty or unsatisfactory planning and execution works. By this



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the normal process of corrosion within a heating system was so accelerated that a corrosion damage as a rule occurred before a damage of material fatigue caused by thermal load. This made the legislator to stipulate suitable measures for avoiding such corrosion damages in the DIN 4726 not only for floor heating systems, but also as a precaution for the radiator connections systems having spread more and more during this period. The exact requirements are described in detail in DIN 4726 (200-01) on page 3 of section 3.

In case of the floor heating and radiator connection systems produced by **aquatherm** today, plastic pipes made of the polybutene material are concerned which are available in 50 – 500 m coils in the dimensions of 16, 17 and 20x2.0 mm as well as 25 x 2.3 mm. The diffusion tightness is ensured by an EVOH coating. By means of a special extrusion process an optimal density is achieved by this kind of coating which is deposited all-over onto the basis pipe. The **aquatherm SHT** multilayer metal composite pipes which can also be used as radiator connection pipes are diffusion-tight by their closed aluminium layer, too. The **aquatherm** floor heating and radiator connection pipes correspond to the requirements of DIN 4726. Evidence is provided by the test certificate of DIN CERTCO 3V098 and is controlled and inspected by semi-annual tests. The test report no. 3100096 of MPA NRW can be ordered with us, if requested.

Since the share of pipe in other heating systems which are not described in this standard is so low, there will be no accelerated corrosion process leading to an early failure of non-precious metal components. Consequently, the use of our **fusiotherm**, **climatherm** and **aquatherm SHT** composite pipes, distinguishing themselves even in high temperature ranges by a good loading capacity which is unusual for plastic pipes as well as a low thermal linear expansion behaviour, corresponds to the state of the art as well as all standards, regulations and decrees which are applicable in this field.

Finally, we would still like to point out to the scores of our heating systems with non diffusion-tight plastic pipes, in case of which due to the professional and proper execution there have been no appearances of corrosion or accumulations of mud until today. In case of a layout of the heating system conforming to standards and by a proper determination of capacity, the flow conditions and the pressure drops within the pipe system resulting from this can be kept



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so small by this that the flow conditions in the heating systems will already lead to a slight penetration of oxygen only in case of non diffusion-tight pipes.

These findings have contributed to the fact that pipe systems being installed in closed heating systems as conventional split system heating-cooling are not subject to any requirements regarding the diffusion tightness.

Our current delivery programme comprises all necessary system components for a professional and proper heating installation. When using the **fuiotherm** and **climatherm** composite pipes, the total pipe system is installed by means of the socket welding process. Thus, no metal materials are used which due to their corrosion behaviour may lead to early damages of the pipe system, both from inside and outside. In case of our pipe systems, the fusion of pipe and fitting results to an inseparable material unit offering an incomparable safety. In addition to this, with the **aquatherm SHT** pipe system we offer our customers the possibility to carry out heating installations up to DN 25 by means of the sliding sleeve technique. By the optimally coordinated pipe systems a combination between **fuiotherm**, **climatherm** and **aquatherm SHT** is possible at any time.

Best regards


Dirk Rosenberg
aquatherm GmbH