

## **ABSTRACT**

Micro-perforated plates (MPP:s) are perforated plates with holes typically in the sub mm range and a porosity around 1%. The idea of a MPP is to achieve high damping of sound waves by creating a surface with a normal impedance close to the characteristic impedance in the fluid. Traditionally MPP:s have been used as panel absorbers in room acoustics but they also have a large potential for other applications, e.g., vehicle noise control. For such applications MPP:s can be subjected to both flow, high temperatures as well as high sound levels and the effect of this on the MPP impedance must be known. In the present work two types of MPP:s have been investigated: i) plates with circular holes and ii) plates with slit-shaped holes. Non-linear effects were investigated with both random noise and pure tone excitation and the results compared with models from the literature. The effect of a grazing mean flow was also investigated and based on the results correction terms for the MPP impedance are proposed. As an application of the work a new type of MPP muffler has been investigated. Based on numerical simulations performed a very efficient through flow multi-chamber MPP muffler configuration was found. A few muffler prototypes were also built and successfully tested.