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### **Modelling of the hydro and aero acoustic sources in piping**

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In the industrial piping networks, various components are crossed by flows, generally in air or in water. The pressure fluctuations generated locally close to these singularities are propagated then in all the network and can lead to important vibrations of the structures. A research program based on many laboratory tests made it possible to highlight a hydroacoustic modelling of the butterfly valves in the low frequencies domain. The model, which describes the acoustic sources, generated by the turbulence, has a general applicability. In this paper, one presents the application of this model to orifices (openings and slits) working in air and in water. These various orifices were studied from an acoustic point of view on different test loops and for several hydraulic conditions (flow rate and head loss). These experimental cases were then simulated using the source model of turbulence noise, associated to the transfer matrix of each singularity, which is determined by another way. The comparison between these calculations and the corresponding measurements makes it possible to consolidate the general character of the model of turbulence noise for singularities in piping.