Static pressure and temperature coefficients of working standard microphones

The sensitivity of measurement microphones is affected by changes in the environmental conditions, mainly temperature and static pressure. This rate of change has been the object of previous studies focused on Laboratory Standard microphones. The literature describes frequency dependent values for these coefficients which are used for calibration purposes. Working standard microphones are not exempt of these influences. However, manufacturers usually provide a low frequency value of the environmental coefficient. While in some applications the influence of this coefficient may be negligible, in others it may be a significant contribution to the uncertainty of the measurement. Determining the environmental coefficients of individual specimens of measurement microphones can be a straightforward though time-consuming procedure provided the appropriate facilities are available. An alternative is to determine them using lumped parameter models or numerical calculations. Any of these possibilities require knowledge of the construction details of the microphones, particularly the geometry of the back cavity, and the properties of the membrane. This paper presents an introductory study of the effect of the environmental coefficients. For this purpose, the environmental coefficients of some commercially available microphones have been determined experimentally, and whenever possible, compared with the coefficients determined numerically using the Boundary Element Method.