Michigan Technological University

Mechanical Engineering-Engineering Mechanics

R. L. Smith Mechanical Engineering-Engineering Machanics Building
1400 Townsend Drive
Houghton, MI, 49931-1295
906-487-2551 • Fax 906-487-2822
www.mtu.edu/mechanical

Microphones that just work!

Representing a research university, I'm always searching for high quality measurement instruments at reasonable costs. When evaluating microphones for acoustics research, we usually are forced to choose between good frequency response characteristics and low cost. A measurement grade microphone may cost anywhere from $800 to $2000 and have very flat frequency response over the audible bandwidth of 20 Hz to 20 kHz. Array microphones are much more cost effective, ranging from $200 to $500, but have limited utility at frequencies greater than 10 kHz and maximum amplitude capability of typically about 130 dB. PCB's model 130A23 microphone is a one-size-fits-most applications microphone. It has a flat (±2 dB) frequency response range of 20 Hz to 20 kHz and a wide dynamic range of 30 dBA to 150 dB at a price that is easily justified. For many of our applications, this microphone is an exceptional balance of cost and performance.

Recently we had the opportunity to test four 130A23 microphones. We performed a reverberant sound power test and an operator ear measurement on a quiet medical pump unit. The microphones worked exceptionally well for our measurements. For the operator ear measurement, we were able to easily measure the pump noise down to the background noise level of our test chamber (~43 dBA). We were able to measure sound power with these microphones at reverberant sound pressure levels of 48 dBA up to 90 dBA with plenty of headroom to measure higher levels, if necessary. In addition, we could power these pre-polarized microphones directly from our data acquisition system using ICP® power. This saved us both the time and cost associated with setting up microphone power supplies.

Overall, we found these microphones to be excellent. This new PCB design has bridged the gap between cost effective electret array microphones and high performance of the measurement condenser microphones. They are rugged enough for student use, which is a testament to good packaging, to be sure. They have both a wide frequency and dynamic range at a price that doesn't break the budget. For many types of acoustic measurements, the PCB's model 130A23 is a quality microphone that we will be using in our lab for years to come.

Andrew R. Barnard, Ph.D.
Assistant Professor, Mechanical Engineering – Engineering Mechanics
Michigan Technological University
Houghton, MI