

What is the maximum level I can measure with a typical ½" free-field microphone?

The maximum level a microphone can handle is usually specified as the "dynamic range upper limit". If we look at ½" measurement microphones, we can see that this limit can be different between microphones that look exactly the same. That is because this parameter will be affected by the sensitivity of the microphone (usually specified in mV/Pa or dB). It is also possible to find ½" microphones with very different sensitivities. Therefore, a ½" measurement microphone of 50 mV/Pa sensitivity can have an upper dynamic range limit of 149 dB, while another ½" microphone of 12.5 mV/Pa sensitivity will have a limit of 164 dB. The lower the sensitivity, the higher the upper dynamic range limit.

The upper dynamic range limit will be also determined by the type of preamplifier used and its power supply. GRAS offers both Traditional and CCP (also known as IEPE/ICP/CCLD) preamplifiers.

Dynamic range in CCP preamplifiers is limited due to its smaller output voltage swing. This is due to the lower driving voltage of a constant-current source which limits the maximum output signal. Effectively, with only an 8-10 V_{peak} swing, the upper limit of the amplitude range for the microphone + preamplifier pair is limited by the CCP preamplifier (rather than the microphone itself) by approximately 8-10 dB. Therefore, a ½" microphone with a sensitivity of 50 mV/Pa and an upper dynamic range limit of 146 dB, would now be limited to 138 dB when using a CCP preamplifier.

Finally, very long cables can also limit the dynamic range upper limit of a microphone set, but that is another topic.