Mündorf 197PP27R-FA and Beyma TPL200-S - Power handling tests

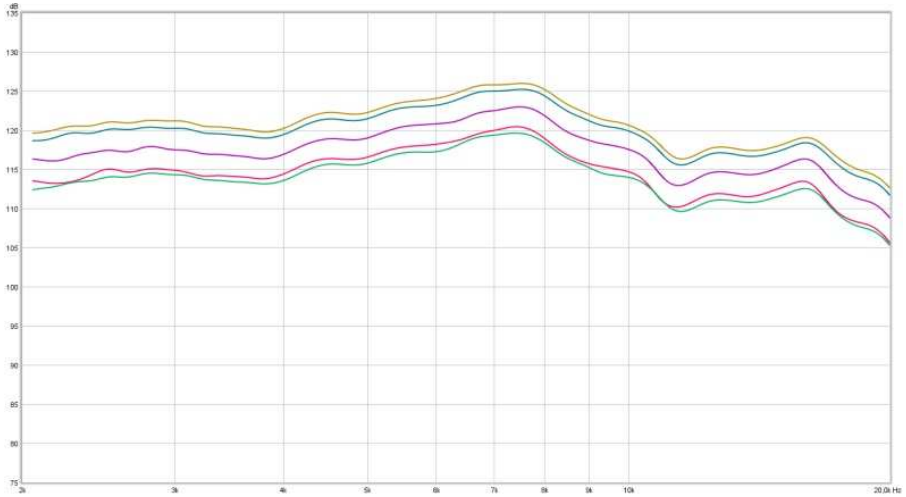
- Bruël & Kjaer 4189 calibrated microphone, measuring distance 1 meter. Antelope Pure2 external soundcard, REW software.
- Power tests made with 2000-10000 Hz filtered pink noise
- Output control : Metrix LF voltmeter MX5006
- Diaphragm temperature control with electronic thermometer.
- Test procedure (AES recommendations) : first measurement on cold device. Then we start a "heating" sequence with the filtered pink noise till temperature stabilization. Then we make a sweep sine 2000-20000 Hz response measurement, in order to evaluate thermal compression and THD.

Mündorf

The device is fan cooled, requiring a 15V power supply. Ours providing only 12V, we decided to limit the input to 131W (21,7V).

From bottom to top : 10v cold, 10V warm (28W), 13,8V warm (53W), 19,3V (104W), 21,7V (131W).

Regarding the latter, the hottest point of the diaphragm did not exceed 35° (outdoor temperature 18°C).



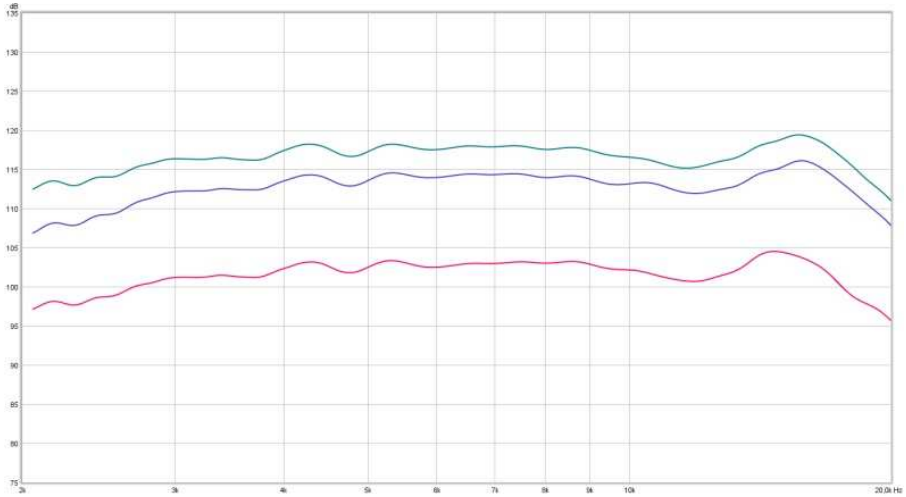
It means that with a 15V power supply the device is certainly capable of a 200W power capability, in accordance with the manufacturer's statements.

In those conditions, the maximum obtainable SPL at 1 meter is **123dB**.

Beyma

From bottom to top : 2,8V cold (1,6W), 13,9V warm (40W), 19,6V warm (78W).

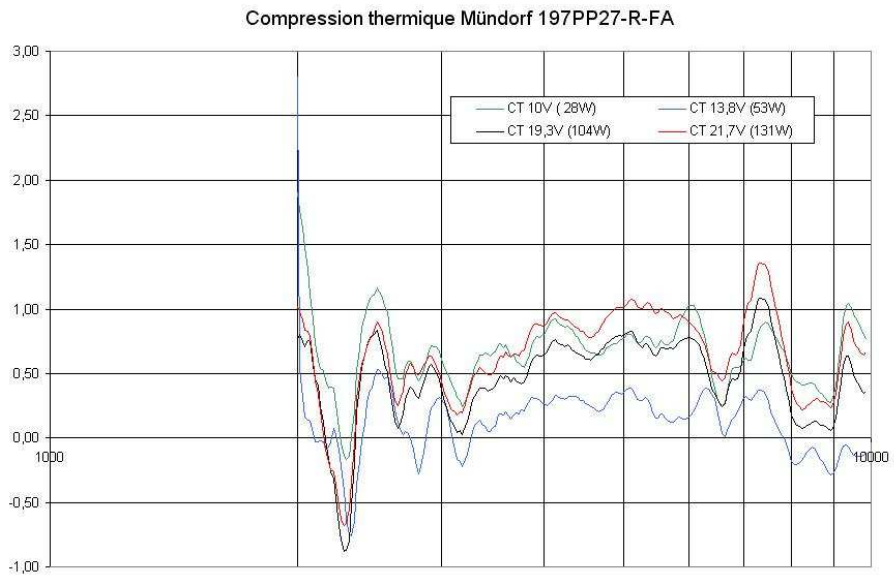
With a 40W input, the diaphragm temperature reached 35°C (outdoor temperature 23°C). With the 78W input, temperature didn't stabilize and we stopped the heating sequence as soon as we noticed a thin white smoke...



The data sheet of the device shows the following indicates *"Power capacity : 120 W AES above 1 kHz"*

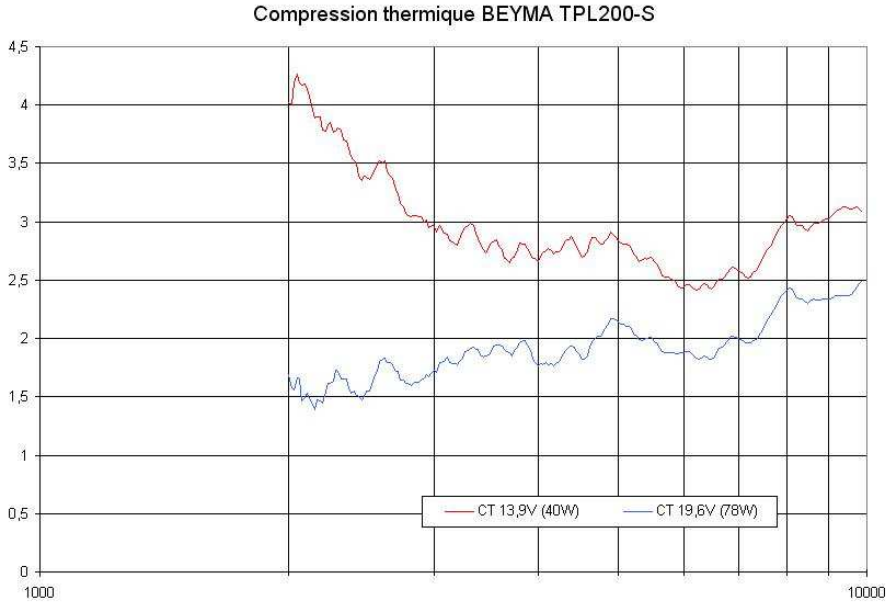
The device is obviously unable to stand such an input, notably if used from 1 kHz. The "true" figure is more likely 60W, making it possible to generate a maximum **115dB** SPL at 3000 Hz (1 m).

Mündorf thermal compression



Thanks to the fan, the thermal compression remains under about 1dB.

Beyma thermal compression



At 40W, the thermal compression is in the 1,5-2 dB range. At 78W, it reaches 2,5 to 3dB, and even more under 3 kHz, a region already marked by a significant decrease of the frequency response.

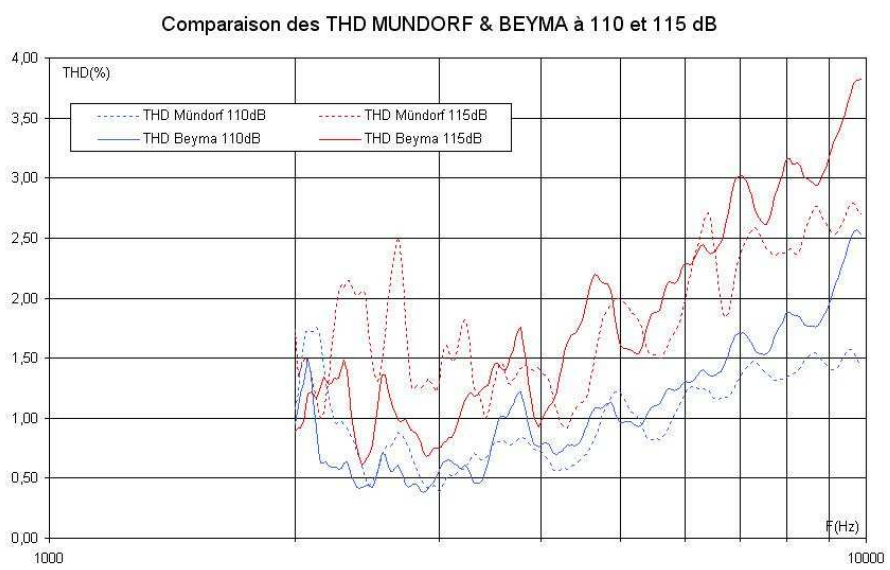
At this stage, we see that the cooling system kills two birds with one stone : it allows for increasing the power capacity of the device (200W instead of 75W, ie 4dB), and at the same time reduces the thermal compression by about 3dB, resulting in a total 7dB advantage.

Distortion

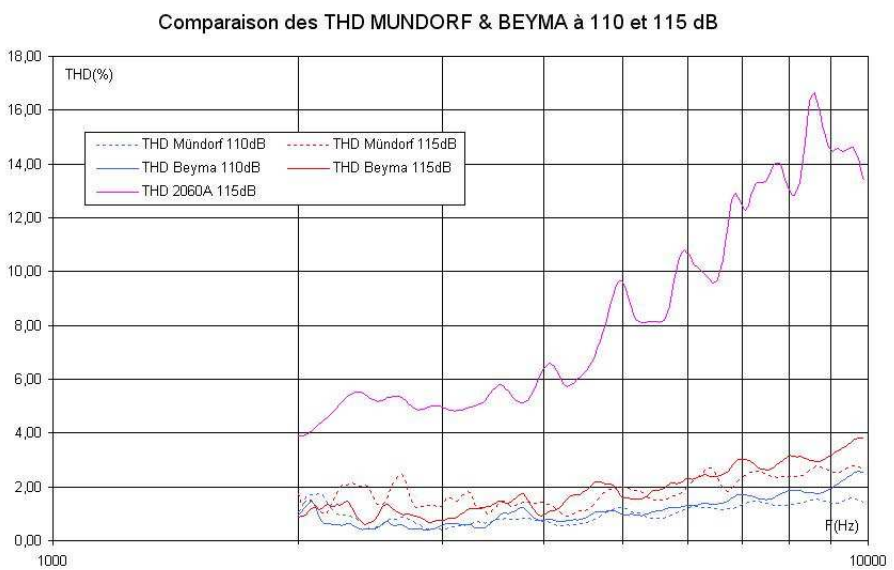
In order to compare the distortion performance of both devices, we **calculated** the THD figures for identical normalized SPL.

For example, the calculation formula at 115 dB for the frequency *f* is : $THD_{115}(f) = THD_{ref}(f) \times 10^{((115-SPL_{ref}(f)/20)}$, where the reference measurement is the one displaying the closest to 115dB SPL figures.

This method is relevant for non-linear systems where H2 is clearly prevailing on H3, which is precisely the case.



Between 2000 and 3000 Hz, the Mündorf device displays a higher THD than Beyma's, but the contrary beyond.



This plot displays the THD curve of a very good compression driver (18 Sound 2060A on AzuraHorn AH340) for a normalized SPL of 115dB measured at 1 meter.

Its THD figures are 4 to 5 times higher, which confirms the interest of the AMT technology.