Product News Letter

OLE WOLFF

Super Linear Micro speaker OWS-082030TA-8

Ole Wolff is proud to announce the latest product in our huge micro speaker portfolio - the super linear micro speaker OWS-082030TA-8.
This micro speaker is one more innovative member to this family of micro speakers developed to ultra-high performance each covering individual segments of portable devices.

In *Fig. 1*, photos and a drawing of the physical outlines are shown.

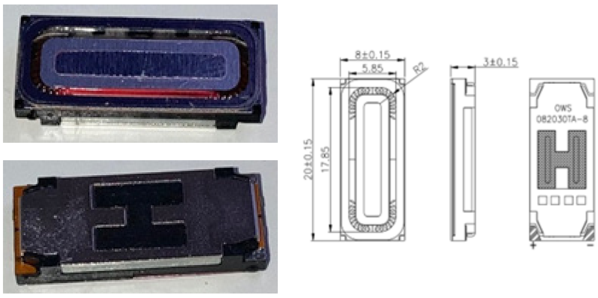

Fig. 1

OWS-082030 is especially dedicated to devices having practically no internal space around the speaker. It supports an optimal performance by delivering "rich sound" with bass content and no need for having a sealed rear volume. These devices are Smart Glasses and other slim devices operating in a near-field situation relative to the ear canal entrance.

Almost all micro speakers are designed to have a sealed rear air volume of a certain size for controlling the load of the diaphragm and thereby assuring the diaphragm to work in a linear mode. Typically, the size of such a sealed rear volume is 1ccm shifting the resonance frequency (F0) of the speaker from being typically around 700Hz with totally open venting conditions on the rear side (infinite air volume/ unstable condition) to being around 1000Hz with the sealed rear air volume (stable condition).

Technical solution

The OWS-082030TA-8 speaker is radically different designed to this approach. Here the F0 is as low as 250Hz achieved by an ultra-high compliance of the suspension of the diaphragm in combination with a spider for controlling the movements of the coil/diaphragm arrangement to be pure vertical then having none horizontally breaking up modes, which would otherwise result in an unacceptable nonlinearity (high distortion) at the low frequencies.

This special spider design is shown in *Fig. 2*.

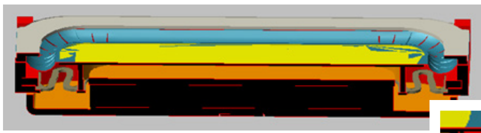

Fig. 2

The spider is the grey part in this drawing showing the spider`s bonding to the bottom part of the short ends of the coil. As mentioned, this ensures only vertical movements of the coil in the coil slit and thereby a total control of the *"dynamic coil to slit relation"* when operating.

However, such a high compliance/low F0 speaker cannot be driven by a simple amplifier source supplying an equal voltage level at all frequencies. This would result in a very huge diaphragm displacement/stroke at low frequencies with a top and bottom collision between the moving coil and the magnet system resulting in very high nonlinearity (R&B).

For this reason, the OWS-082030TA-8 must be driven by a Smart Amp or similar advanced source capable of setting different signal levels for different frequencies.

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The maximum allowed signal levels (input voltages) for the OWS-082030TA-8 are shown as a graph in *Fig. 3*.

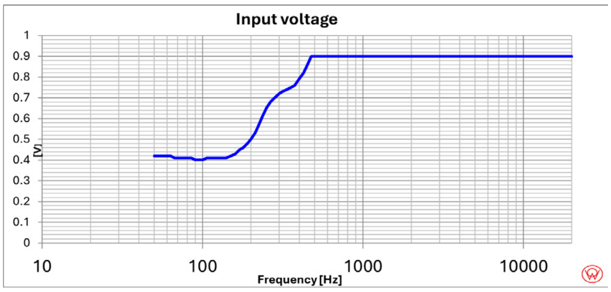

Fig. 3

Comparing performance to a "conventional" micro speaker

But can't a "conventional" micro speaker with the same physical size also be driven "intelligently" by a Smart Amp and give the same level of performance?

Let's compare the performance to a micro speaker having approx. similar diaphragm area, namely the well-known OWS-111525.

Fig. 4 shows a comparison of the frequency responses of the two micro speakers driven by the same voltage level of 0.42V (max. allowed level for the OWS-082030 at the low frequency range) and both having an infinite rear air volume.

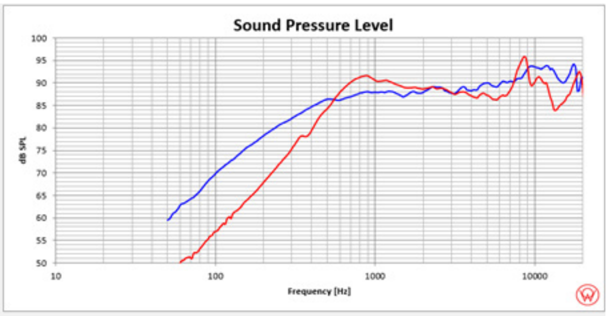

Fig. 4

OWS-082030 3cm 0.42V
OWS-111525TA-8C 3cm 0.42V

As seen, the two speakers deliver approx. the same SPL at mid-to-high frequencies, but in the low frequency range, the OWS-082030TA-8 deliver much higher SPL.

An additional comparison, by equalizing the voltage level for the OWS-111525 speaker to have the same frequency response as the OWS-082030TA-8 speaker, is shown in *Fig. 5*.

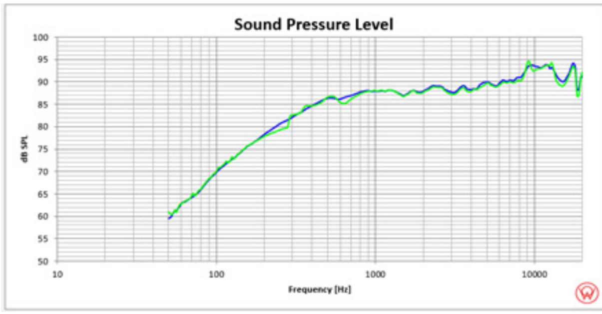

Fig. 5

OWS-082030 3cm 0.42V
OWS-111525TA-8C 3cm 0.3~1.4V

It looks promising for the OWS-111525, which response can be brought to be similar as the OWS-082030 by equalizing the source 0.3v – 1.4V over the different frequencies.

If we compare the THD responses however, the THD for the OWS-111525 speaker goes sky high up to 90% at low frequencies, which clearly shows this is not a realistic possibility, as shown in *Fig. 6.*

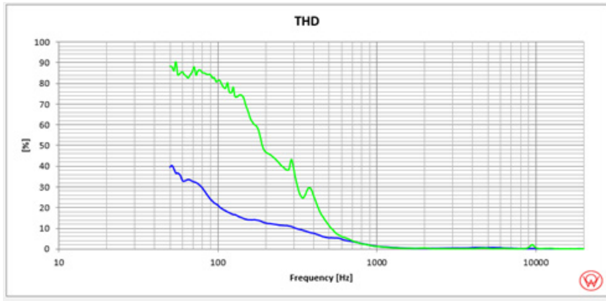

Fig. 6

OWS-082030 3cm 0.42V
OWS-111525TA-8C 3cm 0.3~1.4V

Summary

The OWS-082030TA-8 micro speaker fills the gap in Ole Wolff's speaker portfolio by delivering outstanding full-range performance and a rich sound in compact devices like smart glasses or other slim, portable audio products with limited or no rear air volume.