

De
RBSP/EAV-AS
Alexander Santander

Referencia
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Fecha
19/6/03

A: EAV, VTS-3

Tema: Frequency response of Bosch horns.

Horns without internal breaker have been tested for sound output at different frequencies. The frequencies chosen correspond to musical notes and the setup has been:

1. 13V applied in the line.
2. Pulses of different frequencies with 70% on time.
3. Sound output measured in anechoic chamber at 2m.

The results obtained are in the following chart:

Musical note	Frequency (Hz)	Low note (dB(A))	High note (dB(A))
c	131	81	80
d	147	81	83
e	165	80.5	88
f	175	75.5	79
g	196	81.5	84
a	220	81.5	79
h	247	81.5	97
c1	262	84	81
d1	294	78.4	82
e1	330	75	84
f1	349	74	78
g1	392	85.5	74
a1	440	81.2	79
h1	494	70.1	107.2
c2	523	72.8	79
d2	587	69	71
e2	659	70	71.5
f2	698	68	73.4
g2	784	73	70
a2	880	73.5	72.5
h2	988	66	84
c3	1046	67	73.5
d3	1175	66	68.5
e3	1318	70	69

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The horns tested had the following eigenfrequencies:

1. Low note 416Hz, with a sound output of 108dB(A)
2. High note 497Hz with a sound output of 108dB(A).

Conclusions:

The response of the system away of eigenfrequencies can be considered flat. In order to have an equal response from different musical notes, system eigenfrequencies should be avoided, that is, the frequencies around 400 and 500, plus integer values from those. This means the elimination of musical notes g1, a1, h1, c2. Frequencies below 400Hz should also be avoided, since the resonances in the high note horn at 250 are important and besides, the response of the membrane at those frequencies could lead to membrane breakage.

The frequencies suitable correspond to musical notes from d2 to e3, nine musical notes total. Frequencies above should be tested if needed.

Best regards,

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Anex 1: Graph of frequency response.

