Test setup for „Exciter“ speaker comparison

Used hardware: Benedini TBS Mini soundunit, Radial2 engine sound + 1x40W amplifier

Exciter / Transducer	Speaker Data: Power/Imp., Dim., Weight	Amplifier Supply [V]	Amplifier Current [A]	Volume / 1m [db]	Temperatur after time [°C] after [min]	Installation object	Comment
DAEX25 (Dayton)	6W/8Ohm, Φ50x19mm, 53g	11	0,3	88	55°C after 10min	P51 foam body	No addidional cooling
		11	0,4	91	65°C after 10min		Airflow inside the body recommended !!!
2 pcs in PARALLEL		11	0,8	94			
		---	---	83			1W TBS Mini internal amplifier. Current draw: 280 mA
		11	0,3	89		Reference surface	
			0,4	92			
		11	0,3	82		Car body	
		---	---	80			1W TBS Mini internal amplifier
DAEX25VT-4 (Dayton)							
=> similar to „TT-25“	20W/4Ohm, Φ55x21mm, 83g	11	0,3	90	43°C after 10 min	P51 foam body	
			0,4	91	50°C after 10 min		
		11	0,4	90		Reference surface	
		22	0,5	93			
DAEX25FHE-4 (Dayton)	24W/4Ohm, 65x50x20mm, 96g	11	0,3	90		P51 foam body	
			0,4	91	38°C after 10 min		
		22	0,5	93		P51 foam body	Heavy vibration in the whole body
			0,8	95			
			1	96			**Body vibrations too strong!** **Mechnical stress on all items.**
		11	0,4	93		Reference surface	
EX45 S (Visaton)	10W/8Ohm, 48x65x18mm, 64g	11	0,4	87		P51 foam body	
		11	0,4	88	65°C after 10min	Reference surface	Airflow inside the body recommended !!!

EX60 S (Visaton)	25W/4Ohm, 80x60x23mm, 127g	11	0,4	88		P51 foam body	
			0,6	89			
			0,8	90	65°C after 10min		Airflow inside the body recommended !!!
		11	0,4	87		Reference surface	
		22	0,5	91			
		22	0,8	93			Gets too hot !!!
HIAX25C10-8 (Tectonicelements)	10W/8Ohm, 61x51x19mm, 85g	11	0,3	88		P51 foam body	
			0,4	89	58°C after 10 min		
			0,5	90			
			0,6	91			
		22	0,3	90			
			0,4	92			
		11	0,3	91		Reference surface	
			0,4	92			
HIAX19C01-8 (Tectonicelements)	41x34x13, 30g	---	---	87		Reference surface	1W TBS Mini internal amplifier Current draw: 280mA Very suitable for Cars/Trucks

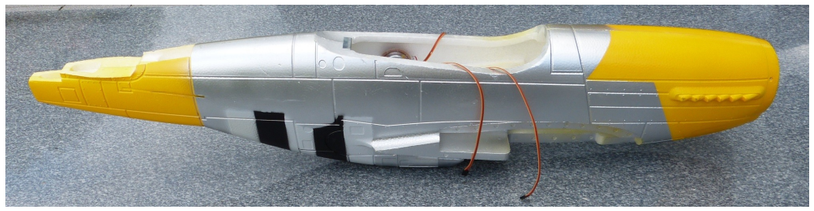
Exciter efficiency comparison				
	11	0,4		Reference surface
DAEX25 (Dayton)			92	
DAEX25VT-4 (Dayton) = TT25			90	
DAEX25FHE-4 (Dayton)			93	
EX45 S (Visaton)			88	
EX60 S (Visaton)			87	
HIAX25C10-8 (Tectoniclelemts)			92	

Traditional cone speaker

R10S (Visaton)	30W/4Ohm, 100x100x38mm, 160g	11	0,3	91	30°C after 10min	Plasticbox, Volume 0,8l	
			0,5	93	35°C after 10min		
			0,7	95	42°C after 10min		
2pcs 4Ohm in series		22	0,8	103		Plasticbox, Volume 4l	Weight: 320g!
2pcs 8Ohm in parallel		11	1,3	102		Plasticbox, Volume 4l	Weight: 320g!
BF-45 (Visaton)	8W/4Ohm, Φ 45x26mm, 32g	11	0,4	88		Plasticbox, Volume 0,4l	
2 pcs in SERIES		11	0,7	91			
FRS7 (Visaton)	15W/8Ohm, 67x67x31mm, 200g	11	0,3	88		Plasticbox, Volume 0,4l	
(recommended for cars)			0,4	90		Plasticbox, Volume 0,4l	
		---	---	82		Plasticbox, Volume 0,4l	1W TBS Mini internal amplifier. Current draw: 250 mA

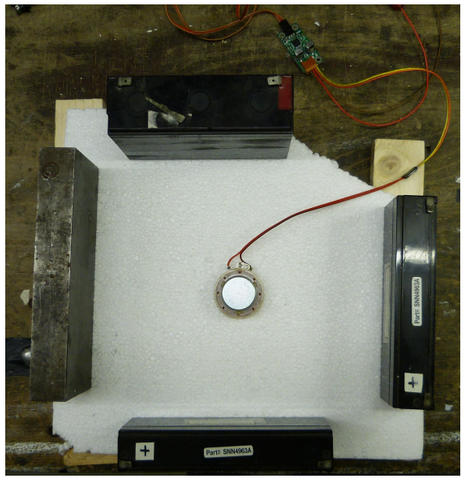
Pictures

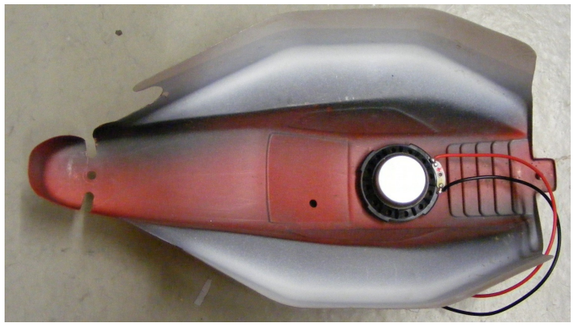
P51 foam body



Exciter application

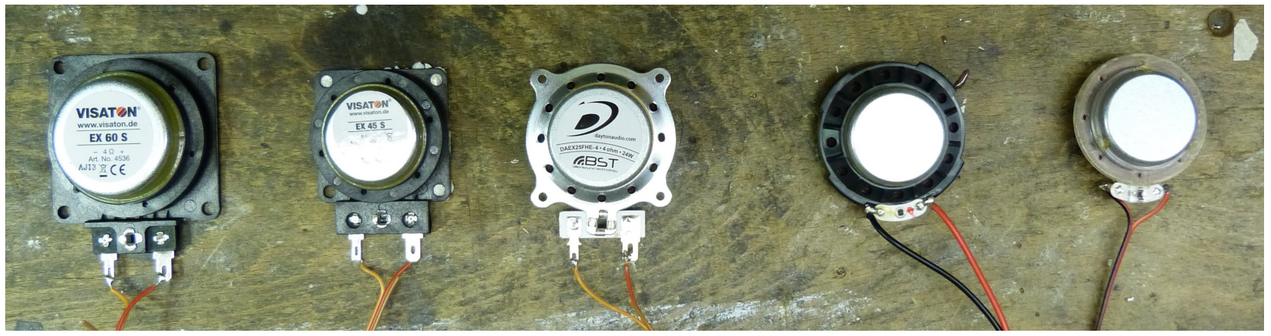
Reference surface(30x30cm)





RC car body

Some test devices



Summary

Summary exciter / cone speaker comparison

General
The exciter sound pressure of 108dB, stated on another website can not be verified.
If a comparable volume is achieved, the mechanical vibrations are so heavy that the model will be stressed mechanically very much.
The main advantage of exciters is of course the pretty simple installation, without the need of cutting any holes inside the body. They are ideal for foam planes.
We recommend using 2k epoxy glue for installation. Using a plane plastic washer between the exciter and hull is recommended. The washer is glued first. After hardening the exciter can be applied onto the washer.
This will cover any bended body surface and provides a ideal even area to fix the exciter itself.
Due to this the 3M tape applied at some exciter may work.
If the tape is not strong enough, the exciter can be glued also with 2k epoxy onto the washer. This mechanically stiff construction will guide the generated "sound vibration" ideal into the body.

Using any other glue than 2k epoxy may damage the body material (foam) through chemical reactions.

Using multiple speakers
No matter which speaker technology is used:
If a second identical speaker is applied, getting the same power than the initial one, volume is **increased by 3dB.**
In case of a Exciter application, the mechanical stress is increased the same way!
(This information may help for interpreting the measurements above)

Which speaker technology is now the best?
As already mentioned the main advantage of using a Exciter is the pretty easy installation.
The achievable volume depends on the mechanical stress you allow to your model.
Most test devices got very hot! The max. operation temperature before destruction was not tested.

The highest possible volume can still achieved by the conventional R10S speaker from Visaton.
It has the best power/weight ratio on the market and is highly efficient.
For larger planes which can carry some more weight the R10S is ideal.
Two R10S operated on a single 1x40W amplifier powered by a 6S can create **103dB**.

Legal/Patent questions?
Using a "old" and well known technology in a certain **application** (f.e. using exciters in RC modelling or f.e. using foam for RC plane bodies) is no technical invention at all.
Anyhow, up to know there is **no** number about the patent application or a final patent provided.

Regarding **pending** patents, please see here:
http://en.wikipedia.org/wiki/Patent_pending

Overview of some Exciter manufacturers:
http://www.daytonaudio.com/index.php/loudspeaker-components/loudspeaker-drivers-by-series/exciters.html

http://www.visaton.de/en/industrie/koerperschall/ex45s_8.html
http://www.tectonicelements.com/audio-exciters/

Distributors are f.e.:
http://www.parts-express.com/
http://www.intertechnik.de/