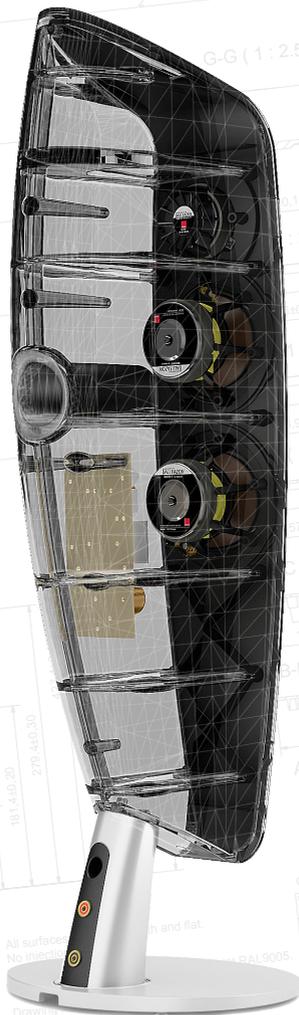




IN ADMIRATION OF MUSIC



Outer baffle must fit in inner baffle.

Material:	ABS Black	Version:	19-01-2011	Scale:	1 : 2,5	Drawn by:	...	Checked by:	...	Approved by:	...
Part no.:	S243160-01 Outer Baffle FAZON F5	Part no.:	S243160-01 Outer Baffle FAZON F5	Part no.:	S243160-01 Outer Baffle FAZON F5	Part no.:	S243160-01 Outer Baffle FAZON F5	Part no.:	S243160-01 Outer Baffle FAZON F5	Part no.:	S243160-01 Outer Baffle FAZON F5
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FAZON F5

TECHNICAL WHITE PAPER





FAZON F5



INTRODUCTION

Over the years DALI has launched quite a number of speakers to the market. And every launch is special in the sense that it reveals the result of thousands of hours of research and development.

But this time is somewhat extra special...

The DALI FAZON F5 is very unlike the vast majority of products available in the market. And we are extremely proud to present this unique combination of craftsmanship, performance and aesthetics.

Across the world there is a growing demand among hi-fi enthusiasts for products able to blend into both contemporary and classic home environments – and obviously without sacrificing any aspects of the sound performance. On the contrary; demands towards a completely unbiased sound reproduction are fiercer than ever.

Indeed this presents a great challenge for the loudspeaker industry.

DALI's latest offer to this demanding segment of the market is the FAZON F5, a floor-standing speaker completing the highly acclaimed FAZON series. A no-compromise speaker for the hi-fi enthusiast searching for that little extra...

Enjoy!



The DALI FAZON F5 is designed, developed, and assembled at DALI's headquarters in Denmark.



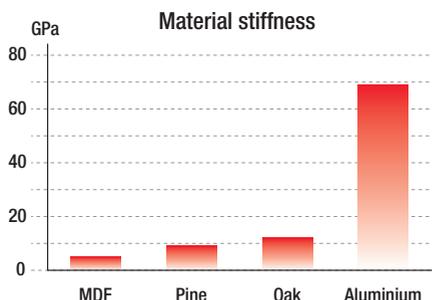
CABINET

The backbone of the speaker is a sculptured, die-cast aluminium cabinet structure.

This choice has presented major challenges to both the R&D engineers as well as the production team. But taking the unique possibilities into consideration, it has been worthwhile.

The material properties of aluminium allow us a much higher internal volume within the limited sized cabinet, while still maintaining a rigid and stiff environment for the drivers.

Assuming the same advanced shape could be formed in MDF in an average thickness of 19 mm - quite typical for high quality loudspeakers of this size - we would lose approximately 30% of the internal volume due to the thickness of the material.



Showing a typical Young Modulus of 69 GPa aluminium is characterized by a stiffness approximately 15 – 20 times the value of MDF (Medium Density Fibreboard) – the most frequently applied cabinet material for high quality speakers.



In unison the organic shape and generous bracing create a very strong structure, and a rigid anchoring of the sandwich baffle which is both bolted and glued to the cabinet.



And no... we couldn't resist testing the strength of the first out-of-tool parts...

But even more important, the use of aluminium introduced freedom in the design process. The freedom to shape the cabinet very differently from a traditional loudspeaker has been utilized to increase structural stiffness far beyond what is given from the material properties alone.

Die-casting an aluminium cabinet of this size requires special production capabilities,

especially due to DALI's high demands to precision and quality of the surface finish. The search was long, but turned out fruitful after intense corporation in development between in-house designers, engineers, and external specialists: A 1,200 tons die-cast machine is now delivering the complex aluminium parts for the FAZON F5.



ACOUSTIC HERITAGE

The FAZON F5 is DALI's offer to the quality conscious consumer, looking for a genuine high fidelity loudspeaker with an attractive and alternative visual expression compared to traditionally styled products.

Built on knowledge developed through years of loudspeaker and material research, FAZON F5 shares some technology with the DALI FAZON series. But when it comes to acoustics, more is actually derived from the DALI MENTOR series.

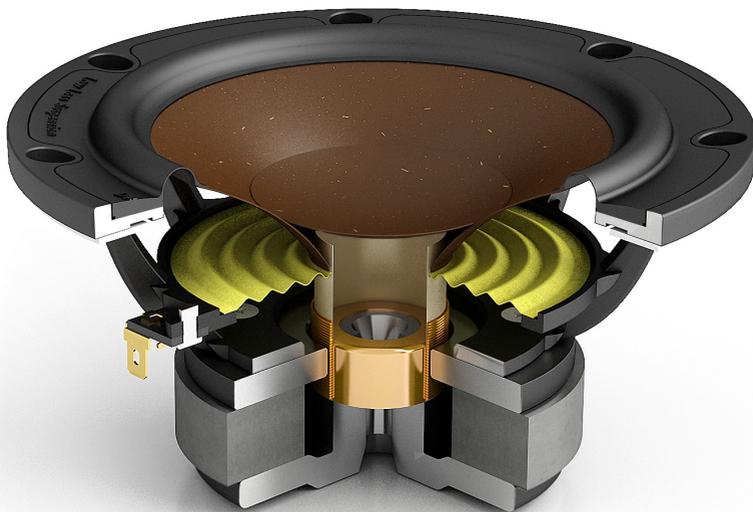
Not everything is invented from scratch. DALI's R&D department is also committed to refining existing technology. In the case of FAZON F5 one of our highly acclaimed in-house favourites was the starting point: Taking the MENTOR 5, if we started over again, and our hands were free in choosing cabinet material and shape, how far would we be able to take it?

During the development process it became clear that the advantage related to removing the parallel surfaces within the cabinet was as real as we had hoped for. The coupling between the backside of the woofer cone, internal volume, bass port, and – not to forget - the listening room, is further improved compared to the already very capable MENTOR 5. The result is a very precise and firm bass impulse reproduction.

The FAZON F5, however, is not a MENTOR 5 in disguise. The drivers are partly re-tooled and refined. Development of the cross-over and port/ cabinet tuning was done the way we know it works: Hours and hours of listening and adjusting.



DALI MENTOR 5



Cut-through of the 5" FAZON F5 woofer.

WOOFER

At DALI we believe strongly in reproducing the recorded signal. No more, no less...

Consequently we believe in the necessity of reproducing not only the frequency contents in the signal, but also the dynamics in all its aspects – ranging from subtle micro details to high level bursts.

The FAZON F5 speaker has been engineered accordingly, and meticulous attention to detail in the design of the high quality drivers was a must.

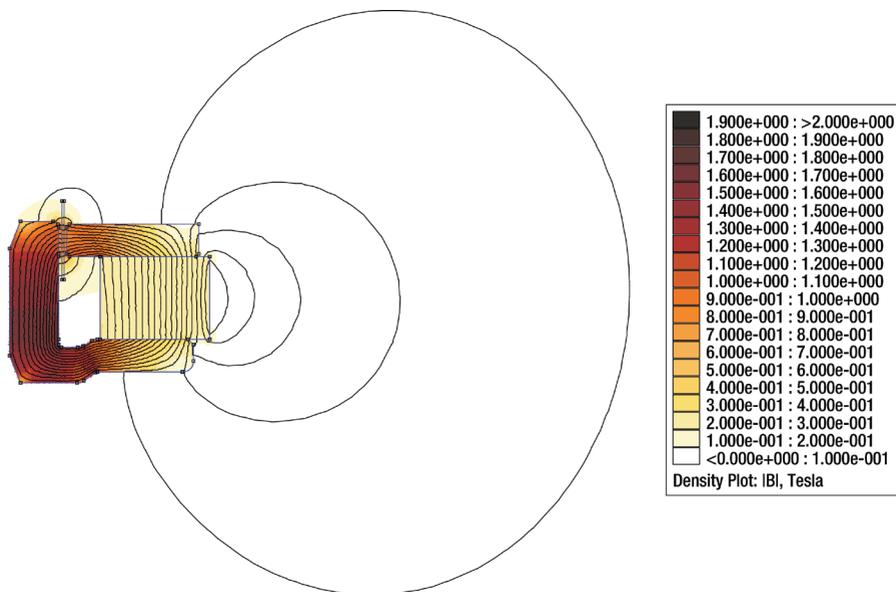
Like all DALI drivers dedicated to reproducing the delicate midrange frequency area, the FAZON F5 woofer features wood fibre cones. This blend of a fine grain paper pulp, reinforced with wood fibres, creates a stiff, light-weight and well-behaving structure. In combination with a

low-loss surround and spider suspension this cone reproduces the micro details in the signal - unfiltered and with high accuracy.

One of DALI's ongoing technology improvement projects is based on optimizing the motor system in our drivers – magnet system and voice coil.

With each and every product launch over the last years DALI engineers have managed to put a little extra engine power into the drivers at any given price point. This is all for the benefit of uncompressed sound reproduction, even during very dynamic passages in the music.

Ideally the forces generated in the motor system must be linear, symmetrical, well defined, and dependent only on the current in the voice coil, or rather; only dependent on the voltage swing from the amplifier.



$$F = B \times l \times i$$

In the basic formula for the force (F) generated in the motor system ($F = B \times l \times i$) we want the magnet flux (B) through the voice coil to be constant. (l) is the length of the voice coil wire in the magnet gap, and (i) is the current through the voice coil wire.

The current through the voice coil, however, generates its own local magnet fields, disturbing the flux which we ideally wanted to be constant. The motor system in the F5 woofer is based on a large ferrite magnet, strong enough to bring the soft iron parts - pole piece and top plate - near the voice coil into saturation.

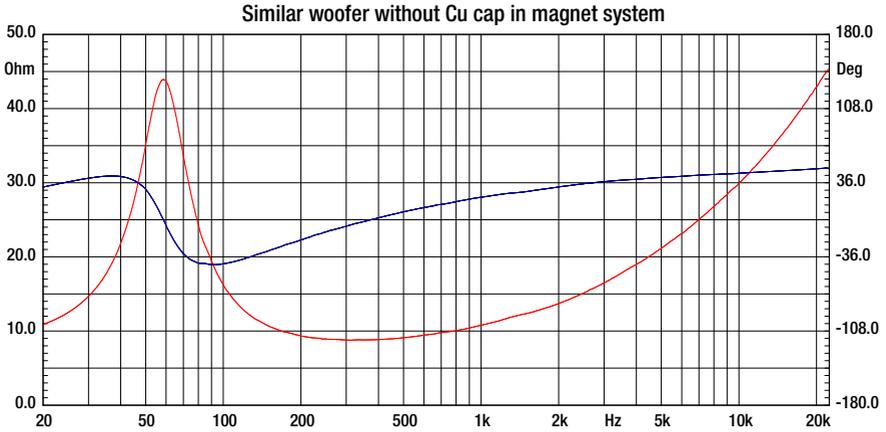
The saturated iron parts counteract modulation of the flux in the magnet gap, creating a stable, unswitched working condition for the voice coil. This compares to a Class A design within amplifiers.

But there are other effects threatening linearity of the motor.

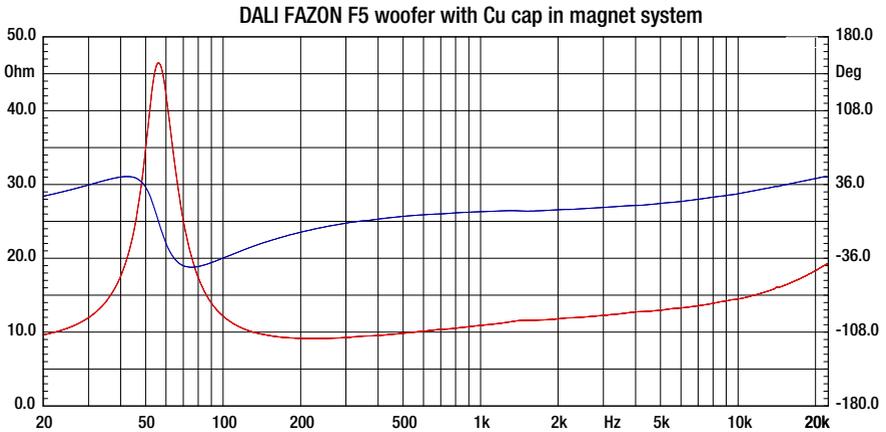
The current (i) through the voice coil is determined by the voltage from the amplifier and the impedance of the loudspeaker driver – apart from the intentional influence from the crossover. Voice coil inductance is part of the driver impedance, and as this inductance varies with the volume of iron inside the voice coil, impedance can vary with the position of the voice coil through its excursion.

From the amplifiers' perspective the size of the problem is proportional to the share of the voice coil inductance compared to the total inductance from cross-over and driver.

The FAZON F5 woofer features a copper sleeve on top of the pole piece which dramatically



Impedance response from a traditional magnet system design.



Adding a copper sleeve significantly reduces the influence from voice coil inductance on driver impedance.

reduces voice coil inductance. This requires tight tolerances in assembly as a larger ferrite magnet ring is needed to generate the required field. The benefit, however, is stable impedance for the amplifier - less influenced by voice coil excursion.

The result is a significant reduction in nonlinearity generated by excursion. Lower distortion is the audible result and - in the end - better ability to simultaneously handle complex small and large signals.



TWEETER

The rigid die-cast aluminium front plate is the strong base for the tweeter construction. This anchoring is important as the ultra-light dome diaphragm enables the tweeter to reproduce the fine micro details in the most critical recordings.

Obviously the tweeter must be able to render high frequencies with high accuracy. This means very short excursions, but at high speed, - or rather – with high acceleration. Consequently a low moving mass and a strong motor is needed.

The FAZON F5 tweeter is constructed on the basis of an ultra light-weight weave fabric. Compared to most soft dome tweeters in the market the DALI dome material is less than half the weight (defined as mg per square millimeter).

Most dome tweeters are 25 – 26 mm diameter. But the FAZON F5 shares tweeter technology with other DALI speakers, and is based on a 28 mm voice coil. This means 10% longer voice coil circumference than your typical sized dome. Lower power compression is an added benefit.

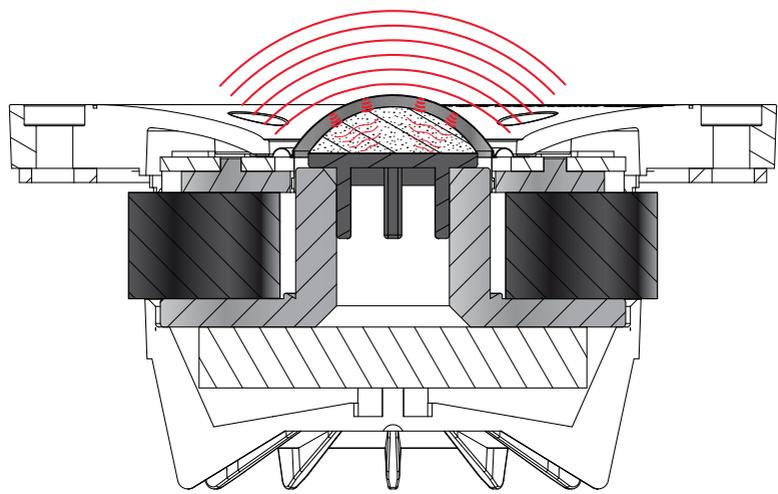
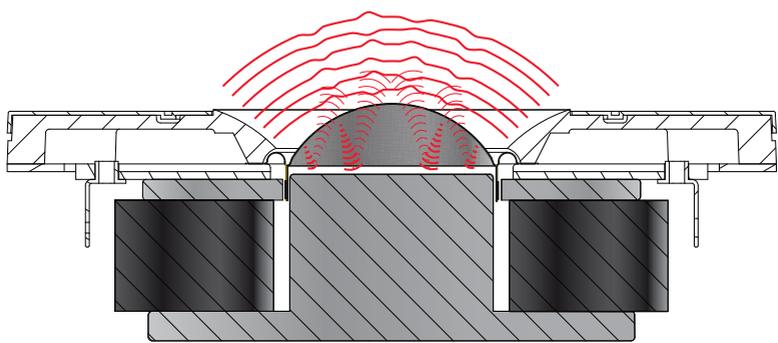


The geometry of the tweeter front plate near the dome has been optimised to create the optimal working conditions for the soft dome. The aim was to combine an extended frequency response with wide dispersion and low coloration.



Combined with a powerful motor system it also means better power handling, both short- and long term compared to more common 1” tweeters. The magnet in the motor system is a ferrite construction similar to the MENTOR series tweeter, ensuring full control of the dome movement.

To improve power handling, to reduce power compression, and to support a straight-line excursion of the voice coil the tweeter magnet system incorporates ferro-fluid.



In the right light this fine fabric will reveal the soft felt damping on top of the pole piece. This damping material eliminates unwanted reflections that may occur from a traditional flat surface pole piece, applied in simpler tweeter constructions. This is another example of the meticulous care for construction details that – altogether allow an unfiltered reproduction of all the details in the music.



TERMINALS

The die-cast aluminium base provides a sturdy platform for the DALI FAZON F5. Integrated discreetly in this base you will find a true world-class cable management solution, specifically developed for this speaker.

Connect the FAZON F5 speakers by means of banana plugs or raw cable. Run your speaker cable elegantly into the base of the speaker for a discreet appearance. Or allow the cable to enter the base from underneath the floor for a completely concealed solution. A very useful feature e.g. in connection with the construction of a new home or listening area.

Banana plugs are connected by means of two elegant sockets placed on the rear side of the base. For connection of raw speaker cable, the terminal housing is ejected from the base to gain access to a pair of spring loaded terminals, able to handle speaker cable in excess of 10 mm².



FAZON F5



FAZON LCR



FAZON SAT

The FAZON F5 is the floor-standing speaker in the DALI FAZON series – a natural extension of the FAZON SAT and FAZON LCR.

APPLICATION

DALI FAZON F5 has been engineered to work as a stand-alone speaker. With a frequency response reaching down to 49Hz (-3dB) no subwoofer is required, and you are guaranteed a true audiophile experience when connecting a pair of FAZON F5s to your stereo system. No matter if you prefer classical music, hard rock or jazz you are sure to hear all the details of the recording.

If you are looking for a stylish, high quality front speaker in a surround system this is also the obvious choice. The FAZON F5 integrates perfectly with the DALI MENTOR SUB.



MENTOR SUB



FAZON SUB 2



FAZON SUB 1

The FAZON F5 provides plenty of acoustic authority while at the same time maintaining a timbre matching the rest of the DALI FAZON series. Thus there are plenty of options for tailoring a speaker system to any need.

An example: Apply 2 x FAZON F5 for front speakers, 1 x FAZON LCR for center speaker, and 2 x FAZON SAT as rear speakers. Add the MENTOR SUB to the LFE channel, and you have a complete 5.1 setup.



TABLE 2 - FAZON F5 TECHNICAL SPECIFICATIONS

FAZON F5	
Frequency Range [+/- 3] dB [Hz]	49-23.000
Sensitivity [2.83V/1m] [dB]	87.5
Nominal Impedance [ohms]	6
Maximum SPL [dB]	109
Recommended Amp. Power [Watts]	40-180
Crossover Frequencies [Hz]	800/3000
Crossover Principle	2½-way
High Frequency Driver	1 x 28 soft dome
Low Frequency/midrange Driver(s)	2 x 5"
Enclosure Type	Bass reflex
Bass Reflex Tuning Frequency [Hz]	47.0
Connection Input(s)	Single wire
Recommended Placement	Floor
Magnetic Shielding	No
Dimensions (H x W x D) [mm]	919 x 281 x 323
Dimensions (H x W x D) [inches]	36.2 x 11.1 x 12.7
Weight [kg/lb]	13.9/30.6

All technical specifications are subject to change without notice.



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Designed and Manufactured in Denmark | www.dali-speakers.com