

# IKON<sup>®</sup> MK2

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## TECHNICAL WHITE PAPER



IN ADMIRATION OF MUSIC



*IKON 1 MK2*



*IKON 2 MK2*



*IKON 5 MK2*



*IKON 6 MK2*



*IKON 7 MK2*

## INTRODUCTION

A full five-year lifespan as market leader in its segment is an amazing and exceedingly rare achievement for any consumer audio product. The longevity of the original DALI IKON series is proof positive of DALI's engineering skill and foresight.

Not content to rest on our laurels, the DALI design team seized the opportunity - and the challenge - to do far more than merely update the cosmetics of the speakers' exterior. In addition to more contemporary styling, we have re-visited key technological aspects of the series in light of newly acquired knowledge, newly developed technologies and components as well as five more years of accumulated experience.

The task of improving on what had become far and away the most popular range in the history of the brand was not undertaken lightly. Naturally, the preservation of IKON's now legendary clarity and wealth of detail was a major priority.

Fortunately, the evolution of DALI's exclusive bass driver technologies enabled us to elevate the revised IKON's to a new level of bass extension and control, for a richer, warmer sound at no sacrifice in the resolution of fine detail and the subtlest nuances.

Like the original IKON's, DALI IKON MK2 is developed, designed, built, hand-assembled and individually



*IKON SUB MK2*



*IKON VOKAL 2 MK2*

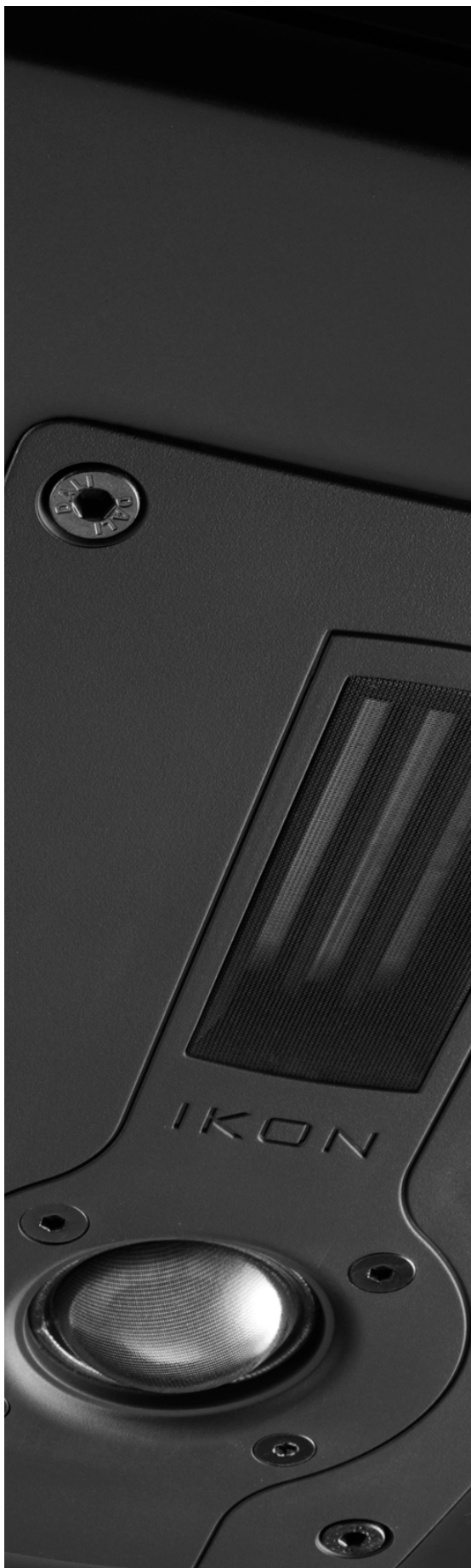


*IKON ON-WALL MK2*

tested (no robots, no assembly lines) entirely in-house at DALI's combined research and development and manufacturing facilities in Denmark for the same strict quality control that made the original IKON such a lasting success.

The DALI IKON MK2 series...

Nothing added. Nothing subtracted.



## TARGET

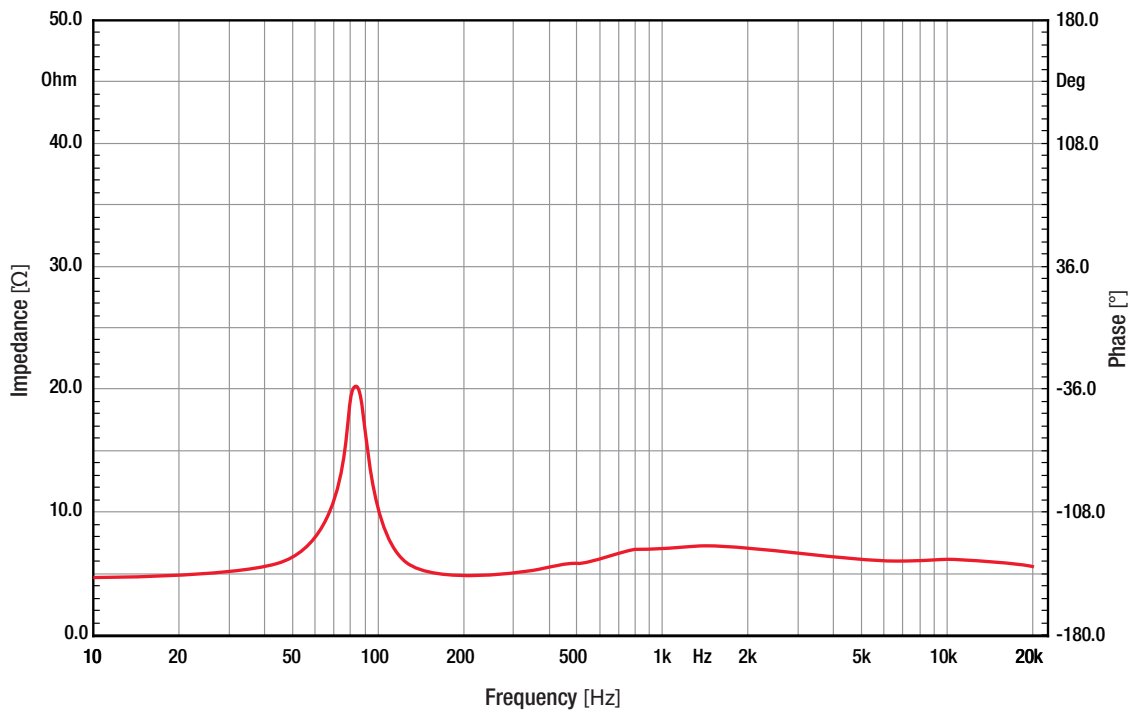
After a remarkable five-year lifespan, the time was deemed right for a significant upgrade of the IKON series, both inside and out.

DALI was looking for specific audible changes, especially refining reproduction capabilities in the lower frequency area. A slightly increased bass level, generating a full-bodied tonal balance has been the aim.

Equally important was to avoid touching the fine resolution in the high frequency area and the balance of the entire speaker.

Generally the acoustic performance had to be 'clearly IKON'.

Following the Scandinavian design trend of having less colour variation, a more exclusive appearance was the objective.



## SOUND DESIGN PRINCIPLES

DALI's design and engineering philosophy is based on a set of principles – sound design principles.

The primary function of any loudspeaker is to convert the electrical signal from the amplifier into a realistic audio experience in the listening room. Any distortion or coloration of the original signal by drivers or enclosure is by definition a degradation of the sound.

All DALI loudspeakers – including the IKON MK2 family - are designed in accordance with our fundamental acoustic and electro-acoustic principles, which together bring you even closer to the full impact of a live music experience.

While these principles work as guidelines they do not limit our creativity nor our freedom to act. On the contrary. Incorporating solid technical solutions DALI has designed everything from the curve of the cones, the weight of the voice coil, the number of screws on the driver to the attachable aluminium 'feet'. You will find no 'off-the-shelf' solutions in IKON MK2. And the entire series is still 'Made in Denmark'.

In the following we will go through individual elements of the construction which – when combined – ensure that all demands are met.

*As an example of our commitment to making 'amplifier-friendly' speakers, the impedance of the IKON ON-WALL MK2 never drops below 5Ω, a stable load at a level which benefits smaller amplifiers and at the same time allows bigger amplifiers to shine.*



*For more information about the DALI sound principles please visit [www.dali-speakers.com](http://www.dali-speakers.com)*





## CABINET

Our large and efficient woodworking facility handles everything from cutting out the cabinet and applying the vinyl to mounting the drivers and performing the final tests and approvals on each and every speaker.

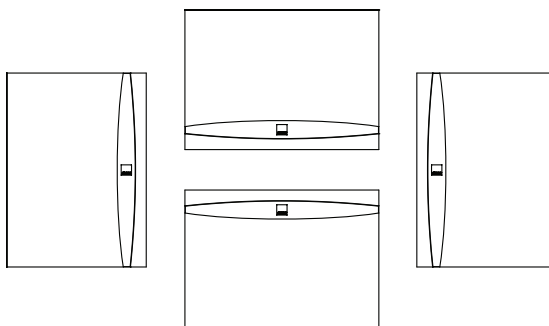
The floorstanding cabinets employ a very rigid construction with solid bracings across the inside of the cabinet for reinforcement. This contributes to the stiffness and practically eliminates resonance



within the cabinet. However, excessive internal bracing can disturb and hinder the crucial airflow inside a speaker cabinet, thereby adversely affecting sound quality. Therefore, great care is taken in the layout and application of internal bracing - in order not to reduce the internal volume of the cabinet unnecessarily.

The high-grade vinyl is carefully selected among the finest available. Extensive testing is carried out to make sure that the surface and joints of the cabinet will stand the test of time. Through strict in-house control of every aspect of production, IKON MK2 achieves a level of fit and finish typically found only well beyond its price point.

Those familiar with the original IKON series will notice that there are alterations to some cabinets in the MK2 series; IKON 1 MK2 is lower than its predecessor and features a bass port on the back, IKON VOKAL 2 MK2 is wider while the slope of the IKON ON-WALL MK2 baffle has been reduced.



*Valuable details: IKON ON-WALL MK2 is fitted with strong key hole brackets for the choice of four different positions.*

*Furthermore it also features cable grooves to facilitate trouble-free mounting flat against the wall.*



*The baffle consists of two layers of MDF bonded together by means of a special vibration-damping assembly adhesive. This construction dissipates vibrations and resonance, forming a solid, rigid, and acoustically inert platform for the drivers. A superior working environment for the drivers plays an important part in maintaining the clarity and purity of the signal by minimizing coloration.*

## FRONT BAFFLE

The new baffle sports a darker, silk mat surface, for a more exclusive look and feel.

The slim-line design of the front baffle contributes to the stereo perspective. And the 'clean' surface is not only pleasing to the eye; it reduces diffractions to an absolute minimum.

Another significant detail is the milling of the woofer cut-out in the baffle. Instead of the usual method of milling the rim full circle of the woofer perimeter, we have milled away the rim, leaving the seven screw fix points intact. We do this to ensure a firm grounding of the woofer within the rim and at the same time to allow free airflow inside the cabinet.

In the original IKON, the rim of the inner layer of the front baffle was milled this way. The IKON MK2 version actually features milling of the outer layer



of the sandwich construction as well. The result is further reduced mechanical compression due to better airflow around the woofer.

A rubber gasket is placed between the woofer and the milled out rim to ensure a 100% airtight fixture.

## BASS REFLEX PORT

Except for IKON ON-WALL MK2 all speakers in this series rely on the bass reflex principle. The bass reflex port has been tuned to minimize distortion from the woofers, and to control the time response of the roll-off from the bass system.

The diameter, length, placement and mounting of all IKON MK2 reflex ports are carefully calculated to ensure ideal, seamless integration of port output with the output of the drivers, so that the port contribution enhances overall system performance. Timing is the absolute keyword here.

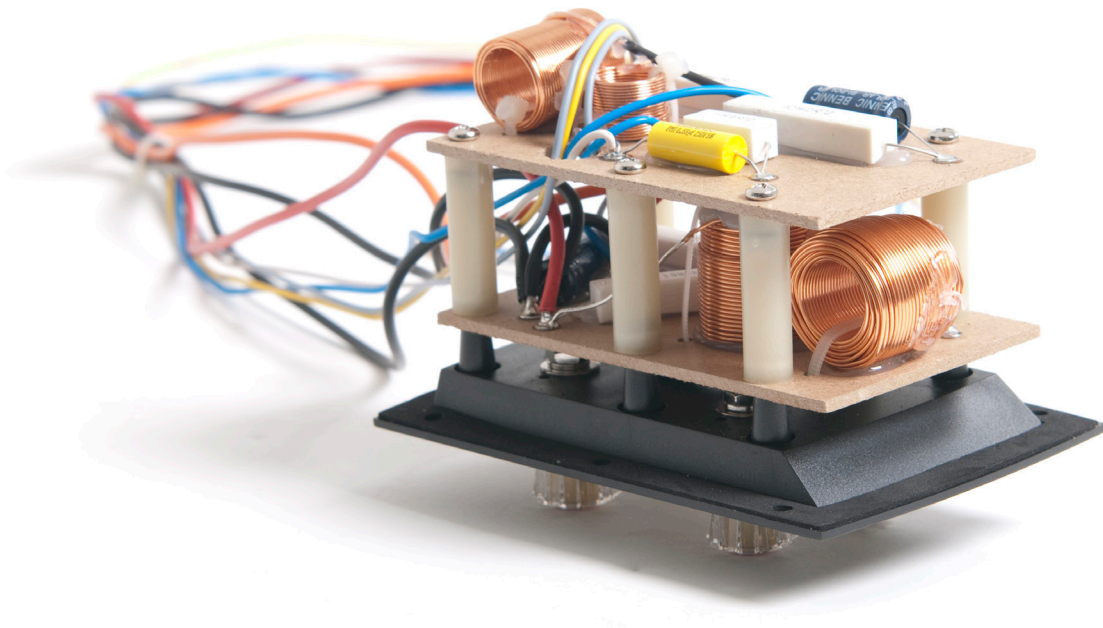


*The port of the IKON 1 MK2 has been angled to increase the tube diameter for reducing audible air turbulence. Feature: extreme close-to-wall placement.*

Correct timing without any unwanted interaction between the drivers and frequencies creates a holographic soundstage. And research clearly shows that speakers with superior time coherence deliver enhanced sonic realism.

The bass reflex port is bolted to the cabinet, using the same screws as used for the drivers. It is even equipped with a gasket on the backside of the mounted port to avoid unwanted air leakage and turbulence.





*IKON MK2 crossover*

## CROSSOVER

The shorter the signal path, the better. That is why we have mounted the crossover directly onto the terminals – minimizing potential signal loss from the terminal to the crossover.

In the floorstanding models - IKON 5, 6, and 7 MK2 - we have constructed the crossover from two vibration-absorbing wood fibre boards to reduce mechanically transferred vibrations. The multi-layer design enables us to position the inductors with maximum separation and at multiple angles to minimize electro-magnetic interference.

All crossovers in the IKON MK2 series are hardwired point-to-point by hand. The advantage is obvious and crucial. By hardwiring point-to-point the connection between each crossover component is optimum and loss is reduced to an absolute minimum. Furthermore, the absence of a traditional glass fibre PCB eliminates the risk of print board resonances.

The terminals have been developed especially for this series and feature sturdy, gold-plated binding posts. IKON 1, ON-WALL, and VOKAL 2 MK2 are prepared for single wiring; the rest of the series

feature bi-wiring terminals with a heavy power bridge (included) for single wiring. The binding posts will accept banana, spade and cable.

For optimal, long-lasting and low-loss connectivity between the driver and the crossover we use gold-plated spades on the internal DALI specified cable from the crossover to the drivers.



*Layout of terminals on the back of IKON VOKAL 2 MK2 enables placement very close to the wall.*





*DALI drivers are all proprietary designs, developed from scratch. Tooled and engineered exclusively for each product, all performance characteristics are tailored to meet the individual speaker requirements.*

## WOOFER

A major contribution to the sonic improvement from the original IKON to the MK2 series derives from the brand new woofer. With the design experience from the MENTOR series in mind we have developed two new woofers – a 5" and a 6½" chassis. Applied in different variations for the individual speakers this new woofer integrates even better with the hybrid tweeter module, adding improved dynamic capabilities and enhanced bass performance.

In recent years, DALI's signature cone material – light paper reinforced by mechanically processed wood fibres – has undergone extensive research and development. Following numerous in-house experiments, today this material is applied in almost all our driver designs. Also the precise structure of the 'acoustical ensemble' – cone, dust cap, coating, and glue - has been established through a vast number of experiments with geometry and materials.

Wood fibres add stiffness to very light paper cone membranes, ensuring non-uniform break-up characteristics within the material. Because of the random position of the wood fibres, resonances are eliminated before they can pick up enough

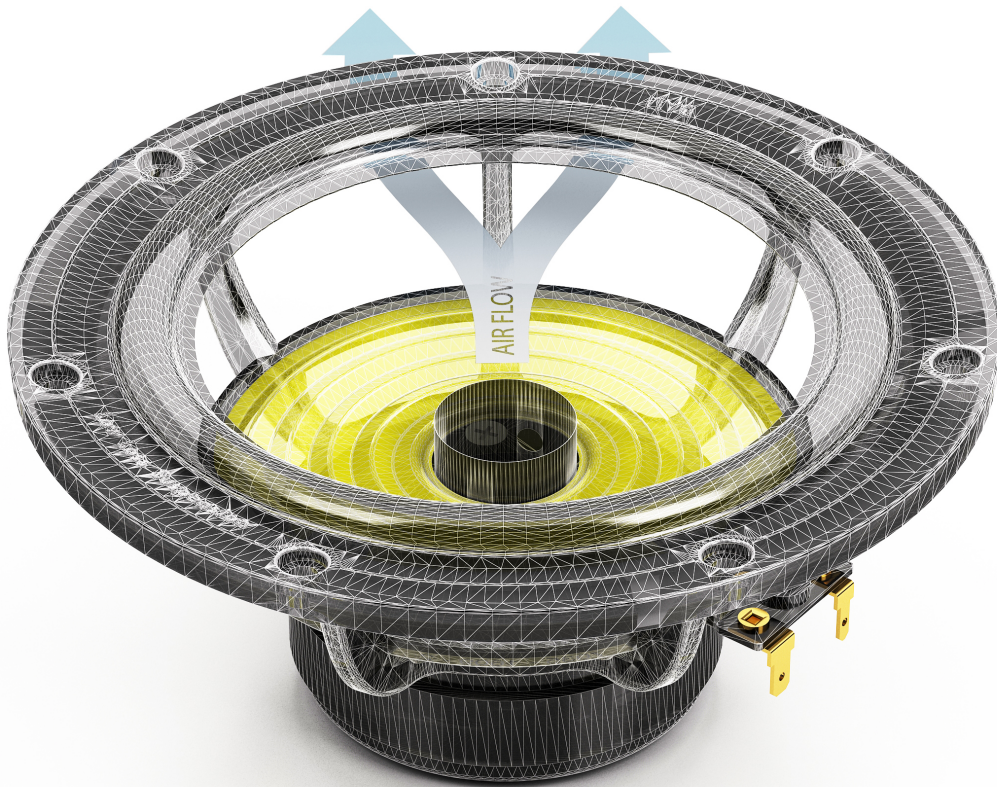
energy to become an audible problem. The unique mixture of structural stiffness, low mass and damping improves behaviour of the cone, resulting in outstanding sound reproduction.

The wood fibre technology has proven to be a key element in reproducing the finest details and dynamics in the music with very low loss of information.

Though important, applying the right cone material for the IKON MK2 woofers is not enough. Many different curve ratios and wood fibre densities were tested and re-tested in order to reach the target.



*The rubber surround is moulded from a special low-loss material and is designed to prevent standing waves, both in the surround and in the cone.*

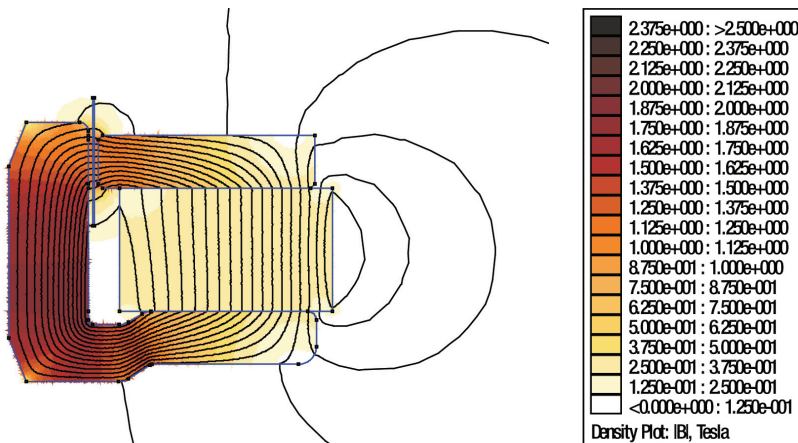


The same attention was paid to the voice coil, the magnetic system etc. Even the slightest change of a driver in the development process has meant hundreds of hours of verification, and in getting it all working together seamlessly.

The woofer is housed in a rigid die-cast aluminum chassis. The chassis has been designed to provide a free flow of air from the backside of the cone, both below and above the spider. Actually, the ventilated area below the spider has increased by a solid 17% compared to the woofer in the original IKON series.

Combined with careful milling of the front baffle, the optimized airflow ensures very limited loss of energy within the driver, minimizing compression – resulting in uncolored, transparent and time coherent reproduction.

The chassis is fixed to the front baffle with no less than 7 screws. This anchors the chassis firmly to the front baffle, thereby minimizing the loss of energy in the chassis itself and avoiding resonance - again a measure to preserve the integrity of the audio signal.



Designing drivers from scratch DALI's engineers apply various tools in the process. An example is Finite Element Modelling, used to evaluate even tiny changes in driver parameters.

The illustration to the left (6½" woofer for IKON MK2) shows that the required flux density has been achieved. FEM is also applied to ensure that all drivers feature temperature stable motor systems.



The long-throw ratio design of the chassis provides headroom for extreme cone excursions. Even when the cone is pushed to the maximum, it will not reach physical limits of motion.

The motor system within the woofer is based on a solid ferrite magnet. The magnetic saturation of the centre pole prevents distortion through a stable magnetic flux density in the voice coil gap. On top of this, the drilled and chamfered ventilation in the centre pole provides total ventilation behind the dust cap.

We use a 1" voice coil providing the optimum combination of low moving mass and long linear motion. This offers a wide frequency band and dynamic, unrestrained reproduction.

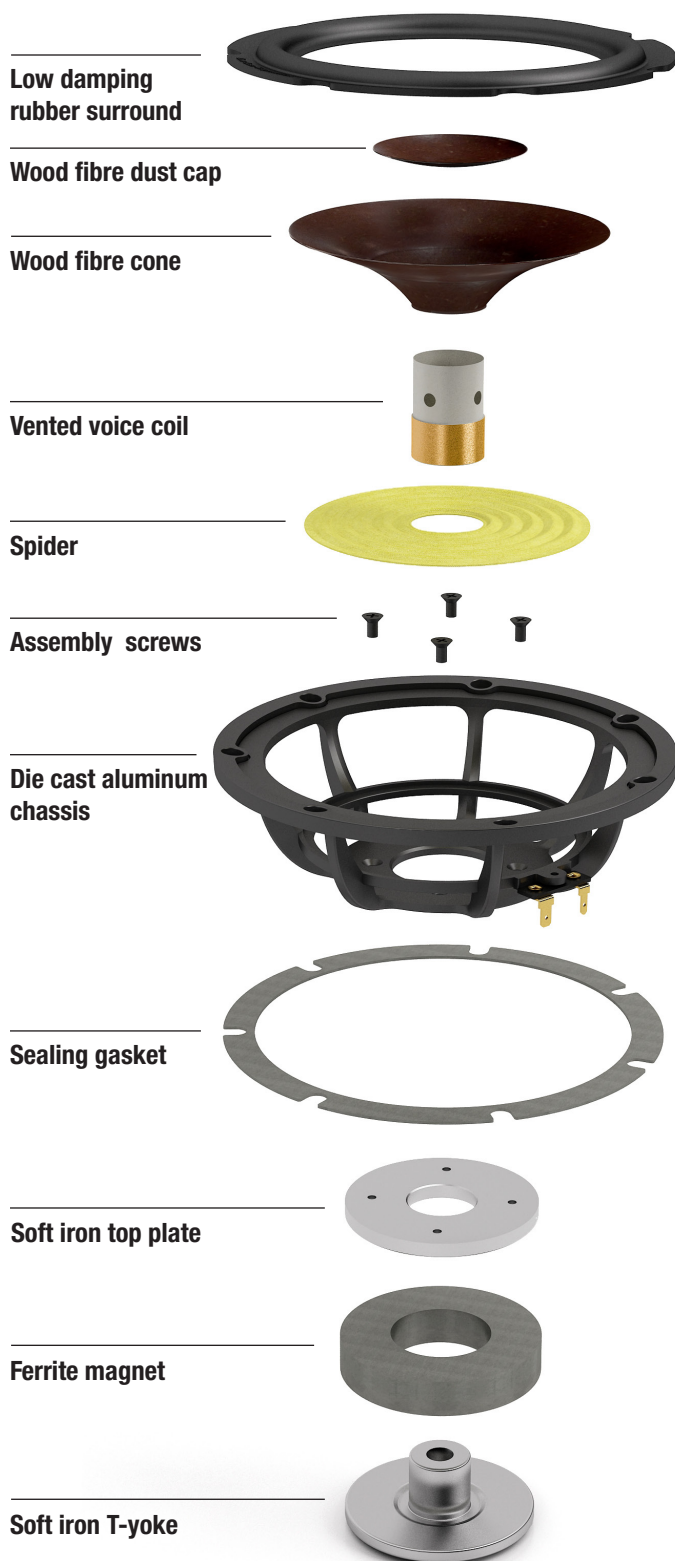
When it comes to mechanical losses, it is clear that the vast majority of these are extremely non-linear, thereby adding level-dependent distortion to the driver's reproduction. At DALI, we believe in designs based on low mechanical loss.

It is well-known within the industry that it is quite easy to control frequency response by adding lots of mechanical damping in e.g. surround and cones. But our approach remains: We do not want to use non-linear mechanical effects to control, damp or limit the movement of the parts that should reproduce the music. The amplifier voltage and current must be the factors that control motion.

DALI was one of the first manufacturers to insist on controlling frequency response through carefully balanced designs, even with low-loss rubber surrounds that will reveal problems in many well-known driver designs.

Listening to the IKON MK2 family shows that it is worth the struggle, however. By letting the amplifier take control, we strive for the music to dominate – and not the character of the speaker.

Consequently, free and open performance is achieved. Increased dynamics is an added benefit. No matter if you play at subtle levels or crank up the volume, the IKON MK2 products will ensure that no details are left out.





## HYBRID TWEETER MODULE

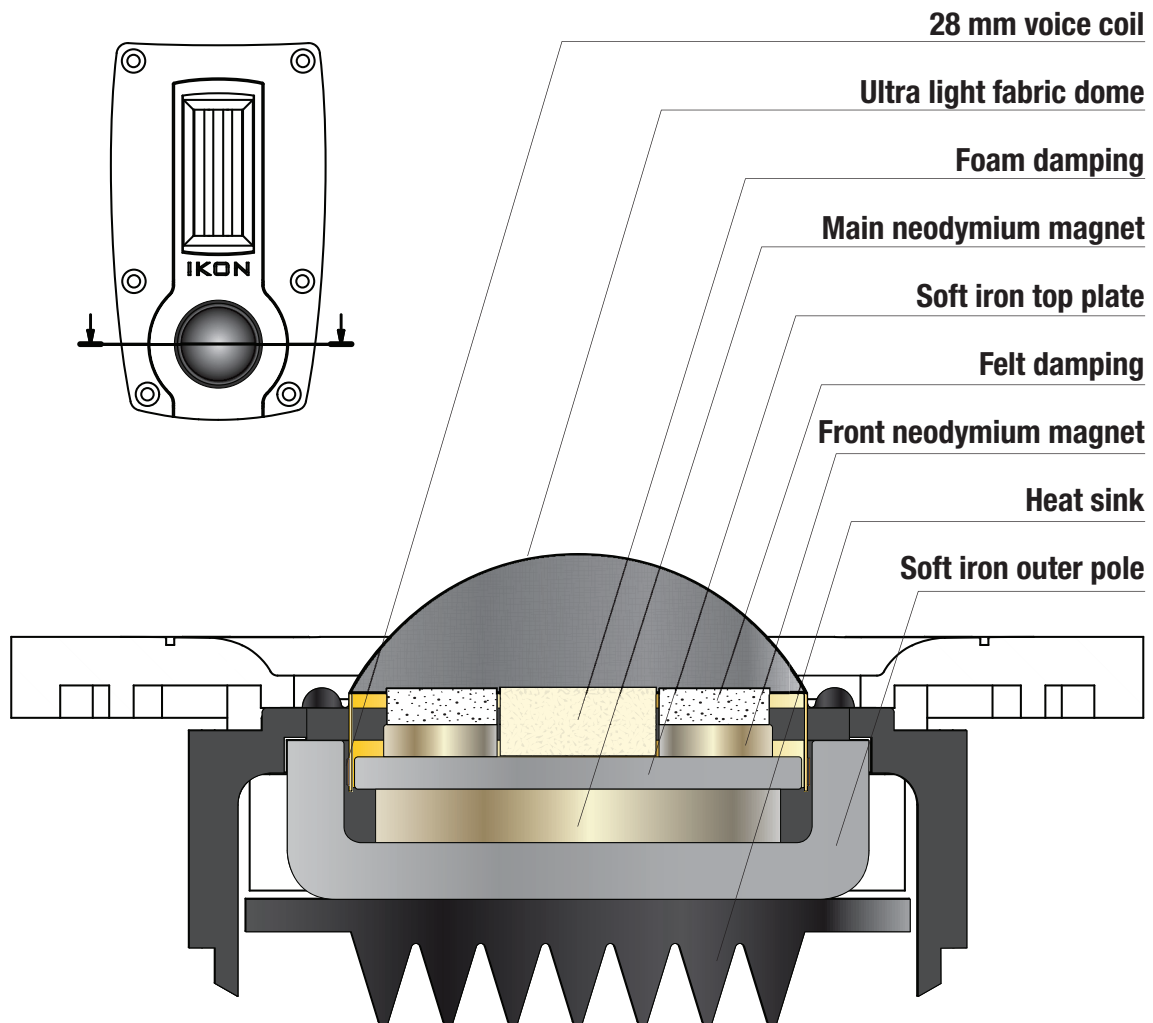
Just as important as it was to improve certain aspects of bass reproduction, it was crucial to preserve the fine performance of the proprietary DALI hybrid tweeter module in the IKON series. We wanted to maintain the transparent and solid rendering of even the most subtle high frequency details.

The IKON MK2 series employs a tweeter solution inherited from our high end EUPHONIA and HELICON series. Extensive experience and know-how from these series as well as the MENTOR family coupled with further research has enabled us to incorporate the hybrid tweeter technology in a speaker series at a very attractive price level.

There are two hybrid tweeter modules for the IKON MK2 series – one is based on a neodymium magnet for the dome, the other applies a larger ferrite magnet system. The first is mounted in the compact speakers, IKON 1, IKON ON-WALL, and IKON VOKAL 2 MK2 - the latter in the rest of the series.

Both versions of the hybrid tweeter module consist of a 28 mm lightweight dome tweeter and a 17 x 45 mm ribbon tweeter. Working in unison, the soft dome tweeter and the ribbon tweeter form the ideal high frequency solution. Combining the advantages of each tweeter's unique properties is a technology which DALI has spent years in perfecting.





*Under the dome, we have meticulously damped the cavity. The damping material consists of two dedicated parts positioned directly in the pole opening and on the edge of the centre pole. All this makes the dome tweeter perform in a smooth and stable manner – adding to the overall quality of reproduction of high frequencies.*

## DOME

Low resonance frequency, high power handling, and exceptional headroom for high sound pressure levels and extreme excursions are all characteristics of the oversized soft dome tweeter. It is rolled in carefully around 2.5 - 3.2 kHz, depending on the model. And the dome is allowed to operate up to its high frequency limit well beyond 20 kHz without being rolled off in the crossover.

Incorporating an ultra-thin magnetic fluid for cooling, the fluid has a very high flux saturation point for greater power handling. This also means superb control of coil movement - even at very high sound pressure levels.

The dome material itself is very lightweight, and actually so thin that the coating has to be applied to hold the material together and uniform.

## RIBBON

The ribbon tweeter features a broad frequency band and superb dispersion in the higher frequencies. Gently rolled in above 10 kHz, the ribbon reaches full contribution from 14 kHz to well beyond 30 kHz, far above the audible range.

Equipped with a rear chamber fitted with rigid bracing, the ribbon is shielded from the disruptive

Rear chamber



Acoustical damping



Magnet assembly plate



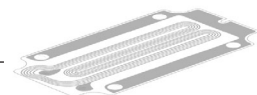
Acoustical damping



Neodymium magnet



Ribbon foil



Ribbon foil assembly plate



Acoustic lens guide



Front plate with dome

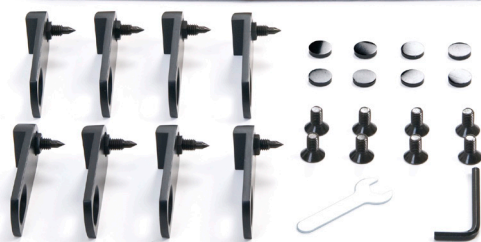


*Developing the DALI ribbon tweeter was no easy task. Years were spent on research until the desired performance was achieved, and all parts were ready to go into production. The EUPHONIA MS5 was the first product to benefit from the hybrid tweeter module. Today, this technology is applied in all IKON MK2 speakers.*

influence of the woofers. The DALI ribbon tweeter is a true master in horizontal distribution of high frequencies, and a superb partner for the soft dome tweeter's unique ability to reproduce frequencies from 3 kHz upwards.

In our view, the hybrid tweeter module is the perfect high frequency solution. Both the soft dome and the ribbon tweeter are free of artefacts, e.g. resonances and high Q peaks within their working range. The Hybrid Tweeter Module features an extremely smooth and wide horizontal dispersion - one of our sound design trademarks.

Even the detailing of the faceplate of the tweeter module is designed for optimal horizontal dispersion.



*Accessories for IKON 5, 6 and 7 MK2.*

## ACCESSORIES

All floorstanding IKON speakers come with spikes made of black chrome steel. These are mounted in the aluminum cast 'feet'.

For use on 'sensitive' floors, we have also included vibration absorbing feet which will leave soft surfaces - such as a wooden floor - untouched.

Tools for mounting the aluminum feet and spikes are included.



## IKON SUB MK2

Built like the rest of the IKON MK2 series, the cabinet of the IKON SUB MK2 sports a solid two-layer front baffle to create the best working environment for the front-firing woofer. The cabinet itself is elevated from a base beneath, the dividing space creating an extension of the down-firing, flared bass reflex port. The result is an impressive, seamless acoustic coupling to the room.

When reproducing low frequencies it is important to maintain a piston-like behaviour from the driver, also at high sound pressure level. For this purpose the long-throw 12" woofer relies on a rigid paper

cone and dust cap attached to a 4-layer 26.5 mm long voice coil.

The dust cap not only lives up to its name, it plays an important role in reinforcing the entire cone. The pole piece features ample ventilation to reduce compression, and to ensure adequate cooling.

The woofer is powered by a 325 Watt analog and extremely linear amplifier. The rear panel feature controls for gain, phase, and upper crossover frequency, and the subwoofer will accept a full frequency LINE IN as well as a dedicated LFE signal.

## IKON MK2 SERIES TECHNICAL SPECIFICATIONS

	1	2	5	6	7	ON-WALL	VOKAL 2	SUB
Frequency Range (+/-3dB) [Hz]	45 - 30.000	41 - 30.000	43 - 30.000	39 - 30.000	40 - 30.000	58 - 30.000	47 - 30.000	26-200
Crossover Frequency [Hz]	2.500 / 14.000	2.500 / 14.000	700 / 2.500 / 14.000	700 / 2.600 / 14.000	700 / 2.500 / 14.000	2.600 / 14.000	3.200 / 14.000	50-130
Input Impedance [kohm]	-	-	-	-	-	-	-	30k (L/R) 20k LFE
Sensitivity (2.83V/1m) [dB]	86.0	86.5	87.0	89.0	90.5	88.5	90.0	-
Nominal Impedance [ohm]	6	6	6	6	6	6	6	-
Maximum Power Consumption [Watt]	-	-	-	-	-	-	-	500
Max. Amplifier Power Output [Watt RMS]	-	-	-	-	-	-	-	325
Cont. IEC Amplifier Power Output [Watt RMS]	-	-	-	-	-	-	-	250
Maximum SPL [dB]	105	107	108	110	112	109	111	113
Recommended Amplifier Power [Watt]	25-100	30-150	30-150	25-180	25-200	25-150	25-150	-
High Frequency Drivers [mm]	1 x 28 soft dome 1 x 17 x 45 ribbon	1 x 28 soft dome 1 x 17 x 45 ribbon	1 x 28 soft dome 1 x 17 x 45 ribbon	1 x 28 soft dome 1 x 17 x 45 ribbon	1 x 28 soft dome 1 x 17 x 45 ribbon	1 x 28 soft dome 1 x 17 x 45 ribbon	1 x 28 soft dome 1 x 17 x 45 ribbon	-
Drivers mid/woofer	1 x 5"	1 x 6½"	2 x 5"	2 x 6½"	3 x 6½"	1 x 6½"	2 x 5"	1 x 12" long stroke
Enclosure type	Bass reflex	Bass reflex	Bass reflex	Bass reflex	Bass reflex	Closed	Bass reflex	Bass reflex
Connection Input	Single-wire	Bi-wire	Bi-wire	Bi-wire	Bi-wire	Single-wire	Single-wire	RCA, Stereo (low-pass filtered) LFE (Mono)
Recommended placement	Shelf / stand	Stand / shelf	Floor	Floor	Floor	On-wall	Shelf	Floor, near wall or corner
Dimensions (H x W x D) [mm]	325 x 150 x 260	440 x 190 x 322	810 x 150 x 280	1000 x 190 x 355	1140 x 200 x 365	375 x 272 x 146	150 x 570 x 260	455 x 410 x 457
Dimensions (H x W x D) [inches]	12.8 x 5.9 x 10.1	17.3 x 7.4 x 11.7	31.6 x 5.9 x 11.0	39.4 x 7.5 x 14.0	44.9 x 7.9 x 14.4	14.8 x 10.7 x 5.7	5.9 x 22.4 x 10.1	17.9 x 16.1 x 18.0
Weight [kg/lb]	4.8/10.6	8.4/18.5	10.4/22.9	17.8/39.2	21.5/47.4	5.6/12.4	7.7/17.0	26.1/57.5

All technical specifications are subject to change without notice.