HIGH DYNAMIC CAPACITY LOUDSPEAKERS

_vKi is dedicated to reproducing the full and exact dynamic range.

It offers a new state of the art in loudspeaker design and acoustic performance.

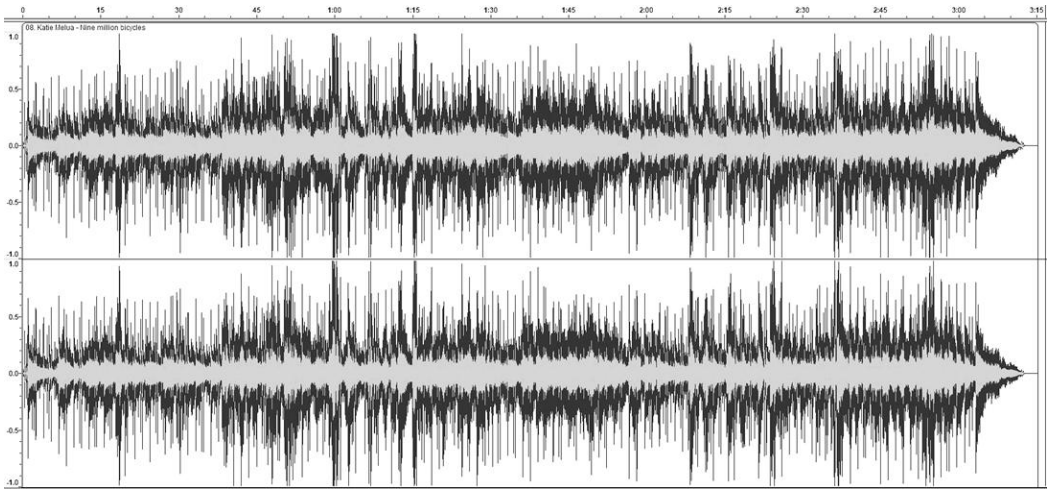
Music is dynamic

Audio signals require a very wide dynamic range to reproduce a real sound wave.

The human ear is not only a "pressure sensor" like a microphone, but also a "transient sensor": sound perception is driven by pressure variations.

In this regard, the human ear is extremely sensitive and accurate over a very wide dynamic range: we can perceive sound pressure variations from 20 µPa to 200 Pa.

Frequency response and other basic data used for a century are important, but the next progress in sound reproduction lies in the transducer dynamic capability.



Example of music signal - length: 3.15min – Katie Melua – Nine million bicycles

Focus on sound reproduction progress

To ensure that _vKi technology really improves sound reproduction, we tested 37 woofer references, with diameters from 172 mm to 190 mm and retail prices from 60% to 200% of Wom185_vKi.

Based on very different results, and in order to provide relevant information, we created two groups to summarize the results:

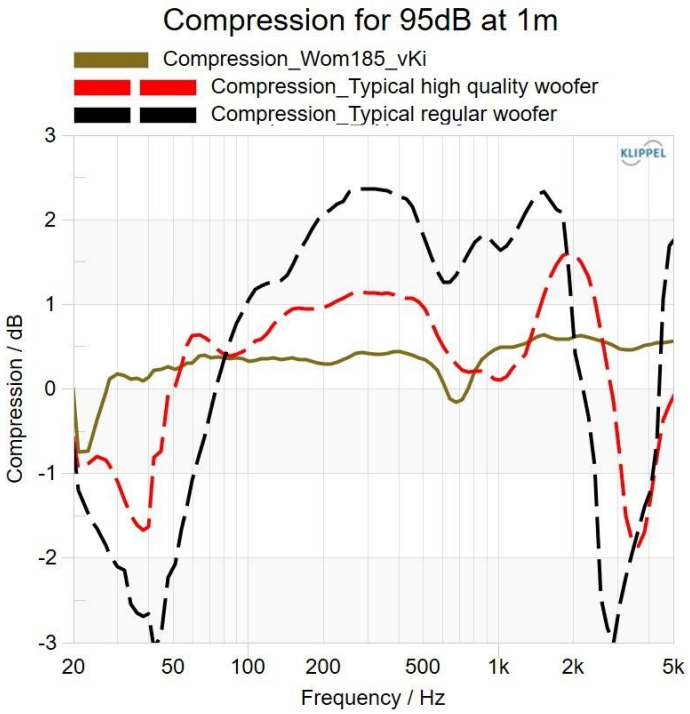
- "Regular woofers", including vintage, esoteric and entry-level products.
- "High quality" woofers, grouping top-of-the-art products.

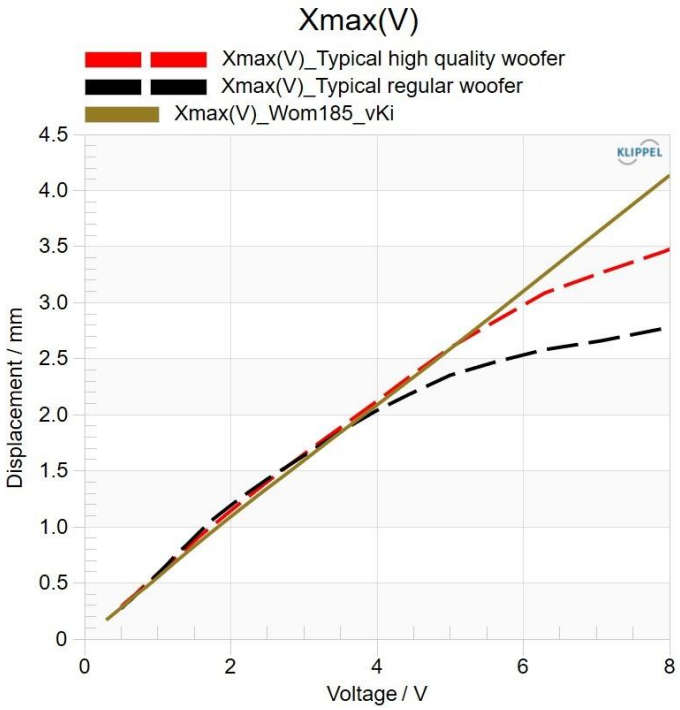
Next, we created average performance curves for each group, which are explained in the next chapter.

Preserve the dynamic range under realistic sound level

In technical terms, preserving the dynamic range means ensuring that the reproduced sound wave remains proportional to the input signal.

Thanks to the large voice coil diameter and the constant force factor, the _vKi technology are closer from the real dynamic of the audio signal.





Keep constant motion forces on larger cone excursion.

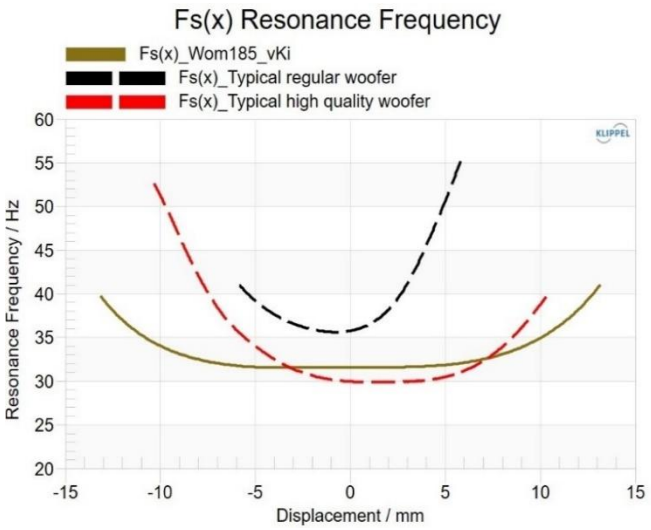
Usual woofer technology limits force factor linearity to around +/-8 mm.

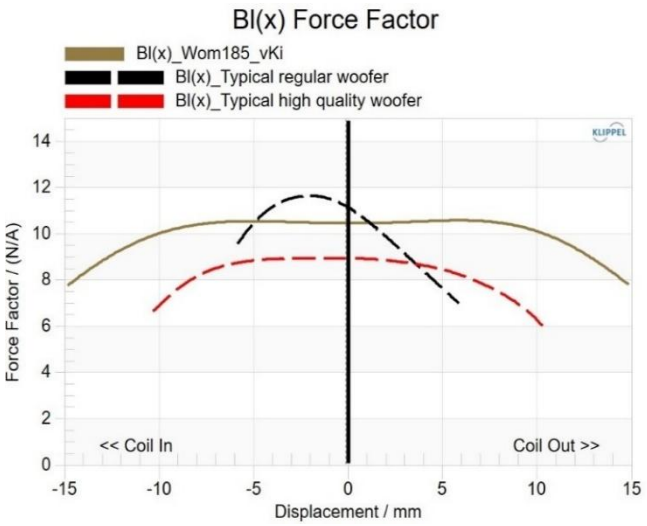
Usually, to extend this typical excursion, the voice coil becomes longer, heavier, or the nominal Bl [N/A] value decreases significantly.

The _vKi motor structure, made with radial magnets, makes it possible to reach a high force factor value and real large-excursion capability.

In the same way, Kartesian spider technology provides linear and symmetric stiffness on very large cone movements.

These performances ensure more accurate cone movements under large excursion.





Improve distortion where it does matter

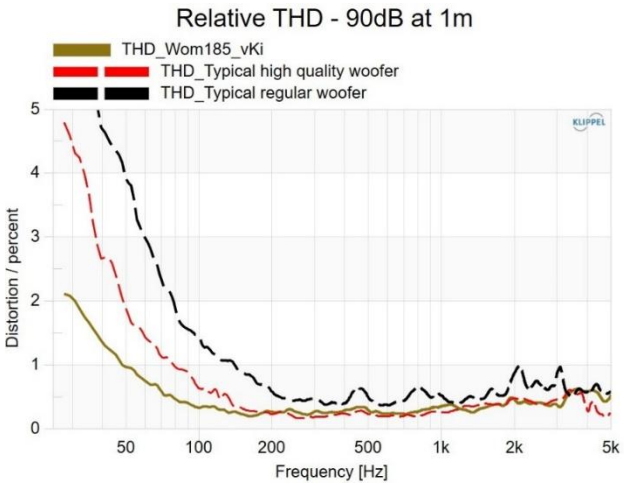
Distortion is one of the basic features that a transducer must manage to be a serious competitor.

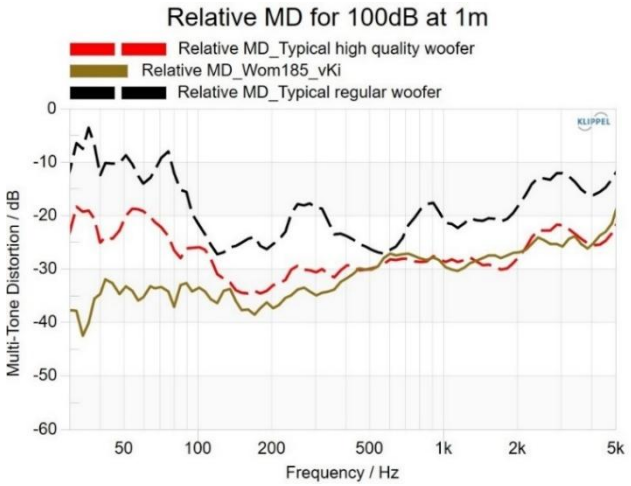
Nevertheless, as other technical data in the past, the THD is tending to become a commercial criterion, losing its meaning and relevance in the process.

THD is static measurement, comparing the generated harmonics with a unique played frequency: This isn't comparable with audio signal, it is only a technical indication for engineering purpose.

As THD is already low in the mid-band area, _vKi technology focuses on making a difference in low frequency, with significant improvements.

Furthermore, to obtain a more relevant indication of distortion components, we prefer to work with multi-tone distortion, where the same improvements are reached in low frequency.

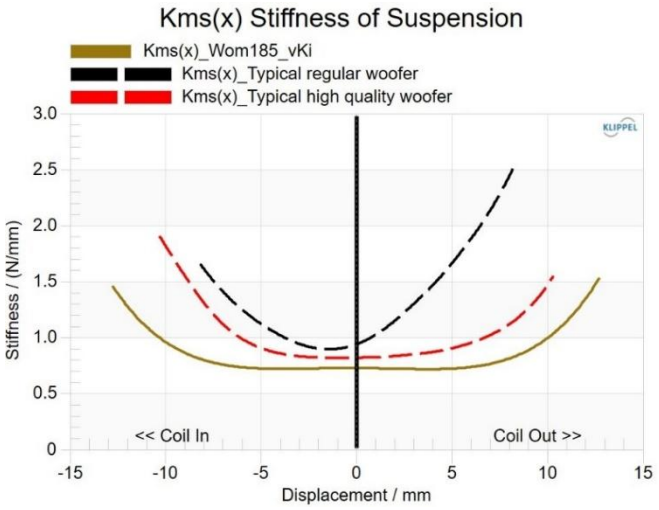


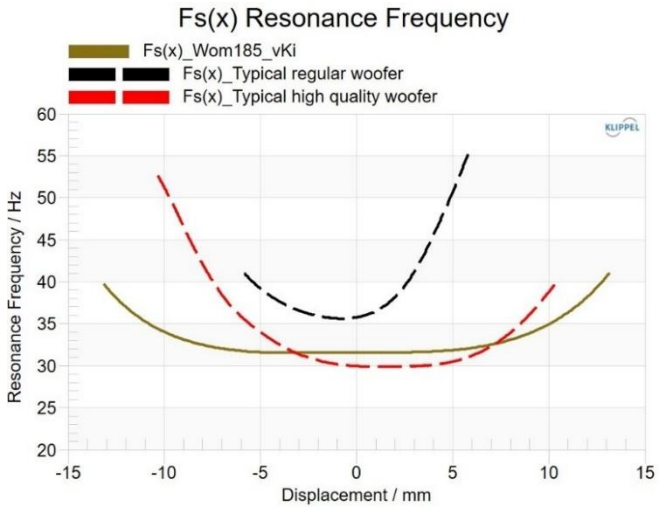


Ensure transducer stability in any circumstances

The shape of the frequency response in low frequency, whatever the acoustic loading (sealed, vented, passive radiator, ...) is driven by the T&S parameters. The resonance frequency is very important parameter because it affects the others parameters (VAS, Qts, ...). If the resonance frequency isn't the same in low and large cone excursion, it means the shape of the frequency response in low frequency isn't the same neither. As a consequence, the dynamic isn't preserved and audio signal is disturbed.

_vKi drivers ensure stable Fs [Hz] over larger cone excursion, offering better stability and a new level of performance, especially in low-frequency reproduction.

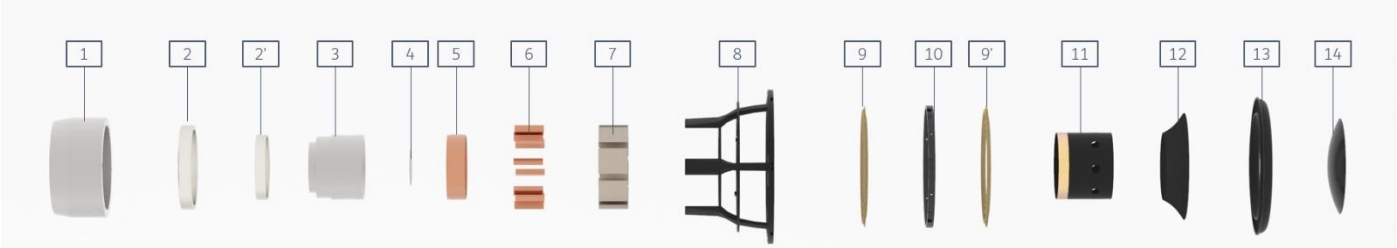




Assembling details of _vKi transducers

_vKi loudspeakers are far from regular drivers using the typical assembly methods used for a century in the audio industry.

Every single part has been engineered and produced to improve performance; most integrate innovation and specific assembly processes.



Example of 185_vKi

1- U-Yoke: Made of very low-carbon steel, it drives intense magnetic flux and ensures voice coil cooling.

2 & 2'- Aluminum rings: They significantly reduce inductance modulation to improve MD performance.

3- Yoke: Made of low-carbon steel, it is specifically shaped to offer a constant magnetic field over 35 mm.

4- Dust protection grill.

5- Copper ring: It reduces the inductance value by 50% and improves its stability according to voice coil position [Le(x)].

6- Copper struts: They significantly protect the magnetic flux from modulation caused by the voice coil current.

7- Radial magnets: Made of N40 grade, they provide 1.05 T over 35 mm height.

8- Frame: Built in injected aluminum, designed to balance moving-part fixation and avoid any inner resonant cavity.

9 & 9'- Spider(s): Using Kartesian innovation, they provide the required and stable stiffness over larger excursion [Kms(x)].

10- Spider spacer: It allows dual-spider assembly without air compression between the two spiders.

11- Voice coil: It uses a composite titanium / glass fiber vented former and a short coil, most of the time with only one layer.

12- Cone body: Built from an advanced paper mixture, it uses hexaKone innovation to combine low mass and high Young modulus.

13- Surround: Built in NBR for lower mechanical loss, it uses different profiles according to driver purpose.

14- Dust cap: Mainly built in CGF, a proprietary material with very high Young modulus and very good internal damping.

_vKi is an adaptable technology

Thanks to the construction detailed above, _vKi technology can be adapted to specific requirements.

It is possible to reach specific T&S parameters and overcome the usual constraints linking moving mass, force factor, inductance value, and R DC.

For the most ambitious projects, it is possible to transfer the _vKi technology into exclusive design, including unique frame design and other cone materials.

Contact us to start your exclusive and uncompromised loudspeaker project.

Uncompromising quality

The _vKi products are engineered and produced in France.

The assembly of _vKi requires specific machines, including an innovative and unique magnet charger for the stiff radial magnets.

Usually, those who use radial magnets charge each magnet before assembly, which does not allow the use of stiff magnets due to handling difficulties and the danger related to intense magnetic fields.

Thanks to Kartesian's innovative magnet charger, the eight magnets are charged at one time, after their assembly in the motor structure, with a specific 280 kV charger.

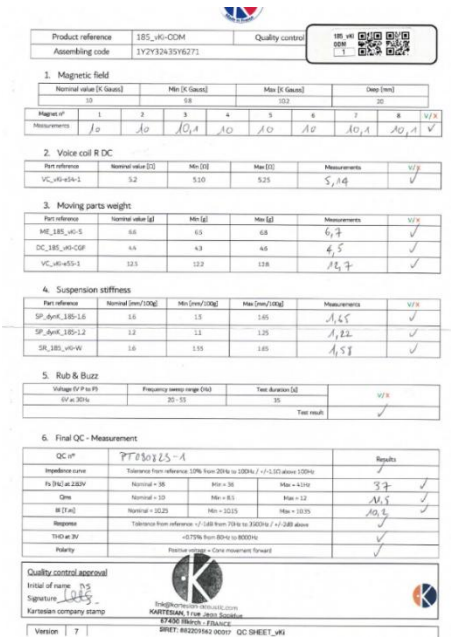
Kartesian controls the value of the magnetic field in the gap at eight points, ensuring a homogeneous field over the full motor structure gap.

Every single part is controlled before assembly: spider stiffness, cone weight, voice coil R DC... totaling 16 quality controls during production.

A quality control report is provided with each _vKi driver, showing the measurements performed during production and the results.

Each _vKi product has a unique quality control number, which can be read on the driver and report.

Kartesian archives these quality controls, including frequency response, impedance, THD, polarity, T&S, and complete batch traceability.



Product reference: 18S_vKi-COM — Quality control
Assembling code: 1Y2Y32435Y6271

1. Magnetic field

Nominal value [K Gauss]		Min [K Gauss]		Max [K Gauss]		Deep [mm]		
10		9.8		10.2		20		
Magnet n°	1	2	3	4	5	6	7	8	V/X
Measurements	10	10	10,1	10	10	10	10,1	10,1	✓

2. Voice coil R DC

Part reference	Nominal value [Ω]	Min [Ω]	Max [Ω]	Measurements	V/X
VC_vKi-e54-1	5.2	5.10	5.25	5,19	✓

3. Moving parts weight

Part reference	Nominal value [g]	Min [g]	Max [g]	Measurements	V/X
ME_18S_vKi-S	6.6	6.5	6.8	6,7	✓
DC_18S_vKi-COF	4.4	4.3	4.6	4,5	✓
VC_vKi-e55-1	12.5	12.2	12.8	12,7	✓

4. Suspension stiffness

Part reference	Nominal [mm/100g]	Min [mm/100g]	Max [mm/100g]	Measurements	V/X
SP_dynK_18S-1.6	1.6	1.5	1.65	1,65	✓
SP_dynK_18S-1.2	1.2	1.1	1.25	1,22	✓
SR_18S_vKi-W	1.6	1.55	1.65	1,58	✓

5. Rub & Buzz

Voltage (V P to P)	Frequency sweep range (Hz)	Test duration [s]	V/X
6V at 30Hz	20 - 55	35	
		Test result	✓

6. Final QC - Measurement

QC n°	PT050225-A			Results
Impedance curve	Tolerance from reference: 10% from 20Hz to 100Hz / +/-1.5Ω above 100Hz			✓
Fs [Hz] at 2.83V	Nominal = 36	Min = 36	Max = 43Hz	37 ✓
Qms	Nominal = 3.0	Min = 8.5	Max = 12	11,5 ✓
Bl [Tm]	Nominal = 10.25	Min = 10.15	Max = 10.35	10,2 ✓
Response	Tolerance from reference: +/-1dB from 70Hz to 3500Hz / +/-2dB above			✓
THD at 3V	+0.75% from 80Hz to 8000Hz			✓
Polarity	Positive voltage = Cone movement forward			✓

Quality control approval
Initial of name: NS
Signature: NS
Kartesian company stamp
KARTESIAN, 1 rue Jean Socrate 67400 Illkirch - FRANCE
SIRET: 88220916200017 QC SHEET_vKi
Version | 7

Example of _vKi quality control report