



HF104



HF144



PROFESSIONAL LOUDSPEAKERS *Made in Italy*



8HX200



12HP1060



15HP1060



18XL1600



18HP1060

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- Since its inception in 1958 Faital has specialized in the design and manufacture of loudspeakers for a variety of industries.
- Starting in the early 60's with 40% of the total Italian market demand for loudspeakers, Faital steadily grew to become today one of Europe's largest loudspeaker manufacturers.
- All the while Faital also focused on improving and increasing its industrialization and technological capabilities.
- **Today Faital can count on many facilities worldwide and several automated production lines** all equipped with custom quality check systems.

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FAITAL PRESENCE IN EUROPE



FAITAL S.P.A. ITALY
World HQ – R&D, Sales
San Donato Milanese



MHG K.F.T. HUNGARY
Automotive
Manufacturing



FAITAL S.P.A. ITALY
Manufacturing

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FAITAL PRESENCE IN ASIA



FAITAL ASIA HONG-KONG
Logistics, Sales
Hong Kong

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FAITAL PRESENCE IN AMERICA



FAITAL USA INC. U.S.A.

Logistics, Sales

New Jersey

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- Constant investment into the development of our R&D department allowed for the abilities and know-how necessary to create a totally new line of drivers
- The creation of a dedicated Pro-Audio division for the development of Professional Loudspeakers marked the beginning of a new Faital commitment.
- The new “FaitalPRO” division was officially presented to the market at the 2006 Winter NAMM Show that was soon followed by other exhibitions like the Prolight+Sound, Infocomm, PALM and AES among others every year after that.
- Through a growing distribution network FaitalPRO products are becoming more available worldwide

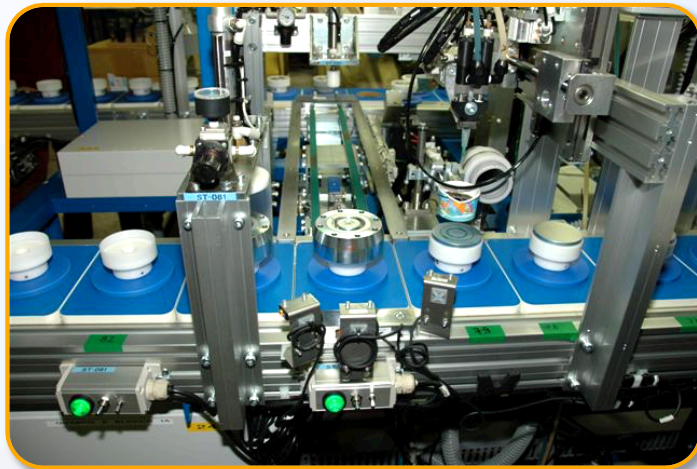
FaitalPRO Exhibitions

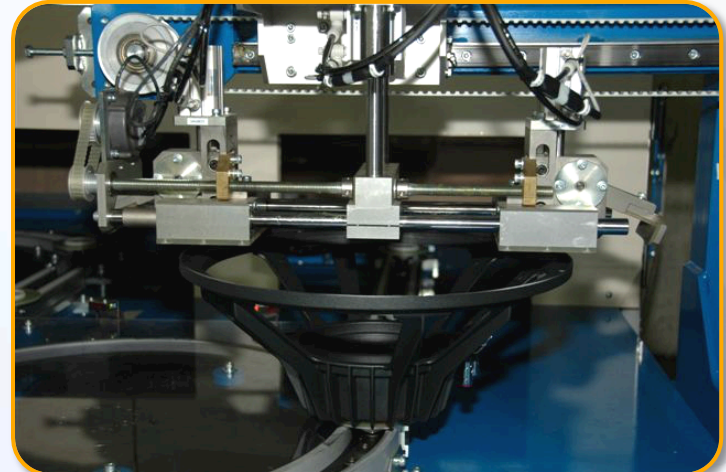
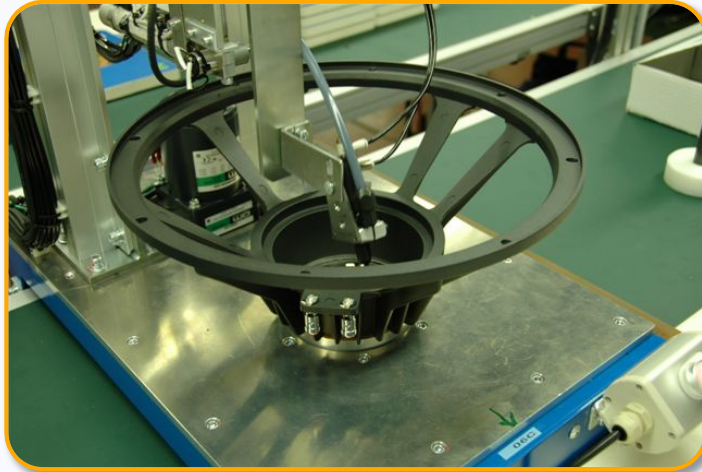


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- Following in true Faital fashion a new automated production line was designed and installed at our Italian manufacturing facility near Milan for the production of Pro-Audio loudspeakers.
- In order to ensure the constant quality of our products the majority of the assembly is fully automated.



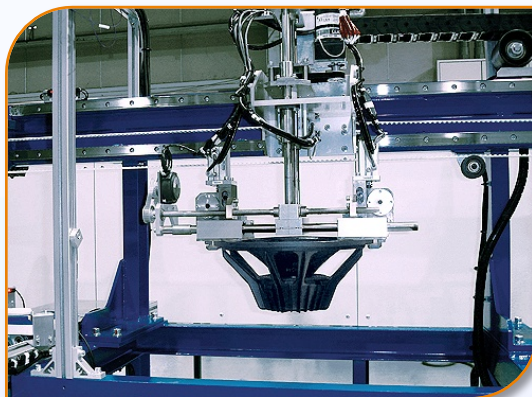


- Decades of experience in automation allowed for the development of a manufacturing process that combines superb craftsmanship and the latest industrial technologies.
- Highly skilled personnel with over ten years experience in loudspeaker manufacturing are dedicated to the most critical assemblies in the production process.

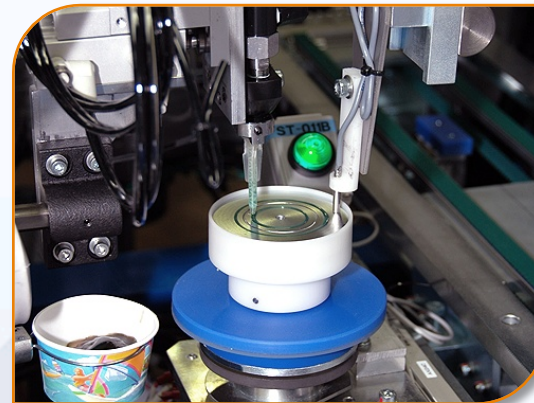
ALL AUTOMATIC ASSEMBLY LINES (some examples)



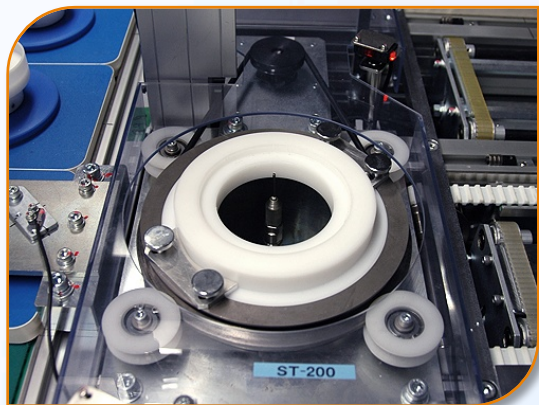
Magnetic circuit assembly



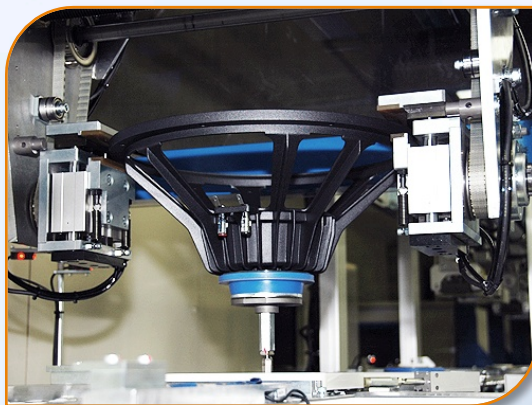
Three axis machines



Automatic adhesive application



Automatic positioning



Special machines



Pallets robotized movement

PROFESSIONAL SERIES



- Small to mid-size mids and mid-woofers
- Versatile design for all applications
- Extremely Light weight
- Excellent linearity throughout the entire useful excursion

FIVE HUNDRED SERIES



- Highly reliable
- Versatile design for all applications
- Innovative electro-mechanical solution
- Mid-High power with outstanding power-to-weight ratio
- Extremely light weight
- Highly reliable even when under continuous stress

HIGH PERFORMANCE SERIES



- Innovative electromechanical solutions (patented neodymium cooling system)
- High power with outstanding power-to-weight ratio and linearity
- excellent mechanical reliability even when under continuous stress

TRUE OEM CAPABILITY

As a leader in the automotive and premium sound component manufacturer Faital is able to provide unparalleled OEM project services

COAXIAL LOUDSPEAKERS



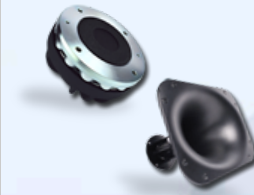
- Small to mid-size Coax designs
- Innovative HF-LF coupling design
- Expanding line
- two independent magnet assemblies while keeping an overall compact package

FE SERIES



- Very small and compact designs
- Based on a steel basket structures
- Mostly low power applications
- More affordable
- Fully validated by all Faital standards

COMPRESSION DRIVERS & HORNS



- A growing line of compression drivers comprising now 1", 1.4" to 2" exit drivers
- Tractrix and exponential curve Horns for high frequency application
- Wave guides for line-array application

New Developments – Research Areas



Increased Power Handling and Sensitivity

Highly controlled mechanical excursion without DC-offset

Superior mechanical and magnetic linearity

Low Power Compression

Maximized Life Time of each product

Proprietary design of the Neodymium Magnetic Circuit with innovative Cooling technologies

Spiders and Surrounds designed to keep the linearity control even beyond 60mm of cone excursion

Lightweight and high strength Composite Materials for all soft parts



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New Developments – Research Areas



Line Array optimized Waveguide: linear source directivity on 'vertical' plane

Allows for a bigger linear source by coupling many elements

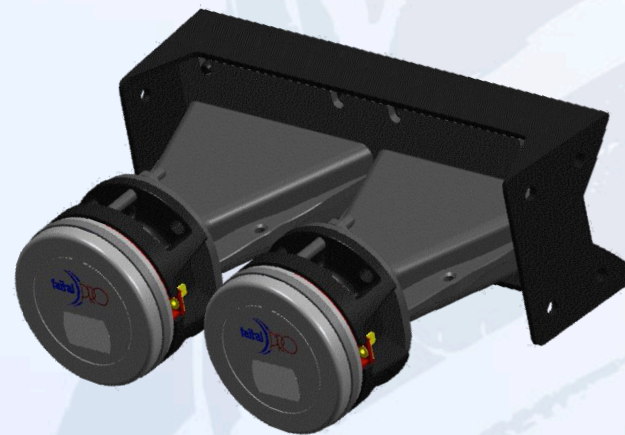
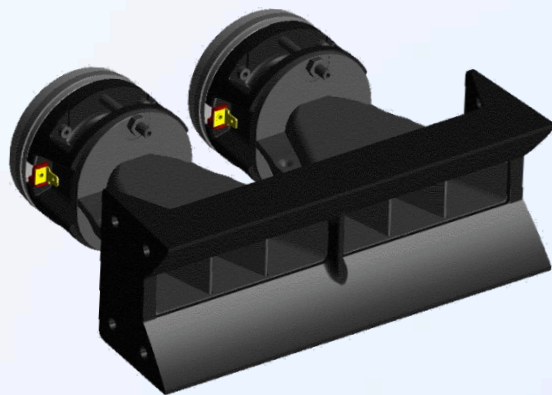
Modular linear source permits a more flexible control and increase of the directivity, for example:

- same signal for every module, modules lying on the same plane

- different processed signals for every module, modules lying on the same plane

- same signal for every module, modules not lying on the same plane (curved line source)

...



Quality Policy and Awards



- **Quality Master Award** - From Nissan in June 2005
- **President's Award** - From CAMI in 2005
- **Saturn Supplier Quality Award** - Excellence in Quality for Production Year 2002
- **QSTP Award "Supplier Of The Year"** - From GM from 1993 to 2000
- **Qualitas Award** - From FIAT in 2001
- **Order Of Merit** - From Sony in 1997



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- All FaitalPRO loudspeakers are engineered and manufactured in Italy
- We test and guarantee all our professional drivers according to **AES 2-1984 rev.2003** standard.
- Strict and continuous controls are carried out on all products (heritage of Faital's extensive experience in the very demanding automotive and Hi-Fi markets)
 - Our drivers are 100% tested at the end of the production line
 - In addition we also perform Samples' statistical checks



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■ Life tests [i.e. power tests]:

- Custom equipment for life test with short/open circuit alarm and timer stop; voice coil temperature measure; 8 different channels (4kW audio power).
- Custom PC-controlled life-test (40ch, 10kW audio power)
- Signal generator (amplified) Etani (JP) ES-100 with short/open circuit alarm and timer stop for long & short term tests.
- “Burst” (ALMA / EIA 426B), “A usura” life test
- Short & long term complying AES 2-1984 rev.2003

■ LDS (Ling Dynamic System LTD, UK) pc controlled equipment for combined climatic/vibration tests

- Hot & cold storage (-70°C / +250°C), with operating and/or vibrating loudspeaker, if required
- Humidity storage (5%RH / 98%RH), with operating and/or vibrating loudspeaker, if required
- Thermal Shock test (chamber with lift)
- Water resistance / Immersion / spray-rain test / dripping test
- Dry corrosion test (with salty fog)
- Sand test
- UV test (UV-A, UV-B) and IR test



TESTING CAPABILITY



LDS (Ling Dynamic System LTD, UK)
pc controlled equipment for
vibration tests



Sound isolated chambers for life tests



- **MAIN LAB (ITALY)**
- **16 ENGINEERS + 6**



- 1 R&D manager**
- 6 Project Leaders**
- 6 Mechanical engineers**
- 4 Electro-acoustic engineers**
- 5 Prototyping Technicians**

R&D

MECHANICAL DESIGN

ELECTRO-ACOUSTICAL DESIGN

MOCK UP PROCESS

PRODUCT MEASUREMENTS



3D MODELING SOFTWARE

NX

(ver. NXV 3.0.2.3 & NXV 4.0)

Catia 4

(ver. 4.2.2 & 4.2.4)

Catia 5

(ver. R16P6)



FIELDS OF APPLICATION

Mechanical (hard & soft parts)

Magnetic (static and dynamic)

Thermal

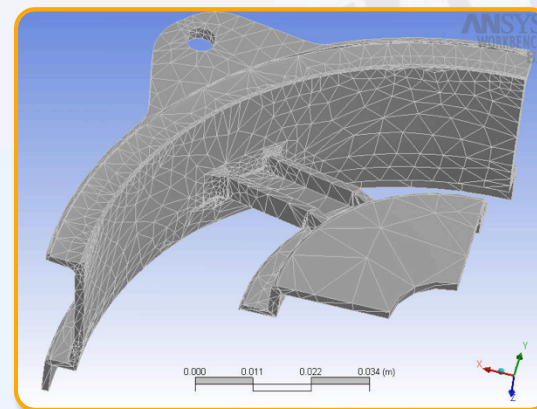
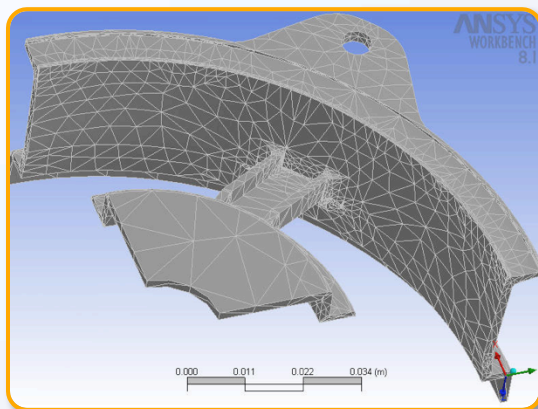
Acoustical and structural non-linear (“piston”
frequency range)

Acoustical linear (high frequency range)



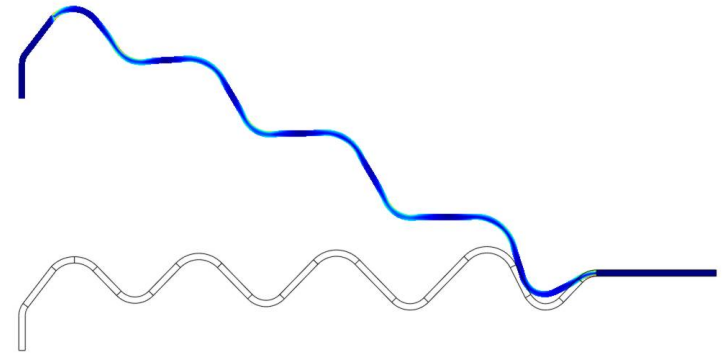
3D STRUCTURAL ANALYSIS OF PLASTIC/METAL BRACKETS

Unigraphics - CATIA

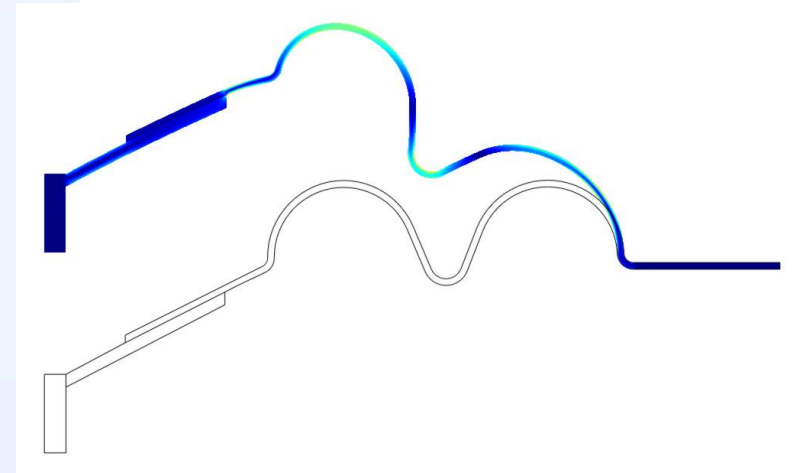




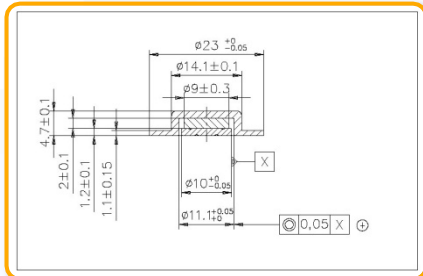
2D non linear structural analysis of spider



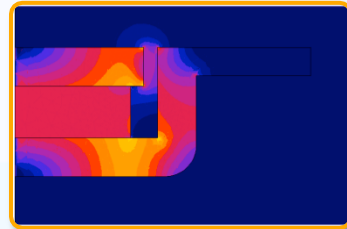
2D non linear structural analysis of surround



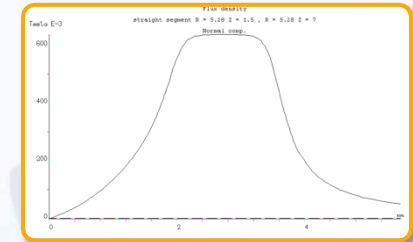
Electro-Magnetic FEA - Static



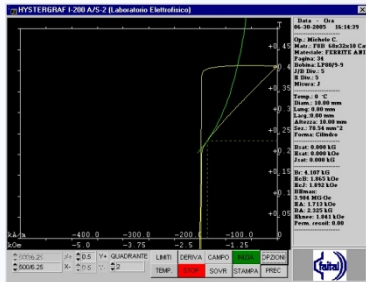
A new magnet assembly is drawn to meet mechanical constraints



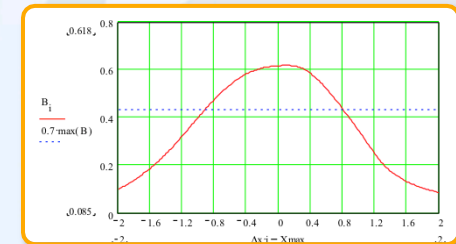
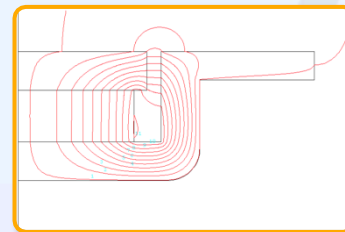
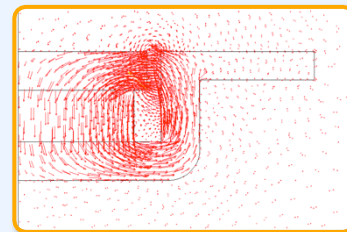
FEA simulation is performed
As example Flux Density Distribution (in the gap and outside the magnet assembly) and saturation of iron is now optimized



Flux Density in the gap is used to calculate true $B_x L$ (for a given voice coil height) versus coil position

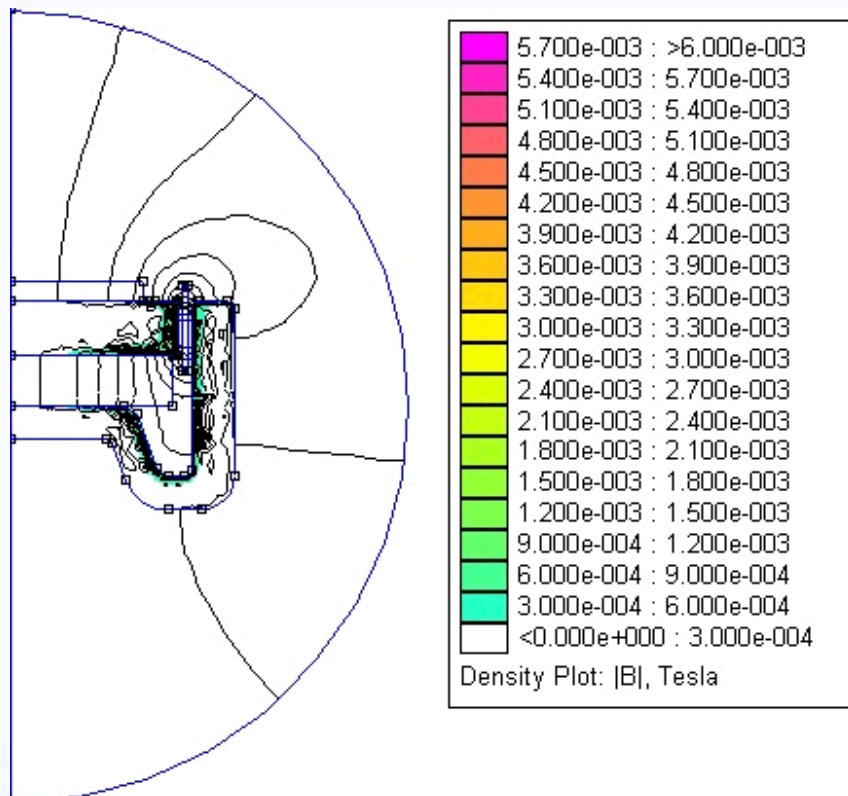


On-site equipment for magnetic hysteresis measurement (Iron, Ferrite and Neo magnets)



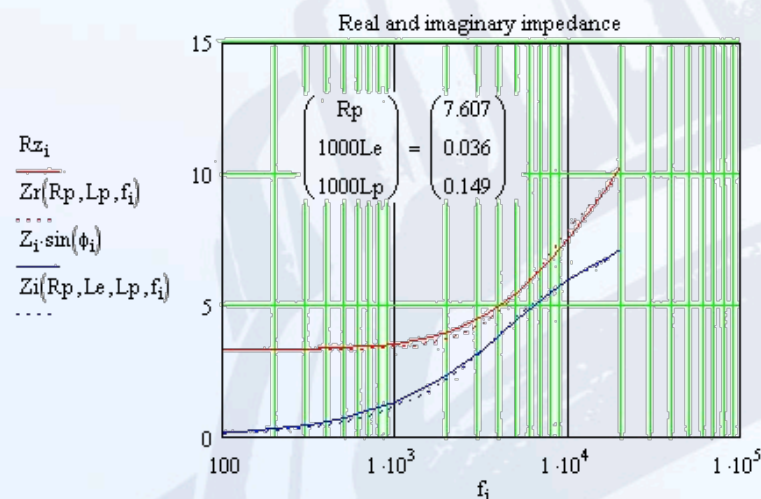
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AN EXAMPLE: EDDY CURRENT



Back e.m.f. analysis
"frequency sweep"

Parameterization of high frequency impedance

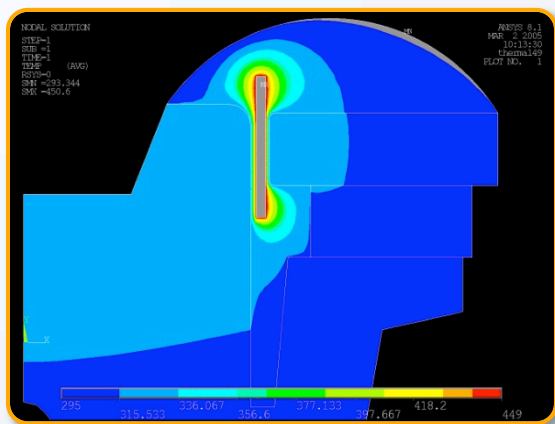


Evaluation of losses and
impact on loudspeaker
impedance

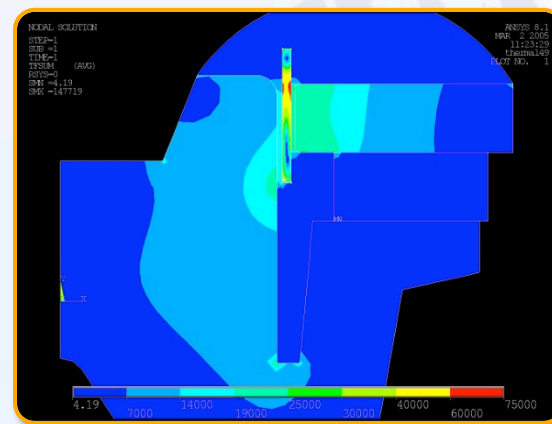
THE THERMAL ANALYSIS ALLOWS A PRELIMINARY CHECK OF THE RELIABILITY AND POWER CAPABILITY OF THE LOUDSPEAKER

Example of potential problems:

- Voice coil burn
- Neodymium magnet demagnetization



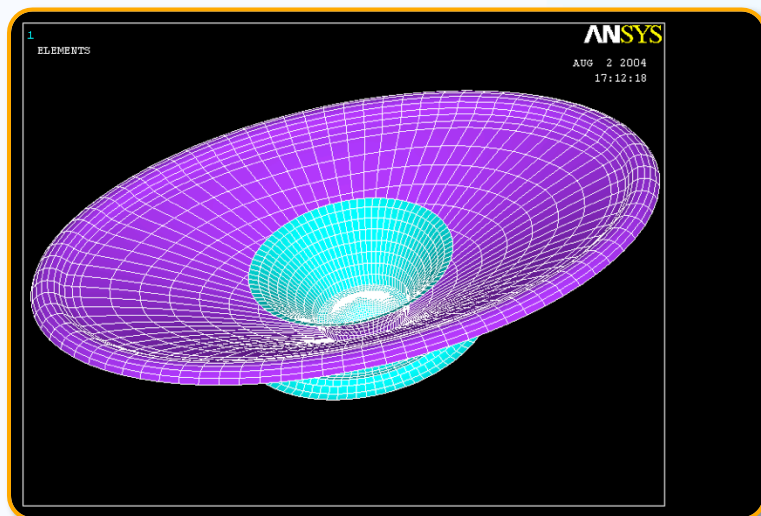
Thermal FEA simulation -
Temperature distribution in
the magnet assembly



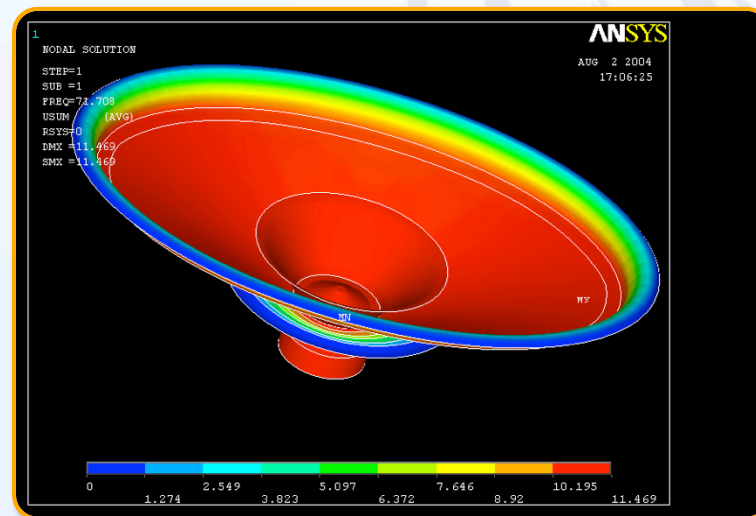
Thermal FEA simulation -
Thermal flow path



2D & 3D STRUCTURAL ANALYSIS OF SOFT PARTS. RESULT DATA ARE USED TO ...



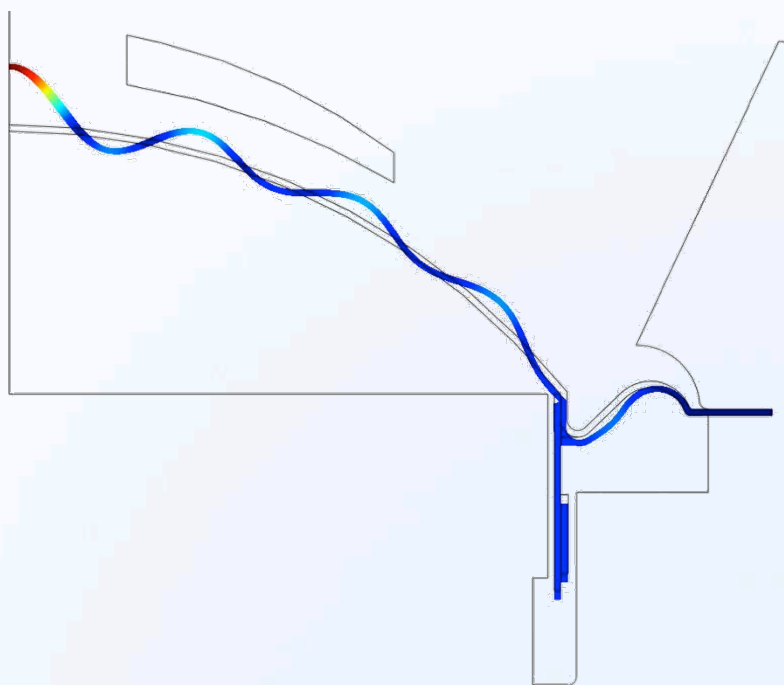
FEA model and simulation of the soft parts



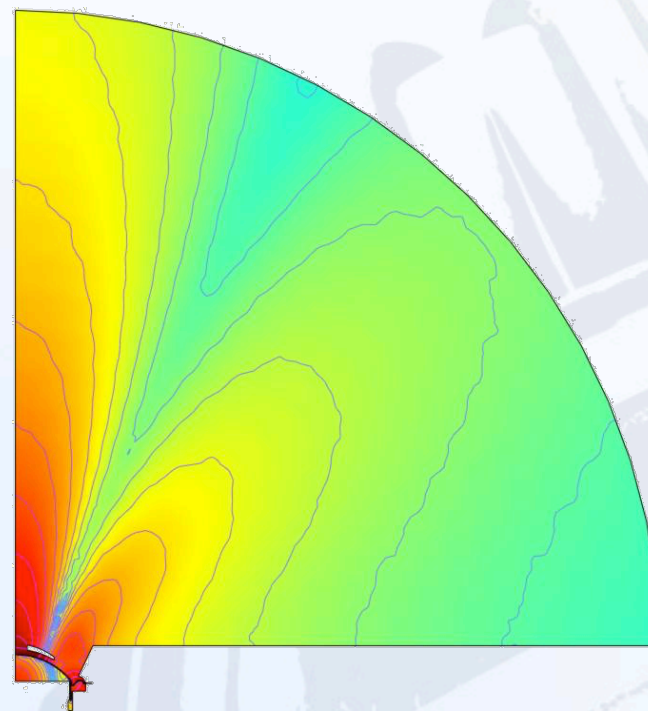
Modal and frequency response analysis of the soft parts



2D STRUCTURAL ANALYSIS COUPLED TO ACOUSTIC RADIATION

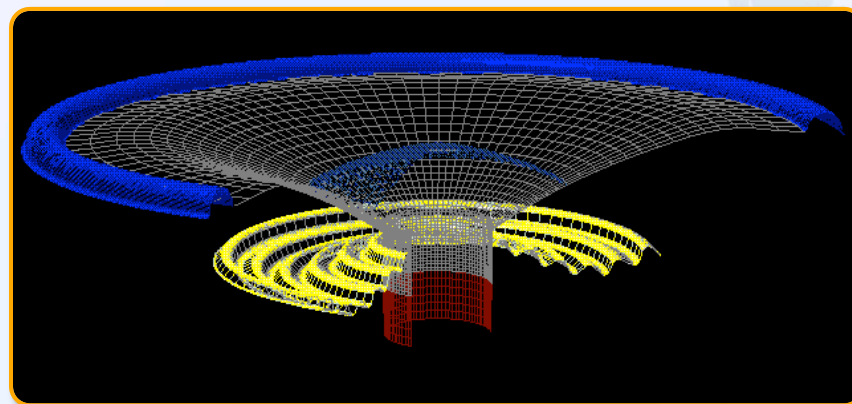
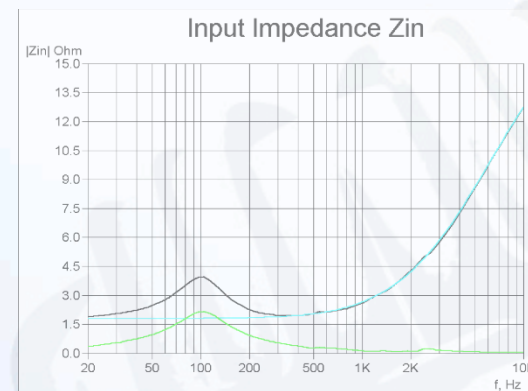
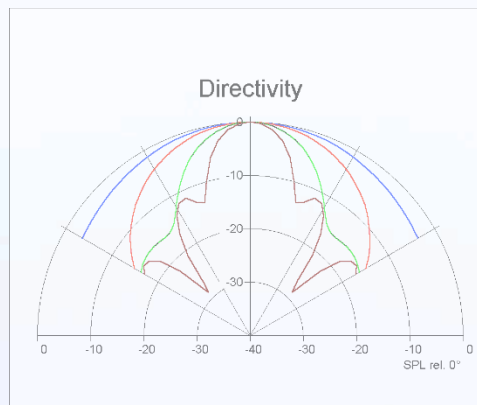
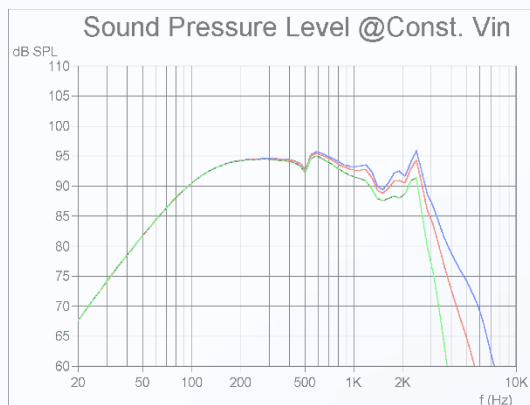


Vibration mode at 16kHz



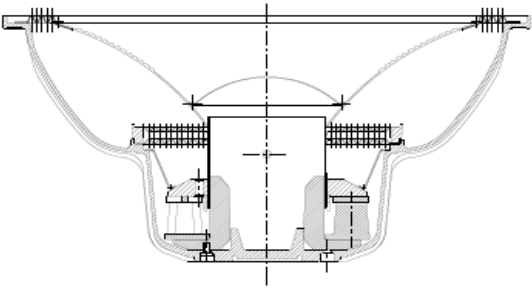
Pressure contour with lobing at 20 kHz

... CARRY OUT A COMPLETE ACOUSTICAL ANALYSIS.



DIMENSIONAL CHECK OF ASSEMBLY

AP 18" PRO - SUBWOOFER
18XL1500



DESCRIZIONE	NUMERO	UNITA'	NOTE
E' TELLO = T 119x229 VN	1052707	x	Uovo componenti
INCASTO 18x18 F41	3100200	x	Uovo componenti
PPS T 17x10x14 ZS	27054107	1	Uovo componenti
MACETE 2x8 H 1/8	1902920	1	15001
PI T 19x10x10x051 ZS	31058007	1	Uovo componenti
CONO 2 T 179x33 ZS	31058702	1	Uovo componenti
ANELLO INCASTO L=18	31058907	x	Uovo componenti
FERRO 4 T 11x10x7 100 CTA	1052407	x	Uovo componenti
E' TAVOLA INF 102x7x230 C.3	10083007.1		Uovo componenti
E' TAVOLA SUP 102x7x230 C.3	10083007.1		Uovo componenti
E' TAVOLA 236x18 S	31058200		Uovo componenti
CONVOLUTORE 213x37x1 VN	31058307	1	Uovo componenti
PARTELLONE 137x27 08/7 S	10057600	x	100132
PIE' CILINDRO FERRO 112/31x2 95.1 H L	11008007		Uovo componenti
ANCORAGGIO - B4 - ETT - CON PUN	10027306		100163
INCASTO T=100	10024041		100152
E' METALLO 307x307x18			111710
QUADRANTE ANTECORO (1/1 ETT) VN	10013705.1		100162
PIE' 55x8 VN (x 1)	10022065		100011
E' TAVOLA x VCT7			
CAVITA' PP			
-TAVOLA - E' PRODOTTORE			
-TAVOLA - E' PRODOTTORE			
INCASTO			

GRAFICO PER DETERMINAZIONE PROFONDITA' E INCASTRI

DESCRIZIONE - LTA - L=14 - TE	= 1100/051010007.1
L=18 - TE	1100/051010007.1
PRODOTTORE	10015000
FERRO TAVOLA CONCAVITA' PP	10015000
DESCRIZIONE - LTA - L=14 - TE	10015000
NUMERO	
UNITA'	
SEAL	1.1
E' ESSE B4	1.1
VERIFICA	1.1
DATA EMISSIONE	25/09/07

OSSERVAZIONI	

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COMPONENTS PREPARATION



Fast prototypes
Soft parts preliminary samples



CNC machined metal parts and magnet assemblies
Pre and post process soft parts' treatment

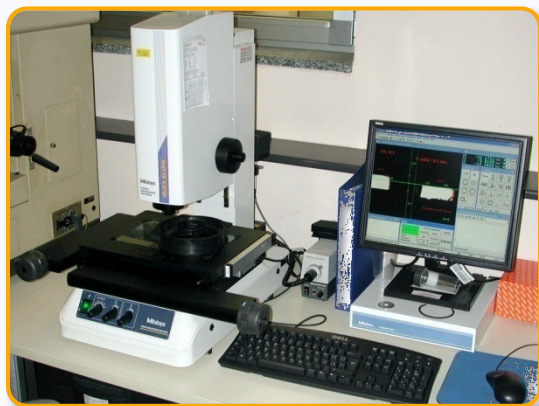


Internally performed measurements and tests on materials, spare parts, loudspeakers and sound systems

- Electro-acoustical
- Dimensional
- Magnetic

Possibility to refer to external, certified labs.

SHORT LIST OF AVAILABLE INSTRUMENTATION



Profile projector
Mitutoyo PJ300
Vision Measurement Machine
Mitutoyo: QuickVision

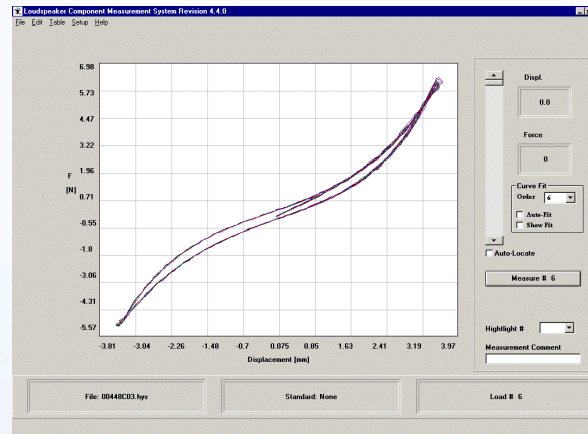


3-D Tracer point
Mitutoyo EURO-C
APEX 544

- Surfaces treatment analysis
- Sockets dynamometric measures
- Spider and edge's cone compliance vs. displacement measure
- Dome hardness measure
- Diaphragm resonance frequency
- Magnet Shear test
- Pneumatic Press: Alfamatic (max 1 ton)
- Custom laser equipment (internally developed) for cones, spiders and domes with Laser displacement unit Ono Sokki LD-1110M-010
- Mitutoyo complete set for metrology (digital calipers, micrometers, gauges...)
- Leptoscope Karl Deutsch 2015
- Dynamometer Mecmesin MFG 250 / Mitutoyo IDU25

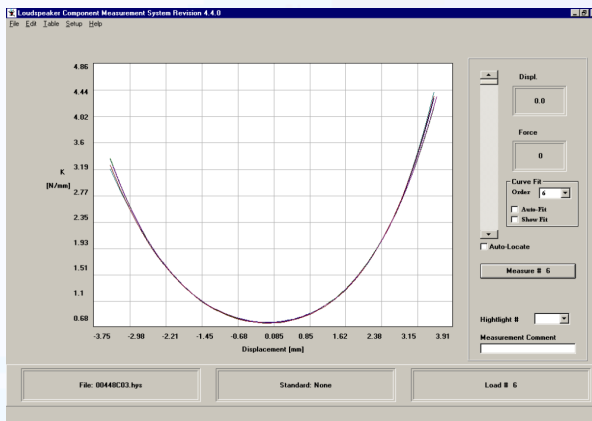
Component Stiffness Analysis

Spider and Surround
non-linear
compliance ...

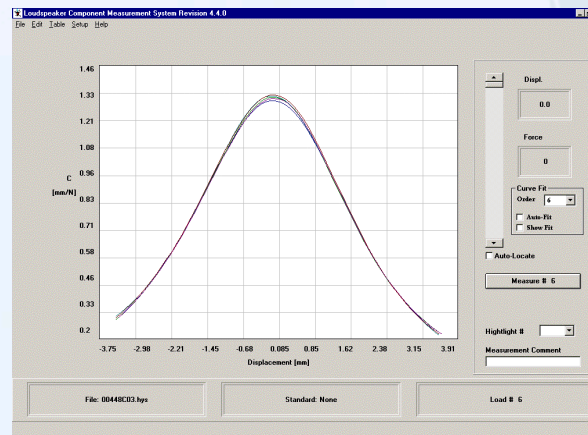


Force vs excursion

... is measured through
specific equipment.
and a newly acquired
Klippel tool



Stiffness vs excursion



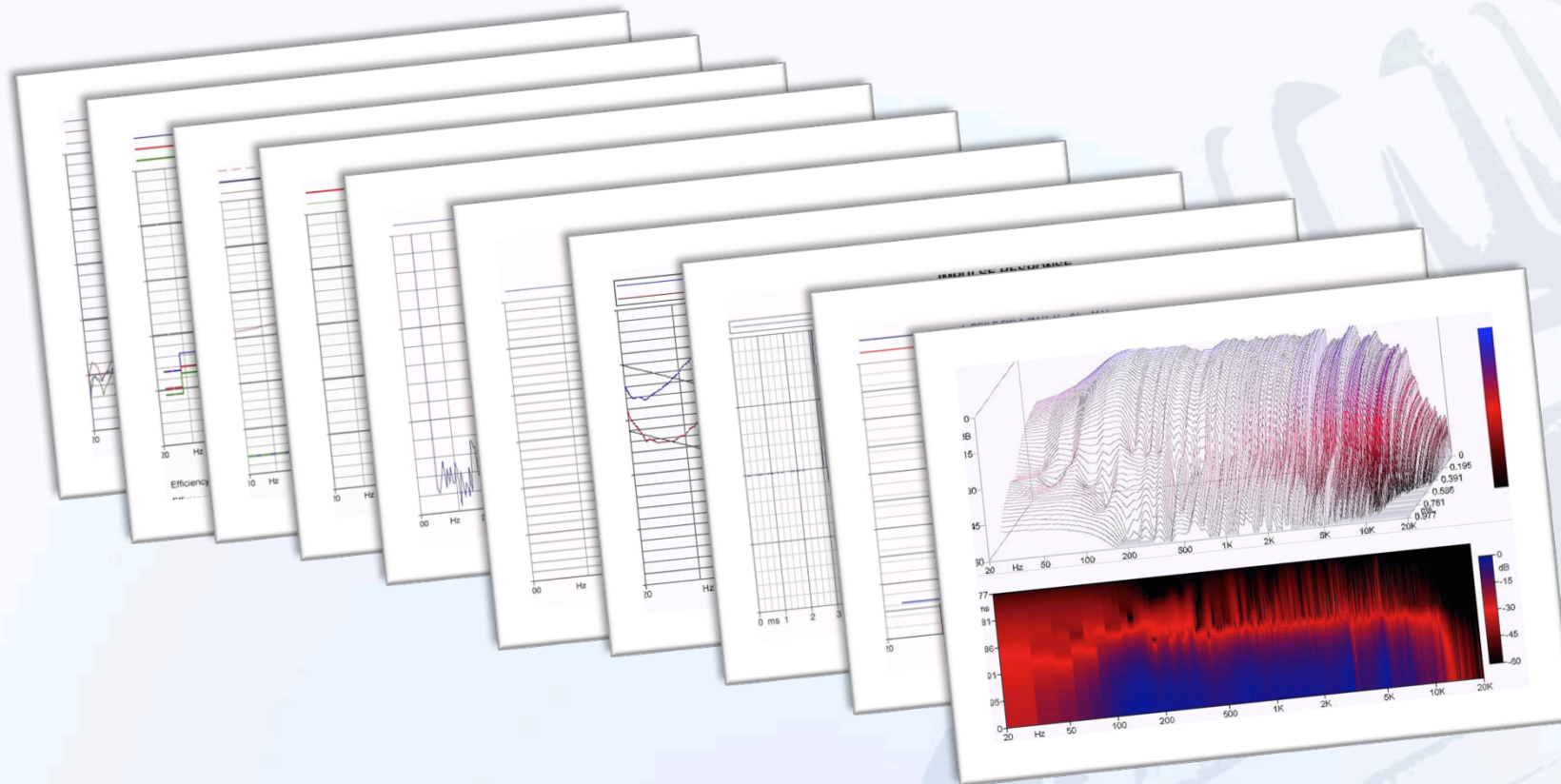
Compliance vs excursion





- Custom software to interface analyzers to PCs
 - Frequency response (sinus and pink noise) on and off-axis
 - Power Compression
 - Impedance and Thiele/Small parameters
 - Distortion (harmonic, HI-2, intermodulation, difference of frequencies)
 - Impulse and burst response
- Thermal measurements of voice coils in loudspeakers
- Dielectric strength and insulating resistance
- Voice coil Electrical analysis
- RT60, spectrograph, waterfall
- Possibility to perform these measures on loudspeaker or acoustical system, in anechoic environment (full anechoic chamber), car and listening room
- Microphones: B&K 4133 and 4192
- Ono Sokki CF-5220 & CF-350
- DLC Tracking Distortion Analyzer
- Larson-Davis 3100 RTA, Audio Precision "System One", Audio Precision 2712, CLIO Acoustic software
- Klippel Distortion Analyzer with custom loudspeaker stand
- K&K P500 quality control system for end of line testing
- Head & torso simulator B&K 4128 + ears simulator B&K 4158/1459
- Various instruments (fo meter, amps, filters, signal generators, strobo light...)
- Dielectrimer Sefelec MPCF 315

EXAMPLE OF MEASUREMENTS OUTPUT



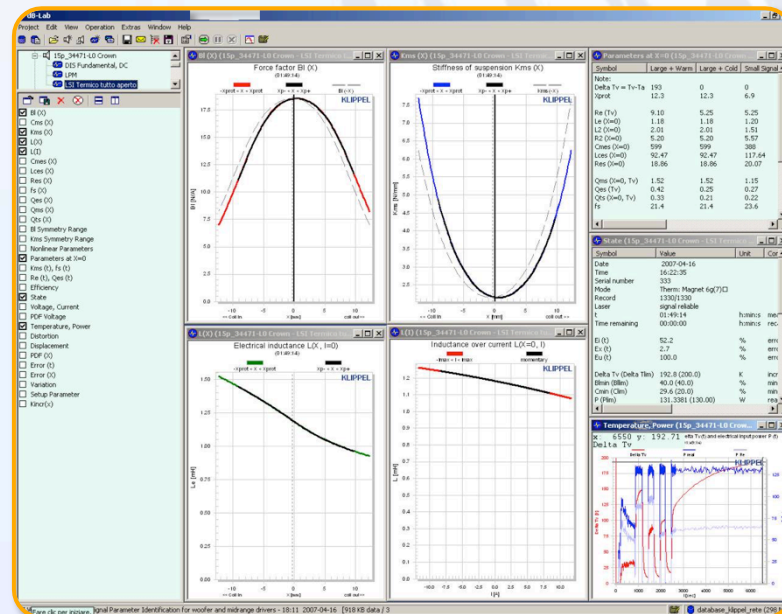
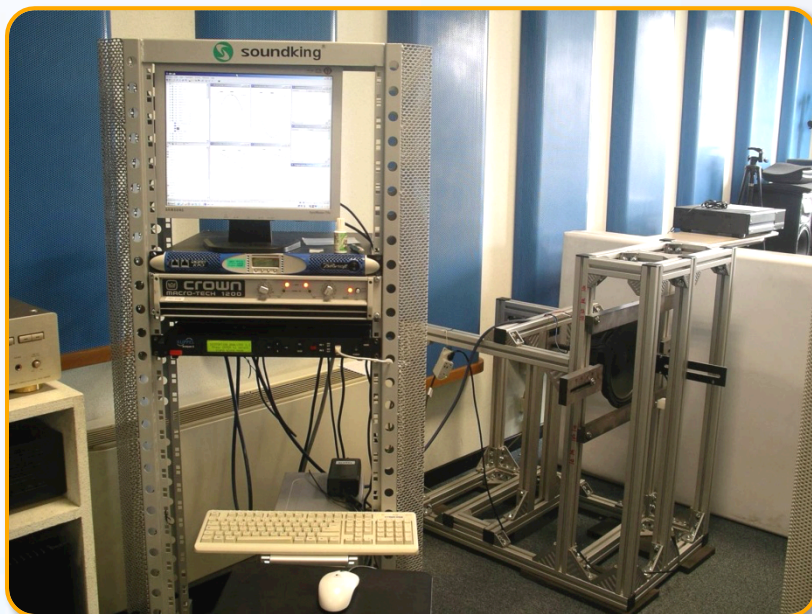
K&K P500 QUALITY CONTROL SYSTEM FOR END OF LINE TESTING



KLIPPEL DISTORTION ANALYZER FOR WOOFER LARGE SIGNAL PARAMETERS MEASUREMENT

Computer controlled equipment with custom-built stand for loudspeakers

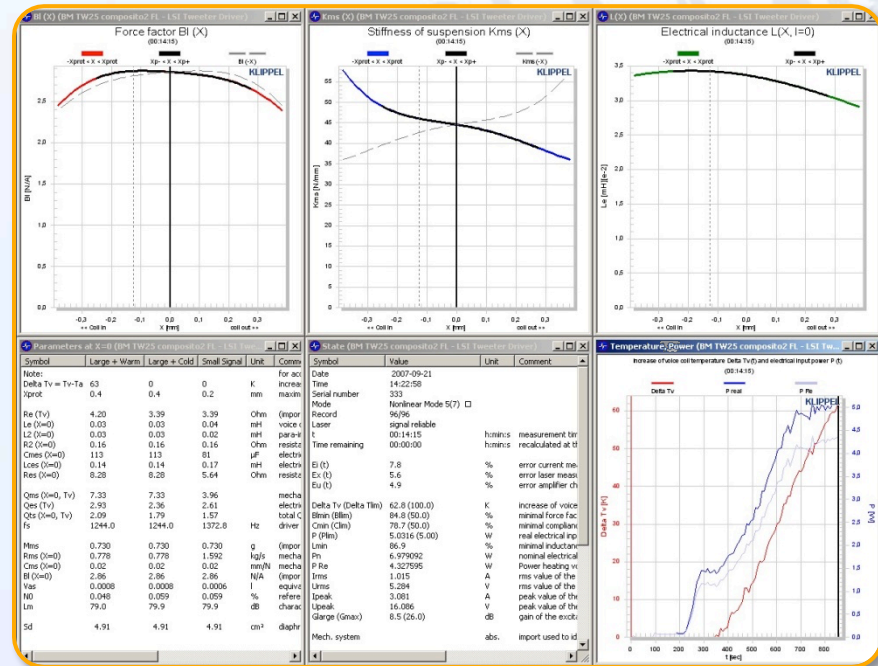
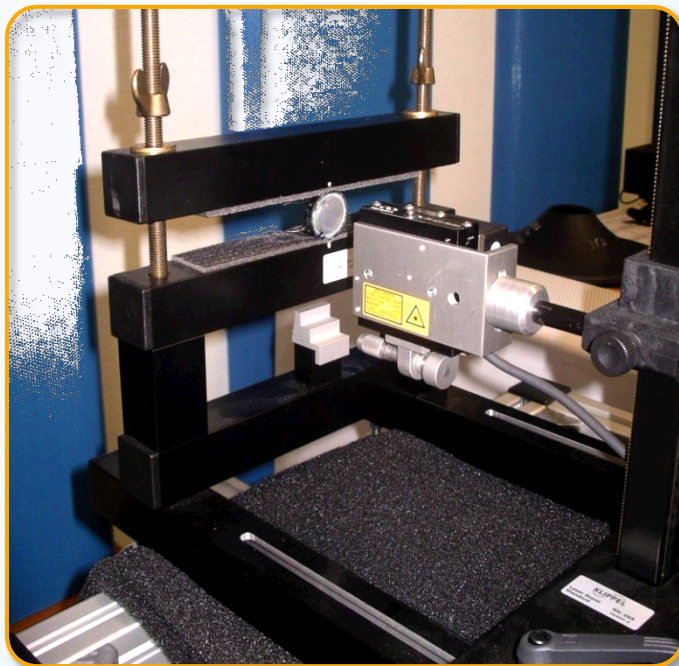
Example of a large signal measurement



KLIPPEL DISTORTION ANALYZER FOR TWEETER LARGE SIGNAL PARAMETERS MEASUREMENT

Computer controlled equipment
with loudspeaker stand

Example of a tweeter large signal
measurement



FAITAL PROPRIETARY MATERIAL
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ANECHOIC CHAMBER #1

Supplier: IAC (Industrial Acoustics Company LTD, UK)

Type: microdyne full anechoic chamber with metadyne wedges

Internal dimensions and volume: 4x3.6x2.6 (m), 38.3 m³ (1.350 ft³)

Cutoff freq.: 63 Hz (-2 dB)

Structural insulation: floating room mounted on 6.5 Hz isolators

Door Insulation: -47 dB (A)

Qualification test: ISO 3745-1977, part 5



ANECHOIC CHAMBER #2

Supplier: MARVIN S.r.l. (Italy)

Type: Anechoic chamber

Internal net dimensions and volume:

3.9x3.8x2.5 (m), 37.0 m³ (1.300 ft³)

Cutoff freq.: 250 Hz (-2 dB)

Door Insulation: -47 dB (A)

Qualification test: ISO 3745-1977



LISTENING TESTING

Design: FAITAL + MARVIN snc (I)

Area: 78 m² (840 ft²)

Rt60: 0.4 sec (250-1k Hz)

0.3 sec (2k-8k Hz)

We also refer and compare our products to

- B&W Matrix 801 (reference for big systems)
- B&O Beovox 50 (reference for small systems).

FAITAL developed a proprietary software (SELEN) which is able to perform automatic and repeatable subjective test sets on various audio files following the ITU-R BS.1116-1 recommendation.

It is composed of a pre-screening section (for evaluation and training of the listener) and programmable blind tests (for acoustical quality evaluation)





FIELDS OF ACTIVITY

Every area cooperates to research in order to achieve improvements.

- New materials (to reduce weight, cost and environmental impact, get water-proof and water resistant property)
- New technology (to reduce time, cost and energy of production)
- New design (to reduce weight and dimensions increasing the performances)
- FEA software applied to robust and optimized design of plastic and metallic part
- FEA software applied to design of magnetic circuits, spiders and cones
- Integrated speaker amplifiers (the amplifier can be exactly tailored on the basis of the speaker properties and vice versa)

Further activities are:

- **hArtes** project, a E.U. funded research project for automotive multimedia applications
- Collaboration with external organizations (Universities, consultants, etc.)
- Continuous study on “**Sound quality**” using binaural techniques
- Use and development of new software to support all the design activities



PRESENTED PAPERS

- Oct. 2001 - A software tool for real-time modeling and simulation of car audio, *ATT Barcelona (Spain)*
- Mar. 2002 - Quality measurement and evaluation of vehicle audio systems, *SAE Detroit (USA)*
- May 2002 - A novel synthesis approach to loudspeaker design, *112th Convention AES - Munich (Germany)*
- Jun. 2002 - Experimental determination of air influence on loudspeaker cone vibration by scanning laser Doppler vibrometer, *International conference on vibration measurements by laser techniques, Ancona (Italy)*
- May 2003 - Discrete-time modeling and simulation of vehicle audio system, *ISCAS Bangkok (Thailand)*
- Sept. 2003 - A novel synthesis approach to loudspeaker design - further research, *AES Milan (Italy)*
- May 2004 - Evaluating different Vehicle Audio Environments through a novel Software-based System, *116th Convention AES - Berlin (Germany)*
- June 2006- IEEE –(transactions on ind.electr.) Industry-oriented software-based system for quality evaluation of vehicle audio environments