



Management System
ISO 9001:2008
www.tuv.com
ID: 9105094636

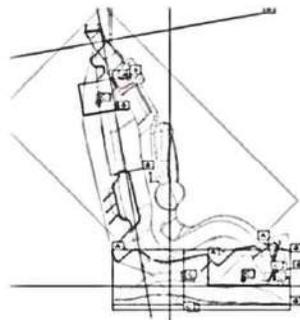
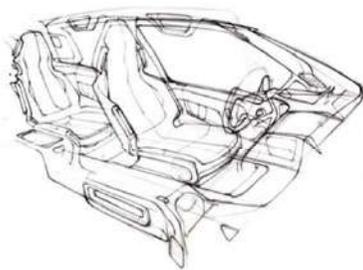


L'Europa alle porte della vostra impresa.



MECCANICA GENERALE GROUP

PLASTICS ENGINEERING



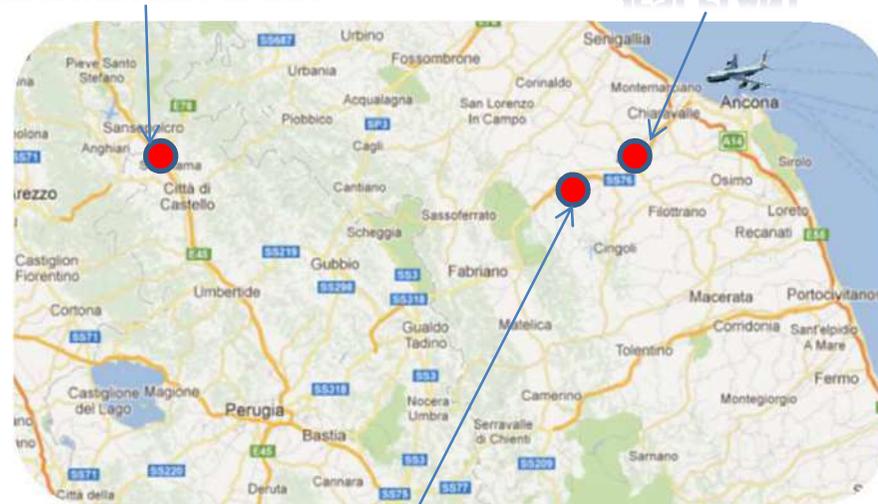
About us – Plants Location



OMAS S.R.L.
SAN GIUSTINO PLANT



MECCANICA GENERALE S.R.L.
JESI PLANT



MECCANICA GENERALE S.R.L.
SAN PAOLO DI JESI PLANT



A TEAM OF 155 PEOPLE

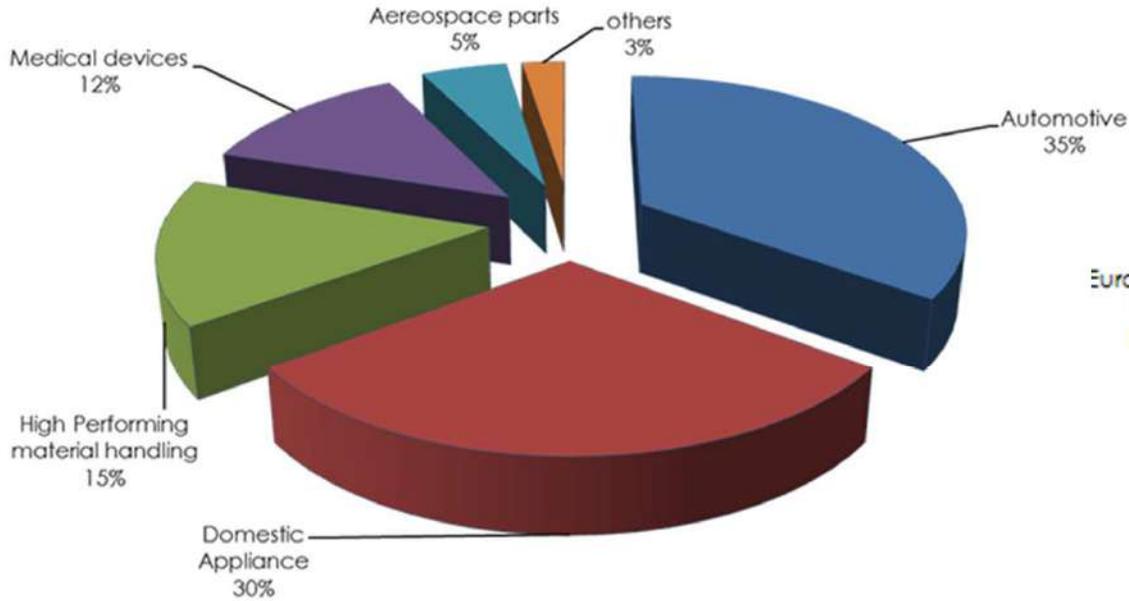


Management System
ISO 9001:2008

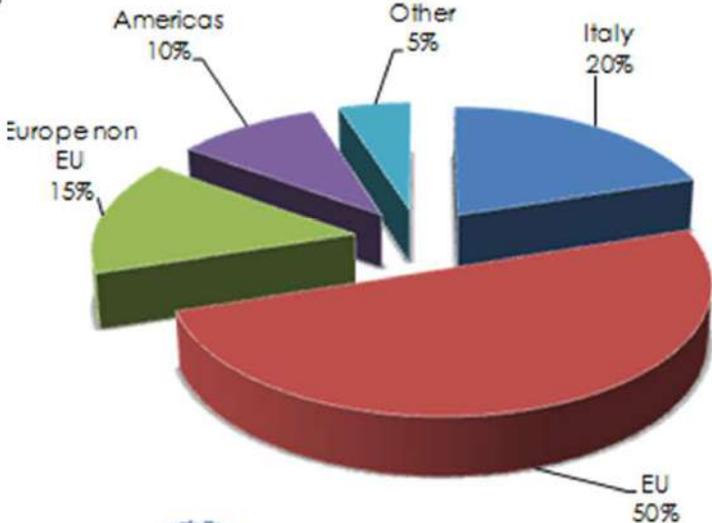


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A global Market



€ 18 MILLION (YEAR 2014)
70% OUTSIDE ITALY



History

- 1964** Founded in Jesi as a Family Craft Company
- 1983** First CAD 3D / CAM / NC system into the moulds construction process

MOULDMAKER
Focused on:
Mould Design and Construction

1986 First MOLDFLOW MIDPLANE LICENSE



1992 First ANSYS LICENSE



ADVANCED MOULDMAKER
Focused on:
Product and Process

2001 Creation of D.A.T.T. → Domestic Appliances R&D Technical Team and product development department

2006 Creation of MG&PARTNERS to reinforce our partnership network with leading worldwide technicians

ADVANCED MOULDMAKER and PRODUCT DEVELOPER
Focused on:
Technology



Important achievements recognized also by some of our customers

Awards for **best partner in co-design** from Magneti Marelli Powertrain

Awards for **INNOVATION** from Indesit Company

Capabilities on PRODUCT and PROCESS

Competitiveness is defined in the design phase

PRODUCT AND PROCESS ENGINEERING (CAE DEPTH)



Classic+ WorkBench
MECHANICAL &
DESIGN MODELER



Simulating Reality, Delivering Certainty™
ADAMS, Nastran, MARC, Dytran,...

IN EVALUATION..





2 LICENCES (Midplane+3D)
COMPLETE



COMPLETE SUITE



SimaPro
LCA software



ANSYS
FLUENT™

PRODUCT AND MOULD DESIGN (TECHNICAL DEPTH)





The PLM Company







PRODUCT AND PROCESS TESTING (LABORATORY)

2002: Basic NVH
SW and HW



NATIONAL INSTRUMENTS



Appliances testing system

Molding machine control



Advanced Data acquisition
SW and HW







Capabilities on MOULDS and TRIALS

MOULD MANUFACTURE

IMPORTANT INTERNAL MANUFACTURING CAPACITY WITH ALSO WIDE RANGE OF 5 AXIS HIGH SPEED MILLING MACHINES.



PROMAC SHARAV GVT 3.5
STROKE: 3500x2200x1200 mm
5 AXIS -> 15.000RPM



IMSA MF1000C: DEEP DRILLING MACHINE WITH MILLING CAPABILITIES, FOR MIDDLE-SIZE MOLDS

Injection moulds with a "smart" approach



Not just a trial but process validation

TRY-OUT AND PRODUCTION (JESI PLANT)



7 INJECTION MACHINE (in MG Jesi Plant):

- 190 Tons
- 400 Tons
- 650 Tons
- 750 Tons
- 1300 Tons
- 1500 Tons
- 1750 Tons

BIG INJECTION MACHINE (Available through Partners):

- 3500 Tons
- 5500 – 6000 Tons

ADDITIONAL FEATURES:

- Each machine equipped with:
 - GAS INJECTION;
 - 2K INJECTION.
- VIBRATION WELDING MACHINE (up to 250Hz, max working surface: 1400x1400x1250 mm)
- PLASMA TREAT for Glue Test



3D OPTIC SCAN

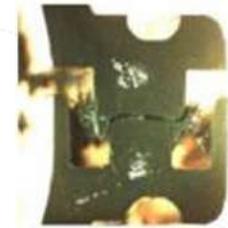
Available Technologies



PHRC: TO AVOID PAINTING AS POST PROCESS



- Welding
- Weldless technology (PHRC)
- Open Air Plasma Surface Activation
 - Gluing
 - Hybrid Technology
- PIT (Plastic Interface Technology)
 - 2k
 - Gas injection
- Metal Over-Injection
- Gloss & Aesthetics
- Surface finishing
 - Noise
 - Decoration
- Overmolding
- Bond Laminates



A Global solution network

CLIENT
(MARKET NEEDS)



PARTNERS
(TECHNOLOGY
AND MATERIAL)

**In each project our solutions
come from a daily contact
with the best European
technicians.**



- LYONDELL BASELL
- TICONA
- CHEVRON PHILLIPS
- FERROMATIK
- AQUAFIL
- LANXESS
- BAYER
- JSP – ARPRO EPP
- PLASMATREAT
- BASF
- BIELOMATIK
- LOCCIONI
- THERMOFIL
- BOREALIS
- SABIC-GE
- MECHANICA
- MILLIKEN
- CEMAS ELETTRA
- ZIEGLER PRODUCT
- SIRMAX
- CRP
- TRICON DESIGN
- MOLDFLOW
- OTHERS...

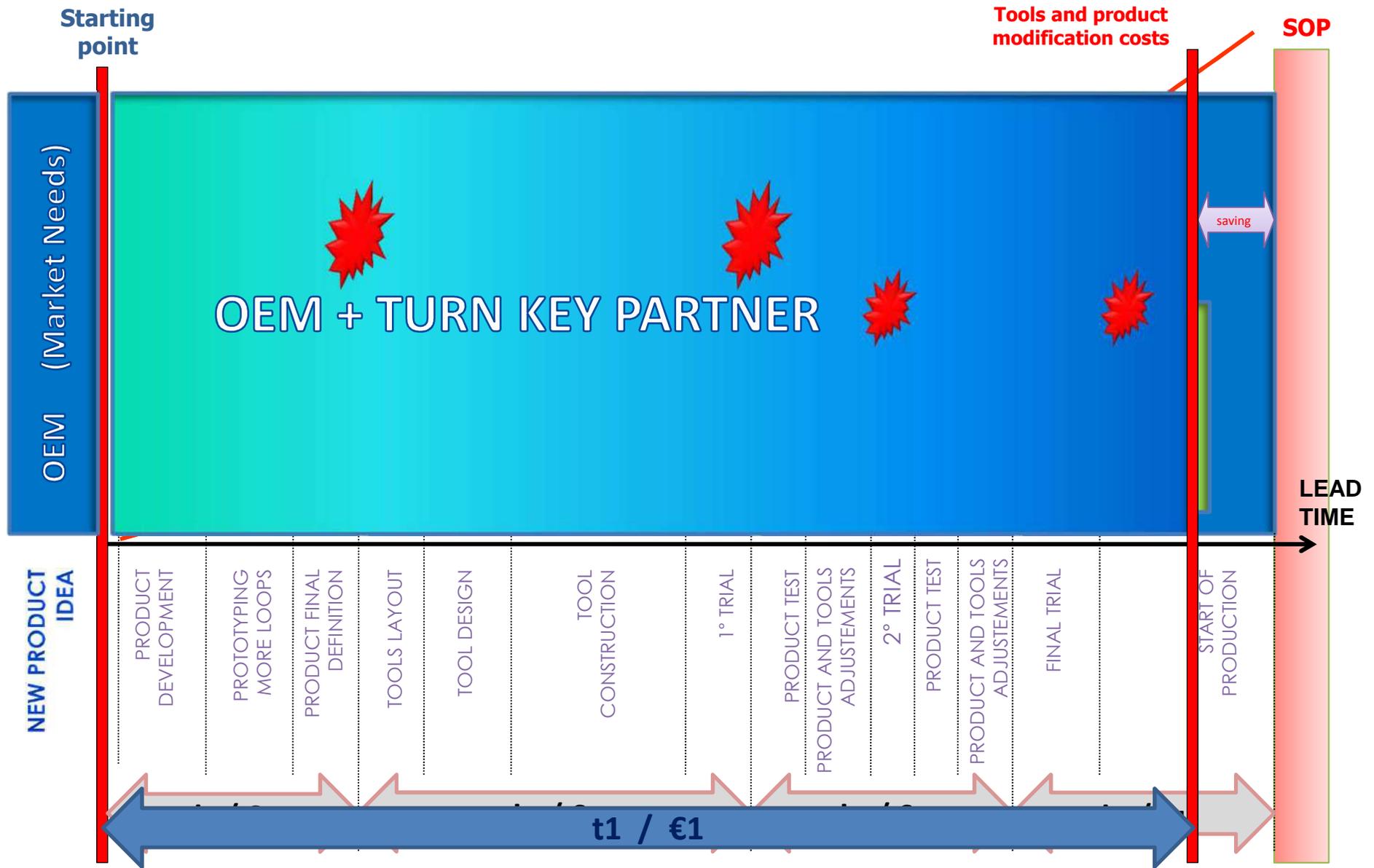
Our "open innovation" model



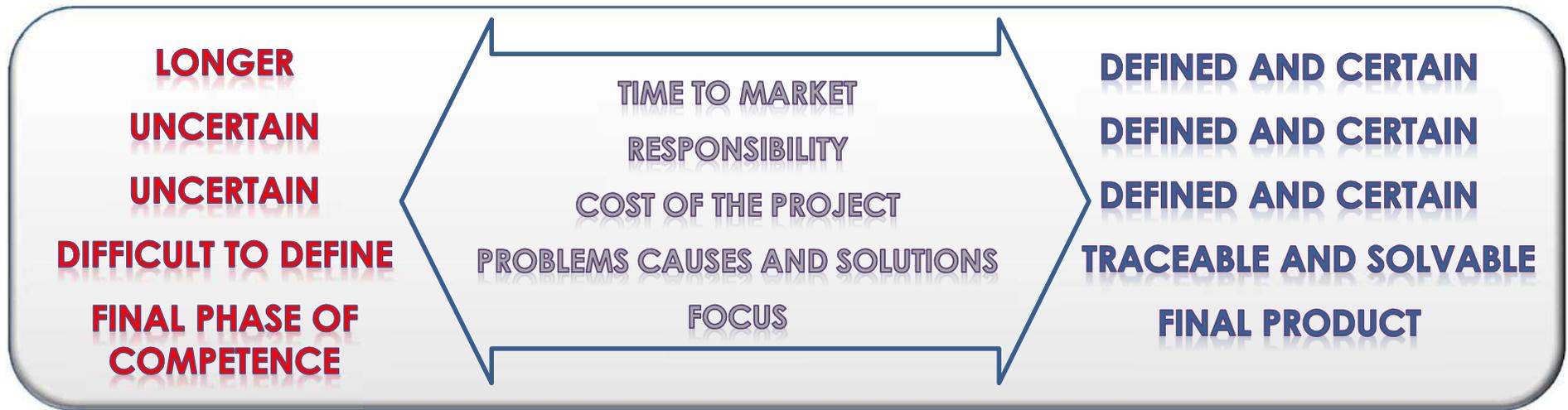
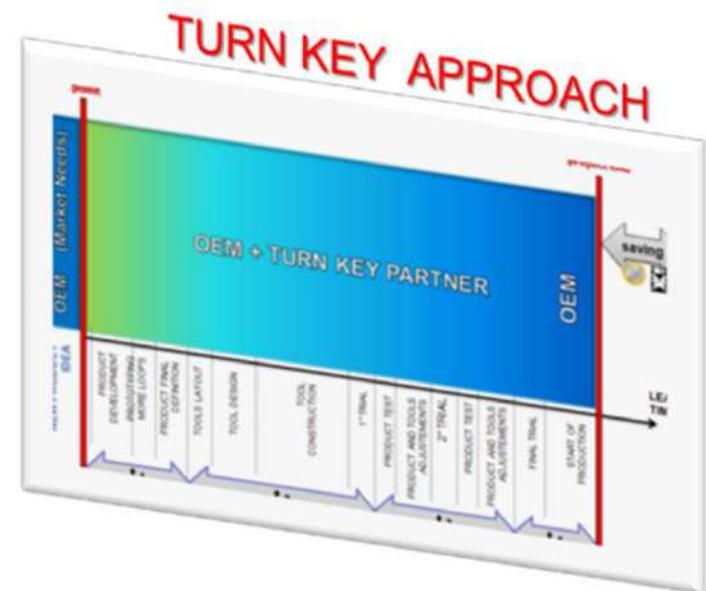
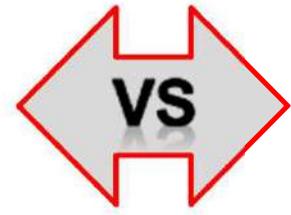
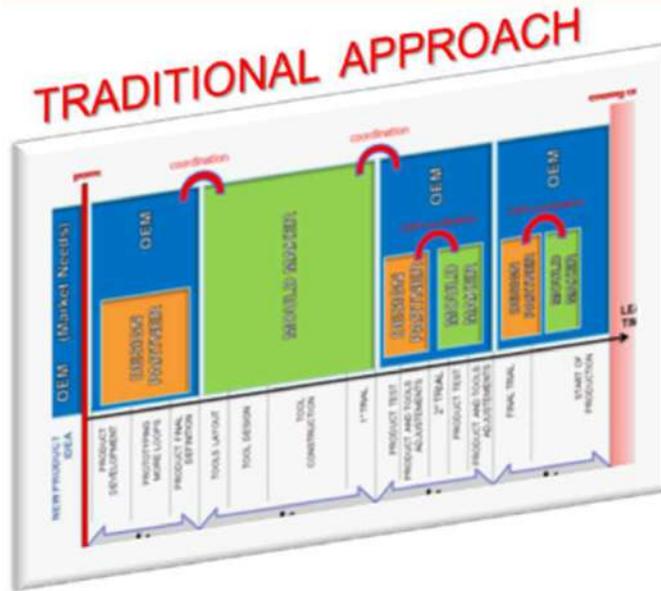
Through

- Co-operation with Customer;
- Design more competitive moulds and products;
- Improve efficiency, productivity and reliability of manufacturing process;
- **TURN KEY APPROACH.**

Our "open innovation" model



Our "open innovation" model – Main benefits



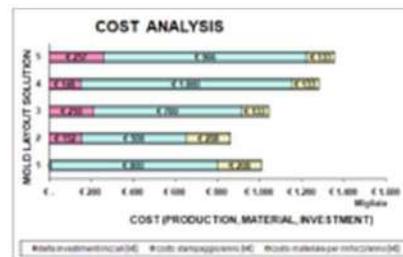
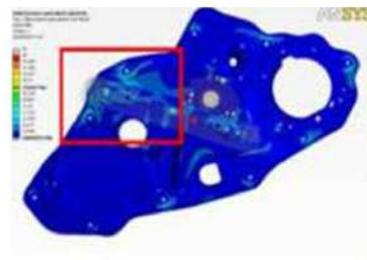
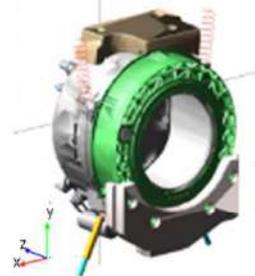
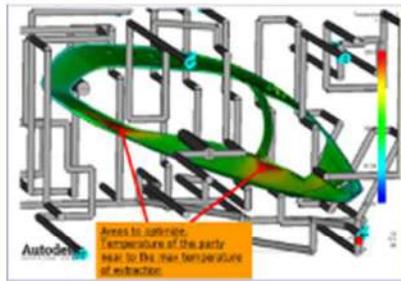
The working method make the difference



Competitiveness is defined in the design phase



SIMULATIONS AND ANALYSIS are necessary to REACH the TARGET



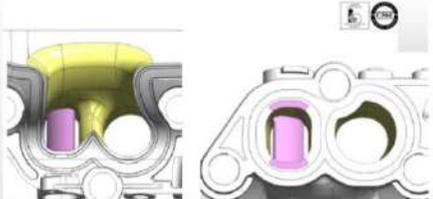
Flexible activities proposal



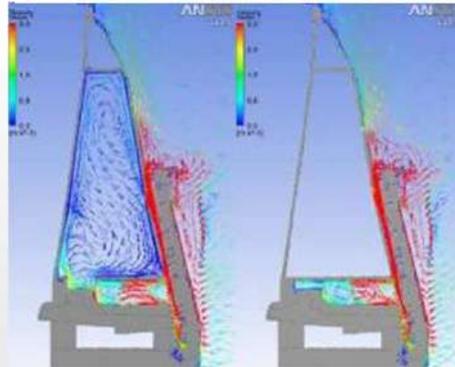
More than a CAE simulation..

Competitiveness is defined in the design phase

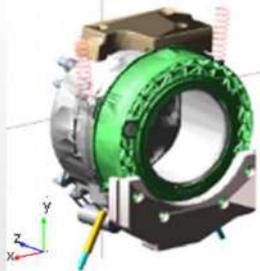
PRE-FEASIBILITY STUDY



FLUIDODYNAMIC ANALYSIS



MULTI-BODY ANALYSIS



LCA ANALYSIS

Environmental Impact

Con l'attuale mix di centrali italiane 1KWh comporta l'immissione in atmosfera di **0,65Kg di CO₂**, considerando quindi l'energia per la produzione (del solo gruppo oscillante), il trasporto dei materiali e l'uso di una lavabiancheria emette nel suo ciclo vitale:

Lavabiancheria con gruppo lavante tradizionale equivalente		CO ₂ emessa (Kg)
Diesel per trasporto materiale (L)	0.2	0.48
Energia totale produzione della WU (KWh)	3.90	2.59
Energia per utilizzo (KWh)	2438	1585
CO₂ totale (Kg)		1588

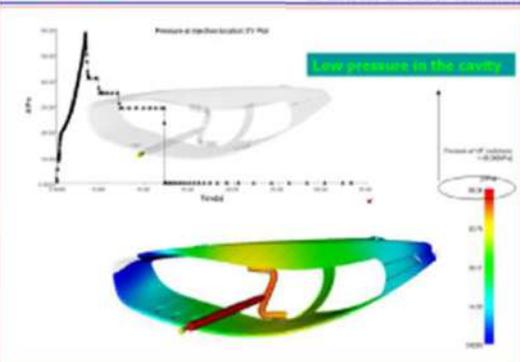
Lavabiancheria con gruppo lavante NGO		CO ₂ emessa (Kg)
Diesel per trasporto materiale (L)	0.1	0.24
Energia totale produzione della WU (KWh)	4.44	2.54
Energia per utilizzo (KWh)	2342	1502
CO₂ totale (Kg)		1505

Saving greenhouses gases/ product

83 Kg

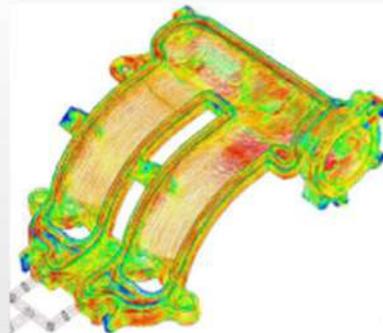
PROCESS ANALYSIS

Results : Pressure

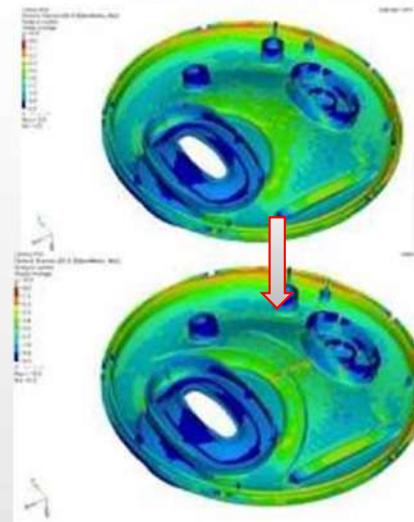


moldflow
plastics made perfect

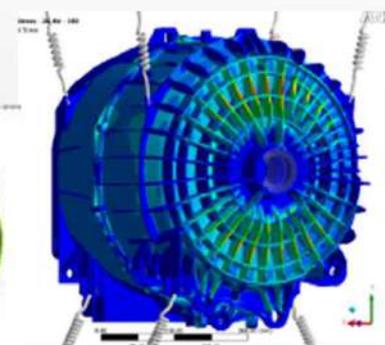
FIBER ORIENTATION



STRUCTURAL ANALYSIS



PRODUCT OPTIMIZATION



INDUSTRIES AND REFERENCIES

Automotive: direct and indirect references

- CONSOLES LINER PILLARS
- SEAT FRAMES
- DOOR PANEL AXIS
- RADIO PANELS
- STORAGE BOXES
- AIRBAGS
- AIR CHANNELS
- AIR BOXES (STACK MOULD)
- AIR INTAKE MANIFOLD
- LOUDSPEAKER PANELS
- ROOF SHELVES
- AIR-DUCTS
- MUDGUARDS
- CABLE CHANNELS
- LAMP HOUSINGS
- WHEEL COVERS
- CURTAIN AIRBAGS

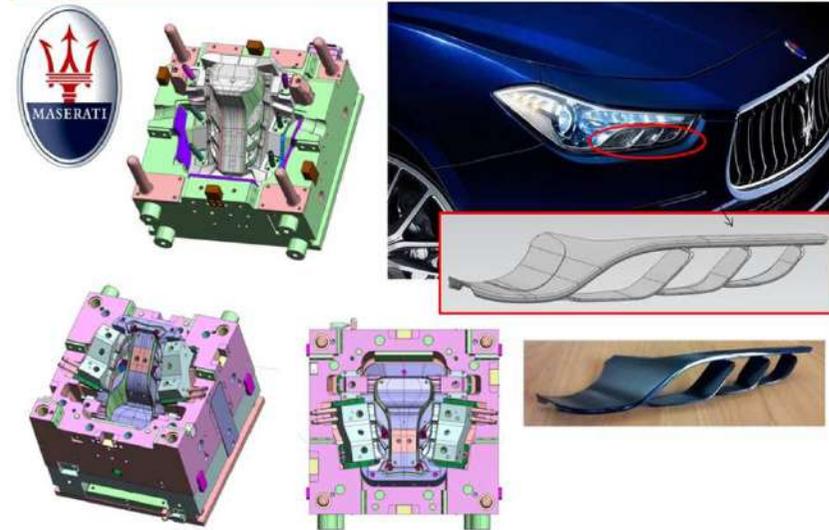


Automotive: direct and indirect references

HEAD LAMP – IVECO STRALIS 2014



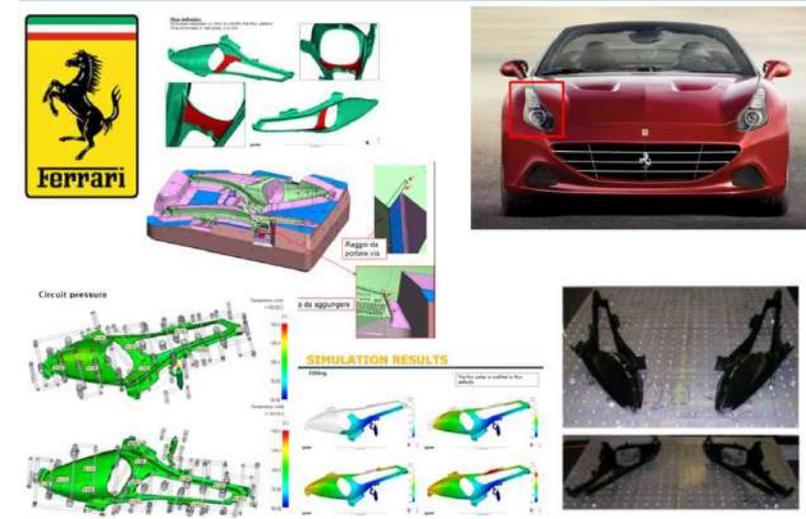
HEAD LAMP – MASERATI GHIBLI 2014



ENGINE COVER- V8 – MASERATI QUATTROPORTE

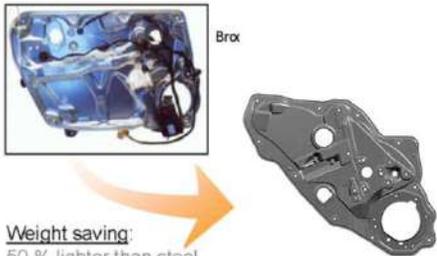


HEAD LAMP – FERRARI F149



Automotive: direct and indirect references

Metal to Composite



Weight saving:
50 % lighter than steel
nearly 4 kg per car!

- Plastics material evaluations;
- Structural performances study;
 - Weight optimization;
- Process evaluations to reach the dimensional constrains;
 - Prototype and production tool manufacturing;
 - Serial production.



Project: Truck air-channel



Mercedes Sprinter: Gitter (2K part)

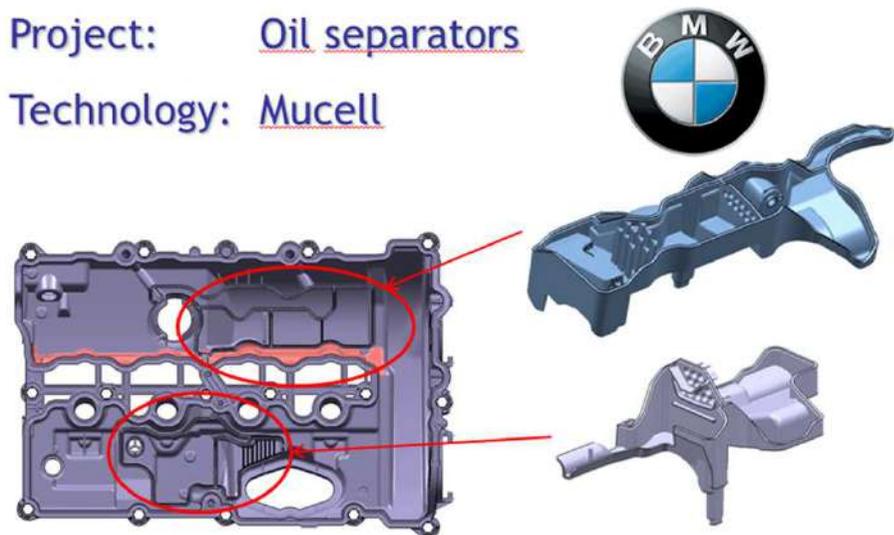


Scania: A-Pillar (2K part)



Project: Oil separators

Technology: Mucell



Automotive: direct and indirect references

3 Cylinders 0.9 Lt Gasoline AIM



INTAKE AIR MANIFOLD

4 Cylinders 2.4 Lt USA Market AIM



MOULDS



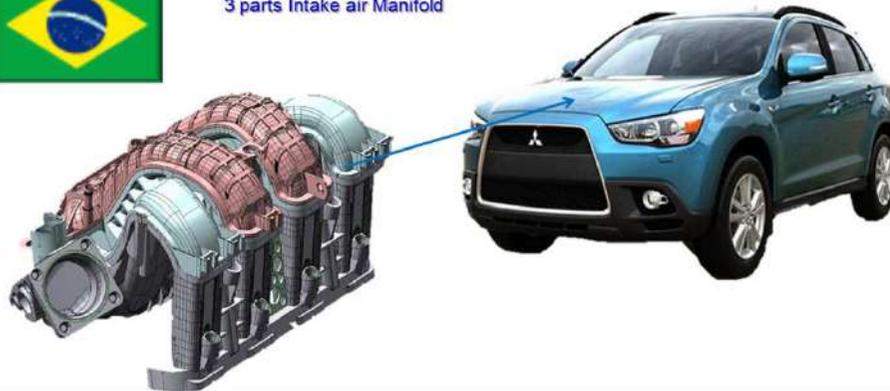
WELDING JIGS



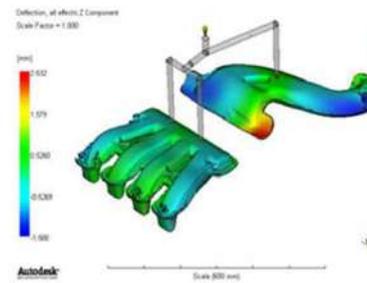
3 Cylinders 1.6/2.0 Lt ASX_MITSUBISHI AIM



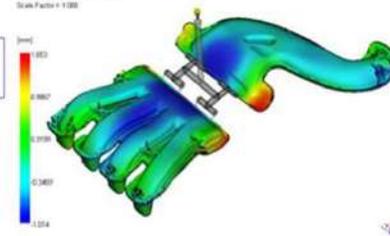
3 parts Intake air Manifold



INJECTION WITH 3 NOZZLES



INJECTION WITH 4 COLD GATES



Domestic Appliances

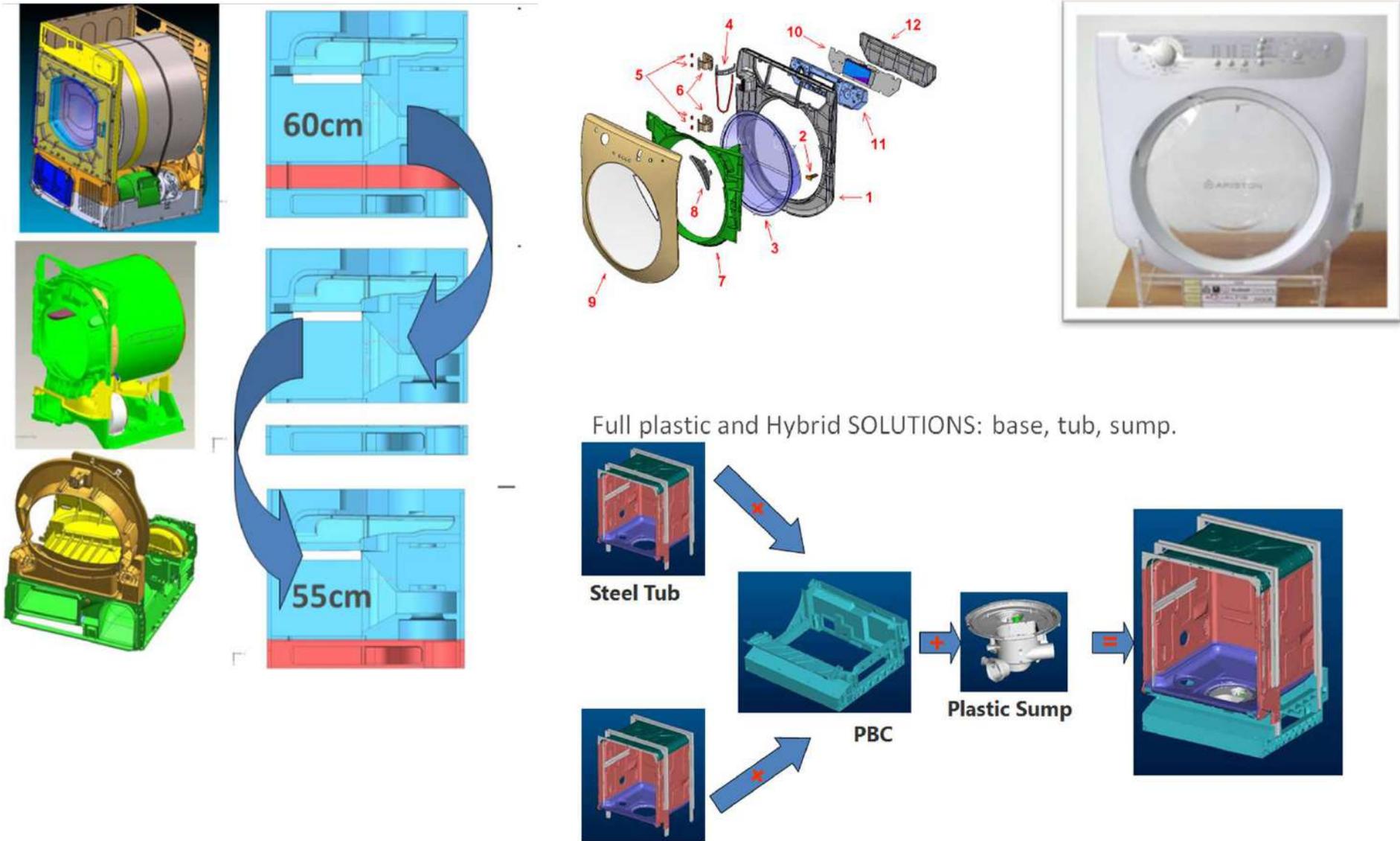
- PLASTIC TUBS
- DOORS
- BASEMENTS
- AESTHETICALS
- DRAWERS



Domestic Appliances



Domestic Appliances – Dryers & Doors - Dishwashers



Domestic Appliances – MG PATENTED PRODUCTS

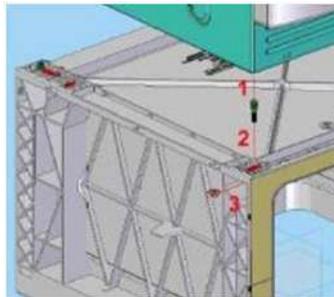
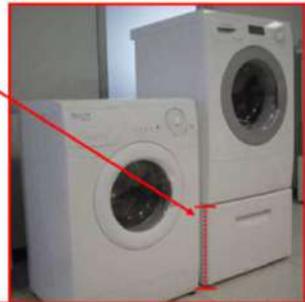
PEDESTAL

PEDESTAL FEATURES

The washing machine door is moved up of **38cm (15")***, giving as result easier laundry loading and unloading activities.

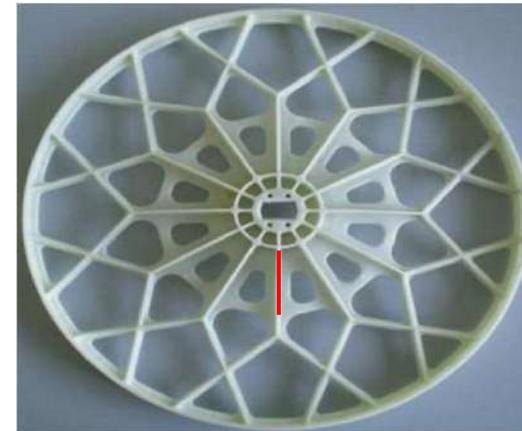
With a capacity   available height of **28 cm**, the drawer is particularly **capacious*** and allows to storage and keep within reach the linen, the detergents or any other laundry care accessory.

* maximum available in Europe

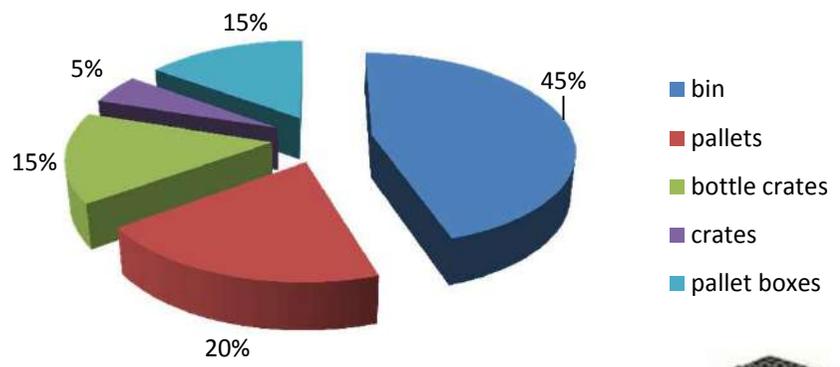


NGO WASHING UNIT

PULLEY



Material Handling

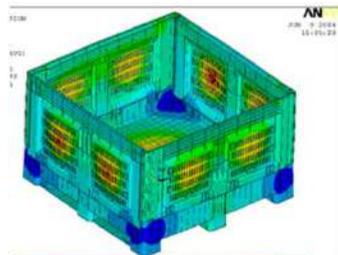
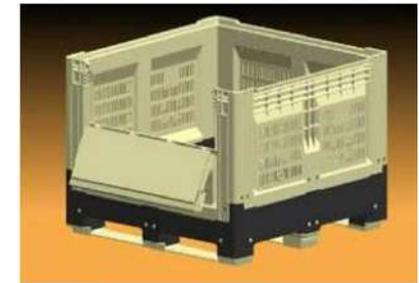


Material Handling

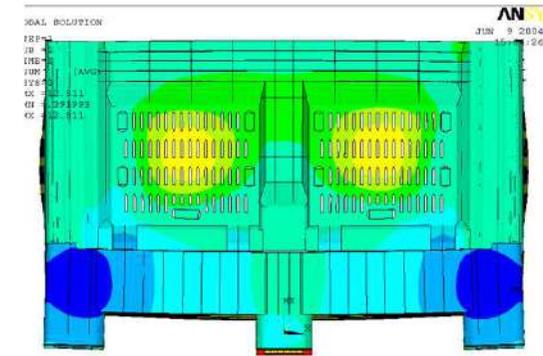
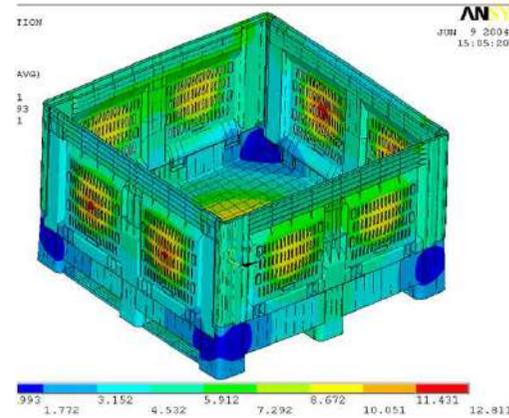
- Crates
- Bottle Crates
- Folding Containers
- Pallets
- Pallet Boxes
- Bins
- Big size moulds
- Gas assist moulding
- Multi version moulds
- Stack moulds
- Multi-cavity moulds



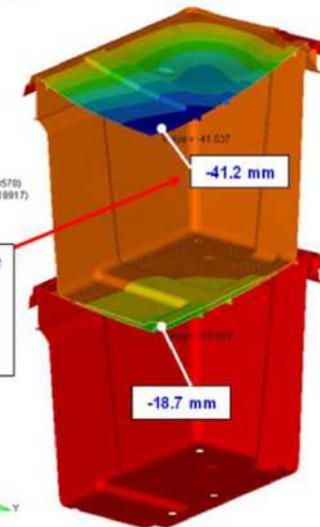
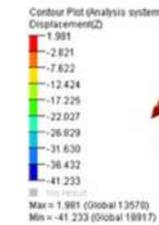
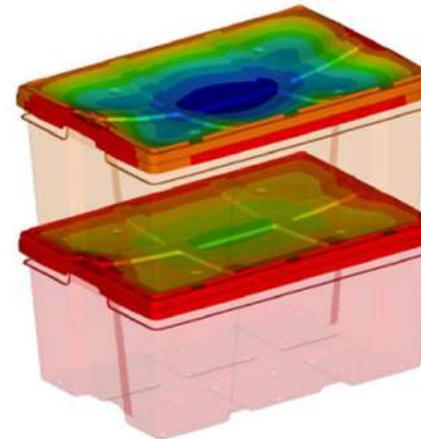
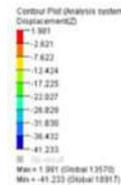
Schoeller Allibert



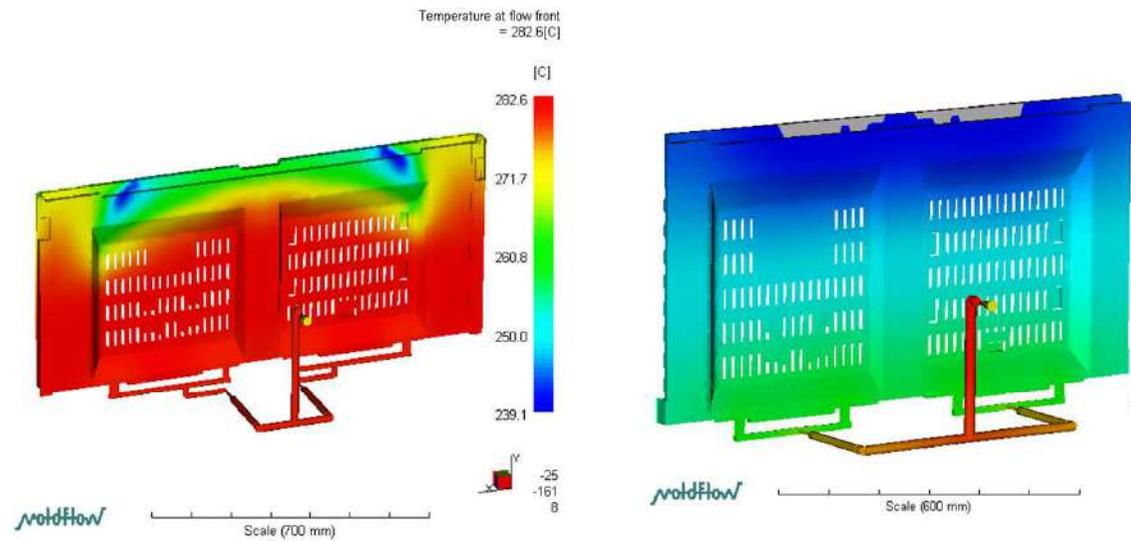
Structural simulation



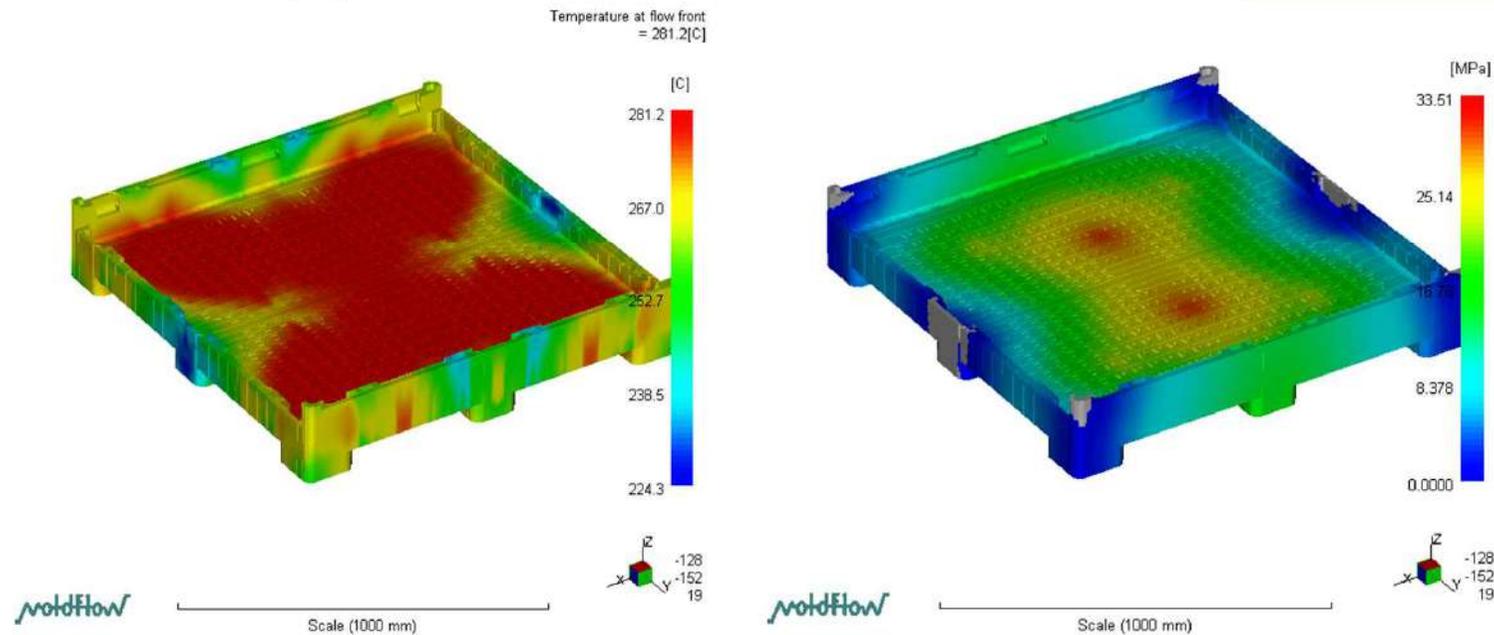
WITH STRUCTURAL SIMULATION THE PRODUCT IS DESIGNED TO WORK UNDER SPECIFIC LOADS AND OPTIMIZED IN WEIGHT AND THICKNESSES



Mold flow + fill pack simulation

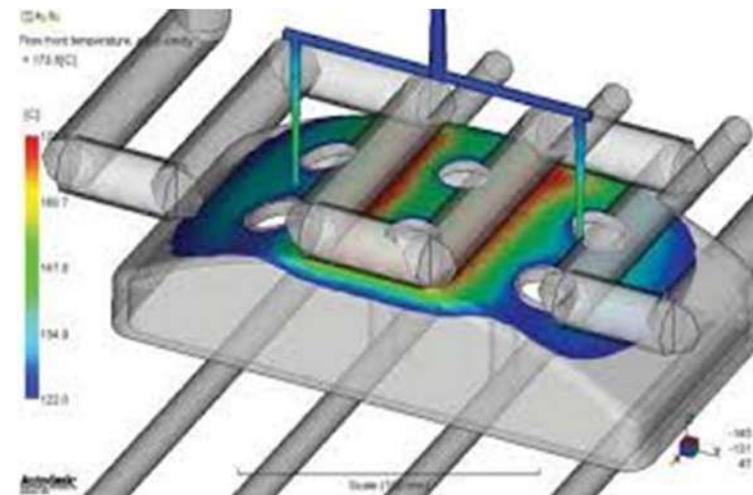
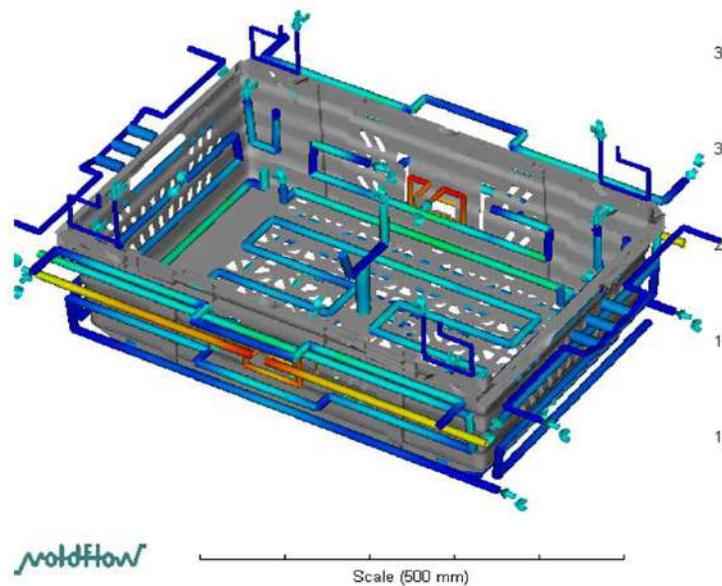
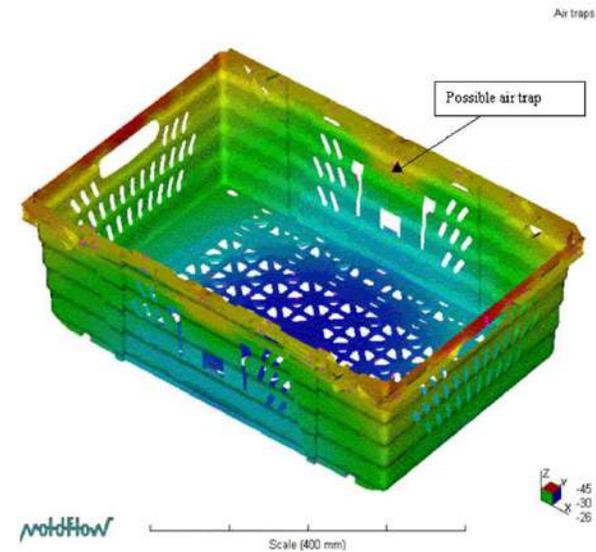


**WITH MOLDFLOW
SIMULATION THE PRODUCT
IS DESIGNED TO BE
PRODUCED WITH A ROBUST
AND STABLE PROCESS AND
SHORT CYCLE TIME**



Cooling Moldflow analysis

THROUGH COOLING SIMULATION IT IS POSSIBLE TO VERIFY THE GOOD BALANCE AND EFFICIENCY OF COOLING LINES AND REACH A STABLE AND SHORT CYCLE TIME



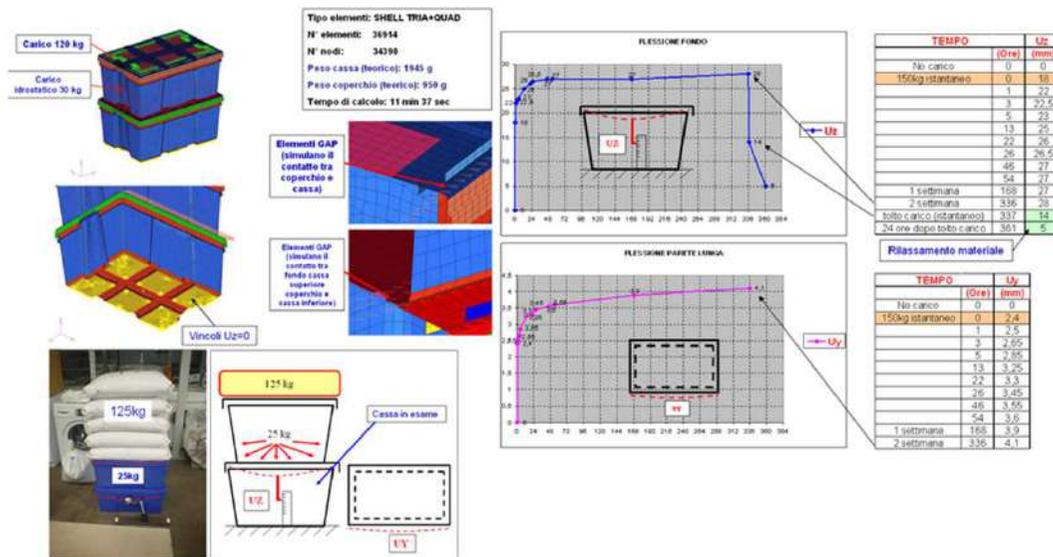
Simulation vs Real test knowledge

THE MECCANICA GENERALE ENGINEERING IS THE RESULT OF SIMULATION AND FEEDBACK FROM REAL EXPERIMENTAL RESULTS.

THIS *KNOW HOW* ENSURES INNOVATIVE AND PROFITABLE SOLUTIONS FOR OUR CUSTOMERS

The polymer applications decrease a lot the FEA potentials because of the simultaneous material properties to be considered.

The experimental results and tests have a very important rule to create a database and deep knowledge..



PROVE DI CARICO SU CASSONE e comparazione risultati con ANALISI STRUTTURALE

"Linpac Moulding Winsford – FRUIT BIN"

03 Novembre 2003

PROVA IDROSTATICA

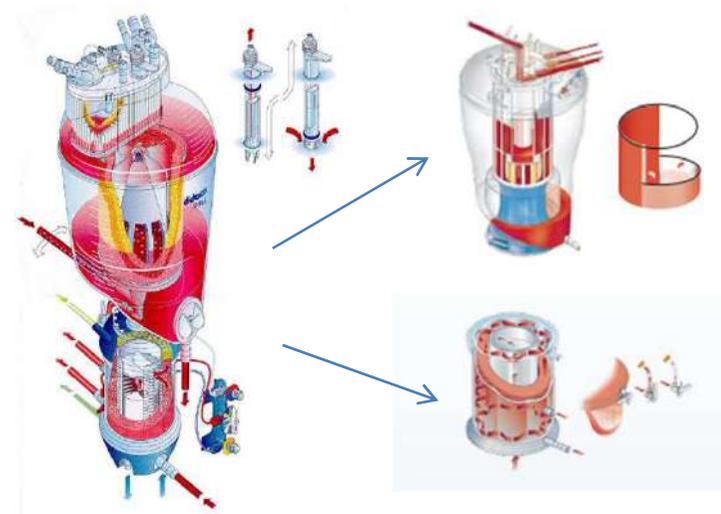
Il cassone e' stato riempito con acqua fino alla massima capacita' (800 lt) e misurato in alcuni punti topici. Il carico resta applicato nel tempo per poter ottenere anche le misure in funzione del creep del materiale.



Medical Devices



TURN KEY PROJECT FOR NEW OXYGENATOR PROJECT
 CO-DESIGN OF EACH COMPONENT
 ASSEMBLY EVALUATIONS
 PRODUCT SIMULATION
 46 MOULDS FOR THE ALL PARTS
 PROCESS VALIDATION IN MG PLANT
 PROJECT START UP IN CUSTOMER PLANT



Project: Renal therapy dev



NOISE STUDY & OPTIMIZATION OF ROT PUMP

INFILTRATION PROBLEM IN CLAMP HOLES

Blood pump



- Strumentazione di prova**
1. Microbilico
 2. Sensore P_{in}
 3. Sensore P_{out}
 4. Bagno termoregolato
 5. Linea di aspirazione Adult Medical
- DN nr. 6186803A
- Condizioni di prova**
- $P_{in} = -200 \pm 0$ mmHg (0.3 - 0 bar)
 - $P_{out} = 0 - 800$ mmHg (0 - 1.06 bar)
 - Bagno termoregolato a 39°C \pm 1°C
 - Velocità di rotazione pompa 1 = 78 RPM
 - Verifica di rotazione pompa: antioraria
 - Flussaggio pompa mediante test esterno (p/n MFG 2187) (controllo idraulico interno non funzionante)
- Parametri di acquisizione rumore**
- Rumore in laterali di ottava 20-20 KHz
 - 10 sec. di acquisizione
 - 4 run per configurazione
 - Mix a 50 cm da pompa, 85 cm di altezza



Venous Clamp



Modalità di prova:
 a prove sono state condotte utilizzando un erogatore spray di acqua colorata getta in giù passato per evidenziare eventuali zone di infiltrazione e di scarsa tenuta delle guarnizioni

- Si sono evidenziato diverse aree di ingresso liquidi:
1. Clamp venosa
 2. Interruttore accensione macchina
 3. Flessaggio circolatore/versari pressione
 4. Flessaggio filtro
 5. Flessaggio pompa epatica

1 - Clamp Venosa



Potenziale causa bruciatura scheda clamp!

Other Technical Markets

SUITCASES



MATERIALE	
PP	
Young modulus =	1260 Mpa
Poisson Ratio =	0.4
Density =	0.9 Kg/dm ³

*I carichi sono stati applicati sotto forma di pressione idrostatica.

GARDEN FURNITURE



Starting from the customer concept...

...the product: GEMMA

...passing through engineering of the part and tool design...

Gas injection analysis

- Evaluate boundary conditions for gas injection
 - 1. Create the boundary conditions for the gas
 - 2. Create the gas pressure
- Analysis of results and optimization required

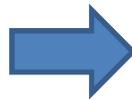
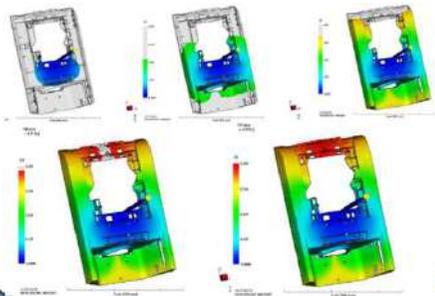
Final injection configuration

Other Technical Markets

COFFEE MACHINE



Moldflow and geometry revision

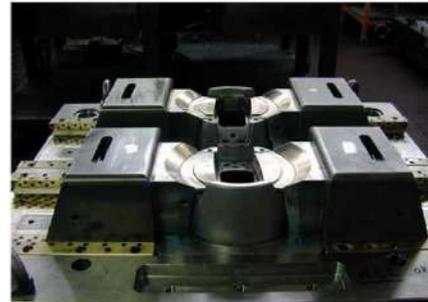


BEER BARREL



Grip top

- 2 cavity tool
- co-engineering in product design
- Gas injection technology
- Critical control of deformation and strict tolerances in the handle area
- Tight tolerances of fitments (tapping device and welding area to the top)



Other Technical Markets

TRACTORS COMPONENTS



BUS SEATS

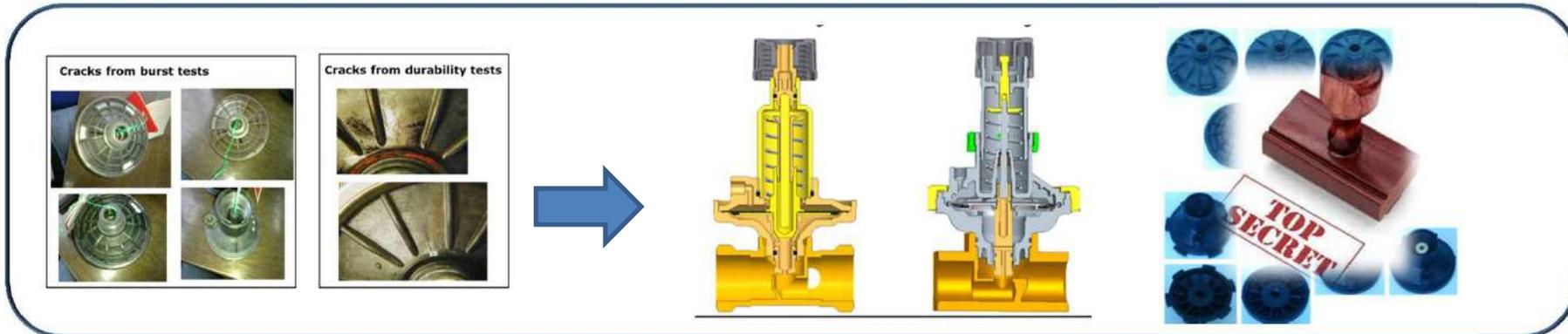


Other Technical Markets

DANFOSS



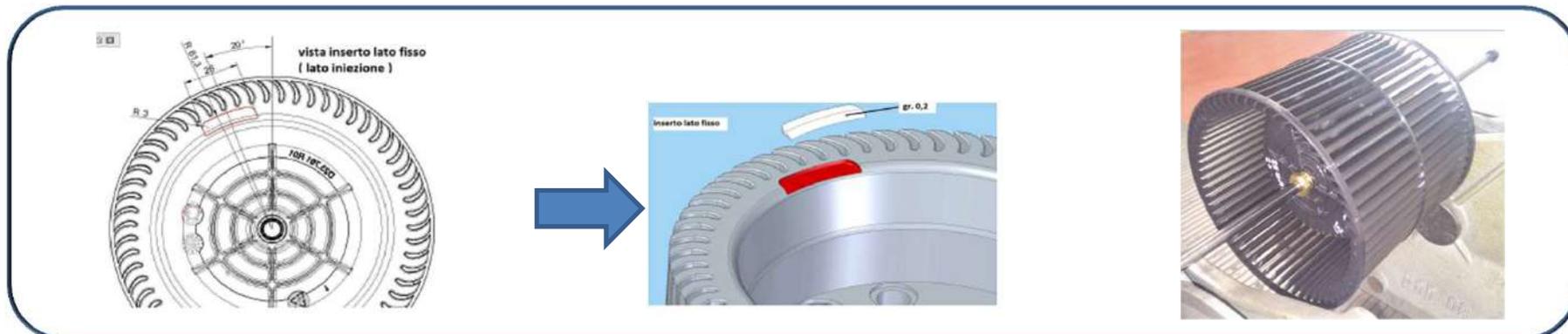
From the Metal concept to the Plastic part



FABER - FRANKE



Kitchen Hood fan balancing with injection process



Other Technical Markets

AEROSPACE

..... CARBON FIBER SUBSTITUTION USING INJECTION MOULDING TECHNOLOGY ON STRUCTURAL PARTS ...



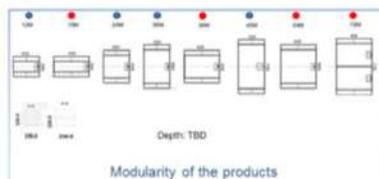
ELECTRICAL PRODUCTS



3 principal plastic part

Plastic Materials:

- Cover, Box : POLYESTER;
- Door: POLYCARBONATE

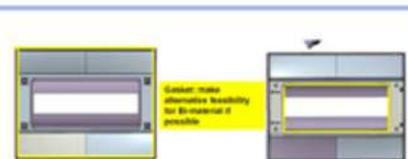


Modularity of the products

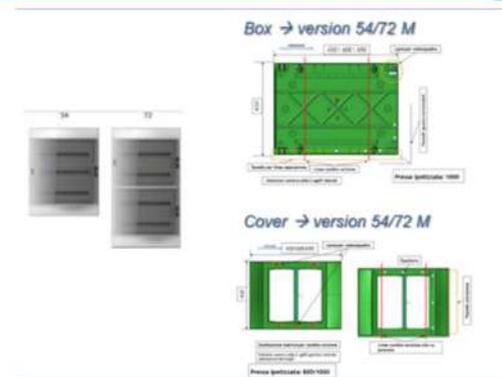
Variable production volume/year:

- 4M – 8M – 12M – 18M - 24M high volume products;
- 54M – 72M small volume products

2k transfer technology

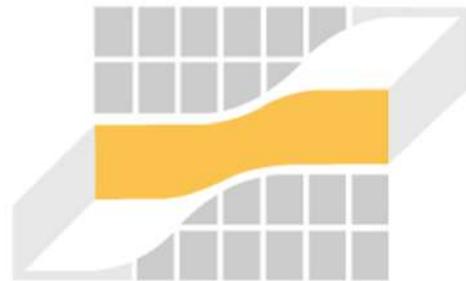


Sealing in the cover part (both sides)



Thanks for your kind Attention,

Τηχαυκς γοι λουη κηυα αττενχιου^



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