



andaltec CENTRO TECNOLÓGICO
DEL PLÁSTICO

ANDALTEC CAPABILITIES

Aeronautic Sector

Sep 2017



[Consultar alcance](#)

Organization

- Type

Non profit-making organisation.

National Plastic Technological Centre.

Activity started in February 2005

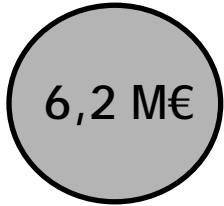
- Main Goal

To improve the competitiveness of the **PLASTIC** sector through R+D+ innovation

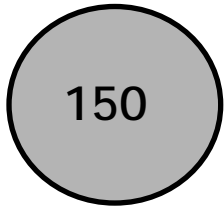
Sectors of activity



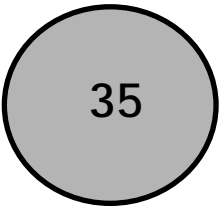
Business figures (in 2016)



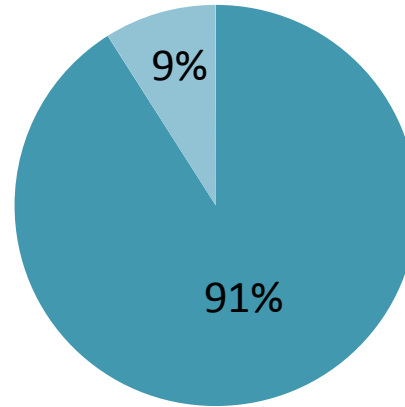
Turnover



Customers

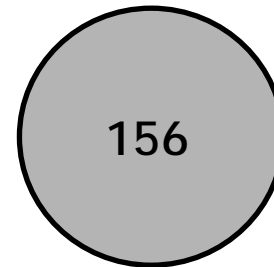


R&D Projects



■ 91% - Private Turnover
(Services or R & D projects under
contract)

■ 9% - Income of R & D programs
(national or international)



Employees

Main strategic lines for Andaltec R&D+i

Nanotechnology and Nanoscience.

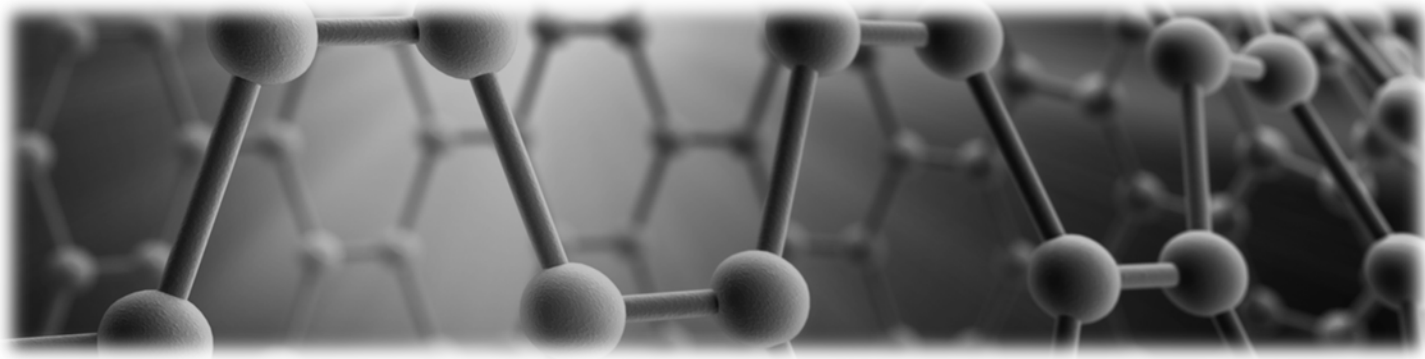
Development of light reflection systems.

New advanced materials

Operations Improvement.

New Production Processes.

Recycling and Biodegradability.



Facilities

Box 2 (6.000 m²)

Prototypes
Small scale testing
Photometric tunnel
Optic laboratories

Box 1 (4.000 m²)

Offices
Laboratories
Accommodation space available
Training
Assembly hall



Current areas of activity

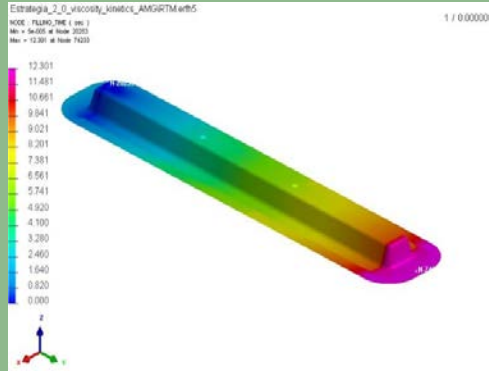
MATERIALS



New advance materials:

Bioplastics
Composites/Nanocomposites
Carbon Fiber composites
Green Materials
Recycling
Additives

PRODUCTS



Product Validations:

Mechanical Simulation
(Static, Dynamic, Crash)
Thermal Simulation
FSI Simulation
Optical Simulation
Electronic
Prototyping
Small Series Production
Lab Test

PROCESS



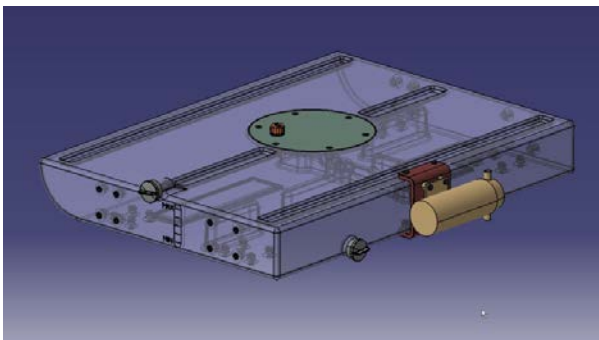
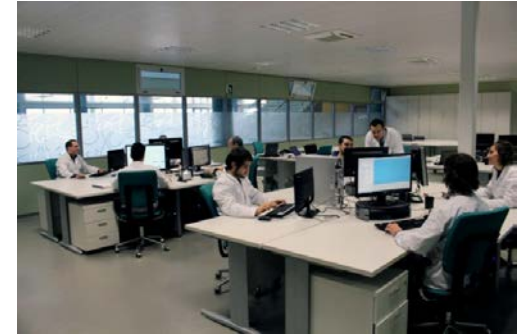
Production optimization:

Injection moulding
Liquid Composites Moulding
Small scale testing
Manufacturing Process
Simulations
(Injection, RTM, Extrusion,
Thermoforming)

RESEARCH AND DEVELOPMENT OF NEW PRODUCTS, MATERIALS...

The definition of technical specifications for new products.

- Research and development of nanotechnologies and new materials
- Design of mould and tooling (plastic injection, RTM, infusion process, etc..)
- New products and prototypes validation
- Development of custom materials
- CAD design of plastic and metal parts (CATIA V5 and SOLIDWORKS)
- Conceptual and detailed design.
- Choice of materials and manufacturing technology.



SOFTWARE:

Andaltec has the following resources for industrial design, process and engineering simulation:



PRODUCT SIMULATIONS

Andaltec has the following resources for engineering composite and plastic materials:

- CAD DEFINITION : CATIA V5
- FINITE ELEMENT MODELING AND SIMULATION:

Mechanical Simulation: Static, dynamic and crash analysis to check product specifications.

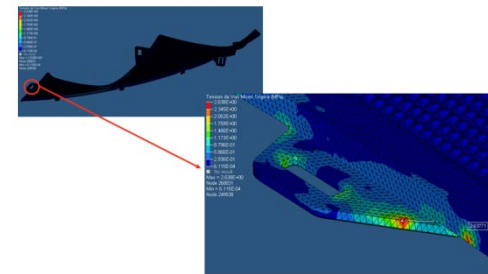
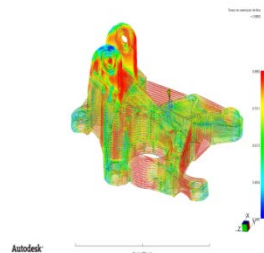
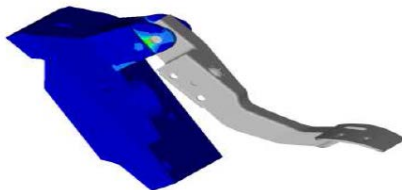
RADIOSS, ANSYS MECHANICAL

Structural Optimization : In order to optimize the material lay-ups that minimize weight and maximize strength. **OPTISTRUCT**

Thermal Simulation: Analysis with different thermal conditions, temperature ranges and thermal resistance of system components. **ANSYS FLUENT, OPENFOAM**

FSI Simulation: To take into account the accomplishment between thermal and mechanical problem join together. **FLUENT-ANSYS MECHANICAL**

Optical Simulation: Lighting design and simulation. **LUCIDSHAPE, ASAP**



PROCESS SIMULATIONS

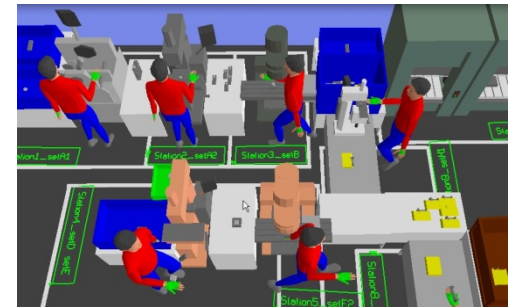
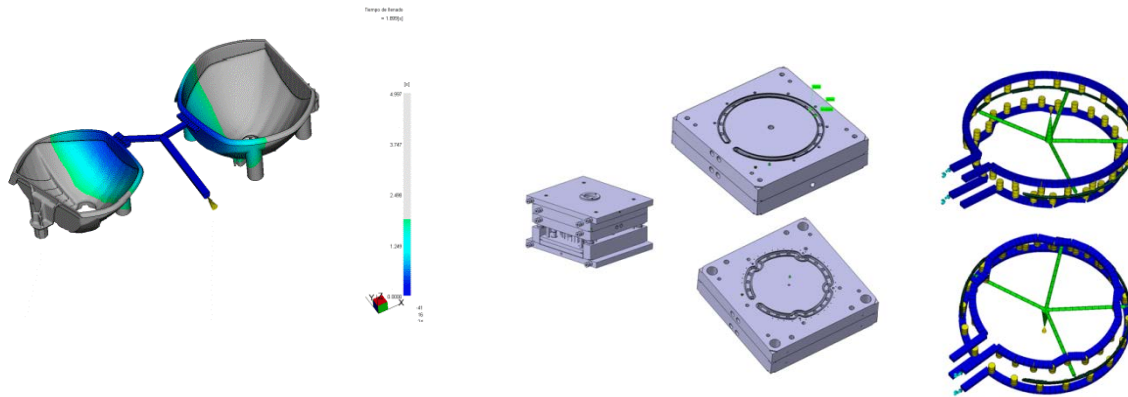
Rheology: Mold feature Optimization to improve the production process, validating the part design, predicting deformation defects, warping post-molding...

Set up the injection molding parameters. Detection of part defects, fiber orientation over molding, cooling system, molding cycle, etc..

Software: **MOLDFLOW**

Process: Development of a full digital factory to analyze statistics on production results, performance, workload, bottlenecks... therefore trying to reach an optimal production processes.

Software: **Delmia QUEST**



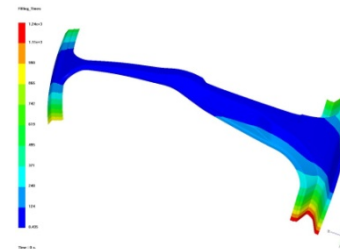
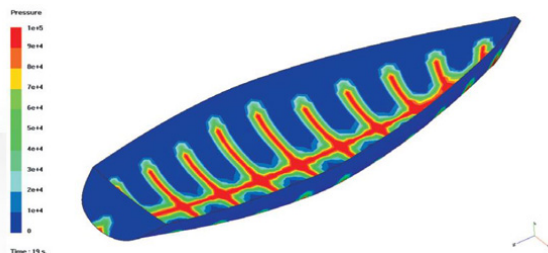
PROCESS SIMULATIONS

Analysis of LCM and curing process.

Software: **PAM-RTM**

PAM-RTM is simulation tool which covers a wide range of LCM manufacturing processes: Resin Transfer Molding (RTM), Vacuum Assisted RTM (VARTM), Vacuum Assisted Resin Infusion (VARI), Compression Resin Transfer Molding (CRTM)...

- Minimizes the risk of producing defective parts and helps master tool design and manufacturing process. It provides rapid solutions for preliminary design, as well as refined analysis for process and mold optimization, and final design checking.
- Allows non-isothermal filling and curing simulation as well as solid modeling required to analyze the resin flow through the thickness. Its high performance solver ensures industrial computation time independently of the model size and complexity.
- Accelerates time to market while reducing costs related to the tooling and injection/infusion process.
- Offers a great variety of validated processes and allows the determination of the best combination of resins and fibers.



PROCESS SIMULATIONS

Analysis of the forming / thermoforming of dry textiles or prepag materials

Software: **PAM-FORM**

PAM-FORM enables the realistic and predictive simulation of dry textiles or prepregs forming processes.

PAM-FORM allows to select the most appropriate materials, the right tooling design, and the best process parameters. Taking into account the physics of the forming process, PAM-FORM enables the user to predict and track the origin of manufacturing induced defects such as wrinkling and to correct these by optimizing the process parameters. Each ply of the laminate is represented in the model, allowing the prediction of internal wrinkling or delamination occurring during the forming process.

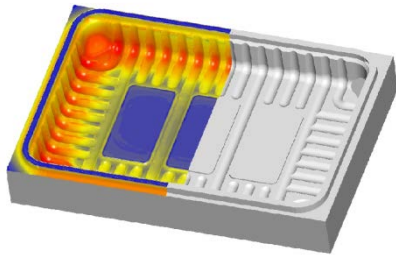


OTHERS PROCESS SIMULATIONS

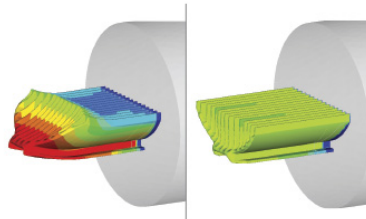
HYPERFORM - Simulation and Optimization of the Stamping Process

HYPERXTRUDE - Simulation for Metal and Polymer Extrusion

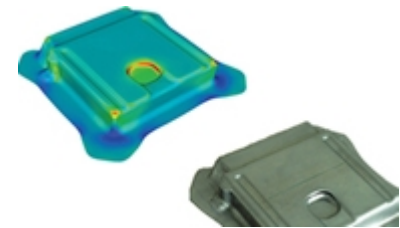
T-SIM - Simulation of thermoforming. Predicts the final wall thickness distribution based on the specified processing parameters the pressure level, the speed of tools, the sheet temperature distribution, etc).



T-SIM



HYPERXTRUDE



HYPERFORM

Laboratories

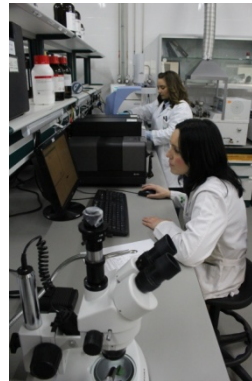
Andaltec offers the comprehensive management of the validation tests of parts or components to guarantee compliance with specifications according to the industry standards (ISO, UNE, ASTM..) or the customer requirements.

- Physical - Chemical Lab.
- Process Lab: Injection, Extrusion And Thermoformed.
- Metrology Lab.
- Optical And Photometric Lab.
- Electronic Lab.



MATERIAL CHARACTERIZATION TESTS

- **Mechanical and optical properties:** Compression, flexural and tensile properties, Charpy impact, Shore, Brinell and Vickers hardness, HDT - Vicat, Colour, Brightness, Density, Melt flowindex, Kofler melting point, Peeling test, Shear test, Abrasion tests, Tearing tests, Dart impact tests, Bending, Roughness coefficient,...
- **Identification of materials:** Infrared spectroscopy (FTIR), Thermal analysis of materials (DSC, TGA), Gas chromatography, Electron microscopy,...
- **Rheological analysis.**
- **Resistance to chemical products.**
- **Leak tightness** (high-pressure spraying, infiltration and dust).



ACCELERATED AGEING TESTS.

- Climatic testing and accelerated ageing
- Salt fog testing: Determination of the effects of exposure to damp heat, water spray and saline mist.
- Artificial ageing. Exposure to artificial radiation (Xenon and ultraviolet light accelerated aging tests).
Combined cycles of temperature and humidity
- Thermal shock testing

Chamber for salt spray



Determination of the effects of exposure to moist heat, water spray and salt spray.

Volume of the chamber: 950 L.

UNE – EN ISO 4611: 2010

Solarbox



Artificial aging, artificial radiation exposure.

Exposure area: 250 x 200 mm.

UNE – EN ISO 11341: 2005

Climatic chamber



Temperature range: - 40 °C to + 180 °C.

Humidity range: 10 – 98 %

(for T° between + 10 °C & + 95 °C).

Volume of the chamber: 990 L.

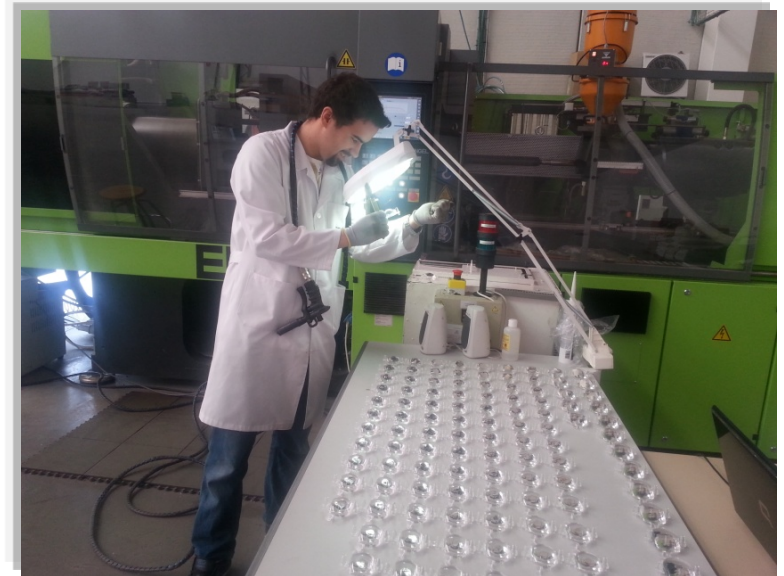
Max. Temperature fluctuation: ± 0.5 °C.

- 3D measurement of parts, tools and gauges of up to a maximum size of 1200 mm x3000 mm x1000mm and 2250Kg.
- 3D measuring on CAD.
- 2D measurement by profile projector.
- Regular monitoring of production and product tolerances.
- Reverse engineering by 3D scanning for dimensional control.



PILOT PLANTS

- Plastic part injection.
- Extrusion and mixing of plastic materials.
- Sheet and blown film extrusion.
- Thermoforming.
- Filament extrusion.
- Compounding.
- Pilot scale and lab scale processing.



INJECTION PROCESS

- Testing to check mould functionality, determination of optimal injection parameters, cosmetic and dimensional validation, cycle time optimisation....
- Full validation of mould for the process, including getting the mould into operation as well as the optimisation of the process in facilities which will be held the final production in.
- Technical support in following up of those projects where the tested mould is involved in.



INJECTION MACH. 150 TON

EXTRUSION PROCESS

- Development of new nanocomposites in order to improve the properties of conventional plastics.
- Development of new plastic composites by means of the addition of fibers, mineral fillers, carbonaceous particles,....
- Replacement of products made of metal, ceramic or glass with plastic materials in order to facilitate their recyclability and reduce production costs.
- Analysis of the sustainability and recyclability of products.



**TWIN SCREW EXTRUDER,
CO-ROTATING TO MIX MATERIALS
(PELLETS AND THREAD).**



**INJECTION OF NORMALIZED PARTS FOR THE
CHARACTERIZATION OF THE EXTRUDED MATERIAL**



EXTRUSION PROCESS



FILM EXTRUSION MACH.



SHEET EXTRUSION MACH.

SINGLE SCREW EXTRUDER

3D Printing Filament Production Line



Scamex RHEOSCAM is a small scale machine for continuous and discontinuous processing of plastics materials, designed specifically to do research.

ANDALTEC RHEOSCAM equipment includes a single screw extruder module to operate on small scale, samples 0.1kg/h to 1 kg/h, with a minimum loss of material in order to obtain thread between 0.5mm and 3.5mm.

LASER WELDING PROCESS

Laser welding equipment to validate plastic products manufacturing processes.



The project concept is based on the application of laser sources with two main objectives:

- ✓ to modify the surface of the metal (structuring) to prepare it for the joining of the plastic
- ✓ to obtain the laser joining between both materials based on a plastic melting, without phase transformation in the metal.

In technical terms the joining properties will be governed mainly by:

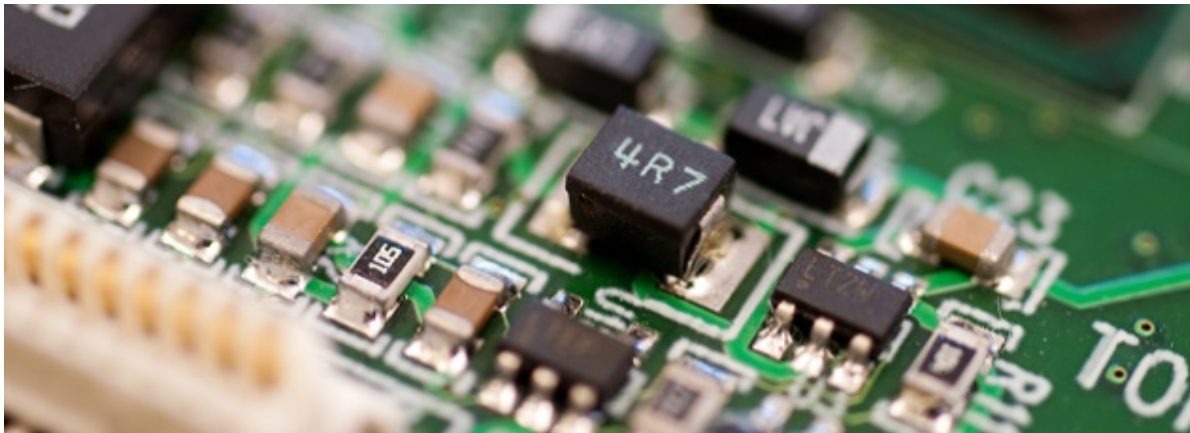
- the kind of plastic (or composite); opaque or transparent
- The kind of metal
- the structuring on the metal and
- the laser irradiation conditions



LASER WELDING Equipment

ELECTRONIC LAB

- PCB design (single/multi-layers), (Orcad, Altium)
- Hardware selection in several applications (medical, automotive, aeronautical),
- Design with microcontrollers, microprocessors and FPGAs.
- Development of high speed circuits
- Firmware development for Embedded Systems (C/C++, Java, RTOS). (Eclipse/Keil uVision)
- Artificial neuronal networks and genetic algorithms. (ANN & Fuzzy Logic)
- Electronic assembly for prototypes.
- HW & SW of Excellence.



OPTIC LAB. FOR LIGHTING SYSTEMS

EQUIPMENT:

- **Simulation of road tunnel 80 x 20 x 4m** with three lanes more to control vehicle lighting systems, optimized road to detect changes about color and intensity.

System for the development and installation of new optical groups without leaving the facilities, ensuring confidentiality.

- Photometric tunnel with goniophotometer (LMT GO-H-1400) and cells about 25,10 and 3.16 meters, colorimeter about 25 and 3.16 meters to **validating vehicle lighting systems to EU markets, USA, China or Japan.**
- Retro-reflectómeter in three angles.
- Integrating sphere (LMT U1000) about 1meter of diameter to characterize light sources



OPTIC LAB. FOR LIGHTING SYSTEMS

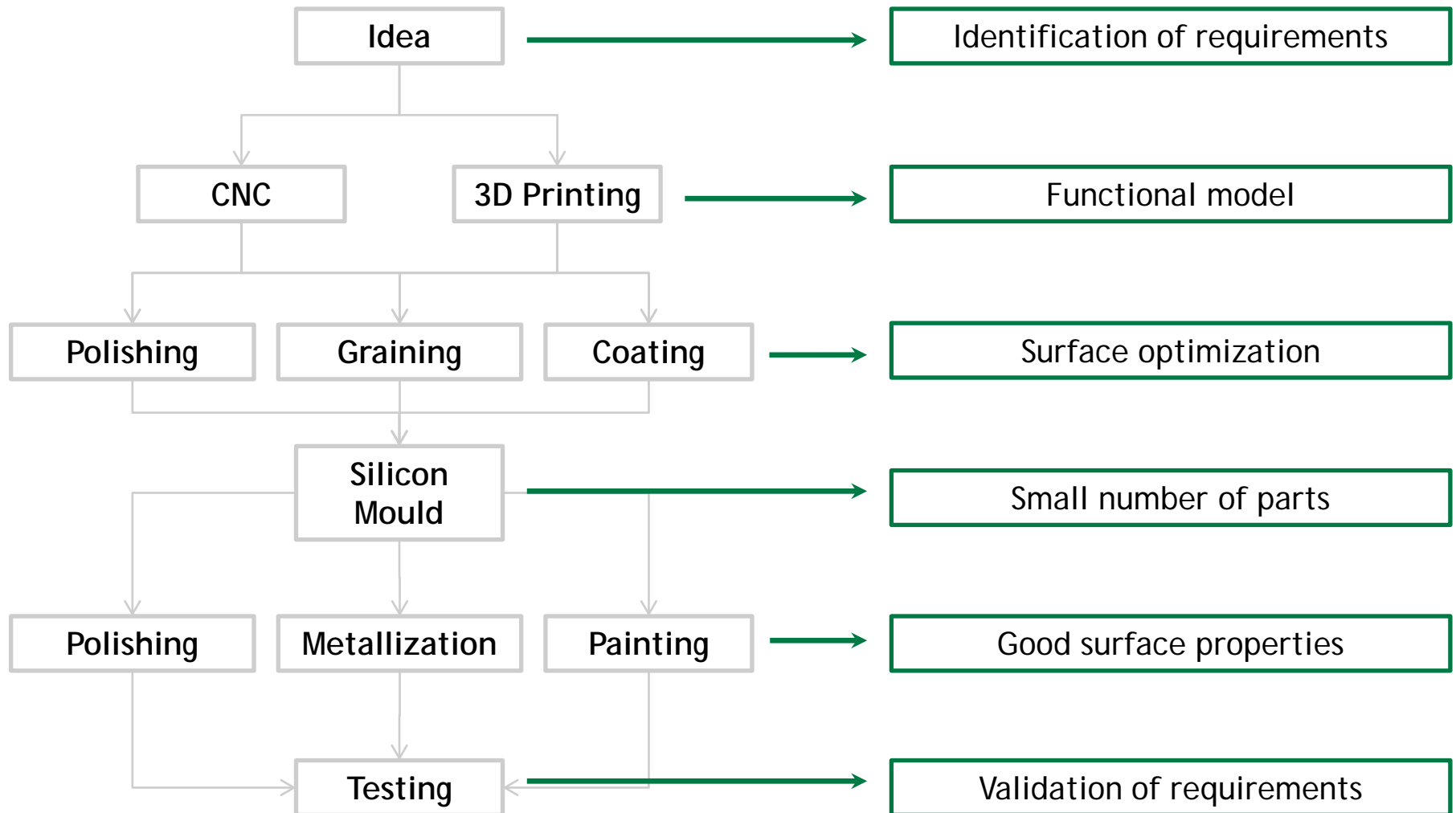
- Determination of photometric values and distribution curves.
- System characterization (goniometer)
- Colorimetry.
- Reflection of reflectors.
- Characterization of photometric court.
- Fitting of Lighting systems
- Verification for compliance of the ECE regulatory and others specifications required for the homologation.



ANDALTEC PHOTOMETRIC TUNNEL HAS THE FOLLOWING DIMENSIONS: 80m LONG X 20m WIDE. THIS IS THE LARGEST PHOTOMETRIC TUNNEL IN SPAIN AND ONE OF THE LARGEST IN EUROPE.

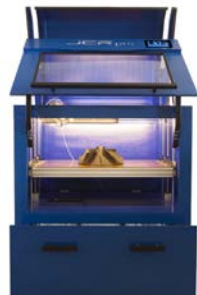


TYPICAL PROTOTYPE PROCESS



3D PRINTERS TECHNOLOGIES AVAILABLES IN ANDALTEC

| EQUIPMENT | Tech. | Material | Usable size | Res. (x,y) μm | Thick. (z) μm |
|--------------------------|-------|---|--------------|---------------------|------------------|
| PROJET 5500X | MPJ | UV-curable liquid resin VisiJet® (Flexible and Rigid) | 533x381x300 | 34 | 29 |
| JCR 1000 PRO | FDM | PLA, ABS, nylon, hard rubber, PVA, PP, PC, HIPS, carbon fiber material. | 1000x600x600 | 100 | 50-500 |
| WITBOX 3D PRINTER | FDM | PLA, PVA y Nylon, TPE (FilaFlex) | 290x210x200 | 50-300 | 80 |
| CUBE 3 | FDM | PLA, ABS | 152x152x152 | 100 | 75-200 |
| PROJET 1200 | DLP | VisiJet® FTX | 43x27x180 | 56 | 30 |
| 3D BLUEPRINTER | SHS | Polyamide | 160x200x140 | 100 | 100 |
| FORM1 | SLA | Functional Resins | 125x125x165 | 300 | 25-200 |





MultiJet Printing (MJP) ProJet MJP 5500X

MJP print thin layers of UV-curable liquid plastic onto a flat platform, using wax to create supports that brace the part during production.

Simultaneously prints and fuses together flexible and rigid material composites layer by layer at the pixel level in a variety of colors and shades including opaque, clear, black or white and numerous shades of gray.

Net Build Volume (xyz): 533 x 381 x 300 mm

Resolution (xyz): Res. (x,y) 34 μm / Thick. (z) 29 μm

Applications:

- Mechanical functional testing
- Rapid tooling : ej: Print injection molds
- Form and fit assembly testing

Materials:

VisiJet® CR-CL Rigid Plastic Material - Clear

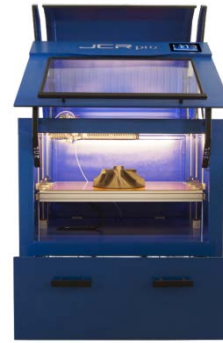
VisiJet® CR-WT Rigid Plastic Material - White

VisiJet® CF-BK Rubber-like Material - Black



[More info](#)





JCR 1000

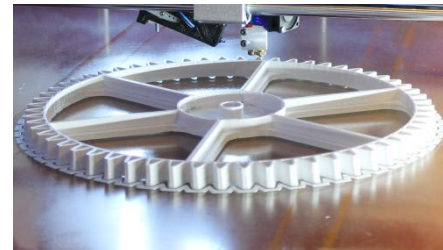
JCR 1000 is the most versatile FDM printer in the market, capable of printing with: PLA, ABS, PVA, PP, PC, HIPS, nylon, hard rubber, carbon fiber material and overall, any other material in the working range between 180°C and 350°C for 1,75 mm. printheads.

Net Build Volume : 1.000 x 600 x 600 mm

Resolution (xyz): Res. (x,y) 100 µm / Thick. (z) 50-500 µm

Materials: PLA, ABS, nylon, hard rubber, PVA, PP, PC, HIPS, carbon fiber material and any material able to work with a temperature of between 180°C and 350°C - 1.75 mm filament diameter

[More info](#)



Cube 3

Dual color printing, a choice of 23 print colors in ABS and PLA plastics, touch-screen controls, printing direct from your mobile device and print speeds 2 times faster than other printers

FDM printer

Net Build Volume : 152 x 152 x 152 mm

Resolution: 70 - 200 μm

Materials: PLA, ABS

[More info](#)



Witbox 3D Printer

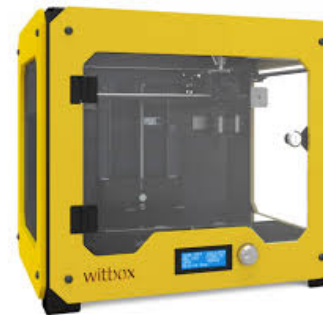
FDM printer

Net Build Volume : 297 x 210 x 200 mm

Resolution (xyz): 50 μm

Materials: PLA, TPE (FilaFlex)

Operating temperature: 180-250 $^{\circ}\text{C}$





Projet 1200

The ProJet® 1200 is ideal for small, precise, detail-rich parts and casting patterns, such as jewelry, electronic components and dental wax-ups.

Net Build Volume : 43 x 27 x 150mm

Resolution: 30 μm layers at a 585 dpi resolution

Materials: VisiJet® FTX materials - 6 durable and rigid materials

VisiJet® FTX Cast

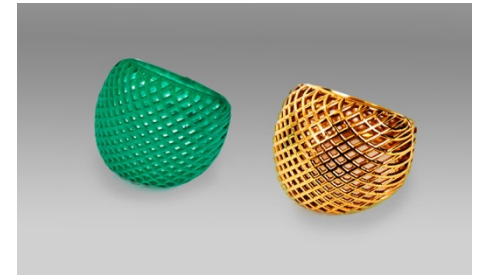
VisiJet® FTX Clear

VisiJet® FTX Gold

VisiJet® FTX Gray

VisiJet® FTX Green

VisiJet® FTX Silver



<http://www.3dsystems.com/3d-printers/professional/projet-1200>

[More info](#)





3D Blueprinter

SHS (Selective Heat Sintering) Printer. A technology which utilizes a thermal printhead rather than the laser used in a typical SLS machine.

This thermal printhead applies heat to layers of thermoplastic powder within the build chamber and is capable of building objects with complex geometrical shapes which feature a minimum wall thickness of 1 mm.

Build Chamber: 157 x 200 x 140 mm

Layer thickness: 100 μm

Materials: Polyamide (Thermoplastic powders optimized to work on SHS™ technology)

[More info](#)



Form 1

SLA Printer.

Build Volume: 125×125×165 mm

Feature Size: 300 microns

Layer Thickness: 25-200 μm

Materials: Standard resins, or functional resins (tough, flexible or castable)

<http://formlabs.com/products/materials/>

[More info](#)



CNC

Milling machines optimized for prototyping models:

- DMG Mori - 5axis CNC
- DMG - 3axis CNC
- Manual Lathe

| CNC | kRPM | Dimensions |
|--------------------|------|-------------|
| DMU 80 Evo | 42 | 800x650x550 |
| Deckel FP3A | 4 | 400x400x400 |



VACUUM CASTING

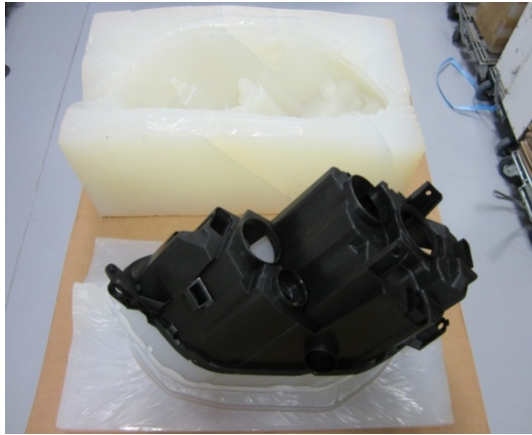
- The Vacuum Casting Technology allows us to create polyurethane resin parts by using a silicone mould. To manufacture this mould, we usually use a pattern made by stereolithography. Nevertheless, we can build a silicone mould almost using any piece made with other technologies as a master piece: sintering, FDM, machined, modified old part...
- A short set of serial parts can be produced with polyurethane resin with characteristics like flexibility, transparency, high temperature resistance, fiber load, similar to the final product: ABS, PP, PC, etc



MCP04

Mould max 730x730x880mm

VACUUM CASTING



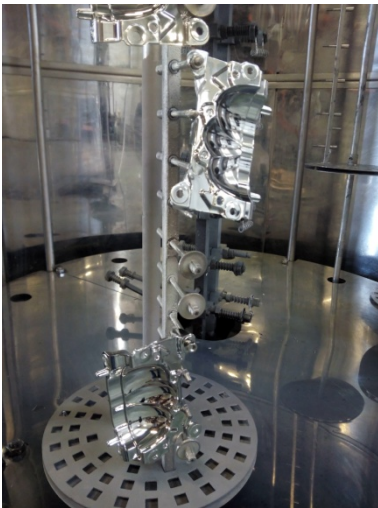
FINISHED SURFACE

- Painting room with drying ovens
- UV Oven for high gloss finish
- Different types of surface finish: Paint: Gloss paint finish, satin, matt, textured, monolayer, double layer.
- Metallic: high vacuum metallised parts or metallic paint Blasting
- Polish the parts or moulds.



Metallitation (PVD)

- High vacuum chamber
- Sublimation of different aluminum alloys base
- Treatment with oxides and salts under vacuum



Vacuum chamber

800x800x1200

R&D+i project department

- Design and development of R&D+i projects, from the initial concept to the results phase. Technical assistance to those companies that request it on R&D+i issues.
- Search for and individualized study of national and international opportunities (National R&D Programs, H2020, Bilateral programs, etc.).
- Expertise in the preparation and leadership of technical and economic R&D proposals on all levels (international, national and regional).
- Search for partners and collaborators, the writing of proposals and assistance as intermediaries with finance entities.
- Andaltec is an accredited member of the "PIDI" Network of CDTI



ANDALTEC European Projects Office (OPE)

The aim of the Andaltec_OPE is encourage the participation of the center in the European program Horizon 2020, and increase the capacity of Andaltec to promote the participation of companies in the research activities funded by the European Commission.



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