



**andaltec** CENTRO TECNOLÓGICO  
DEL PLÁSTICO

**ANDALTEC CAPABILITIES**

**Automotive Sector**

March, 2017



[Consultar alcance](#)

## Organization

- **Type**

Non profit-making organisation.

National Plastic Technological Centre.

Activity started in February 2005

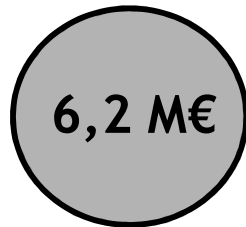
- **Main Goal**

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

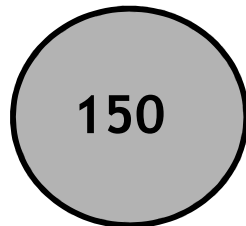
## Sectors of activity



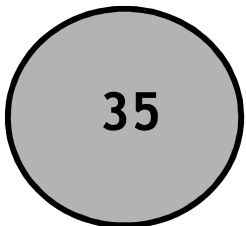
## Business figures (in 2016)



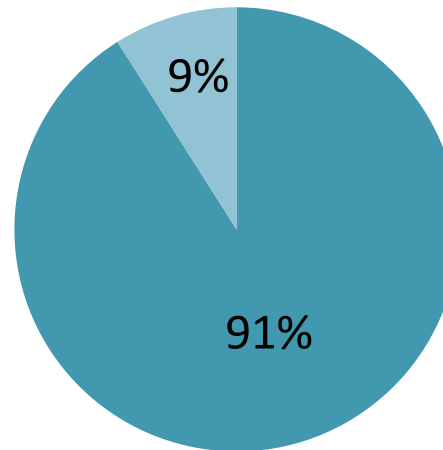
Turnover



Customers

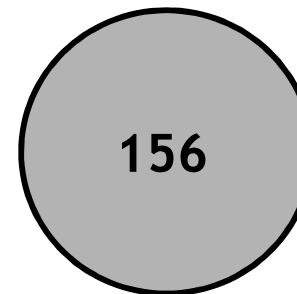


R&D Projects



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

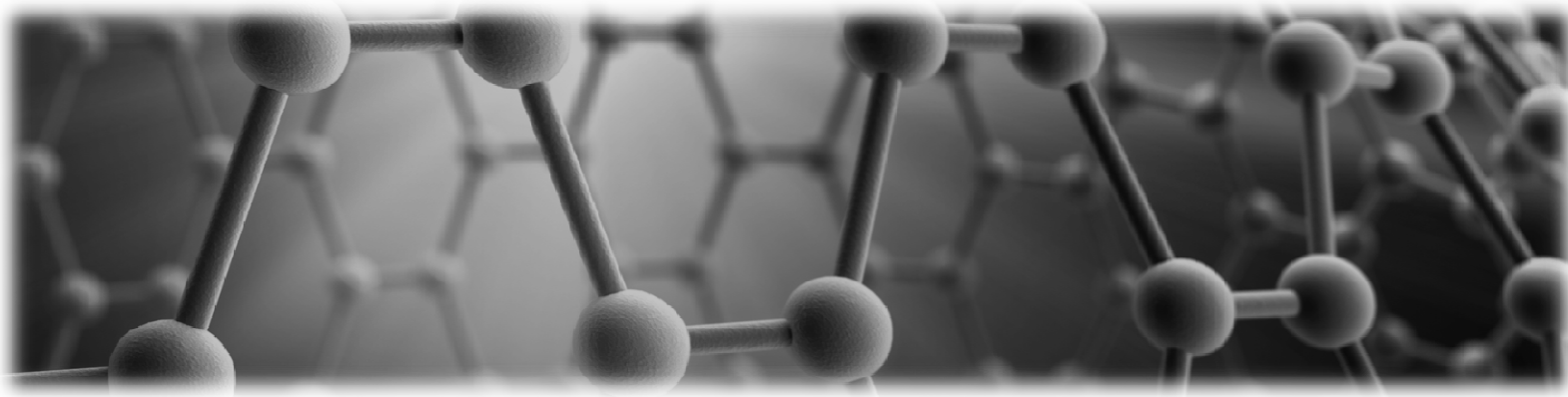
■ 9% - Income of R & D programs  
(national or international)



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 m<sup>2</sup> )

Prototypes

Small scale testing

Photometric tunnel

Optic laboratories

### Box 1 (4.000 m<sup>2</sup> )

Offices

Laboratories

Accommodation space available

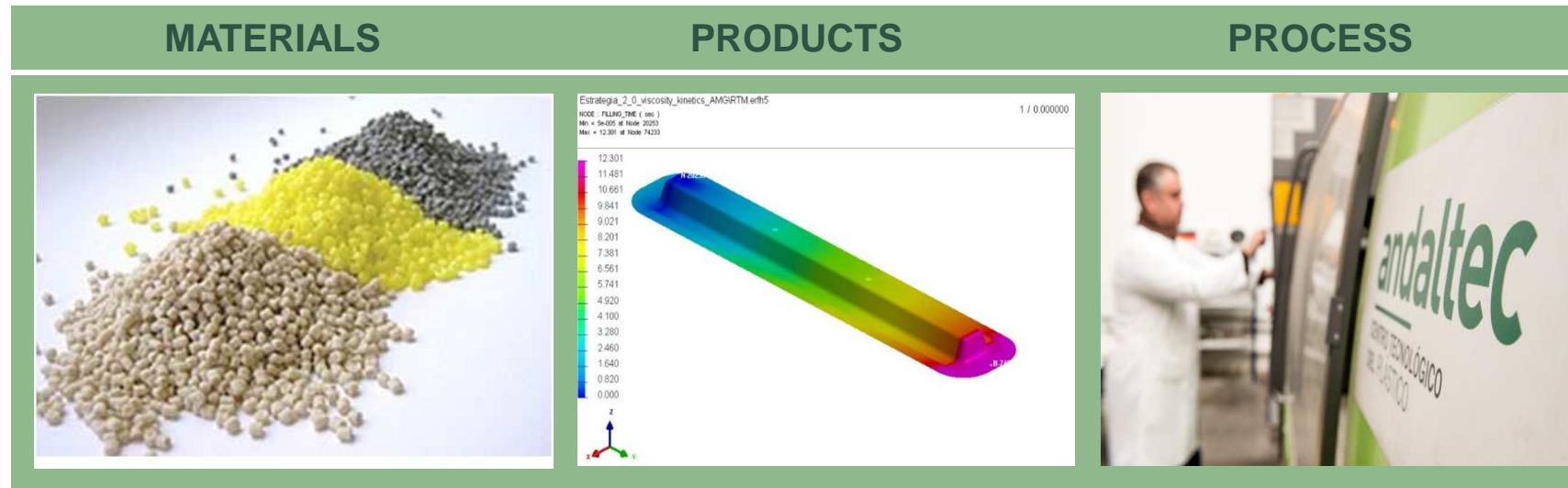
Training

Assembly hall





## Current areas of activity



### New advance materials:

Bioplastics  
Composites/Nanocomposites  
Carbon Fiber composites  
Green Materials  
Recycling  
Additives

### Product Validations:

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

### Production optimization:

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

### CAD DESIGN:

- CAD design of plastic and metal parts (soft: **CATIA V5**).
- Conceptual and detailed design.
- Choice of materials and manufacturing technology.
- High resolution 3D Scanner.
- Reverse Engineering (Soft: Geomagic Design X).

### CAE SIMULATION:

- **Mechanical Simulation:** Static, dynamic and crash analysis to check product specifications. (soft: **RADIOSS, ANSYS MECHANICAL**)
- **Structural Optimization** : In order to optimize the material lay-ups that minimize weight and maximize strength. (soft: **OPTISTRUCT-ALTAIR**)
- **Thermal Simulation:** Analysis with different thermal conditions, temperature ranges and thermal resistance of system components. (soft: **ANSYS FLUENT, OPENFOAM**).
- **FSI Simulation:** To take into account the coupling between thermal and mechanical problem join together. (soft: **ANSYS FLUENT-ANSYS MECHANICAL**).



### CAE SIMULATION:

- **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.. (Soft: **MOLDFLOW**).

### ELECTRONIC DESIGN:

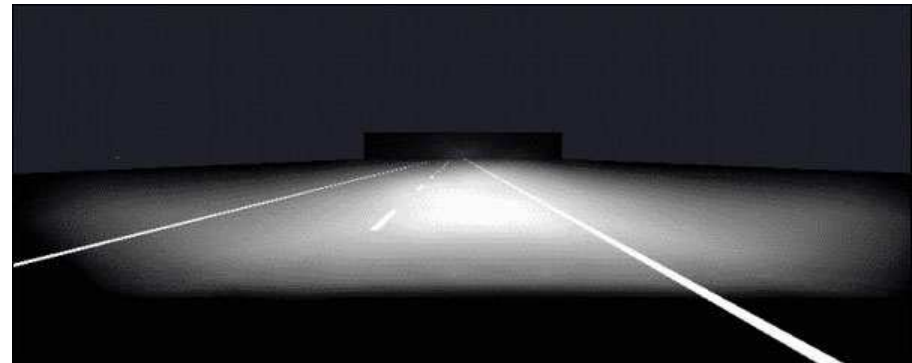
- Detail design of electronic components, hardware and software
- LED boards and driver modules
- Advanced Lighting Control Modules





### OPTICAL DESIGN AND SIMULATION:

- Design and simulation of **lighting systems** and light sources: Classic optical surfaces (reflectors, prisms, filters) and **advanced technologies** (light-guides, flat-guides, collimators, total reflection).
- Design and conception of **complex optical systems**
- **Visualization Module** which delivers photo realistic images of the lighting system developed: lit appearance demonstrates the luminance effects when light source are illuminated in the model
- Design of prototypes, **mockups** or **demonstrators**.
- Software: **LUCIDSHAPE, ASAP**



## INTERIOR LIGHTING:

Design, optical simulation and prototyping of light guide for interior / ambient lighting  
Roof lighting development (with button panel backlitted)

## EXTERIOR LIGHTING.

### \* Headlamps:

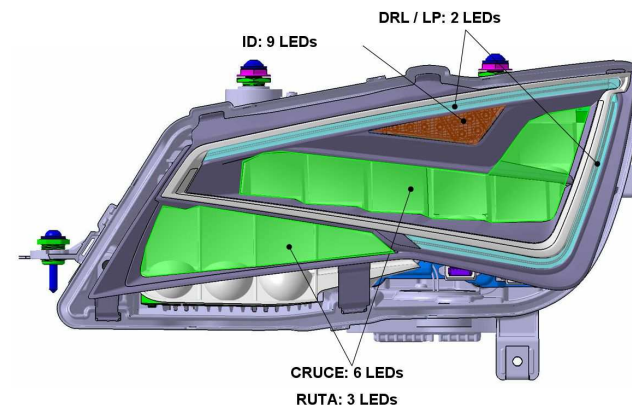
- Development of innovative optical modules  
(ex. Light beam / route with matrix beam technology and LED)
- HL complete with LEDs

### \* Rearlamps:

- RL complete with LEDs

### \* Center High Mounted Stop Lamps

- CHMSL complete with LEDs



### SOFTWARE:

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



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.





## 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

Salt fog testing.

Artificial ageing

Exposure to artificial radiation.

Combined cycles of temperature and humidity.





### METROLOGICAL LAB.

- **3D measurement of parts, tools and gauges** of up to a maximum size of 1200 mm x 3000 mm x 1000mm 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.



### HIGH RESOLUTION 3D SCANNER

Fields of view: from 30 mm - 1500 mm

Resolution: 0,0014 mm (small parts) / 0,0053 (big parts).

Applications:

- 3D inspection and quality control
- Tooling inspection
- CAD comparison
- Process optimization
- Reverse engineering
- Fast prototyping
- 3D model
- Documentation and archiving



### 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.

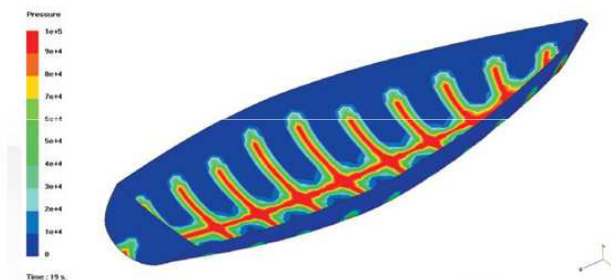


## EXTRUSION PROCESS

- 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.

## COMPOSITES MATERIALS & MANUFACTURING

- Manufacture by **infusion**, part and process design (process optimization, determination of the infusion parameters for the validation of appearance, dimensional and other characteristics of the parts).
- Manufacture by **RTM**, mold design and process definition (process optimization, determination of infusion parameters for the validation of appearance, dimensional and other characteristics of the parts).
- **Optimization and redesign of the components** to be manufactured, based on the results obtained in previous simulations.
- Design of tools to improve the process, definition of parameters such as temperature and speeds (SOFT: **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)...



## 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.

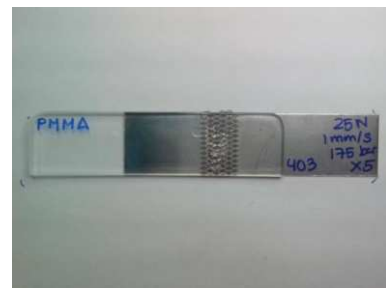


The project concept is based on the application of laser sources with two main objectives:

- ✓ 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

## OPTIC LAB. FOR LIGHTING SYSTEMS

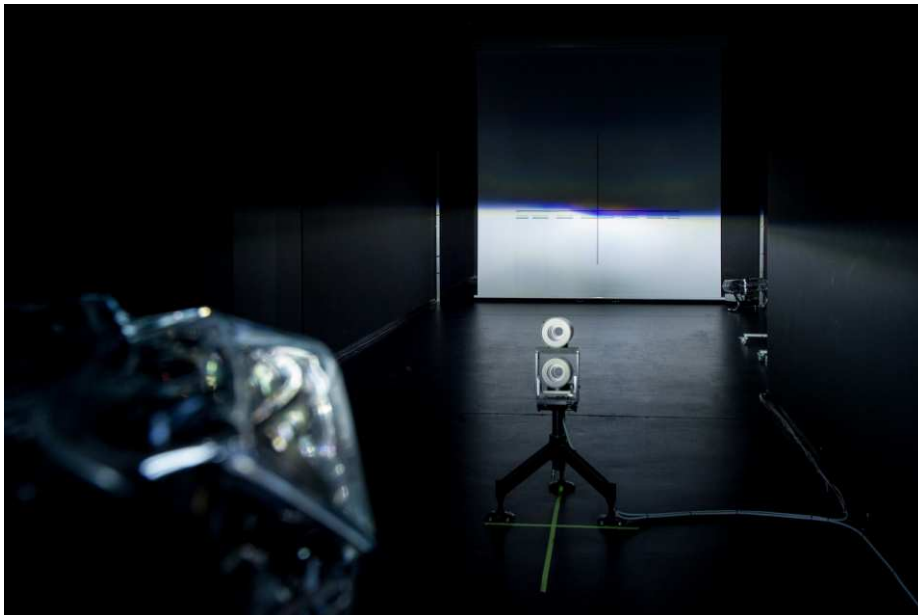
- **Simulation of road tunnel 80 x 20 x 4m** with three lanes more to control vehicle lighting systems, optimized road to detect changes about color and intensity.
- System for the development and installation of new optical groups without leaving the facilities, ensuring confidentiality.
- Photometric 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-reflectometer in three angles.
  - Integrating sphere (LMT U1000) about 1meter of diameter to characterize light sources

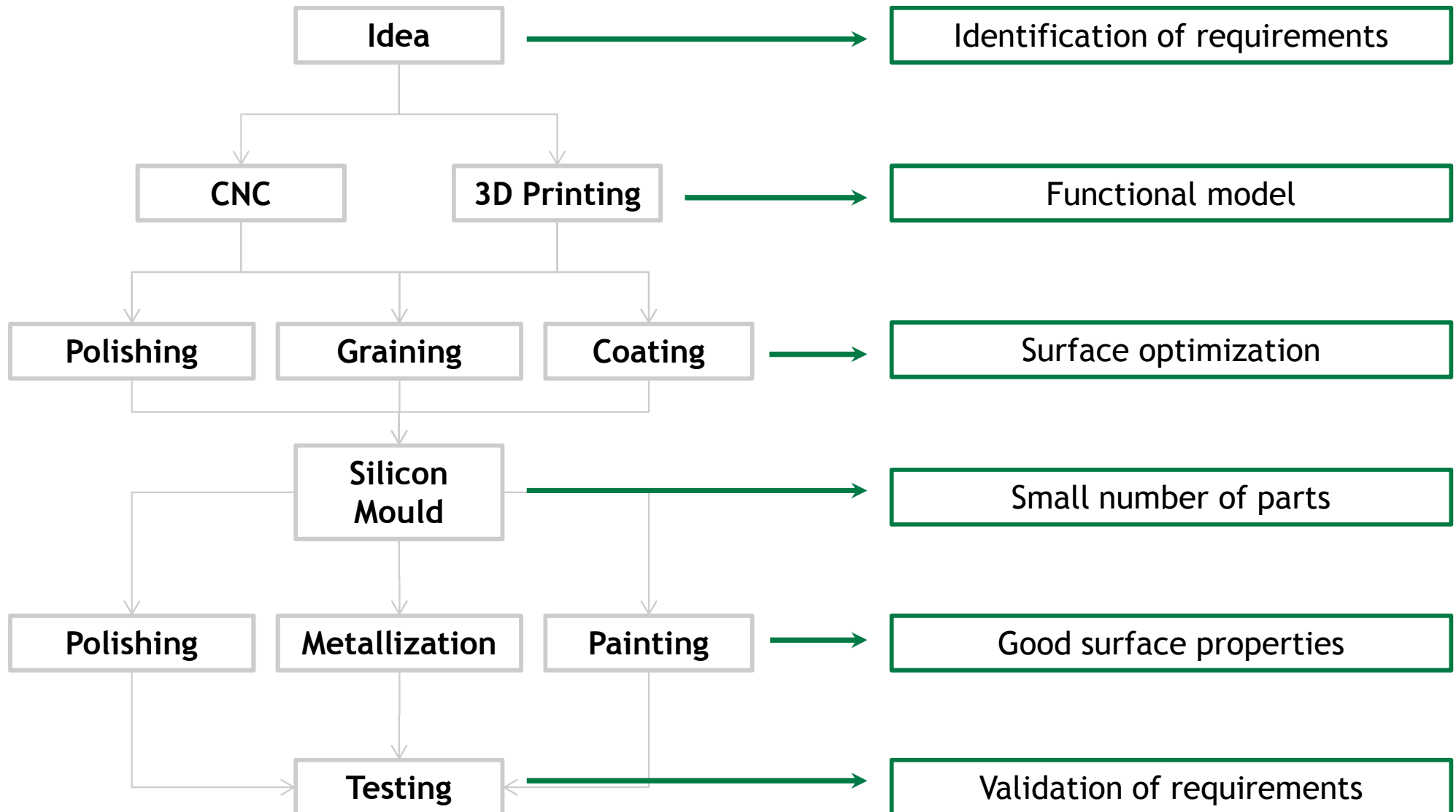
**ANDALTEC PHOTOMETRIC TUNNEL HAS THE FOLLOWING DIMENSIONS: 80m LONG X 20m WIDE. THIS IS THE LARGEST PHOTOMETRIC TUNNEL IN SPAIN AND ONE OF THE LARGEST IN EUROPE.**



## OPTIC LAB. FOR LIGHTING SYSTEMS

- Determination of photometric and luminous intensity values.
- Lighting 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.





## Technologies:

The Prototyping Area offers a wide range of materials and technologies for the prototyping of the Lighting system developed:

- Our design area create 3D models of your parts and style and design mockups.
- High Precision **CNC** (5 axis) for Optical Prototypes
- **Vacuum Casting** (Silicone Moulds): Short serial parts with polyurethane resin with similar characteristics to the final product.
- **3D Printing**: Several 3D printers technologies available: (FDM, Multijet, SLS and SLA).
- **Rapid Injection Moulds** (aluminium moulds): Design of injection moulds and production of pre-series or short series in the production material.
- **Assembly of components** and different type of **finish surface** (metalized, polishing, painting, textured, impregnation, etc.).

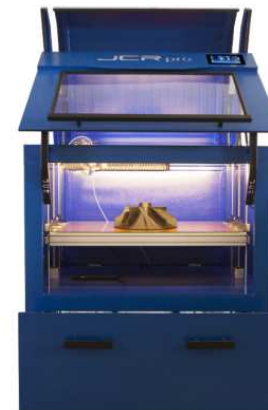




## 3D PRINTING TECHNOLOGIES AND MATERIALS

EQUIPMENT	Tech.	Material	Usable size, mm	Res. (x,y) $\mu\text{m}$	Thick. (z) $\mu\text{m}$
PROJET 5500X	MPJ	UV-curable liquid composite resin VisiJet® (Flexible and Rigid, black, white, clear)	533x381x300	25	25 - 16 - 13
JCR 1000 PRO	FDM	PLA, ABS, PETG, EasyPrint, Casting, PLA Soft, ABS fireproof, Iglidur, Nylon, hard rubber, PP, PC, HIPS, TPE, 3D850, Soluble materials (PVA, HIPS support)	1000x600x600	100	50-500
ULTIMAKER 2 Extended+	FDM	PLA, ABS, PETG, EasyPrint, Casting, PLA Soft, ABS fireproof, Iglidur, Nylon, hard rubber, PP, PC, HIPS, TPE, 3D850	223x223x305	50-300	20-600
WITBOX 3D PRINTER	FDM	PLA, PVA y Nylon, TPE (FilaFlex)	290x210x200	50-300	80
CUBE 3	FDM	PLA, ABS, Rinse support	152x152x152	100	70-200
PROJET 1200	DLP	VisiJet® FTX (Cast, Green, Gold, Silver, Clear and Gray)	43x27x180	56	30
BLUEPRINTER	SHS	Polyamide	160x200x140	100	100
FORM1	SLA	Functional Resins	125x125x165	300	25-200

## Prototypes



### 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



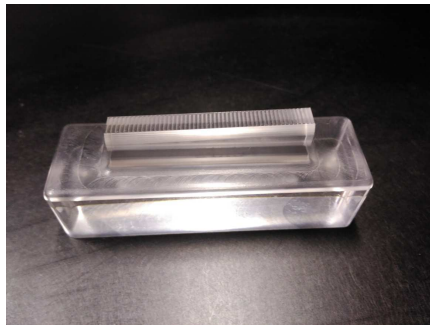
MCP04

Mould max 730x730x880mm

### CNC

Milling machines optimized  
for prototyping models:

CNC	kRPM	Dimensions
DMU 80 Evo	42	800x650x550
Deckel FP3A	-	400x400x400
First V43	-	1100x600x510



**High Precision CNC for Optical Prototypes**  
Light guide with optical quality PMMA  
Minimum radius of milling: 0.05 mm  
Precision diamond turning



## 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.

## Some Training Fields:

- Technical Plastics and Injection technology.
- CAD Design of part and moulds (CATIA V5) R19.
- Products and process simulations (ANSYS R13.0 , HYPERWORKS), AUTODESK MOLDFLOW).
- Optimization of production (VPS). Lean Manufacturing. 5S.
- IMDS.
- Quality: Production, management systems and process audits.
- Implementation of quality tools: PDCA, AMFES, 5S, DOE's ...





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