

# ADVANCED PRODUCT ENGINEERING

We can help you in the development of your products



Energy, Water, Environment.  
Global Sustainable Solutions.



## Introduction

ENE A Grupo® offers specialized product engineering services in collaboration with an independent spin off, since 2009, of a multinational automotive leader in the design and development of active safety systems.



Currently, ENE A grupo® has a high level team of 15 engineers who brings international experience of over 20 years leading and developing cooperative R & D projects, with worldwide responsibilities, in developing new products and supporting their industrialization.

With a U.S. subsidiary and two teams of resident engineers in Germany and China, ENE A Grupo® provides engineering services in Germany, USA, Spain, China and India.

The background experience in the global automotive industry brings a deep and solid know-how on concepts, methodologies, processes and industrial transformation, project management and automotive standards, which can be applied not only in the automotive industry but also in other industrial fields related to Energy, Water, Environment and other global sustainable solutions.



ENE A Grupo® provides comprehensive product engineering services for industry in a global market, in order to contribute to new product development, engineering process and into the application of advanced technologies in collaboration with its clients.

Our mission is to provide flexible and tailored services to clients needs at all times, becoming both as a technology partner and long-term services partner.

ENE A grupo® aims to become an international supplier reference in product engineering, being identified by a high level of excellence in services and by the ability to respond in a comprehensive, flexible and efficient way to the requirements of industrial enterprises of different sizes and in any location.



Our product engineering services are based upon the following company values:



## Services

What it gives?		
	<b>Innovation solutions</b>	Identification and integration of engineering innovation solutions in order to ensure their clients could use the most efficient and competitive one in each moment
	<b>Concept and design</b>	Generation and analysis of concepts, study of their stability and variability, and detailed definition of design and specifications
	<b>Prototyping</b>	Definition and preparation of product development prototypes
	<b>Development</b>	Specification's definition and performing testing programs for the selection of product specifications, design verification and / or validation of the product
	<b>Industrialization</b>	Support for the industrialization of the product by defining the significant characteristics of systems and components, and control plans
	<b>Reverse Engineering</b>	Advising to improve products, materials and components and / or existing processes
	<b>Project Management</b>	Project management with complete follow-up processes Project Management Professional (PMP) certification by the Project Management Institute (PMI)
	<b>Project Support</b>	Support for client participation in international research and development projects at European and intercontinental level, etc.
	<b>Outsourcing</b>	Providing circumstantial service support and reinforcing the clients technical department, providing them resident engineers or specific hiring

According to the phase of the project, ENEA Grupo® offers the following services:

### 1. Product Design Related Activities:

- Product Concept Phase:
  - ✓ Creativity Tools
  - ✓ Value Engineering
  - ✓ Common understanding of process and performance related key characteristics.
  - ✓ Concept Analysis and Selection
  - ✓ Risk Assessment and Mitigation Plan.
  
- System, Sub-System and Components definition
  - ✓ Design for Six Sigma (DFSS) process - Robust Engineering Tools
  - ✓ Design for Manufacturing & Assembly
  - ✓ Material Selection
  - ✓ Production Process Recommendation
  - ✓ Predictive Behavior
    - Structural / Thermal / Thermo-Structural Analysis
    - Computational Fluid Dynamic
    - Dynamic Analysis
    - Process Analysis
    - Assembly Analysis
  - ✓ Geometric Dimensioning & Tolerances
  - ✓ Tolerances Plan & Statistical Prediction
    - Investigation of design limits- extreme conditions analysis
    - Investigation of process limits - extreme conditions analysis
  - ✓ 3D Models & Drawings





## 2. Product Development Related Activities:

- System, sub-system and components development and validation plans
  - ✓ Individual Tests definition to reduce RPN
  - ✓ Individual Test definition on specific conditions to validate Predictive Behavior expectations
  - ✓ Interpretation of Market Requirements
  - ✓ Interpretation of Customer Specs
  - ✓ Setting Test Acceptance Criteria
  - ✓ Optimizing Testing Plan – DOE
- Testing facilities definition
  - ✓ Tools and Rigs Definition to Function
  - ✓ Specific Tools & Rigs procurement
- System, sub-system and components samples
  - ✓ Prototypes Definition to Target
  - ✓ Geometrical / Functional Rapid Prototyping
  - ✓ Customer Specifications
- Concept / Design validation
  - ✓ Basic Testing
  - ✓ Statistical Analysis
  - ✓ Conclusions on Components Results

## 3. Product Industrialization Related Activities:

- Project management
  - ✓ Global Product Launch Methodology
  - ✓ Six Sigma Methodology (DMAIC)
  - ✓ Design for Six Sigma Methodology (IDOV)
- Suppliers management
  - ✓ Potential Suppliers Evaluation
  - ✓ Consistent link from Design FME&A to Process FME&A
  - ✓ Supplier Support on Manufacturing Severity
  - ✓ Key Characteristics Deployment
  - ✓ Consistent link from Process FME&A to Control Plans
  - ✓ Control Plans



The main differential characteristics of ENEA Grupo® product engineering services are:



**Profitability**

High training and experience to undertake effectively and profitably the projects for clients.

**Quality**

23 years of experience delivering services to the automotive industry worldwide, with the highest quality standards.

**Flexibility**

We adapt our organization, resources and tools to the needs of clients in a flexible and fast way.

**Comprehensive Services**

Comprehensive services capacity, from the definition of the concept to the industrialization process, including comprehensive management and monitoring of the Project.

**Global**

We have offices in three different continents from which we deliver services worldwide, and setting up ad-hoc engineers teams for clients.

**Advanced Equipment**

We provide the latest tools for the design, development and validation of engineering projects, designing ad-hoc client test benches.

**Technology partner**

We can become your trusted engineering partner, accompanying on your challenges of product development in the long term.

**Integrity**

We offer a reliable and honest relationship, with the utmost confidentiality and the possibility of negotiating exclusivity in certain aspects of services.



## Tools and Resources

### CAE - Predictive Engineering

 Modelling and workpiece drawings	 FEA - nonlinear deformations	 FEA - linear deformations	 FEA - Dinamic fluid
 ANFE	 Statistical analysis	 Data analysis	 Dynamic simulation

### Trials

We develop ad-hoc tools for trials, and have access to the resources of our technology partners in order to perform more complex tests for our clients.



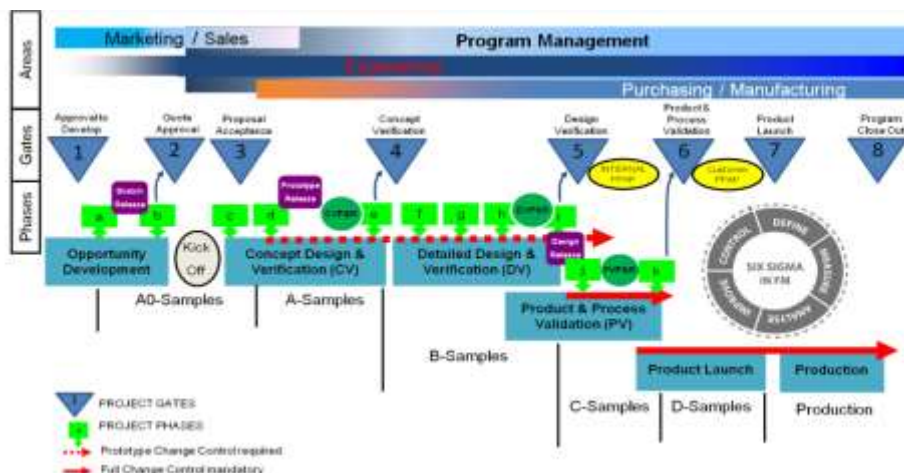
Atomic Force Microscope [Surface characterization]



Climatic Chamber  
 T [-40°C to +140°C (+/- 0.1°C)]  
 HR [10% to 98% (+/- 1%)]

## Process

We can carry out the entire process of design, development, and validation of your product, using our own resources, creating them ad-hoc or by using tools and instrumentation from our extensive network of partners.





## Clients & Sectors

### Sectors

The automotive sector is the original activity of our team, being the basis of our knowledge and experience in applied engineering product development services, enabling us to tackle complex solutions in other sectors.



### Clients and Projects

Due to the high requirements of our Privacy Policy, this information cannot be disclosed.

### Liability

We have comprehensive liability insurance that can cover any potential liability for the work performed by our team anywhere in the world.

## Knowledge Management





## CAE (Computer-Aided Engineering) Department



### Department Functions

- Support to R&D Department
- Seek of Innovation

### Main Capabilities

Development of Multi-physic Models

Mechanic	Thermal
Pneumatic	Thermo-dynamic
Hydraulic	Electrical

Optimization Technique

- Sensibility Analysis
- Target Functions
- Genetic Algorithms (Coming up)
- Monte Carlo Analysis

Parameter Identification

- Correlation Model-Exp. (examples)
  - COF
  - Heat Source due to friction
  - Temperature
  - Wear rate (Coming up)

Data Analysis



## Capabilities

### MULTIPHISICS MODELS DEVELOPMENT

- Mechanical
- Pneumatic
- Hydraulic
- Thermal
- Thermo-dynamic
- Electric

### OPTIMIZATION TECHNIQUES

- Sensitivity Analysis
- Target Functions
- Genetic Algorithms
- Monte Carlo Analysis

### PARAMETER IDENTIFICATION

- Predictive Analysis to Experimental Data correlation

### DATA ANALYSIS

#### FEA

- System and materials characterization
  - Linear & Non Linear Materials
  - Steady & Unsteady
  - Viscosity properties
- Structural Analysis
- Modal Analysis
- Fatigue Analysis
- Creep Analysis
- Buckling Analysis
- Thermal Analysis
- Viscoelastic Analysis
- Acoustic Analysis

#### MATLAB

- Data Analysis
- Frequency Analysis
- Fitting Curves

### FATIGUE ANALYSIS

- SN and EN

### ACOUSTIC ANALYSIS

- Sources, Pathways and Receptors
- Noise Reduction

### VIBRATION ANALYSIS

### SOFTWARE DEVELOPMENT FOR APPs.

- Matlab
- Python
- Visual Basic for Excel
- Excel

#### CFD

- Valves Characterization
- Discharge Coefficient calculation
- Fluid-dynamic

#### SIMULINK

- Modeling of time-dependent Systems
- Operation Analysis

#### MS EXCEL