

EUCLIDE

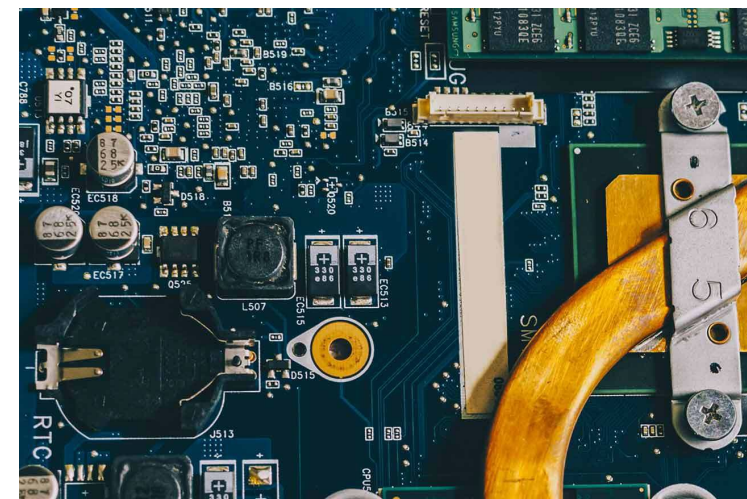
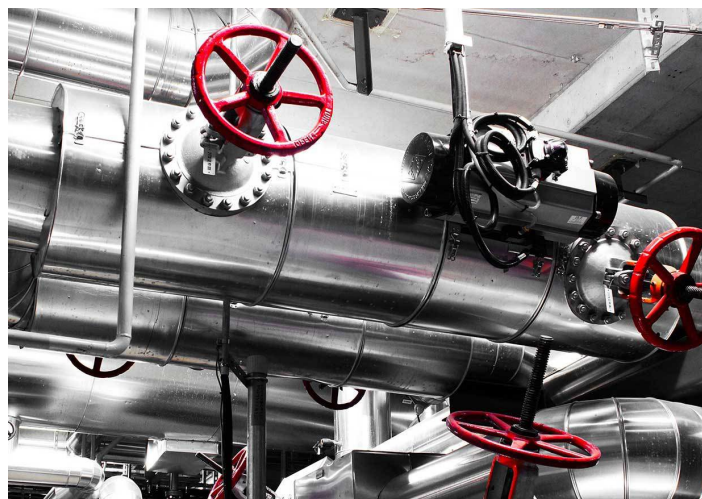
GRUPPO
DESIGN & RESEARCH

COMPANY PROFILE



— ABOUT US

- ✓ The Euclide Group unites **multidisciplinary skills** in the field of engineering to successfully meet the constantly growing number of problem solving requests from businesses.
- ✓ **Across-the-board engineering** for the most ambitious goals: we tackle every project with total commitment and professionalism.
- ✓ We handle with professionalism and confidentiality typical **research and development** flows in their entirety or with specific activities.
- ✓ We support our clients, whether small, medium or large, from the creation of new concepts to design, prototyping and final analysis and quality control: **mechanical, electronic and software development engineering, testing and manufacturing skills in a single partner.**



HISTORY

2006

The Euclide Group was formed in 2006, at the same time as the Archimede engineering firm, a company that is now a member of the Group.

Due to the high added value of its services, Archimede immediately distinguished itself, especially in automatic-machinery-mechanism design, FEM and CFD numeric-simulation development and high-level mechanical design. As a result of its expertise, Archimede was soon commissioned by several of the top players in the automotive, medical and industrial-automation sectors.

2010

In 2010, Euclide was established because Archimede's partners wanted to offer a wider spectrum of high-added-value engineering services with the ambition of becoming a national benchmark for research and development.

2014

In 2014, the company Volt was set up to complete the Group's organisational structure by offering across-the-board engineering services, implementing skills in not only the mechanical, but also the electrical, software development, electronic sector.

TODAY

Today, the organisational structure of the Euclide Group, a public limited company (S.p.A.) with share capital of EUR 1.000.000,00, highlights the stakeholders' desire to interlace and converge technical skills originating from different engineering disciplines.



Euclide Group Headquarter

Our facility, extending over an area of about **2000 m²** (21.500 ft²), includes, in addition to the engineering, administrative and sales departments:

- Polymer **rapid prototyping** workshop
- **Electrical/electronic prototyping** workshop
- **Mechanical prototyping** workshop
- **Mounting and assembly** workshop
- **Metrology** laboratory
- **Quality control** laboratory

GROUP ORGANISATIONAL STRUCTURE

The Group's member companies specialise in different fields, working together in close cooperation to achieve synergy: we offer our clients across-the-board expertise, experience and know-how.



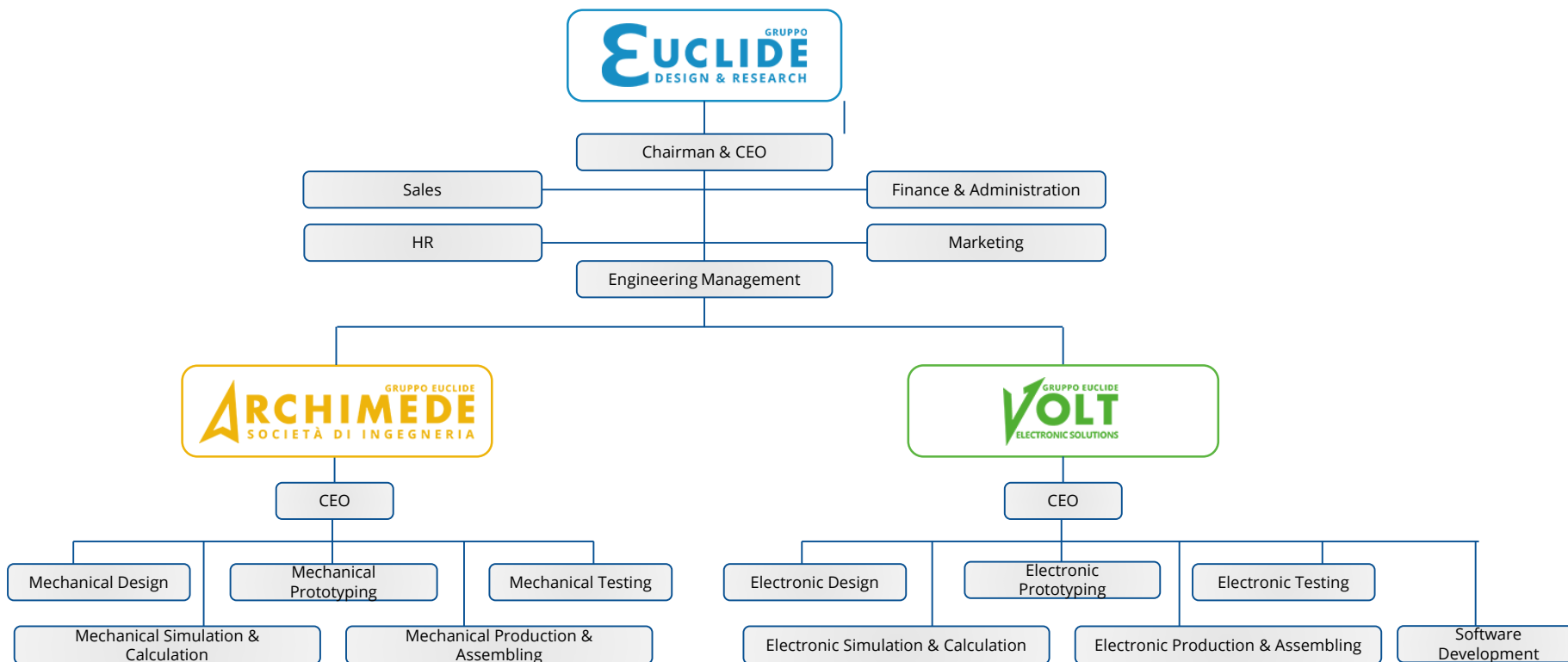
Parent company in which the various skills and means of the subsidiaries converge



Engineering company specialising in the **mechanical** and **analytical** sector



Engineering company specialising in the **electrical** and **electronic** sector



MISSION, VISION & VALUES

We support manufacturers in all activities regarding research, design and development of new products, new services and the optimisation and streamlining of existing ones.

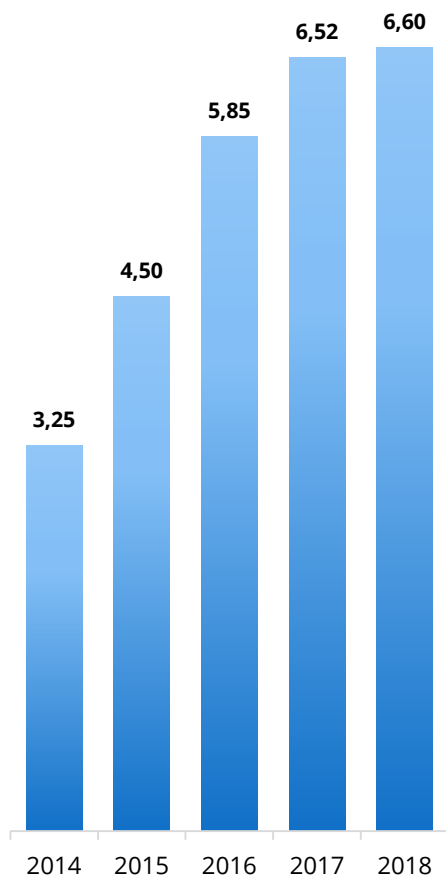
We employ innovative, multidisciplinary methods that allow us to stand out from our competitors regarding both the type and the manner in which we perform our tasks. The Group's companies have exceptional technical skills in the fields of mechanical, electronic, mechatronic and computer engineering and interact in a harmonious, synergetic manner. This concept of multidisciplinary engineering, our core value, is the only way to identify and propose solutions to highly complex issues – solutions in step with our clients' requirements in a rapidly changing world that constantly awaits the arrival of new technology.

When conducting our business, **we conform to the values** that act as our moral and professional guidelines. These help make our organisation a calm and satisfying place for our staff and, at the same time, make Euclide a reliable and trustworthy partner.

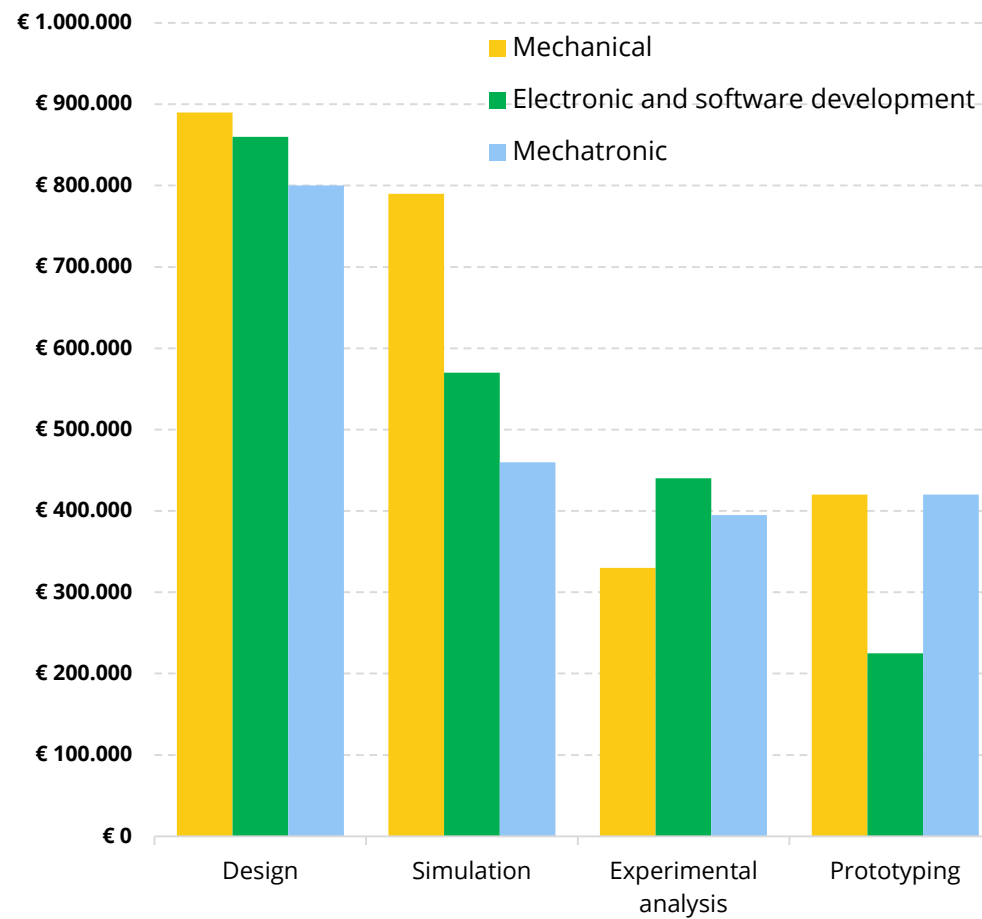


NUMERI DEL GRUPPO

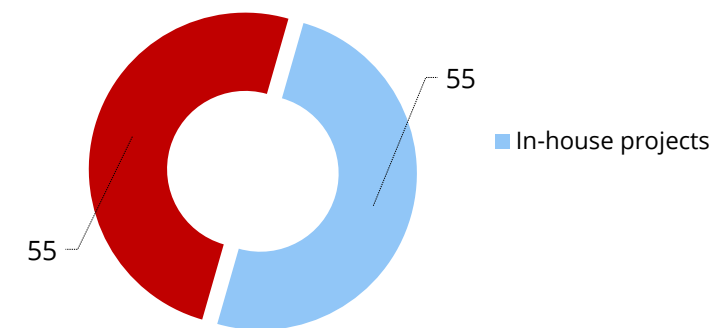
Sales in Mln (€)



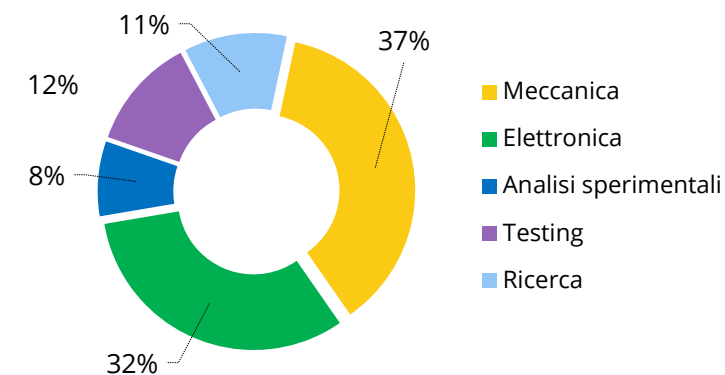
2018 Sales (€) broken dow by activity



Group employees



Allocation of engineering staff



SECTORS

We operate in numerous sectors, with a unique approach based on **cross-sector engineering**:

INDUSTRIAL AUTOMATION



RAIL, AVIATION, MARINE AND AEROSPACE



MEDICAL



CONSUMER GOODS



AUTOMOTIVE AND MOTORSPORT



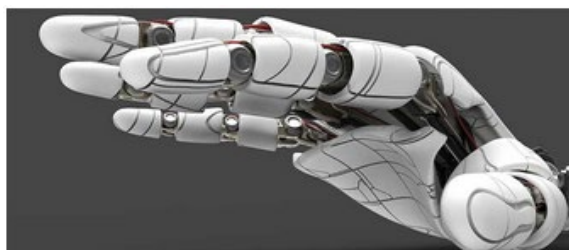
HEAVY INDUSTRY

ACTIVITIES



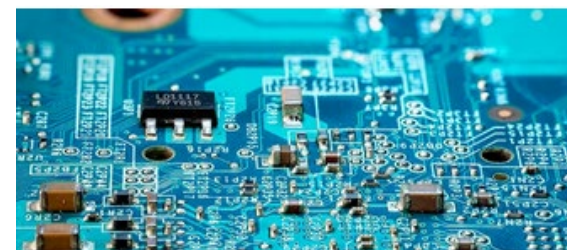
MECHANICAL DESIGN

Euclide group was formed and developed as a mechanical design company.



3D SURFACE DESIGN

3D surface creation, modelling and optimisation.



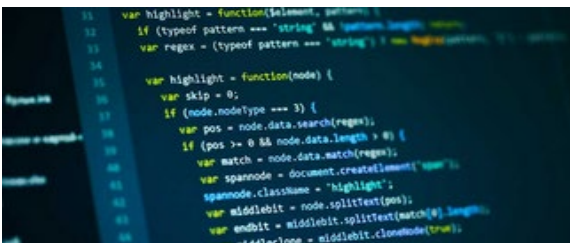
ELECTRONIC DESIGN

A comprehensive service in applied electronics.



MECHATRONIC DESIGN

Projects in mechatronics, demanding close interaction of mechanical, electronic and computer engineering.



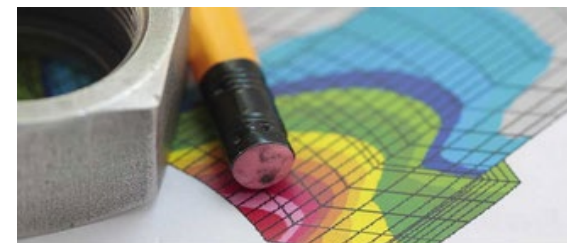
SOFTWARE E FIRMWARE

We are familiar with and develop systems in the industrial sector's most popular software languages.



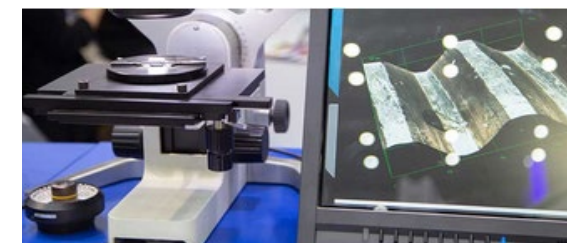
ELECTRONIC SIMULATOR DESIGN

We study, simulate and test production processes for our clients.



NUMERICAL SIMULATION

Analysis, construction and study of numerical models is one of the Euclide Group's main activities.



LABORATORIES

Specialised quality control laboratories.

ACTIVITIES



FAILURE ANALYSIS

We have in-house quality control laboratories: we are designers by nature.



TESTING

Testing and experimental analysis at our clients' premises.



PROTOTYPE CONSTRUCTION

Construction of experimental equipment and components in dedicated laboratories and workshops.



TEST BENCH/RIG CONSTRUCTION

We design and construct custom test benches and rigs.



SUPPLY OF FUNCTIONAL UNITS AND MACHINERY

We can construct the units and machines we design.



TECHNICAL TRAINING

We firmly believes that staff technical training should be a continual process.

ARCHIMEDE ACTIVITIES

SERVICES

Archimede propone soluzioni per:

- Automation design;
- Car and motorcycle chassis design;
- Internal-combustion-engine component design;
- Industrial facility design;
- Prosthetic component design;
- Rigid or flexible body kinematic and kinetic/dynamic simulation;
- Structural simulation (linear, non-linear, buckling, static and dynamic calculation);
- Vibration simulation (modal, FRF, transient);
- Fatigue life estimate (durability) using the σ -N, ϵ -N approach, in accordance with the most recent theories, or based on standards;
- Thermal simulation (conduction, convection, radiation);
- Advanced training, technology transfer and training.

TOOLS

The software platform to be used for design and analysis is chosen with the client based on compatibility and suitability criteria for the specific problem to be tackled. Archimede employs the majority of popular CAD software and calculation codes.

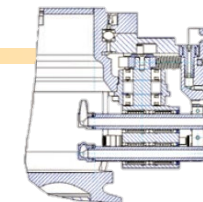
AEROSPACE / AVIATION



Design and optimisation of aviation components. Design of primary and secondary fuselage components. Simulation and sizing of door and hatch opening mechanisms.

PACKAGING / FOOD AND BEVERAGE

Automation unit draft projects. Unit design. Articulated-mechanism kinematic and kinetic/dynamic calculation. Cam calculation and optimisation.



AUTOMOTIVE / TRANSPORT

Motorcycle/car chassis static and dynamic stiffness calculation. Steering tie rod instability analysis. Engine component design and fatigue life estimate. Engine/cylinder block and cylinder head dynamic analysis (modal, frequency response, correlation).



BIOMEDICAL

Knee implant design and simulation. Fatigue test in accordance with sector standards. Internal fixation device design. Electro-medical-equipment component design.



INDUSTRIAL

Gear-pump component design and optimisation. Structural design and calculation based on current standards. Dimensional-measurement-machine unit/assembly design.



VOLT ACTIVITIES

HARDWARE

- Design and prototyping digital (with microcontroller), FPGA, PLD, and analogue boards;
- Electrical and electromechanical machine design;
- Electronically-controlled mechanical and electromechanical test apparatus design;
- Radiofrequency device design and construction;
- Optical and electro-optical device design and construction;
- Embedded test application design, Hardware in the loop (HIL) and software in the loop (SIL) simulator design;
- Reverse engineering of control boards;
- Re-engineering of control boards;
- Assistance with production process and preparation of bill of materials;
- Acceptance test procedure specification.

SOFTWARE

- C, C++ embedded and mobile systems programming: firmware programming on 8-bit, 16-bit and 32-bit (ARM) microcontrollers, FPGA;
- C++, C#, Python, LabView, Matlab/Simulink programming;
- IEC 61131 programming for industrial automation PLC and motion controller platforms;
- Real-time operating system and direct hardware programming;
- Use-case analysis and documentation: sequential diagrams, unified modeling language (UML), state machines and sequential function charts (SFCs), Petri net modelling;
- National Instruments LabVIEW programming for controlling actuators, signal acquisition and real-time signal analysis;
- Dynamic system modelling in the MATLAB/Simulink environment and data analysis;
- Implementation of Hardware in the Loop (HIL) and Software in the Loop (SIL) simulation models, model-based design and model code generation.
- C # software development for the development of CAD applications to support engineering

TESTING

- Electrical, electronic and electromechanical equipment failure analysis;
- Equipment for vibroacoustic, stress-strain, thermal and optical surveys analysis;
- Burn-in testing in a temperature and humidity chamber;
- Electrical resistivity and insulation testing;
- Electronic measurements and checks using test benches and automated instruments (e.g. National Instruments, PLC);
- Man-machine high- and low-frequency electromagnetic compatibility measurements;
- Test and measurement custom equipment design and construction.

MOUNTING AND ASSEMBLY

- Mounting of control boards for prototypes and small production runs using two pick & place machines and a wave soldering machine;
- Wiring of low-voltage switchboard prototypes for industrial automation;
- Wiring of electromechanical-equipment prototypes and test benches/rigs.



```

main.c  Define_io.c  can_event.c  can_func
683     t_payload payload;
684     if (p_message->CANID.field.ack_nack == CMD_
685     {
686         ack_received = TRUE;
687     }
688     else if (p_message->CANID.field.ack_nack ==
689     {
690         payload.length = 2;
691         payload.data[0] = LSB_RELEASE; // L
692         payload.data[1] = MSB_RELEASE; // H
693         // Assuming the request is for the CTRL
694         CanSend2019(CMD_READ_SW_VERSION_CODE, p_
695     }
    
```



LABORATORIES

METROLOGY INSPECTION

- Dimensional checks of complex figures using 3D laser scanner, 3D coordinate measuring machine, profile projector, optical microscopes with motorised table;
- Surface morphology and roughness measurement;
- Thickness measurement of surface coatings such as chrome plating, paint, nickel plating, galvanising, etc.;
- Thickness measurement of coatings on metallographic cross sections.

MEASUREMENT SYSTEM ANALYSIS

- Upon request, drafting of MSA documentation by qualified in-house staff.

REVERSE ENGINEERING

- 3D CAD replicas of physical objects, however complex;
- Supply of CAD 3D models in the main exchange formats (STL, STEP, IGES, etc.) and in the proprietary formats of all major associative and parametric CAD software brands.



EXPERIMENTAL STRESS ANALYSIS

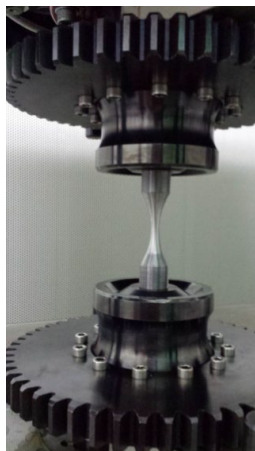
- Measurement of mechanical stress using strain gauges (including during machining) with possibility of wireless signal acquisition (rotating parts);
- Vibration measurement using accelerometers.

STANDARD MECHANICAL AND TECHNOLOGICAL TESTS

- Complete tensile, compressive and flexural strength tests on universal testing machines, both quasi-static and dynamic, including in a temperature chamber;
- Simple bend test, face/reverse bend test;
- Spring characterisation;
- Charpy impact test at room and/or low temperature (up to -196 °C);
- Brinell, Rockwell, Vickers hardness testing, microhardness profiles (seams), Jominy hardenability measurement, U-curve determination.

BESPOKE MECHANICAL AND TECHNOLOGICAL TESTS

- Design and supply of complete test devices designed for specific products or special test conditions in accordance with customer request, including actuators, electronic control unit and software, complying with safety standards.



LABORATORIES

METAL ALLOY ANALYSIS (chemical)

- Optical emission spectrometry (OES) on all types of steel, aluminium and its alloys, copper and its alloys, nickel and its alloys, cobalt and its alloys, zinc and its alloys, titanium and its alloys, magnesium and its alloys, cast iron with recasting in an inert atmosphere;
- Determination of C concentration gradient in carburised or decarburised steel;
- Determination of a sample's compositional homogeneity by mapping;
- Alloy classification;
- Chemical analysis using atomic absorption spectrometry (AAS);
- Inductively coupled plasma atomic emission spectroscopy (ICP-AES);
- Infrared spectroscopy for determination of total C and S content in steel and cast iron;
- X-ray diffractometry (XRD);
- Spectrophotometry (XRF).

METAL ALLOY ANALYSIS (metallographic and microstructural)

- Scanning electron microscopy (SEM) for fractographic and diagnostic investigation with photographic evidence, qualitative and semi-quantitative EDS microanalysis;
- Macroscopic and microscopic examination;
- Definition of the metallographic structure in metal alloys;
- Evaluation of non-metallic inclusions;
- Examination of decarburisation depth in steels;
- Classification of graphite in cast iron;
- Thickness measurement of coatings and layers of oxide, hardened layers, etc.;
- Accelerated corrosion testing;
- Measurement of austenite/ferrite-grain size in steels;
- Measurement of the surface hardening depth produced by case hardening, induction hardening, etc.;
- Material type identification analysis;
- Comparison with metallurgy in published articles.

METAL ALLOY ANALYSIS (tribology testing)

- Valutazione dell'usura dei materiali mediante macchina pin-on-disc.

CONSTRUCTION OF EXPERIMENTAL AND TEST EQUIPMENT

- Our facility has a workshop equipped to build prototypes, bespoke measuring equipment and electromechanical test rigs/benches for process simulation and instrument testing.

CONTAMINATION TESTING

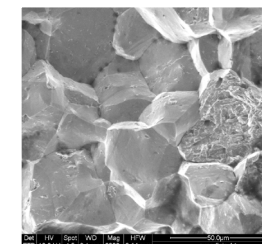
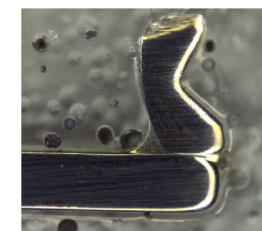
- Gravimetric measurement of contaminant level;
- Dimensional analysis of contaminating particles using an optical and/or electron microscope;
- Identification of contaminating particles using SEM-EDS scanning electron microscopy.

NON-DESTRUCTIVE TESTING

- Ultrasonic, magnetic particle and dye penetrant inspection.

RAPID PROTOTYPING

- Building of prototypes with exceptional surface and dimensional quality;
- Multi Jet Modelling, SLS, SLA, FDM, silicone mould replicas and fused deposition modelling;
- Prototypes for various application sectors: ranging from mechanical engineering to automotive, electronics to medical and design to consumer products, both for functional tests and silicone replicas.



WORKSHOPS



CNC lathe HAAS ST20/ST25Y



CNC HAAS VF4SS



CNC HAAS UMC750SS



EDM SODICK AQ535L



Polymer rapid prototyping workshop



Injection press HAITIAN



Pick&Place MECHATRONIKA



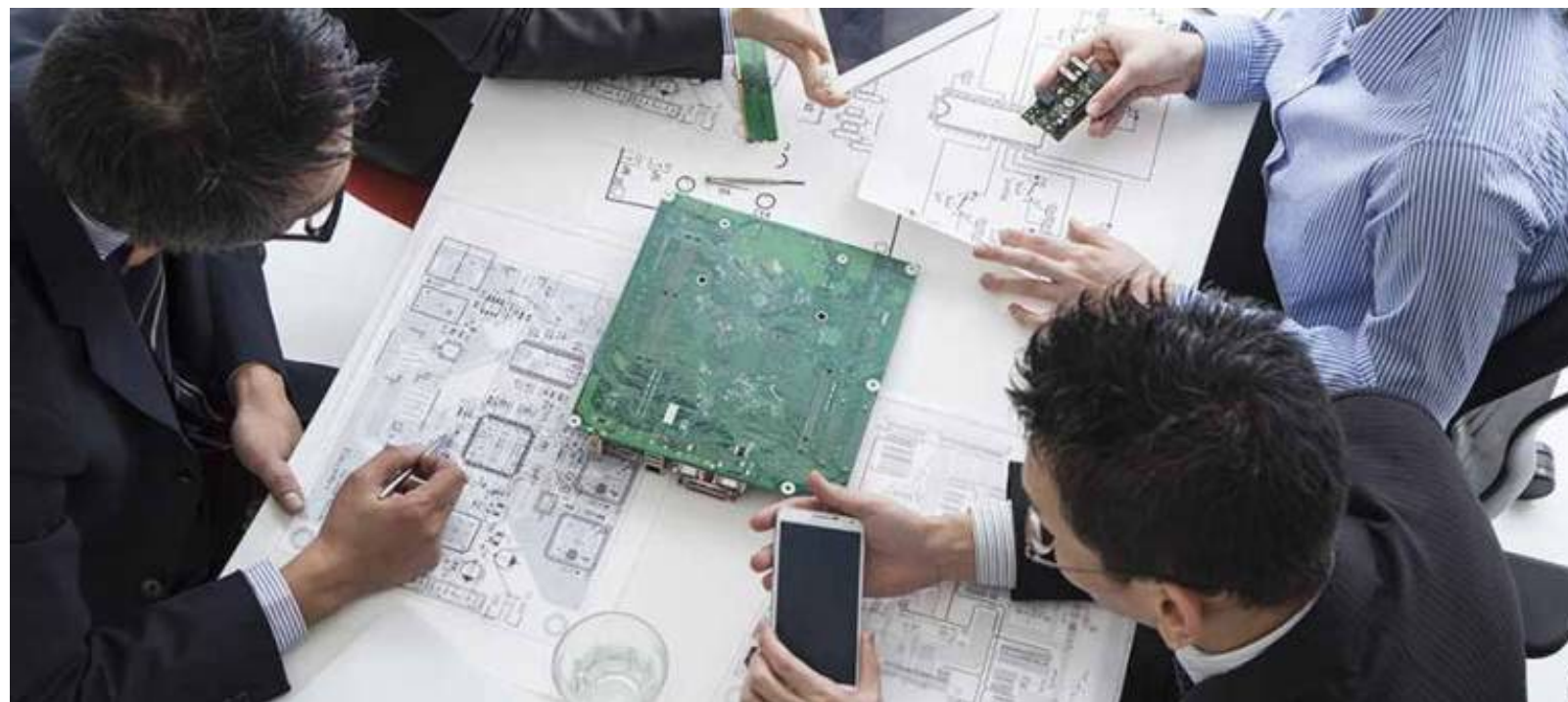
Pick&Place ESSEMTEC

TECHNICAL TRAINING

We firmly believe that **staff technical training** should be a **continual process**.


Our engineers regularly attend seminars, courses and workshops to constantly update and expand their know-how.

In addition to in-house training activities, we **organise technical seminars and workshops for our clients**.





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