MACHINING FACILITIES

Applications

CECOM facilities allow the high precision machining of a large variety of materials.

The main fields of application of our productions are aeronautics and scientific research.
CECOM equipments and organization have been refined along the years in order to fulfil the requirements of these two fields, in terms of precision, reliability, repeatability, quality certifications and application of frontier technologies.

Thanks to our production standards and to our Quality System (ISO 9001 and ISO 14001) we can guarantee the application of reliable procedures for machining, assembling, and testing.

Summary

1 Materials and machining techniques

1.1 Materials

CECOM machining equipments allow the machining of a large variety of materials.
In the following table the most used materials for our products are detailed[1]:

Material / alloy	Applications		
	Scientific research	Aeronautics	Civil / Industry
➢ Copper and copper alloys:			
o CU – OFHC and OFE (101% I.A.C.S.)	●●	○	●
o CuBe	●	○	○
o Brass	●	○	●
➢ Glidcop Al 15	●	○	○
➢ Aluminium and aluminium alloys:			
o Al-6082	●●	●●	●●
o Al-5083	●	○	○
o Al-7075	●	●●	
➢ Stainless steel alloys:			
o AISI 304 / 304L	●	○	●●
o AISI 316 / 316L / 316LN / 316LN(ESR)	●●	○	●
➢ Steel special alloys and special materials:			
o 17-4 PH	○	●●	○
o KOVAR	●	●	●
o INVAR	●	○	○
o INCONEL	●	●	○
o Molybdenum	●●	●	●●
o Tungsten	●	○	○
o Titanium	○	●●	●
➢ Bi-metallic (explosion-bonded) materials:			
o OFHC-Cu / AISI 316LN (or AISI 316L)	●	○	○
o Al / AISI 316LN (or AISI 316L)	●	○	○
➢ Plastics and insulating materials:			
o PVC	●	○	●●
o PEEK	●	○	●
o Nylon	○	○	●●
o MACOR	●	○	●
o TEFLON	●	●	●
o ALUMINA	●●	○	●

Working on each of the above listed material requires a specific know-how in order to obtain the best results from the machining. Thanks to our experience and equipments we can select the machining setup in order to optimize the working cycle of each specific product, improving the performances and reducing the time required for the machining.

[1] Legend of "Applications" symbols:
- ○ : almost not used
- ● : normally used
- ●●: very often used

1.2 Machineries

CECOM machine shop includes several kinds of machineries for the following machining methods:

Milling machining:

- 5-axis CNC milling
- 4-axis CNC milling (2 pallets and 10 pallets)
- 3-axis CNC milling
- 3-axis CNC pantograph
- 3-axis manual milling

Workable dimensions [mm]:
Up to 2600 x 900 x 900

The multi-pallet facility allows a flexible organization of production activities, thanks to the possibility of preparing new parts while other machining operations are in progress. Moreover the multi-pallet equipment can be programmed in order to switch automatically from one work to another, thus improving significantly the duty cycle of the machine. Also the selection of machining tools is programmed and the pre-setting parameters of all tools are loaded into the relative machining programs, in order to guarantee a reliable and continuous machining process.

Lathe machining:

- CNC turning
- CNC turning / milling
- Manual turning

Workable dimensions [mm]:
Up to Ø700 x 1500

The integrated milling equipment is very useful for special applications in which a high accuracy is required, since this facility allows to perform milling operations without removing the lathe machined part from the machinery.

Spark-erosion machining:

- 4-axis wire-eroding
- Spark-erosion drilling

Workable dimensions [mm]:
Up to 750 x 550 x 400

The wire-eroding machining allows to execute special machining of complex parts. Thanks to this technology it is possible to obtain tapered shapes with very high precision (<0.03 mm) overall the length of the machined parts. This technique can be applied to electrically conductive materials.
In order to obtain the best performances from this machine, the relative machining programs are prepared and simulated by means of the MASTERCAM software.

Grinding:

- Linear (tangential) grinding
- Round (cylindrical) grinding

Workable dimensions [mm]:
- Up to 1000 x 400 (linear)
- Up to Ø300 x 500 (round)

By means of this machinery it is possible to obtain a roughness of 0.2 (R_a) on the machined surfaces.

Marking and engraving machines:

We are equipped with several machines and tools for the marking of products. The most used are point-engraving machine, vibrating-pen, air engraving pen and pantograph.
Marking and engraving can be also executed by means of direct machining, if required.

Tools preparation and pre-setting:

An important technology for any kind of machining is related to the preparation of tools, by means of the following facilities:

- Shrinking fitting of mandrels
- Balancing machine for mandrels
- Pre-setting machine for tools

These instruments allow a correct and precise preparation of tools, in order to achieve high rotating speed (up to 20000 RPMs), low vibrations, and high reliability during the machining.

Thanks to the applied technologies it is possible to achieve an accuracy up to 5 μm and a roughness up to 0.2 (R_a).

The complete list of machineries is available at CECOM web site (www.cecomweb.com).

1.3 Reference pictures