

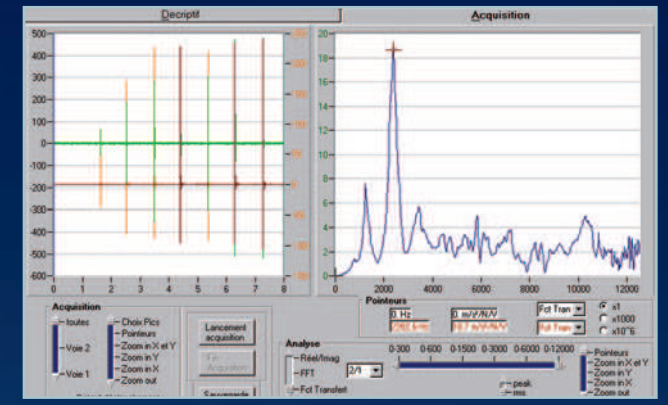
Research & Development

The constant commitment to improving the quality and performance of our tools is the result of close cooperation with our customers and suppliers/partners in Europe.

Continuous attention to the choice of raw materials, research in new geometries with the aid 3D simulation systems and using the best PVD coating technologies; this is our philosophy and our commitment.

In addition, we frequently make use of international research centres to allow us to highlight the margins of improvement and, in consequence, to validate the performance of the tools we have in production.

TEST of FRESAL Milling Cutter type HSC-F Ø20 R=4 LU=58



01) DYNAMIC IMPULSE

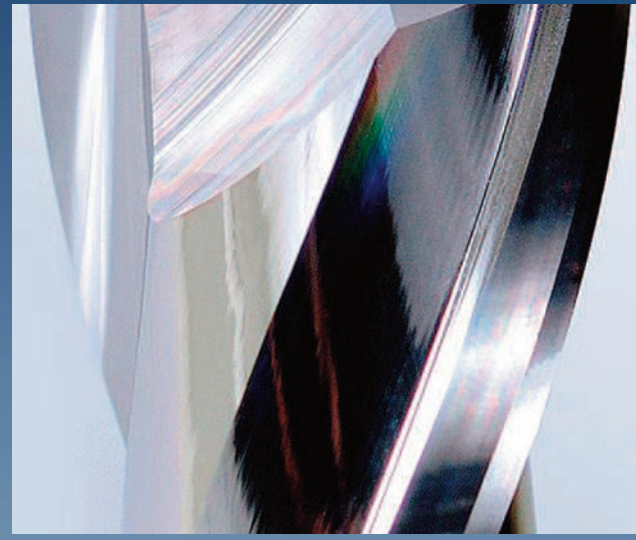
Following a blow with a special hammer, we obtain the natural frequency of vibration of the tool-spindle nose system with the aid of an accelerometer. With this information, we can determine the optimal rotational speed for the machine used in the test (Meteor 10).
n= 23600 rpm

02) TEST AND RESULTS

The objective of our test: finding the maximum volume of chip with a cutting depth (a_{pmax}) of 15mm.
 (Q_{max}) of around 3700 cm³/min.

The energy model used for determining the cutting energy (W) as a function of shaving thickness (h) showed us an extremely low value for the specific cutting energy ($W_{cref}=9,8$).

The high quality of the sharp surfaces shows its full potential.



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FRESAL CATALOGUES

Viewable and/or downloadable from our site:
www.fresal.com

- Carbide Milling Cutters and Reamers
- Steel Milling Cutters and Reamers
- Carbide Drills
- Fresal Reamers

FRESAL BROCHURES

- Aerospace HSC Milling Cutters
- Aerospace Tools

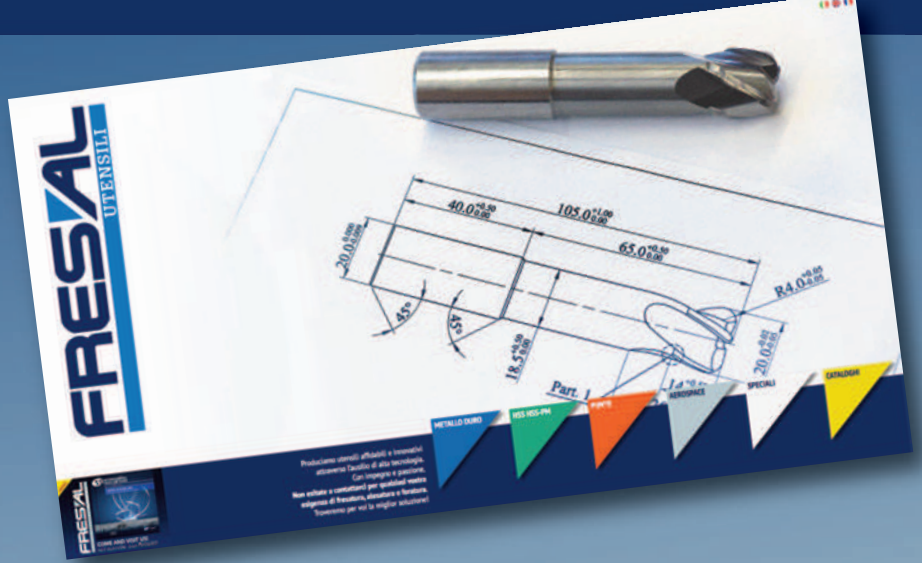


ONLINE QUOTES

You can send us a request for a quote by accessing the "specials" section from our site's homepage and simply indicating one of the preset drawings



www.fresal.com



We manufacture innovative and reliable tools using advanced technologies.

With commitment and passion.



WHO WE ARE

Fresal S.r.l. is an Italian manufacturing company specialized in complete tools for machine cutting.

The company was founded on the initiative of Osvaldo Melon in Turin, in 1996, but boasts a long family tradition in tool making dating back to 1968.

Fresal has always been synonymous with the manufacture of Milling Cutters and Reamers, steadily increasing its know-how over the years and establishing itself internationally as a highly regarded company.

Today, Fresal has its headquarters in Volpiano (Turin), at its company-owned industrial facilities, which house a modern production unit, the technical office, warehouse and logistics, and the sales and administrative offices.

THE FUTURE

The future will bring an increasingly selective and competitive economy. The continuous evolution of manufacturing technologies and the development of new materials are the focus of our commitment in developing programs and solutions capable of ensuring the high quality of our products and services.

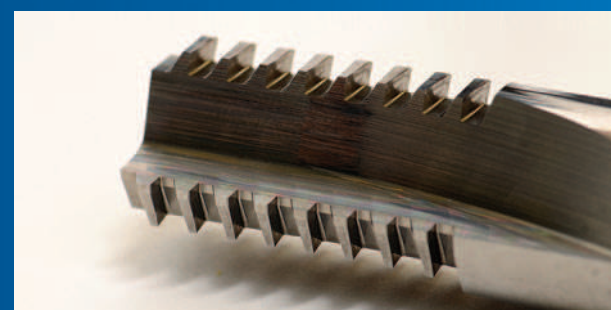


STANDARD TOOLS

The range of standard tools manufactured by Fresal allows meeting the needs of various industrial sectors (Aerospace, Automotive, Energy, Railroad and General Mechanics), comprising **cylindrical cutters, drills and reamers in solid carbide**, as well as **milling cutters and reamers in powder metal (HSS-PM) and cobalt (HSS-E) high speed steels**.

Our range constantly grows with new and innovative articles to offer state-of-the-art solutions and respond rapidly to the variable needs of the market.

A high level of stock availability and stock management based on the Just-In-Time (JIT) philosophy allows us **to deliver orders within 24 hours in all European countries**, including centesimal reamers in HM and HSS with special tolerances!



SPECIALS

We produce special tools in **Solid Carbide, Brazed Carbide, Powder Metal and HSS-E steels** with any type of geometry, profile or tolerance.

We design and make the most appropriate tool starting from the drawing of the machining to be performed and with the aid of 3D simulation software and latest-generation CNC machines.

Our experience combined with the best that technology offers today, enables us to make your tool using solutions with assured functional and cost advantages.

Answering the specific needs of our customers while offering the best solution in the least time is the basis of what we mean by Customer Service.

AEROSPACE

The Aerospace industry is one of the world's industries with the highest technical and quality requirements. Materials with superior mechanical characteristics and constructional specifications with very precise tolerances require the use of high-quality tools.

To have a role in this industrial world in such rapid and continual evolution has always been a stimulus in our quest for continuous improvement.

Every phase of our production process and every product and technology used must be functional to this end.

Among Fresal's strategic objectives is that of offering an increasingly comprehensive range of standard tools and a growing level of know-how in making special tools required in the production and maintenance of aircraft components and structural parts.

Because... only those who dare can fly!



Coatings & Reconditioning

Tool performance plays an important role in modern-day machining, becoming an integral part of the total production cost.

Tools are subjected to stress and extreme conditions that require a **perfect combination of the best geometry and the most appropriate coating**.

We propose **the best of PVD technology for our tools**, guaranteeing high performance and repeatable quality.

A short list of our **STANDARD COATINGS:**

— **AllcuT** The AlCrN structure enables a **significant reduction** in wear across a broad range of working conditions.

— **maXcuT** A new generation of extremely optimized AlTiN coatings. Special conditions of the deposition process allow **reducing stress and the average size of the crystals**, which endows the tool with high performance under medium working speed conditions.

— **SpeedcuT** A TiSiN based multilayer coating, the nanostructure of which endows **extreme hardness** when hot and very high oxidation resistance that enables working at temperatures exceeding 1100°.

Ideal for machining special alloys and abrasive or hard materials at very high speeds and with little lubrication (or dry).

— **DiacuT** Needs a perfectly treated adhesion surface on the tool in order to achieve low roughness and a low friction coefficient. We recommend utilization for machining soft materials with a high tendency to adhere on the cutting edge.

TOOL RECONDITIONING

Tool reconditioning is carried out in the same production shop, using the same technologies and CNC machinery used for making the new tool.

This enables us to give the tool the original geometrical characteristics and allows our customers to reutilize the tool with as-new performance.

