Big challenges, Great solutions!

TOOLS FOR CAST IRON MACHINING

www.fmttooling.com
FREZITE, A HISTORY OF SOUNDNESS AND INNOVATION
Working for the highly competitive professional and industrial segments, Frezite has achieved its growth in sound, sustainable fashion since its foundation in 1978. The company started its activity with the production of high-precision tools for the wood, plastics, composite materials and metals transformation industries and sectors.

The opportunities generated by the surge of the automobile and aerospace sectors have led to the automation of the Metal Division and the creation of the **FMT – Tooling Systems brand**. With head offices based in Portugal and strongly geared towards internationalisation, the Frezite Group already has a consolidated branch network. Developing engineering solutions for different markets, Frezite has been extending its field of action to new operating areas.
GLOBALLY WELL POSITIONED
A touch of innovation based on experience

MISSION
“TO BE AN ORGANIZATION RECOGNIZED FOR ITS EFFICIENCY IN MAINTAINING AND CREATING VALUE.”

VISION
“TECHNOLOGY DEVELOPMENT FOR SUSTAINABLE IMPROVEMENT OF QUALITY OF LIFE.”

VALUES
“INTEGRITY, TEAM SPIRIT AND INNOVATION.”
INDUSTRIES/MARKETS

AUTOMOBILE

AERONAUTICS

ELECTRONIC

MEDICAL

MOULDING

VALVES
PHILOSOPHY

Continued investment in the latest machinery technologies

Local support and service for all product

Commitment to research and development

Investment in expertise to support Key User Partnerships
Internal test centre for new cutting tool designs.

Setting up of machining demonstrations for customers.

Troubleshooting of machining problems.

Development of new machining processes and internal knowledge.
Backed up by the great experience of its engineers in designing high-quality cutting tools – in standard products and customized solutions – Frezite’s Metal Division has become more independent and now works with the FMT – Tooling Systems brand.

Geared up for any challenge, FMT adopts state-of-the-art working concepts, producing innovative tooling systems developed in line with the requirements of each customer.

The company has a Research and Development Centre at which it tests better adjusted solutions to ensure the best performance and returns.

Particularly geared towards meet the needs of the following industries: Automobile, Aeronautics, Moulds, Medical (Instrumental), Electronics, Equipment etc., the FMT brand offers the markets 7 advantages which set it apart.
Your goals are our goals!

Feeling our customers challenges that is part of the solution.

Impossible is not listed on our glossary.

“WE ARE PART OF OUR CUSTOMERS TEAM.”
“WE KNOW HOW TO LISTEN OUR CUSTOMERS.”

We have expertise to understand your challenges and goals, together we will develop the best solution.
“ALWAYS LOOKING FOR THE RIGHT SOLUTION.”

- Flexibility and innovation
- Enlarged portfolio
- The best quality
- The best cost effectiveness
“WE WANT TO BE THE BEST, NOT THE BIGGEST.”

Proximity, efficiency and a speed response are advantages which make working with us unique and easy.

Our commitment, delivery and products

- Solid carbide – 3 to 4 weeks
- Braze carbide – 4 to 5 weeks
- Indexable tooling – 4 to 5 weeks
- PCD milling cutter – 4 to 5 weeks
- PCD drills – 4 to 5 weeks
- Fine boring tools – 6 weeks
- Modular systems – 6 weeks
- Inserts – 4 weeks
- Service – 3 weeks
- Follow up order, less one week

Special service

- Offers in 48 hours max
- Local technical support in 24 hours
- Special delivery from 2 to 10 working days
- Project offers in 2 weeks max
TOOLS FOR CAST IRON MACHINING

The following tools use mainly hard metal ISO inserts which is simplest way to machine ferrous materials. Specific cutting forces can be reduced using positive cutting angles which ease machining, this is important when several profiles are being machined simultaneously which increases the requested spindle power.

PCBN on the other hand will provide longer tool life, combined with an increase in production due to a higher cutting speeds and higher feed rates.

PCBN is also capable of providing better surface finish and tighter tolerances, being in some applications a good alternative to grinding processes.

On this presentation we aim to provide some application examples for combined drilling applications, profile milling and reaming operations.
COMPRESSOR HOUSING

MATERIAL: CAST IRON
DRILL E930.0926

E930.0926 drill is a good example of precision machining, combined with a roughing operation (and chamfering) where a simple cartridge can provide micron to micron adjustment allowing the user to achieve the desired tolerances with ease.

DRILL E931.0710

E931.0710 drill is a 340mm long reach tool, responsible for the machining of multiple profiles.
COMPRESSOR HOUSING

DRILL E931.0712

E931.0712 drill is designed for a long bore, while combining a hard-metal drill on top for a secondary operation.

DRILL E931.0817

E931.0817 is another example of high precision with simplicity, using radially adjustable cartridges.
BRAKE CALLIPEPER

MATERIAL: CAST IRON
GGG55
E931.0771 profile mill is a great example of a sturdy construction, with a specially bimetal body to provide the best process stability.

E931.0770 profile mill completes the profile of the E931.0771 profile mill.

**Material**: GGG55

**Cutting Parameters**:
- S: 400 rpm
- Vc: 74.82 m/min
- Feed: 90 mm/min
- Fz: 0.225 mm

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**Material**: GGG55

**Cutting Parameters**:
- S: 400 rpm
- Vc: 74.82 m/min
- Feed: 90 mm/min
- Fz: 0.225 mm
**DRILL E931.0257**

E931.0257 drill is capable of a high rate of material removal while machining several surfaces simultaneously.

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**REAMER E931.0229**

The E931.0229 “One-Shot” drill is one of the most successful examples in this list due to its capability of reaming to H8 tolerance without previous operations.

<table>
<thead>
<tr>
<th>Machining Centre</th>
<th>BA 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>GGG 55</td>
</tr>
</tbody>
</table>

**Cutting Parameters**

- **S** – 900 Rpm
- **Vc** – 153 m/min
- Feed (initial) – 400 mm/min
- Feed (end of bore) – 250 mm/min
**BRAKE CALLIPER**

**TRIPLE TOOL COMBINATION**

With the combination of tools the customer gains 5.6 seconds per part, which results in a significant reduction of the COST PER PIECE.

<table>
<thead>
<tr>
<th>#</th>
<th>Tool</th>
<th>Time [min]</th>
<th>$ S $ [rpm]</th>
<th>$ F $ [mm/min]</th>
<th>$ F $ [mm/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Milling Cutter ø71.7</td>
<td>0.576</td>
<td>160/300/390/780/150</td>
<td>0.753</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Milling Cutter ø72.05</td>
<td>0.226</td>
<td>500</td>
<td>250</td>
<td>0.203</td>
</tr>
<tr>
<td>3</td>
<td>Boring Cutter ø53</td>
<td>0.365</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Machining Operations:**

- Tool E911 0128: $S$ = 650, $F$ = 160/300/390/780/150, $F$ = 0.753
- Tool E911 0138: $S$ = 500, $F$ = 250, $F$ = 0.203
HYDRAULIC OIL PUMPS

MATERIAL: CAST IRON GGG50
FINE BORING PREVIOUS SOLUTION

Machining advantages of FineBoring One Shot tool:
- Exceptional dimensional precision
- Excellent concentricity
- One shot – Two operations with a single tool
- High quality surface finish
- High production output

Tool Components
- Two microbores
- Two hard metal ISO Inserts TCMT 090209 Cone SK40 (ISO40) DIN69871
- Monoblock construction

The multiple step fine boring E944.0112 is an example of process stability in low support work piece designs. This challenge was met and overcome with a highly complex tool and high precision adjustment.

FINE BORING TOOL (E944.0112)

Tool Components
- Tapper SK40
- 11 Cermet Guide pads ø57
- 4 Cermet Guide pads ø32
- 1 Blade on ø57
- 1 Blade on ø32
- Two component drill allowing for run-out adjustment

Material: GGG50
Cutting Parameters:
- S – 900 Rpms
- Vc – 161 m/min
- Feed – 1.366 mm/mm
- Fz – 0.15 mm

Machining advantages of FineBoring One Shot tool:
- Exceptional dimensional precision
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Cutting Parameters:
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Times Savings (per part machined)

<table>
<thead>
<tr>
<th></th>
<th>Tool change</th>
<th>Machining cycle time (2 boring operations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client’s previous solution</td>
<td>16 secs (2 tool changes)</td>
<td>2 tools = 1 min and 30 secs</td>
</tr>
<tr>
<td>One Shot</td>
<td>8 secs (1 tool change)</td>
<td>1 tool = 50 secs</td>
</tr>
</tbody>
</table>

Financial savings in cycle time reduction

<table>
<thead>
<tr>
<th></th>
<th>16 hours</th>
<th>22 workdays</th>
<th>222 workdays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client’s previous solution</td>
<td>240 €</td>
<td>5.280 €</td>
<td>53.280 €</td>
</tr>
<tr>
<td>One Shot</td>
<td>225 €</td>
<td>4.950 €</td>
<td>49.950 €</td>
</tr>
</tbody>
</table>

Machine plus machinists cost per hour = 15 €
BRAKE WHEEL CYLINDER

MATERIAL: GRAY CAST IRON
Ici il im il de dianosaniquam que quis ella in provide ndandem sam con nonse ped quid ma consed qui ditatur, nulparchita con cullut modit vel est ali int, et quoditisto blabore hendige niscis ad eaquis essi sit etum.
Ad magnam harumendae lam volorecus audae peruptaspid qui conem quiatur re mod minctotas voluptae pro et eaque eaquis idem
CRANK BAR BORE

MATERIAL: CAST IRON CGI
PILOT FINE BORING  [E944.0160]

E944.0160 is a large diameter pilot fine-boring tool for the E944.0161.

Material: CGI
Cutting Parameters:
- S: 500 Rpm
- Vc: 102 m/min
- Feed: 75 mm/min
- Fz: 0.15 mm

FINE BORING TOOL  [E944.0161]

E944.0161 is a large diameter fine boring tool for tight tolerances and concentricity machining.

Material: CGI
Cutting Parameters:
- S: 500 Rpm
- Vc: 102 m/min
- Feed: 75 mm/min
- Fz: 0.15 mm
GENERAL DRILLS

MATERIAL: CAST IRON
ISO ELEMENTS DRILL  E930.0898

With several adjustable cartridges this drill is capable of achieving high tolerances and deal with the inserts tolerances variability.

DOUBLE ANGLE DRILL  E922.2059

With a corner chamfer protecting the cutting edge from the abrasiveness of the cast iron this drills has excelled in tool life parameters, and better hole quality.
The double chamfer also works as a chip breaker while also reducing burr when breaking through.

Material: GGG55
Machine: BA 400
Cutting Parameters:
- S – 2065 Rpms
- Vc – 120 m/min
- Feed – 365 mm/min
- Fz – 0.088 mm
DOUBLE ANGLE DRILL  E922.3196

With a corner chamfer protecting the cutting edge from the abrasiveness of the cast iron, this drill has excelled in tool life parameters, and better hole quality. The double chamfer also works as a chip breaker while also reducing burr when breaking through. The addition of 0.5 land within the flute enabled a better chip control.

DOUBLE ANGLE STEP DRILL  E922.5536

Pormenor de perfil Esc 2:1

#10h6

0.8 x 45°

14.5 x 1.05

#9.065 x 10.005

A 0.005

#10h6

14.5°

1.5

1.5

0.8

0.8

40

55 x 0.2
**“BICKFORD” DRILL E922.3199**

With a combination between the helical and the radius drill, this drill tip combines self-centering capabilities with a long tool life while also enabling higher feeds. These drills can do without previous pilot drilling and produce a reduced burr when breaking through.

**“BICKFORD” DRILL E922.3337**

With a combination between the helical and the radius drill, this drill tip combines self-centering capabilities with a long tool life while also enabling higher feeds. These drills can do without previous pilot drilling and produce a reduced burr when breaking through.
FREZITE Group

Head Office:
FREZIGEST, SGPS, SA
Rua do Vau, 173 · Apartado 134
4786-909 Trofa
T. +351 252 400 360
F. +351 252 417 254
www.frezitegroup.com

FREZITE – Ferramentas de Corte, SA
Rua do Vau, 201 · Apartado 134
4786-909 Trofa
T. +351 252 400 360
F. +351 252 103 279
info@fmttooling.com
www.fmttooling.com

FREZITE – Ferramentas de Corte, SA (FMT)
Rua do Vau, 201 · Apartado 134
4786-909 Trofa
T. +351 252 400 360
F. +351 252 103 279
info@fmttooling.com
www.fmttooling.com

FREZITE – Equipamentos Energéticos & Ambiente, Lda.
Rua do Vau, 323 · Apartado 134
4786-909 Trofa
T. +351 252 400 758
F. +351 252 401 014
energia@frezite.com
www.energia.frezite.com

FREZITE – Ferramentas de Corte, SA
(MF Metal)
Rua do Vau, 201 · Apartado 134
4786-909 Trofa
T. +351 252 103 277
F. +351 252 103 278
pedidos@mfmetal.net
www.mfmetal.net