Thread production in tapered cast holes

Tool concepts for reducing the number of machining jobs
Thread production in tapered cast holes

Tool concepts for reducing the number of machining jobs

With components of cast aluminium, cast iron or similar materials, threads must often be produced in tapered holes left by the casting process in which the blanks for such parts are usually made. In order to cut down on production costs, the common aim in such cases is to avoid reboring the hole before thread production in a separate work process, and to produce the thread in one single work process instead.

There are different tool concepts available for achieving this aim, the construction of a specific tool always depending on the special properties of the hole in the work piece. In accordance with this principle, all the geometric conditions of the work case must be known in order to design the perfect tool.

1. Tapered cast hole
2. Finished thread, re-bored and cut to perfection in one work process

Work piece examples
Application example: Component of cast aluminium GAL

For the machining of this casing, seven threading operations must be performed in tapered cast holes. For this purpose, seven different tool concepts come into play.
Thread production in tapered cast holes

Tool concept A

Thread size: M6

Conventional process sequence

Raw condition
Twist drill
Finished condition

Tool solution

Tap with reaming device

Process sequence

Raw condition
Finished condition
Thread Cutting Technology

Thread production in tapered cast holes

Tool concept B

Thread size: M18 x 1.5

Raw condition

Finished condition

Tool solution

Tap with reaming device and face chamfer

Process sequence
Thread production in tapered cast holes

Tool concept C

Thread size: M5

Raw condition

 Finished condition

Conventional process sequence

Twist drill

Tap

Finished condition

Tool solution

Tap with face chamfer

Process sequence
Thread production in tapered cast holes

Tool concept D

Thread size: M6

Conventional process sequence

- Raw condition
- Twist drill
- Tap
- Finished condition

Tool solution

Drill Tap

Process sequence

- Raw condition
- Finished condition
Thread production in tapered cast holes

**Tool concept E**

**Thread size: M5**

**Raw condition**

**Finished condition**

**Conventional process sequence**

- **Raw condition**
- **Twist drill**
- **Tap**
- **Finished condition**

**Tool solution**

- Tap with face chamfer

**Process sequence**

- **Raw condition**
- **Finished condition**
**Tool concept F**

**Thread size: M 10 x 1**

**Raw condition**

**Finished condition**

**Conventional process sequence**

- Raw condition
- Twist drill
- Counterbore
- Thread milling cutter
- Finished condition

**Tool solution**

MoSys unit with thread milling cutter BGF

**Process sequence**

- Raw condition
- Finished condition
Thread production in tapered cast holes

Tool concept G

Thread size: M6

Tool solution

Thread milling cutter ZBGF

Process sequence
Thread cutting technology

Tool programme

The tool programme is partly available as a standard stock programme, and partly as special production.

**The standard stock programme includes:**
- Thread milling cutters BGF, thread milling cutters ZBGF
- Combination drill taps (applicable for through hole threads)

**As special production, we can supply:**
- Taps for blind hole threads, and special combination drill taps for through hole threads
- Thread milling tools, especially with our easy-to-combine counterbore and stepped-bore system MoSys

Tool technology

Thread production in tapered cast holes

Engineering for your application case with questionnaire for work piece thread

Basically, it is always the strategy of EMUGE to supply a perfectly designed tool with cutting material, coating and geometry tailored exactly to work conditions like work piece material, lubrication, hole type, machining position etc.

Tool construction is of special importance whenever blind holes have to be machined. Wherever work conditions permit the use of standard tools these will be recommended as a preferred choice. In all other cases, we quote specially designed tools which are supplied as custom-made special solutions.

For giving us full information about the technical work conditions of your application, best use the technical questionnaire on page 13 of this brochure.
**Workpiece material:**
- Description: 
- Hardness: 
- Elongation: 
- Tensile strength: \( N/mm^2 \)
- Short-chipping
- Long-chipping

**Thread hole:**
Thread hole type – please enter dimensional specifications:

<table>
<thead>
<tr>
<th>Raw condition</th>
<th>Finished condition</th>
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**Preferred work process:**
- Tapping
- Thread milling

**Machine:**
- Manufacturer: 
- Type: 
- Spindle power: \( kW \)
- Horizontal
- Vertical
- Rotating tool
- Stationary tool

**Cutting data:**
- Speed/rpm \( n \): \( \text{min}^{-1} \)
- Cutting speed \( v_c \): \( \text{m/min} \)

**Feed:**
- Pressure cam
- Lead screw
- Synchronous spindle
- Others
- Hydraulic
- NC control
- Gear wheels

**Feed for thread milling:**
- \( f_z \)
- \( f_b \)
- \( f_b \)

**Tool holder:**
- Rigid
- Collet
- Tapping attachment
- Tap holder
- With overload clutch
- With length compensation
- With axial-parallel floating
- With internal coolant-lubricant supply
- DIN 1835 / 6535 HB
- DIN 1835 / 6535 HE

**Spindle adaption:**
- MT / ISO taper / HSK / TR / Others
- DIN / ANSI / JIS / Others

**Cooling:**
- Oil
- Emulsion \( \% \)
- Dry
- Circulation
- Brush
- Mist
- Minimum quantity lubrication
- Others: 

**Tool information:**
- Design: 
- Article no.: 
- Shank diameter: 
- DIN: 
- Special features: 

<table>
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**Tools used until now (manufacturer):**

**Tool life:** (No. of threads)

Fills in by: 
Date/signature: 

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**Telephone:** 
**Fax:** 
**E-mail:**
## Range of application – Material groups for the available stock programme

### 1. Steel materials

<table>
<thead>
<tr>
<th>Table</th>
<th>Symbol</th>
<th>Condition</th>
<th>Coolant-lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Through hole</td>
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<td>finished</td>
<td>Q-S</td>
</tr>
<tr>
<td></td>
<td>Finished</td>
<td></td>
<td>R-Fe60</td>
</tr>
<tr>
<td>II. Through hole with reverse cut</td>
<td>Raw</td>
<td>finished</td>
<td>9275MP</td>
</tr>
<tr>
<td></td>
<td>Finished</td>
<td></td>
<td>S70</td>
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<tr>
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### 2. Coolant-lubricant

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<th>Hole type</th>
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<td>47 Hz (HL)</td>
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### 3. Materials for special applications

- **Thread production in tapered cast holes**

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</tr>
<tr>
<td>KOMBI</td>
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<tr>
<td>I, II, III</td>
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</tr>
<tr>
<td>1 x d₁</td>
<td>1.5 x d₁ - 2.5 x d₁</td>
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<tr>
<td>E / O</td>
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| ZBGF-T       | ZBGF-H                 |
| I, II, III   | I, II, III             |
| 3 x d₁       | 2 x d₁                 |
| E / O        | E / O                  |

| ZBGF-W       |
| I, II, III   |
| 2 x d₁       |
| E / O        |