GEAR SHAVING TOOLS

Gear shaving tools for finishing pre-hobbed or pre-shaped gears
TYPES OF SHAVING CUTTERS
As one of the largest producers of cutting tools worldwide and with particular expertise in shaving technology, we offer a wide range of shaving cutter types:
- Transverse
- Diagonal
- Diagonal-underpass
- Underpass
- Tangential
- Plunge
- Internal/external shaving
- Unground or finished shaving cutters
* All tools are supplied with inspection and lead test charts

DIMENSIONS
- Module 0.7 - 10 mm*
- Max. width 65 mm
- Outside diameter 70 - 330 mm
*All shaving cutter serrations from 0.7 up to 0.99 are formed by turning.

MATERIAL
It is possible to choose from different conventional HSS or powder steels.
- M2
- ASP 2023
- ASP 2030

SERVICE
From design to delivery, all processes are carried out in-house and Samputensili shaving cutters are manufactured on our own process machines.

Our service centers in Europe and the United States reground all types of shaving cutters - regardless of who produces them - on the very latest grinding machines available.

In certain areas collection and delivery services are available. We can even offer complete CMS (Commodity Management System) solutions. We would be delighted to answer any specific questions on tool management or tool application parameters you may have.
In 1949, Samputensili started the production of gear cutting tools. At that time, quality requirements were not satisfied by the production machinery available on the market. It was from this demand that Samputensili began developing its own manufacturing solutions for high precision gear tooling.

These production requirements led to many technological innovations, including our shaving technology which began in the early 1960's.

Today, the most critical operations in terms of quality are performed on Samputensili process machinery, which is now into its fourth generation of development. Samputensili also produces special production tooling in-house to guarantee high quality standards maintaining control of costs.

**From top to bottom:**
A Samputensili developed serrating machine is used to cut serrations on shaving cutters to the strictest tolerances. The Samputensili S 400 GS shaving cutter and master gear profile grinding machine used as part of the production process and for tool resharpening. Customers may purchase this machine to resharpen tools in-house. The machine is equipped with direct drive torque motors and an integrated on-machine measuring system.

Samputensili serrating tools which are used on our serrating machines
UNDERPASS SHAVING

Underpass shaving is basically the same as diagonal shaving but with a diagonal angle of 90 degrees. With underpass shaving there is no axial table reciprocation. Instead, the workpiece reciprocates perpendicularly to its own axis. The shaving cutter must be wider than the gear to be shaved and its serrations must be placed on a helix. All tooth corrections must be made to the shaving cutter, as it will not be possible to realize them through axial movements on the machine.

DIAGONAL-UNDERPASS SHAVING (*)

Diagonal-Underpass shaving is diagonal shaving but with a very large oblique angle. With each reciprocation radial feeding of the shaving cutter occurs. The oblique angle is in general between 40 and 90 degrees. Since the oblique angle may be very large, this method is also suitable for shaving shoulder gears, but it is important to use shaving cutters with similar characteristics to plunge-type shaving cutters.

TANGENTIAL SHAVING (*)

With tangential shaving the oblique angle is between 60 and 90 degrees. The table stroke is in the direction of a tangent. The shaving cutter must be wider than the gear to be shaved and its serrations must be placed on a helix in order to produce the relative tooth flank feed. Plunge shaving is particularly suited to shaving shoulder gears. In this case, however, all tooth modifications must be made to the shaving cutter, as it will not be possible to realize them through axial movements on the machine.

(*) these shaving methods are only application variants but are particularly used in the automotive industry.
# FAX QUOTE/ORDER FORM

**Customer No:** _________________________  
**First/last name:** _________________________  
**Company:** _________________________  
**Department:** _________________________  
**Tel:** _________________________  
**Fax:** _________________________  
**E-mail:** _________________________  

- [ ] Inquiry  
- [ ] Order  

**SU-ID-No.:** _________________________  
**Workpiece drawing no:** _________________________  
**Tool drawing no:** _________________________  

**Shaving method:**  
- Transverse  
- Diagonal  
- Diagonal-Underpass  
- Tangential  
- Plunge  

**Shaving cutter type:**  
- For external gears  
- For internal gears  

**Shaving cutter data:**  
- No. of teeth: _________________________  
- Normal module: _________________________  
- Pressure angle: _________________________  
- Helix angle: _________________________  
- Direction of helix: Right  
- Left  
- Width: _________________________  

**Workpiece data:**  
- No. of teeth: _________________________  
- Normal module: _________________________  
- Pressure angle: _________________________  
- Helix angle:  
  - Right  
  - Left  
- Outside diameter: _________________________  
- Width: _________________________  

**For shoulder gears:**  
- Shoulder diameter: _________________________  
- Distance from gear: _________________________  

**Tool clamping:**  
- Bore:  
  - Ø 63,50  
  - Ø 100,00  
  - Other: _________________________  
- DIN138  
  - Hole diameter: _________________________  
  - Hole centre distance: _________________________  

**Orders without drawing:**  
- Outside diameter: _________________________  
- Root diameter: _________________________  
- Tooth depth: _________________________  
- Start of active profile: _________________________  
- End of active profile: _________________________  

**Pre-shaving tool data:**  
- Start of active profile: _________________________  
- End of active profile: _________________________  
- Start of root radius: _________________________  
- Start of undercut: _________________________  

**Quality:**  
- Unground  
- Finished  
- Involute unground  
- Outside diam. unground  

**Material (High alloy ASP-Steels):**  
- M 2 (HSS-E)  
- ASP 23 (PM)  
- ASP 30 (PM)  
- Other: _________________________  

**Quantity:**  
- 1 piece  
- 2 pieces  
- 3 pieces  
- 4 pieces  
- 5 pieces  
- ____ pieces  

**Remarks:**  
- _________________________  
- _________________________  
- _________________________  
- _________________________  
- _________________________  
- _________________________  
- _________________________  
- _________________________  

Please send the completed form to:  
**Fax:** 847-649-0112  
**Tel:** 847-649-1450  
**E-mail:** sales@star-su.com
CERTIFIED EFFICIENCY
At Star SU, we produce shaving production machinery at above average speeds, with high precision and quality standards. All steps in the production process, from the cutting of the base cylinder to final quality inspection are optimized. The strict compliance with our precise, and well-defined, quality system is guaranteed by UNI EN ISO 9001 quality certification, which we have held since 1996.

Photos to left:
A wide range of materials are available at all times - cutting base cylinder to size
Turning of a shaving cutter body
Engraving shaving cutter data
Pre-milling of teeth
Quality checks after each process - complete shaving cutter geometry inspection
Serration of shaving cutter grooves
Hardening of a shaving cutter in salt baths to minimize distortion
Bore and face grinding
Final quality inspection

Below:
A book about gear shaving
No problem. Samputensili delivers each tool with a user-friendly resharpening diagram, enabling you to monitor the life cycle of your tool and directly control the resharpening process, provided you have the right equipment for this high quality process.

Our expert engineers are always ready to support you with assistance or advice. For those customers who would rather take advantage of our wide range of tooling services, we can guarantee the highest possible quality standards of resharpening using modern Samputensili grinding machines.

1. Points that touch the root diameter of the gear
2. Points that touch the root radius of the gear
3. Points that produce the start of the undercut after shaving
4. Points that produce the start of the undercut after milling
5. Points that generate the start of the active profile (SAP)
6. Points that generate the end of the active profile (EAP)
7. Lines of even contact 4-2-4
8. Lines of even contact 4-4-4-4
9. Lines of even contact 6-4-6-4-6

Tool design and optimization are based on decades of experience of our shaving cutter design engineers. Unique software developments implemented on our shaving cutter grinding machine, combined with our test programs, means highly precise and efficient re-sharpening of your tools.

**WOULD YOU LIKE TO RESHARPEN YOUR OWN TOOLS?**

1. Star SU software for the design and optimization of shaving cutter applications
2. Samputensili software for twisting profile corrections on Samputensili shaving cutter grinding machines
3. Samputensili software for the design and optimization of serration positioning
4. Samputensili post shaving gear simulation software

**STAR SU SOFTWARE SOLUTIONS ARE THE CORNERSTONE OF OUR MISSION TO PROVIDE GOOD SERVICE**