

GEAR SHAPER CUTTERS





DISC TYPE, SPUR AND HELICAL, INVOLUTE GEARS

The most common body type of gear shaper cutters, in the form of a disk with a precision central mounting hole. Disc type cutters are made either with a shoulder or a flat back.



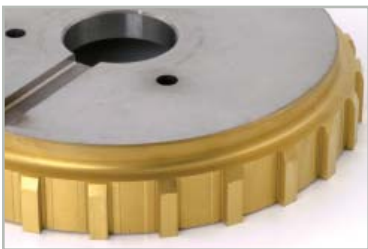
DEEP COUNTERBORE

Similar in design to a disk type cutter, the deep counterbore has an increased height (or axial length). This design is typically made to “reach” a gear element without interfering with the fixture, or to keep the retaining nut nested behind the cutting face throughout the life of the cutter.



TAPER SHANK TYPE

A shaper cutter designed with an integral taper or straight shank which mounts directly in the machine cutter spindle, or in an adaptor to the machine cutter spindle.



NON INVOLUTE GENERATING

INTERRUPTED TOOTH SPACING



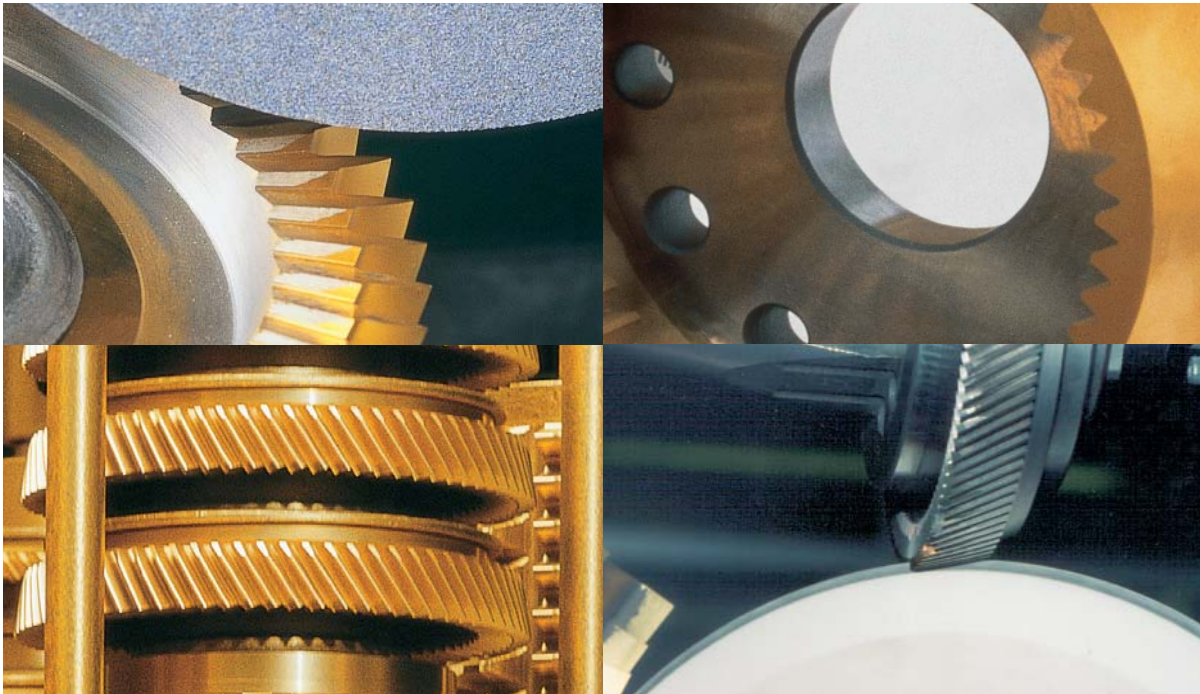
HELICAL TYPE



HUB TYPE

A design style, usually offered between standard shank and disk cutter diameter sizes, that can be mounted to a machine cutter spindle having no taper hole without the use of an adapter.





SHAPING THE FUTURE

Fellows gear shaper cutters have been available since the development of the first Fellows gear shaping machine by E. R. Fellows in 1896.

Fellows gear shaper cutters are now manufactured by Star SU, purchaser of the Fellows cutter division.

UNIQUE DESIGN CAPABILITIES

Star SU offers a unique computer design capability by integrating Fellows rich cutter design experience in modern computer systems.

The system provides both customer and manufacturing data from a single input source reducing potential errors.

COMPLETE SHAPING TECHNOLOGY SOLUTION

Star SU has partnered with Bourn & Koch, purchaser of the Fellows machine division assets, to provide complete gear shaping application solutions worldwide.

Star SU manufactures gear shaper cutters in the United States, Italy, France, and Brazil to better serve the market place.



SHAPER CUTTERS, MATERIALS, COATINGS AND SERVICES

**CUTTER TYPES**

- Spur and helical, involute and non-involute
- Disc type
- Deep counterbore type

The above cutters are available in the following range of dimensions:

- Module (DP) range 0.5 - 8 mm (50 - 3.175")
- Min pitch diameter 20 mm (0.787")
- Max whole depth 19 mm (0.75")
- Max diameter 250 mm (9.84")

- Taper shank type

Available in four sizes:

- 1.0625" .6235" tp
- 0.700" # 2 Morse
- 0.475" # 1 Morse
- 0.250" # 2 Jarno

- Internal type
- Special cutters

For chain sprockets, cams, splines, timing gears and large module cutters

Star SU designs and manufactures special cutters for both involute and non-involute applications. Special cutters are available as precision ground cutters for finishing, pre-shaving, pre-grinding and roughing operations and as unground cutters for a variety of chain sprockets.

Our special cutters can be supplied with the following profile modifications:

- Chamfer or semi-topping
- Protuberance
- Modified flank for tip relief
- Modified pressure angle
- Full topping
- Combinations of modifications above

To order special cutters you may use the included order sheet



MATERIALS

We offer many types of high speed steels from stock. Depending on the application, standard or premium grade material is used. Our most popular grades are:

- M4
- CPM Rex 45, 54 and 76
- T-15
- ASP-steels can be supplied on request.

COATING/STRIPPING/RECOATING SERVICES

Our Blazer coatings reduce abrasion and can increase corrosion resistance and tool life up to 5-10 times depending on the application.

- TiN
- TiCN
- TiAlN
- Other coatings can be supplied on request.

RESHARPENING SERVICES

Our service centers in Michigan, Ohio, Illinois, South Carolina, and Saltillo provide you with what you really need: fast turnaround of high-precision sharpenings. In many areas pickup and delivery services are available.



When ordering special cutters, a detailed drawing of the part to be cut should be furnished. Your information MUST include the following data.

CUSTOMER DATA

Star SU Customer-No.(opt.): _____
 Company name: _____
 Department: _____
 Request by (first/last name): _____
 Tel: _____
 Fax: _____
 E-mail: _____

Quotation Order

PART DATA

Star-SU part-ID-no. (opt.): _____
 Workpiece drawing no: _____
 Workpiece type External Internal
 Number of teeth _____
 Diametral pitch (DP) _____ Module _____
 if helical, please specify Normal Transverse
 Pressure angle _____
 if helical, please specify Normal Transverse
 Major dia. _____ Minor dia. _____
 Helix angle _____ Lead _____
 Hand of helix Right Left
 Depth of cut _____
 T.I.F. diameter _____
 Tolerance _____
 Root fillet radius _____
 Cutting operation Rough Finish
 Pre-shave* Pre-grind Pre-finish
 *supply pre-shave shape including undercut!

Chordal Addendum _____
 Tooth thickness _____
 Measuring over pin/balls _____
 Pin/ball diameter _____
 Span reading _____ No of teeth _____
 Material to be cut _____
 Hardness at time of cutting _____ HBN __ HRC

MATING PART

Part number _____
 Number of teeth _____
 Major dia. _____ minor dia. _____
 Center Distance _____
 Backlash _____

CUTTER DATA

Star SU-tool-ID-no.(opt.): _____
 Tool drawing no: _____

Type of cutter Disc Deep counterbore
 Shank* Internal**
 Special profile***

Diameter _____
 Hole size _____
 Type of keyway _____

*If shank cutter, specify Taper size Tapped hole
 Flange

**If internal cutter, specify _____
 Face width _____
 Clearance required for clamping fixture _____
 Depth of recess, if teeth are recessed _____
 below top surface of blank _____

***If special cutter specify application (e.g. chain sprockets, cams, splines, timing gears, etc.) _____

Profile modifications Corner radius
 Chamfer or semi-topping
 Protuberance
 Modified flank for tip relief
 Modified pressure angle
 Full topping

Specify special quality: _____

Material: M4 Rex45 Rex54
 Rex76 T-15

Other materials are available on request.

Coating: TiN TiCN TiAlN

Specify other coating: _____

Number of pieces: _____

Remarks: _____

Please send the completed form to:
 Fax: 847-649-0112
 Tel: 847-649-1450 E-mail: sales@star-su.com

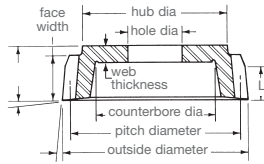


DEFINE YOUR CUTTER REQUIREMENTS

CUTTER TYPES

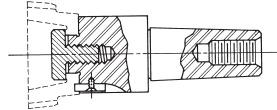
DISC TYPE

The most common type, normally installed directly on the cutter spindle.



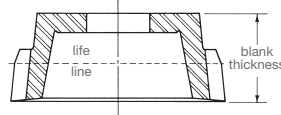
DISC TYPE ON ADAPTER

Disc type cutters are also used on adapters, especially when the size required is between a disc and taper shank cutter.



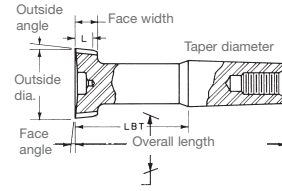
DEEP COUNTERBORE TYPE

Similar to disk type, except the blank thickness is increased to position the cutter holding nut or screw above the cutter's lifeline. Normally used for cutting internals, cluster or shoulder gears.



TAPER SHANK TYPE

Generally used in cutting small pitch diameter internal parts. The cutter length below the taper must be adequate for the face width of the gear to be cut, plus the required overtravel at the bottom of the machine stroke and available life in the cutter. The workholding fixture or a recess of the gear teeth in the blank may require extra length. Taper shank type cutters are made in four taper sizes, as measured at the large end of the taper:



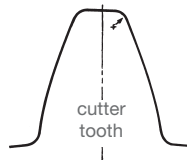
Taper diameter	Taper type
1.0625"	.6235" tpf
.700"	# 2 Morse
.475"	# 1 Morse
.250"	# 2 Jarno

Pitch diameter of the cutter should approximate the diameter of the taper. Flutes can be added to long cutters of small pitch diameter to minimize deflection when cutting.

PROFILE MODIFICATIONS (SHAPER CUTTER TOOTH SHOWN)

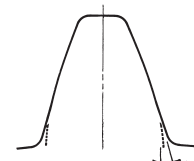
CORNER RADIUS

Corners of cutter teeth are radiused to produce a controlled fillet in the root corners of the gear being generated - adds strength to gear and improves tool life.



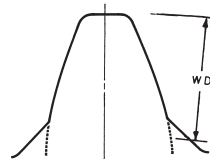
MODIFIED FLANK FOR TIP RELIEF

Root of cutter is filled more gradually than chamfering cutter - removes a small amount of profile form tops of gear teeth - often desirable in high speed gears to minimize noise and tip bearing resulting from tooth deflection under loads.



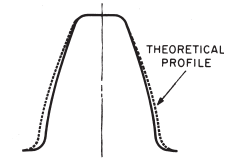
CHAMFER OR SEMITOPPING

Root of cutter is filled in to generate a sharp corner break or chamfer on the tips of the gear - minimizes tip build-up during heat treatment due to nicks incurred during handling.



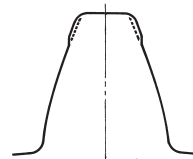
MODIFIED PRESSURE ANGLE

The cutter tooth profile is ground to a slightly lower pressure angle to provide for a constantly increasing amount of stock from root to tip of the gear generated - another method of providing relief for subsequent finishing operations.



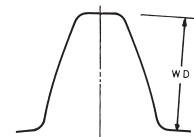
PROTUBERANCE

Cutter tooth profile is built up on the cutter tip to provide an undercut near the root of the gear being generated - provides relief for subsequent finishing operations.



FULL TOPPING

The cutter tooth is ground equal to the whole depth (WD) of the gear tooth. The outside diameter of the gear is "topped" to size when the teeth are cut.



GEAR SHAPER CUTTERS



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Star SU LLC, Hoffman Estates/Illinois



- Tools Service Center
- Tools Manufacturing Site
- Tools Service Center – Planned

