

# Internal Turning with IFANGER Boring Tools

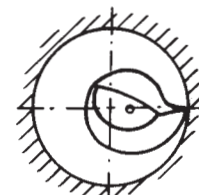
## Fitting of replacement cutters on shanks



The fitting of replacement cutters must be done with great care. Screw the cutter on by hand, without forcing it, until it is in place. Then set a narrow carrier on it, in such a way that its screw rests on the rake of the cutter (see illustration); finally give the lathe dog a few knocks with a hammer.

## Boring tool position

The cutting edge and the axis of the tool are normally set at centre height. However, with a view to increase the clearance angle in small bores, the cutting edge and the axis of the tool can be set 0.1 to 0.5 mm above the centre of the bore.

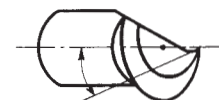


## Resharpener of IFANGER boring tools

The original rake angles on boring tools IFANGER are as follows:

Boring tools ASB:

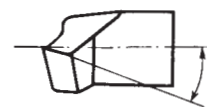
of HSS-CO, HSS, TiN-coated	20°
with carbide tips for steel	20°
for cast iron	15°



The cutting edge must always point to the center.

Bottoming and facing tools ECS axial:

of HSS-CO, HSS, TiN-coated	20°
with carbide tips for steel	20°
for cast iron	15°



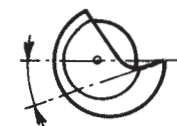
Bottoming and facing tools ECS radial:

of HSS-CO, HSS, TiN-coated and with carbide tips	10°
---	-----



Grooving tools NUS, SEN, HAS, GRS  
Tools FLG for cutting square threads:

of HSS-CO, HSS, TiN-coated	20°
with carbide tips: for steel	20°
for cast iron	15°



Thread cutting tools GWS and tools TRG  
for cutting trapezoidal threads:

axial and radial	0°
------------------	----



The face for chip evacuation should, if ever possible, be hollow ground.

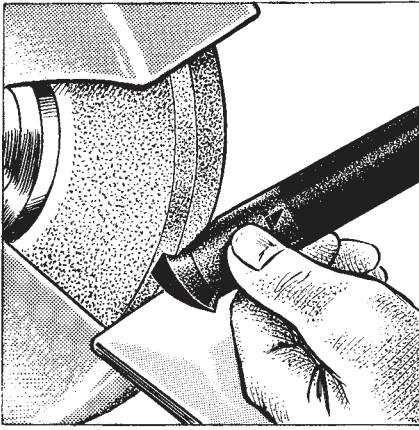
## Recommended rake angles on ASB, ECS, NUS, HAS, GRS and FLG:

Material to be machined	Rake angles	
	HSS-CO, HSS and TiN-coated	Carbide tipped
Steel 30–50 kg/mm <sup>2</sup>	25°	20°
Steel 50–80 kg/mm <sup>2</sup>	20°	15°
Grey cast iron	10°–15°	10°
Aluminum	30°	20°–25°
Copper	30°	20°–25°
Brass	0°–10°	0°–10°

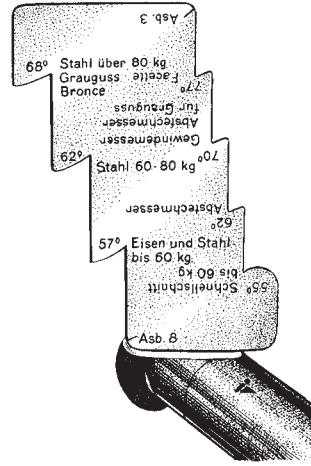


# Freehand-Resharpener of Boring Tools IFANGER

Boring tools ASB and Facing and Bottoming tools ECS

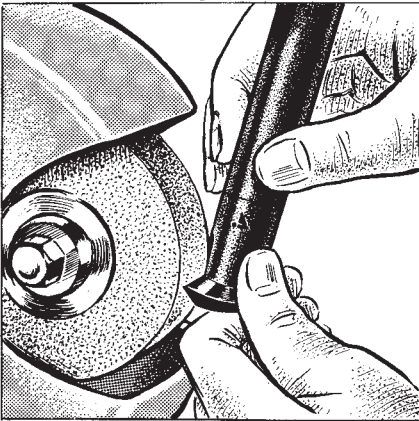


Manual resharpener with IFANGER tool grinding machines for freehand grinding.  
 Recommended equipment of grinding machines:  
 Grinding wheels of aluminumoxide 46 and 60 J for HSS-CO and HSS.  
 Grinding wheels of silicone carbide of 46 to 120 grains per square inch,  
 hardness H for carbide.



The check of the rake angle and of the height of the cutting edge can be done with the IFANGER universal grinding gauge.

Internal thread cutting tools

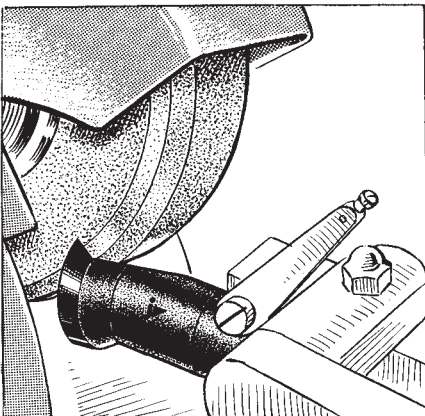


Manual resharpener.  
 Diameter of grinding wheel: 50 to 100 mm.  
 Grinding wheels of aluminumoxide 60 J for HSS-CO and HSS.  
 Grinding wheels of silicone carbide 80 H or diamond grinding wheels for carbide.



The flow of the chip is thru the center of the V. A small-diameter grinding wheel will produce a sufficient hollow-ground top.

# Mechanical Resharpener of IFANGER Boring Tools ASB and ECS



Resharpener with sharpening fixture or mechanical sharpening machine.  
 Special grinding wheel of aluminumoxide for HSS-CO and HSS.  
 Special diamond grinding wheel for carbide.

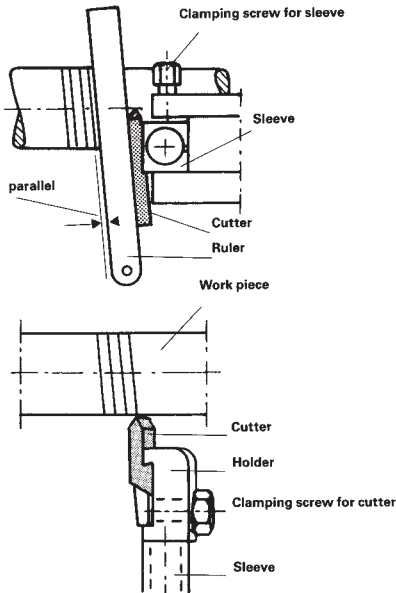


# Turning with IFANGER Turning Tools

## General remarks

The primary condition to be watched for when using IFANGER turning tools is that the numbers indicating size of cutters and holders are identical. Generally, the indications regarding type of tool have to be identical as well. In this connexion, however, there are exceptions to the rule. In these cases, tool holders suitable for use with such cutters are indicated in the technical description of the cutters.

Furthermore, it is important to keep clamping faces on cutter and holder absolutely clean, as dirt can increase tensions and brake the cutter when being clamped into the holder.



## Roughing and side cutters

To reach best cutting capacity and tool life set the roughing cutters A, B, X and Y and the side cutters D and E over the center at about 3% of the turning diameter (carbide tipped cutters only 1%).

## Parting cutters

When parting the cutter should be set over the center at approx. 3% of the diameter of the groove and for a complete cut off the cutter should be set at approx. 0.2 mm over the center. On older lathes it is recommended to use the holder GHS and to cut off in reverse.

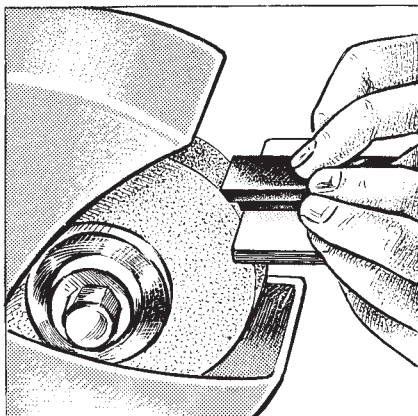
## Threading cutters

In comparison to the angle of screw thread the angle on the cutter is adjusted. Therefore, and in order to keep this adjustment upright, the rake angle should be resharpened exactly in accordance with the IFANGER grinding gauge (see page 31).

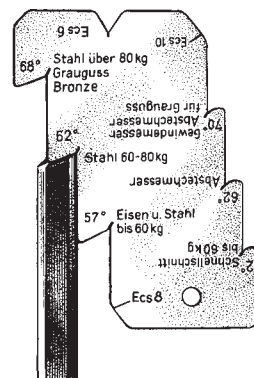
To reach the correct angle of inclination of the cutter in relation to the angle of pitch on the work piece, the following procedure is recommended:

- 1) After having fixed the work piece on the lathe introduce the IFANGER tool holder in the turret and tighten the fixing screw slightly. Set the cutter at the correct height of center and give the cutter the estimated inclination of pitch of the thread by twisting the cutter and the holder in the sleeve. Tighten the fixing screw rigidly.
- 2) After having selected on the lathe the pitch required mark a few threads on the work piece with the cutter.
- 3) Loosen the screw holding the sleeve in the turret. Lean a ruler against the cutter and twist ruler, cutter and holder so that the ruler be placed absolutely parallel to the marks of thread on the work piece. Now the clearance angles on both sides of the cutter are of equal size during work.
- 4) Tighten the fixing screws of the turret and check the center heights of the cutter once more. To be adjusted if necessary.

## Resharpener of IFANGER External Turning Tools of HSS-CO (Kob), HSS (Rap) and TiN-coated



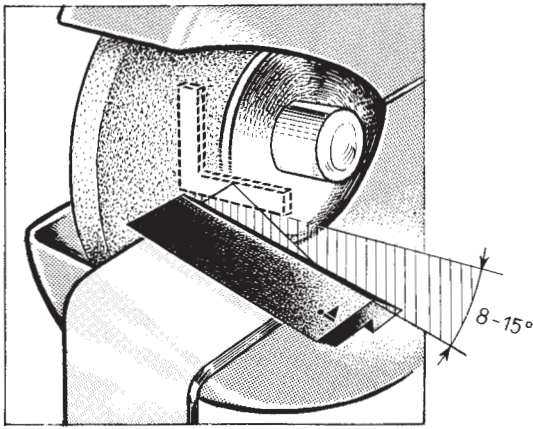
IFANGER cutters are only to be resharpened on the face for chip evacuation. Grinding wheels of aluminumoxide, grit 46 and 60, hardness J and K are recommended.



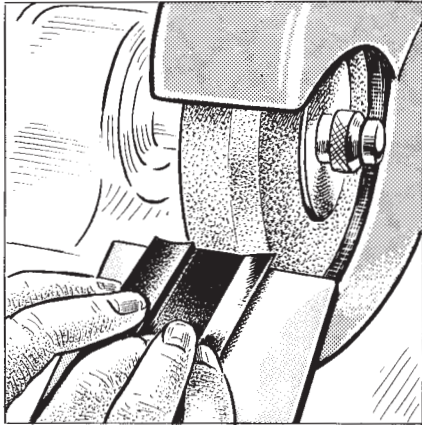
Rake angles can easily be checked with IFANGER grinding gauge.



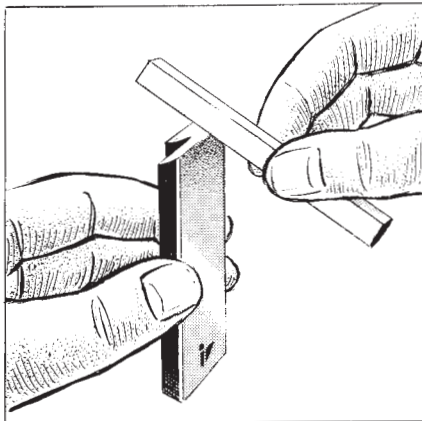




Grinding of the abrasion facet. It protects the cutter from excessive wear. Use grindstones or grinding wheels of a grit of 100 or finer.



Grinding of threading and parting off cutters on IFANGER grinding machine with aluminumoxide grinding wheel grit 60, hardness J or K and slight facet.



On all cutters an abrasion facet should be applied on the cutting edge with a whetstone. (Whetstones available ex stock: round, triangular, square.)

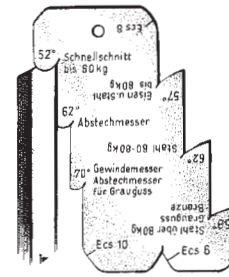
## Resharpener of IFANGER Turning Tools with Carbide Tips

Tools with carbide tips should always be resharpened with abundant liquid cooling. To cut down the risk of cracks in the carbide tips avoid dry resharpening and never chill warm carbide tips with liquid.

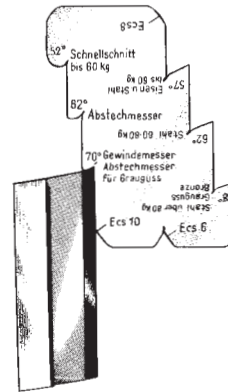
Roughing cutters A, B, X and Y as well as side cutters D and E are provided with grooves for chip evacuation. These grooves should be adapted to the cutting conditions and the material to be machined.



Facet on the cutting angle under  $77^\circ$ , width 0.1 to 0.3 mm.



Use of the gauge when grinding the groove for chip evacuation.



The only way to guarantee a correct angle of profile of thread on the work piece.

### Recommended rake angles

Material to be machined	Rake angles	
	HSS-CO, HSS and TiN-coated	Carbide tipped
Steel 30–50 kg/mm <sup>2</sup>	25°	20°
Steel 50–80 kg/mm <sup>2</sup>	20°	15°
Grey cast iron	10°–15°	10°
Aluminum	30°	20°–25°
Copper	30°	20°–25°
Brass	0°–10°	0°–10°

After every resharpening of a carbide cutter an abrasion facet should be applied under an angle of  $30^\circ$  by means of a diamond file. Width of facet:  $0.5 \times \text{feed}$  (diamond files available ex stock).

Recommended grinding wheels: grinding wheels of silicone carbide of 46 to 120 H, diamond grinding wheels, metal- or synthetic-bonded.

