



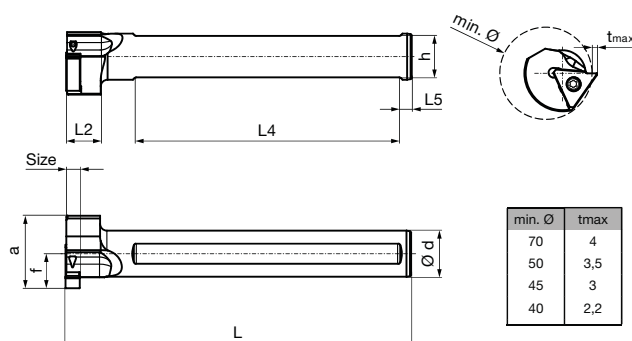
## Round shank holder, internal machining, with IC

Series no. **25370**

- grooving depth up to 4 mm
- with internal coolant delivery from above

Type **GB 305**

for indexable inserts type 305 see from page 200



Right hand version shown  
Left hand version mirror image



version right-hand

System 305

| Code no. | Description               | d     | d     | L      | L2    | L4     | L5   | h     | f     | a     | Size |
|----------|---------------------------|-------|-------|--------|-------|--------|------|-------|-------|-------|------|
|          |                           | mm    | inch  | mm     | mm    | mm     | mm   | mm    | mm    | mm    |      |
| 12.021   | GB305.0750.600.90.04.R.IK |       | 3/4   | 152.40 | 14.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 04   |
| 12.001   | GB305.0020.150.90.04.R.IK | 20.00 |       | 150.00 | 14.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 04   |
| 12.002   | GB305.0025.170.90.04.R.IK | 25.00 |       | 170.00 | 14.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 04   |
| 12.022   | GB305.1000.670.90.04.R.IK |       | 1"    | 170.18 | 14.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 04   |
| 12.023   | GB305.1250.800.90.04.R.IK |       | 1-1/4 | 205.20 | 14.60 | 162.56 | 5.08 | 29.74 | 21.08 | 39.37 | 04   |
| 12.003   | GB305.0032.200.90.04.R.IK | 32.00 |       | 200.00 | 14.60 | 160.00 | 5.00 | 30.00 | 21.00 | 39.25 | 04   |
| 12.024   | GB305.0750.600.90.06.R.IK |       | 3/4   | 152.40 | 14.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 06   |
| 12.004   | GB305.0020.150.90.06.R.IK | 20.00 |       | 150.00 | 14.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 06   |
| 12.005   | GB305.0025.170.90.06.R.IK | 25.00 |       | 170.00 | 14.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 06   |
| 12.025   | GB305.1000.670.90.06.R.IK |       | 1"    | 170.18 | 14.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 06   |
| 12.026   | GB305.1250.800.90.06.R.IK |       | 1-1/4 | 203.20 | 14.60 | 162.56 | 5.08 | 29.74 | 21.08 | 39.37 | 06   |
| 12.006   | GB305.0032.200.90.06.R.IK | 32.00 |       | 200.00 | 14.60 | 160.00 | 5.00 | 30.00 | 21.00 | 39.25 | 06   |
| 12.027   | GB305.0750.600.90.12.R.IK |       | 3/4   | 152.40 | 14.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 08   |
| 12.007   | GB305.0020.150.90.08.R.IK | 20.00 |       | 150.00 | 14.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 08   |
| 12.008   | GB305.0025.170.90.08.R.IK | 25.00 |       | 170.00 | 14.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 08   |
| 12.028   | GB305.1000.670.90.08.R.IK |       | 1"    | 170.18 | 14.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 08   |
| 12.029   | GB305.1250.800.90.08.R.IK |       | 1-1/4 | 203.20 | 14.60 | 162.56 | 5.08 | 29.74 | 21.08 | 39.37 | 08   |
| 12.009   | GB305.0032.200.90.08.R.IK | 32.00 |       | 200.00 | 14.60 | 160.00 | 5.00 | 30.00 | 21.00 | 39.25 | 08   |
| 12.030   | GB305.0750.600.90.06.R.IK |       | 3/4   | 152.40 | 19.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 12   |
| 12.010   | GB305.0020.150.90.12.R.IK | 20.00 |       | 150.00 | 19.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 12   |
| 12.011   | GB305.0025.170.90.12.R.IK | 25.00 |       | 170.00 | 19.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 12   |
| 12.031   | GB305.1000.670.90.12.R.IK |       | 1"    | 170.18 | 19.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 12   |
| 12.032   | GB305.1250.800.90.12.R.IK |       | 1-1/4 | 203.20 | 19.60 | 162.56 | 5.08 | 29.74 | 21.08 | 39.37 | 12   |
| 12.012   | GB305.0032.200.90.12.R.IK | 32.00 |       | 200.00 | 19.60 | 160.00 | 5.00 | 30.00 | 21.00 | 39.25 | 12   |

Series no. **25371**

version left-hand

| Code no. | Description               | d     | d     | L      | L2    | L4     | L5   | h     | f     | a     | Size |
|----------|---------------------------|-------|-------|--------|-------|--------|------|-------|-------|-------|------|
|          |                           | mm    | inch  | mm     | mm    | mm     | mm   | mm    | mm    | mm    |      |
| 12.021   | GB305.0750.600.90.04.L.IK |       | 3/4   | 152.40 | 14.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 04   |
| 12.001   | GB305.0020.150.90.04.L.IK | 20.00 |       | 150.00 | 14.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 04   |
| 12.002   | GB305.0025.170.90.04.L.IK | 25.00 |       | 170.00 | 14.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 04   |
| 12.022   | GB305.1000.670.90.04.L.IK |       | 1"    | 170.18 | 14.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 04   |
| 12.023   | GB305.1250.800.90.04.L.IK |       | 1-1/4 | 205.20 | 14.60 | 162.56 | 5.08 | 29.74 | 21.08 | 39.37 | 04   |
| 12.003   | GB305.0032.200.90.04.L.IK | 32.00 |       | 200.00 | 14.60 | 160.00 | 5.00 | 30.00 | 21.00 | 39.25 | 04   |
| 12.024   | GB305.0750.600.90.06.L.IK |       | 3/4   | 152.40 | 14.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 06   |
| 12.004   | GB305.0020.150.90.06.L.IK | 20.00 |       | 150.00 | 14.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 06   |
| 12.005   | GB305.0025.170.90.06.L.IK | 25.00 |       | 170.00 | 14.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 06   |
| 12.025   | GB305.1000.670.90.06.L.IK |       | 1"    | 170.18 | 14.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 06   |
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| 12.027   | GB305.0750.600.90.12.L.IK |       | 3/4   | 152.40 | 14.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 08   |
| 12.007   | GB305.0020.150.90.08.L.IK | 20.00 |       | 150.00 | 14.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 08   |
| 12.008   | GB305.0025.170.90.08.L.IK | 25.00 |       | 170.00 | 14.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 08   |
| 12.028   | GB305.1000.670.90.08.L.IK |       | 1"    | 170.18 | 14.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 08   |
| 12.029   | GB305.1250.800.90.08.L.IK |       | 1-1/4 | 203.20 | 14.60 | 162.56 | 5.08 | 29.74 | 21.08 | 39.37 | 08   |
| 12.009   | GB305.0032.200.90.08.L.IK | 32.00 |       | 200.00 | 14.60 | 160.00 | 5.00 | 30.00 | 21.00 | 39.25 | 08   |
| 12.030   | GB305.0750.600.90.06.L.IK |       | 3/4   | 152.40 | 19.60 | 116.84 | 5.08 | 17.04 | 14.48 | 30.48 | 12   |
| 12.010   | GB305.0020.150.90.12.L.IK | 20.00 |       | 150.00 | 19.60 | 115.00 | 5.00 | 18.00 | 15.00 | 31.50 | 12   |
| 12.011   | GB305.0025.170.90.12.L.IK | 25.00 |       | 170.00 | 19.60 | 130.00 | 5.00 | 23.00 | 17.50 | 34.50 | 12   |
| 12.031   | GB305.1000.670.90.12.L.IK |       | 1"    | 170.18 | 19.60 | 129.54 | 5.08 | 23.39 | 17.78 | 34.54 | 12   |
| 12.032   | GB305.1250.800.90.12.L.IK |       | 1-1/4 | 203.20 | 19.60 | 162.56 | 5.08 | 29.74 | 21.08 | 39.37 | 12   |
| 12.012   | GB305.0032.200.90.12.L.IK | 32.00 |       | 200.00 | 19.60 | 160.00 | 5.00 | 30.00 | 21.00 | 39.25 | 12   |

**Spare parts**

| Series no. | Clamping screw | Tightening torque | Size    |
|------------|----------------|-------------------|---------|
| 25901      |                | Nm                |         |
| Code 4.000 | M4x15x15IP     | 4-4.5             | 04 - 08 |
| Code 4.003 | M4x17x15IP     | 4-4.5             | 12      |

| Series no.  | Torx-Plus Wrench |
|-------------|------------------|
| 25904       |                  |
| Code 15.000 | T15IP T-handle   |

# 305





# SYSTEM 305

## GROOVING AND PARTING OFF



Square shank holder straight  
with and without IC  
from page 184



Square shank holder, 90°  
offset with and without IC  
from page 190

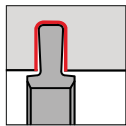


Square shank holder, 45°  
offset with and without IC  
from page 194

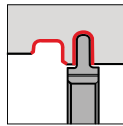


Round shank holder  
with and without IC  
from page 196

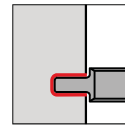
Tool holder



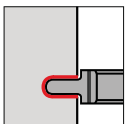
Radial grooving  
straight slots, Type GE  
from page 200



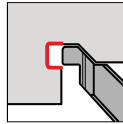
Radial grooving  
full radius slots, Type GE  
from page 202



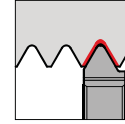
Axial grooving,  
straight slots, Type GA  
page 203



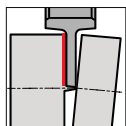
Axial grooving,  
full radius slots, Type GA  
page 204



Grooving axial recesses,  
Type GA  
page 205



External thread turning,  
Type GG  
from page 206



Parting off,  
Type GZ  
from page 210

Indexable inserts

# SYSTEM 305

|  | Feed rate<br>f (IPR)                                              |  | Feed rate<br>f (IPR)                                              | General formulas                                        |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------|
|                                                                                   | ↓ 0.0012 - 0.0059<br>↔ 0.0008 - 0.0047<br>ap = 0.0039 - 0.0197 in |                                                                                   | ↓ 0.0012 - 0.0059<br>↔ 0.0008 - 0.0047<br>ap = 0.0039 - 0.0197 in |                                                         |
| Geometry .BA<br>ground round<br>chip breaker                                      |                                                                   | Geometry .AA<br>ground flat<br>chip breaker                                       |                                                                   |                                                         |
|                                                                                   |                                                                   |                                                                                   |                                                                   | Cutting speed (SFM)<br>RPM x Dia. / 3.82 = SFM          |
|                                                                                   |                                                                   |                                                                                   |                                                                   | Revolutions per minute (RPM)<br>SFM x 3.82 / Dia. = RPM |
|                                                                                   |                                                                   |                                                                                   |                                                                   | Feed rate (IPM)<br>IPR x RPM = IPM                      |

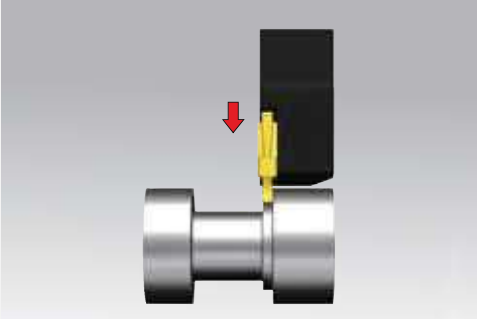
↓ = radial feed direction

↔ = axial feed direction

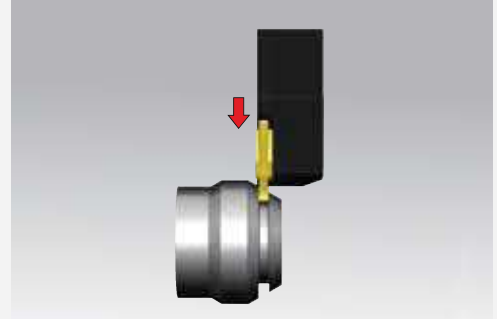
| ISO      | Material                                   |                                                      | Material examples/<br>material number                  | Tensile<br>strength<br>(N/mm <sup>2</sup> ) | Brinell<br>hardness<br>(HB) | Cutting speed<br>(surface feet / min) |           |
|----------|--------------------------------------------|------------------------------------------------------|--------------------------------------------------------|---------------------------------------------|-----------------------------|---------------------------------------|-----------|
|          |                                            |                                                      |                                                        |                                             |                             | FIREX/nanoFIREX<br>Ⓢ                  | TiCN<br>Ⓒ |
| <b>P</b> | Carbon steel                               | C < = 0.15 %                                         | 11SMn30+C / 1.0715<br>C15 / 1.0401                     | 500<br>600                                  | 150<br>180                  | 490-720                               | 425-655   |
|          |                                            | C ≥ 0.15-0.45 %                                      | S235JR (ST37-2) / 1.0037<br>Ck22 / 1.1151              | 400<br>600                                  | 120<br>180                  |                                       |           |
|          |                                            | C > 0.45 %                                           | S355JO (St52-3) / 1.0553<br>C60 / 1.0601               | 600<br>900                                  | 180<br>270                  |                                       |           |
|          |                                            |                                                      |                                                        |                                             |                             |                                       |           |
|          | Low-alloyed steel<br>(alloy content ≤ 5%)  | annealed                                             | 16MnCr5 / 1.7131<br>18CrNi8 / 1.5920                   | 650<br>650                                  | 200<br>200                  | 395-560                               | 295-490   |
|          |                                            | heat-treatable                                       | 25CrMoV4 / 1.7218<br>42CrMo4V / 1.7225                 | 900<br>1100                                 | 270<br>320                  |                                       |           |
|          | High-alloyed steel<br>(alloy content > 5%) | annealed                                             | X37CrMoV5-1 / 1.2343<br>X153CrMoV12 / 1.2379           | 750<br>850                                  | 220<br>250                  | 425-590                               | -         |
|          |                                            | heat-treatable                                       | 55NiCrMoV7 / 1.2714                                    | 1200                                        | 350                         |                                       |           |
|          | Cast steel                                 | un-alloyed, low-alloyed                              | GS52 / 1.0552                                          | 600                                         | 180                         | 425-590                               | -         |
|          |                                            | high-alloyed                                         | GX40CrNiSi22-10 / 1.4826                               | 750                                         | 220                         |                                       |           |
| <b>M</b> | Stainless steel                            | martensitic, ferritic, tempered                      | X14CrMoS17 / 1.4104<br>X4CrNiMo16-5-1 / 1.4418         | 800<br>1000                                 | 240<br>300                  | 295-525                               | 230-460   |
|          |                                            |                                                      | X5CrNi18-10 / 1.4301<br>X2CrNiMo17-12-2 / 1.4404       | 650                                         | 200                         |                                       |           |
|          |                                            | austenitic, Ni > 8%<br>austenitic, ferritic (Duplex) | X2CrNiMoCuN25-6-3 / 1.4507<br>X2CrNiMoN25-7-4 / 1.4410 | 850                                         | 250                         | 230-330                               | 165-395   |
|          |                                            |                                                      |                                                        |                                             |                             |                                       |           |
|          |                                            |                                                      |                                                        |                                             |                             |                                       |           |
| <b>K</b> | Grey cast iron                             | low tensile strength                                 | EN-GJL-200 (GG20) / 0.6020                             |                                             | 180                         | 295-490                               | -         |
|          |                                            | high tensile strength                                | EN-GJL-400 (GG40) / 0.6040                             |                                             | 260                         |                                       |           |
|          | Spheroidal graphite<br>iron                | low tensile strength                                 | EN-GJS-400-15 (GGG40) / 0.7040                         |                                             | 160                         | 295-490                               | 230-330   |
|          |                                            | high tensile strength                                | EN-GJS-700-2 (GGG70) / 0.7070                          |                                             | 260                         |                                       |           |
|          | Malleable cast iron                        | low tensile strength                                 | EN-GJMW-350-4 (GTW35) / 0.8035                         |                                             | 125                         | 230-460                               | 165-330   |
|          |                                            | high tensile strength                                | EN-GJMB-550-4 (GTS55) / 0.8155                         |                                             | 250                         |                                       |           |
| <b>N</b> | Al-alloys                                  | non-heat-treatable <12% Si                           | EN-AW-2017 (AlCuMg1) / 3.1325                          |                                             | 60                          | -                                     | 1640-2625 |
|          |                                            | heat-treatable <12% Si                               | EN-AW-6082 (AlMgSi1) / 3.2315                          |                                             | 100                         |                                       |           |
|          | Al-cast-alloys                             | non-heat-treatable <12% Si                           | AlSi9Cu3 / 3.2163                                      |                                             | 80                          | -                                     | 1640-2625 |
|          |                                            | heat-treatable <12% Si                               | AlSi10Mg / 3.2383                                      |                                             | 100                         |                                       |           |
|          | Copper alloys                              | brass, lead alloy                                    | CuZn39Pb2 (MS58) / 2.0380                              | 400                                         | 120                         | -                                     | 435-820   |
|          |                                            | bronze                                               | CuSn6 / 2.1020                                         | 500                                         | 150                         |                                       |           |
| <b>S</b> | Heat resistant alloys,<br>super alloys     | NiFe-base, annealed                                  | NiCr15Fe (Alloy600) / 2.4816                           | 700                                         |                             | -                                     | 100-230   |
|          |                                            | NiFe-base, hardened                                  |                                                        | 950                                         |                             | -                                     | 400-165   |
|          |                                            | NiCo-base, annealed                                  | NiMo16Cr15W (Alloy C-276) / 2.4819                     | 800                                         |                             | -                                     | 100-195   |
|          |                                            | NiCo-base, cast                                      |                                                        | 1100                                        |                             | -                                     | 100-130   |
|          |                                            | NiCo-base, hardened                                  | NiCr19NbMo (Alloy718) / 2.4668                         | 1200                                        |                             | -                                     | 65-100    |
|          | Titanium-alloys                            | annealed                                             | Ti6Al4V / 3.7164                                       | 900                                         |                             | -                                     | 100-165   |
|          |                                            | hardened                                             |                                                        | 1200                                        |                             | -                                     | 65-100    |
|          |                                            |                                                      |                                                        |                                             |                             |                                       |           |
| <b>H</b> | Hardened steels                            | Heat-treatable steel                                 |                                                        |                                             | > 52 HRC                    | 66-131                                | -         |
|          |                                            | Heat-treatable/case hardened steel                   |                                                        |                                             | > 59 HRC                    | 33-98                                 | -         |
|          |                                            | Heat-treatable/case hardened steel                   |                                                        |                                             | > 62 HRC                    | (CBN)                                 | -         |

The specified values must be adapted to the machine and machining conditions.

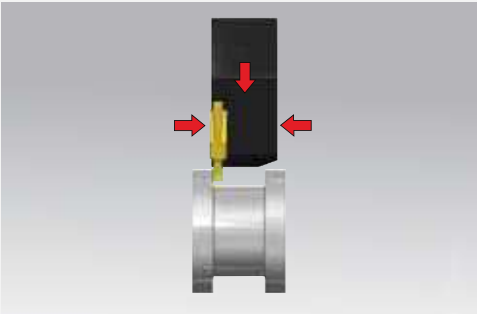
## General machining hints



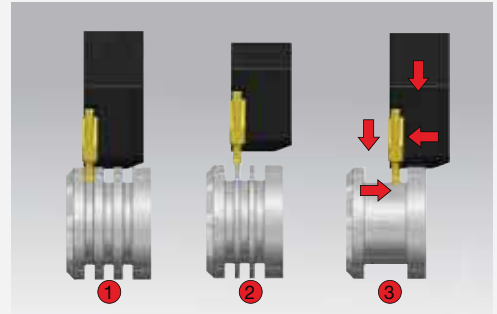
Width of machining should be min. 70% of the width of the cutting edge



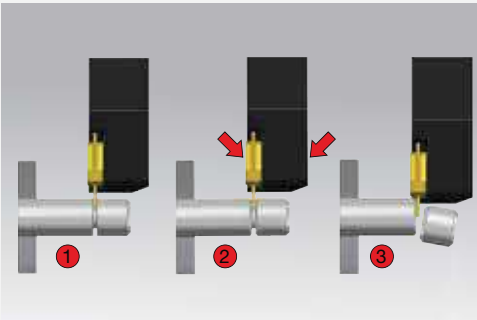
Reduce feed by 20 – 50% when grooving on angled faces



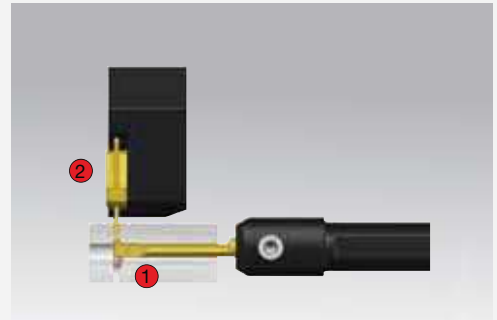
Recessing  
- radial in-feed  
- turning in axial direction  
- leave axial and radial stock for finishing



Process tip for reaming:  
1 – pre-grooving “comb”  
2 – removing remaining webs  
max width of webs: insert width  $b - (2xr)$   
3 – finishing



Process tip for parting:  
1 – pre-grooving  
2 – chamfering  
3 – parting



Process tip for parting into a central bore:  
1 – pre-grooving with tool type GV104  
2 – parting with tool type GZ305



# Troubleshooting

| Subject                  |                                     | Solution |                |               |                        |               |       |                 |               |                    |               |                               |         |
|--------------------------|-------------------------------------|----------|----------------|---------------|------------------------|---------------|-------|-----------------|---------------|--------------------|---------------|-------------------------------|---------|
|                          |                                     | Feed     | Feed at centre | Cutting speed | RH/LH edge orientation | Corner radius | Wiper | Width of groove | Tool clamping | Workpiece clamping | Tool overhang | Centre height of cutting edge | Coolant |
| Related to wear          | Edge chipping                       | ↓        | ↓              |               |                        | ↑             |       |                 | 🔍             | 🔍                  | 🔍             | 🔍                             |         |
|                          | Build up edge                       |          |                | ↑             |                        |               |       |                 |               |                    |               |                               | 👍       |
|                          | Flank wear                          | 🔍        | ↓              | ↓             |                        | ↑             |       |                 |               |                    |               | 🔍                             | 👍       |
|                          | Plastic deformation                 | ↓        | ↑              | ↓             |                        | ↑             |       |                 |               |                    |               |                               | 👍       |
| Related to the component | Vibrations                          | ↑        |                | ↓             |                        | ↓             |       | ↓               | 🔍             | 🔍                  | ↓             | 🔍                             |         |
|                          | Burrs                               |          | ↓              |               | 👍                      | ↓             |       |                 |               |                    |               | 🔍                             | 👍       |
|                          | Surface                             | ↓        | ↓              | ↑             |                        | ↑             | 👍     | ↑               | 🔍             | 🔍                  | ↓             | 🔍                             | 👍       |
|                          | Long chips (no chip breakage)       | ↑        |                | ↑             |                        |               |       |                 |               |                    |               |                               | 👍       |
|                          | (too) short chips, compressed chips | ↓        |                |               |                        |               |       |                 |               |                    |               |                               |         |



decrease values (large impact)



increase values (large impact)



decrease values (low impact)



increase values (low impact)



check



apply