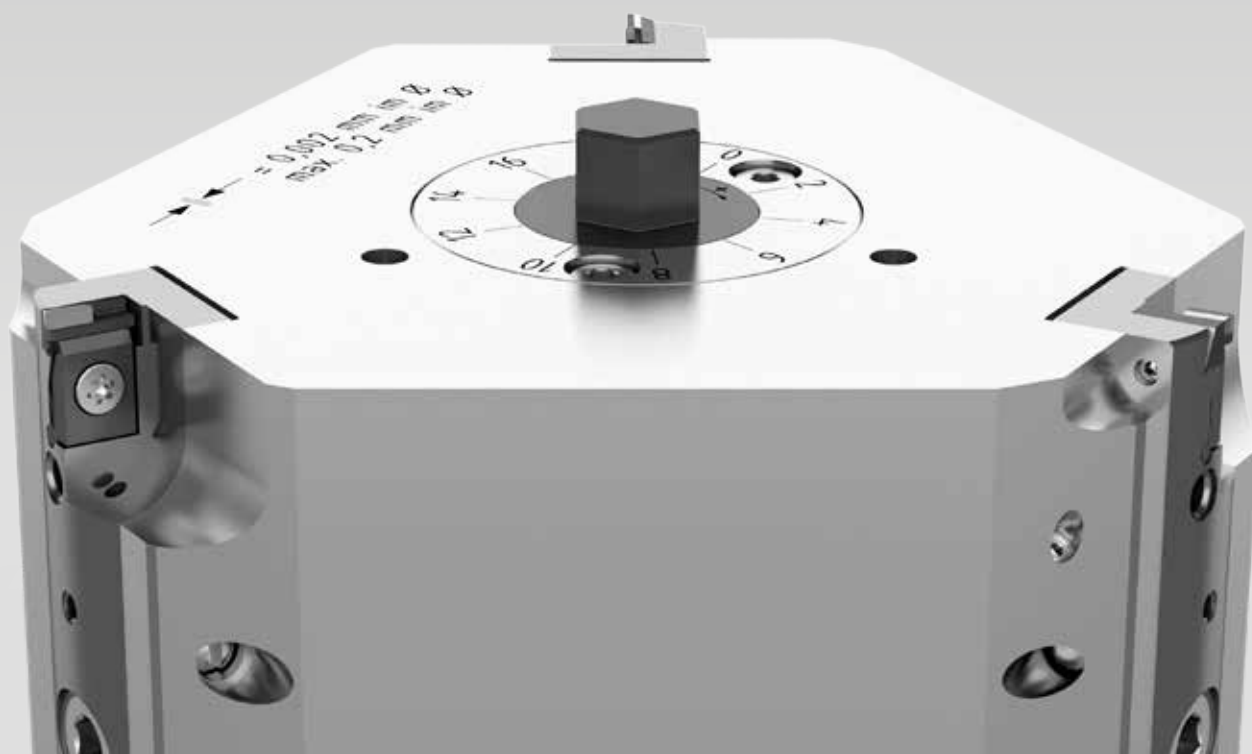# HOLLFELDER
GÜHRING
CUTTING TOOLS

Special tools for customer applications

Your competent partner in the area of metal chip removal

At our two company locations in Nuremberg und Zorbau (Germany) we design and manufacture precision tooling for highest quality demands on state-of-the-art CNC-turning / milling / grinding and EDM machines.

All activities in our enterprise are based on our corporate quality and environmental policy and aim to contribute to a permanent increase in our customers productivity while observing all applicable legal and governmental regulations.

Additionally we strive to achieve a leading position in our sector with our products and services and to continuously improve this position by means of a high level of quality as well as an adequate environmental policy.

All processes in our enterprise are mainly based on our customers demands and are always supervised by the management team and adapted to the changing general conditions by continuous improvement processes (CIP). In order to achieve our targets we maintain a certified quality and environmental system according to DIN EN ISO 9001 : 2008 and DIN EN ISO 14001 : 2004.

The perfect composition of highly qualified staff and most modern production methods constitutes the basis for fully developed products on a high quality standard.

The easy handling and the adjustability of our milling cutters are the basis for savings in the area of tool presetting as well as for achieving tight tolerances.

Our standard program constitutes the basis for a huge number of innovative special tooling solutions which get used and appreciated at our customers globally. In many cases it is the customers specific solution which opens up the full potential of our tooling systems and thus contributes to savings and increases in productivity.

We would be happy to advise you in selecting the right tooling solution for your specific application and to stay on your side as your competent partner from the start of process planning until the effective use of our tools.

<div align="center">

Challenge us with your requirements!
precise | flexible| innovative
We always appreciate your confidence in us.

</div>

Headquarters Nuremberg

Location Zorbau

A reliable partner

HOLLFELDER-GÜHRING CUTTING TOOLS
has achieved a leading position as a reliable partner in the metal cutting industry. Innovative tooling solutions in standard tools as well as in tools made to customers specifications constitute the basis for cost optimised production.

Competence

Individual solutions for complex machining problems, tailor-made to the individual requirements are part of the self-image of our technicians and engineers. With a high qualification and an innovative thinking combined with a lot of experience, we design and manufacture in close contact with our customers tooling systems of highest precision for the µm-accurate machining of complex contours.

Profitability

HOLLFELDER-GÜHRING CUTTING TOOLS offers profitable solutions. The easy adjustment of our tools reduces non-productive times. We achieve a reduction in machining times due to our intelligent combined tools, the high number of effective teeth and the selection of the optimal cutting grade. The advantages are the utmost flexibility, productivity and certainty in process.

Our service

Depending on the technical requirements we analyse the machining processes and suggest tooling solutions which satisfy the high demands of our customers. With the proven tooling solutions of HOLLFELDER-GÜHRING CUTTING TOOLS our customers use highly precise and reliable systems which have achieved an excellent reputation worldwide.

Our service spectrum includes among others:
• In-house machining tests
• Application training also on-site at the customer's premises
• Complete CAD-layouts according to customer specifications
• Technical support

Our targets...

...are to steadily increase the efficiency of our precision tools as well as their operational possibilities. Thus our customers are leading obtain a competitive advantage due to the more efficient production with a high certainty in process.

For further information
visit our website
www.hollfelder-guehring.de

⊞ Contents

Contents ᕼ

Eccentric pin adjustment

The adjustment systems in the tools constitute the basis
for highly precise production results in the most different materials.
They are the basis for innovative tooling designs which contribute
enormously to the productivity of our customers.
The application is simple and saves time.
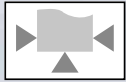
- Eccentric pin for µm-accurate adjustment
- Many design options thanks to open construction
- Design of the clamping system doesn't require any support on the side of the pocket seat
- Triangular machining is possible
- Insert can be adjusted in 2 directions

Adjustment range

Eccentricity

Insert

Eccentric pin

Tool

Hexagon drive

Insert

A A

Eccentric pin
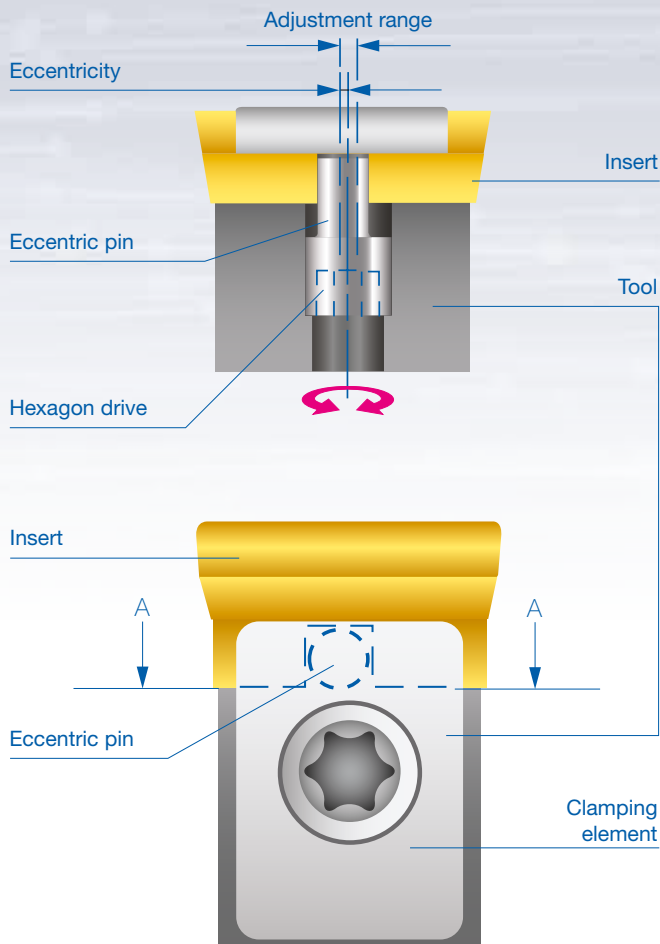
Clamping element
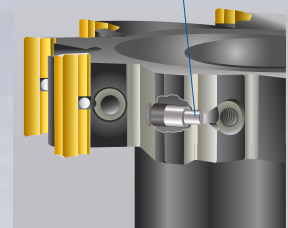
Eccentric pin

Clamping element
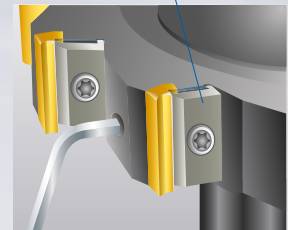
Adjustment key (hex key)
to operate the eccentric pin

Radial screw adjustment and adjustment with tapered screw

- Radial screw adjustment for µm-accurate diameter adjustment
- Large range of adjustment → up to 2 mm in diameter
- Easy handling thanks to robust design

Large chip flute

Adjustment element
(pushing screw)

Adjustable
up to 2 mm

Set screw

Thrust transmitting piece

Central position of the insert
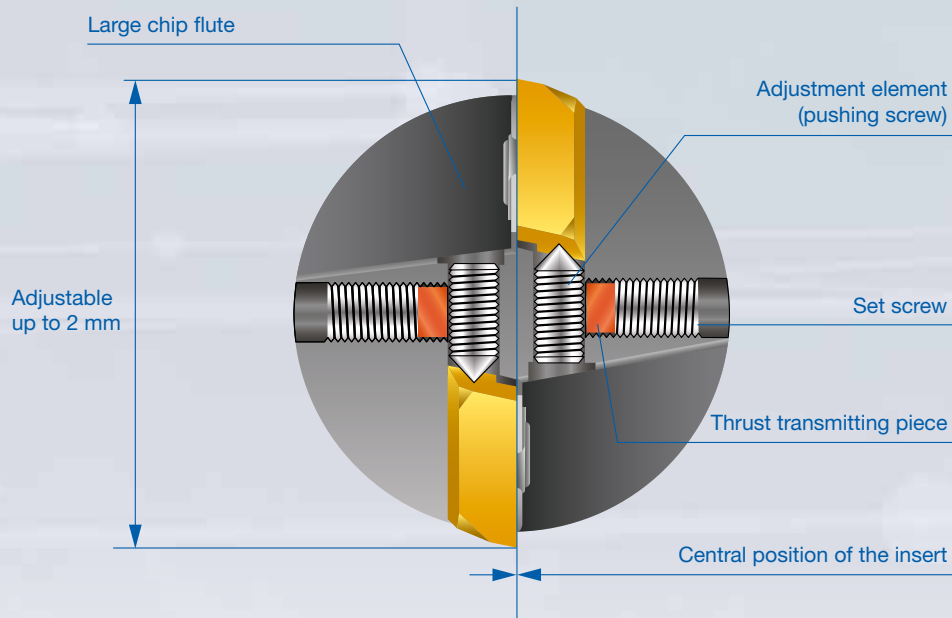
- µm-accurate diameter adjustment with tapered screw
- Adjustment possible from the front and from the top
- Can be flexibly combined and used

Adjustment element
(tapered screw / torx
or hexagon socket)

| ⟋ | 0,02 | Shank |

Ø µm-accurate adjustable
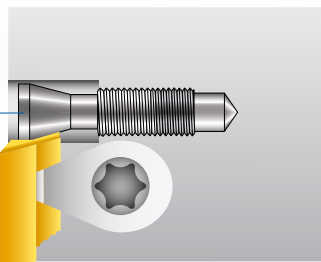
Adjustment from the front
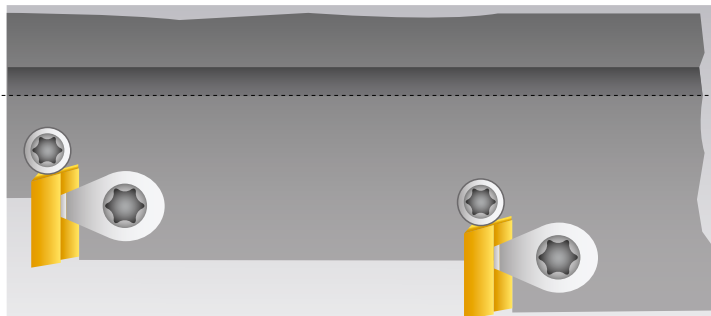
Adjustment from the top

The micro-adjustment can be considered as the logical next step
in the development of the tapered screw adjustment from the front.
A built-in adjustment cartridge in the holder enables the user
to achieve an extremely precise adjustment of the machining measures

µm

1 revolution
≙ 0.02 mm in Ø

• Adjustment element can be integrated even for small bore diameters
• Advantageous adjustment relation → 1 revolution ≙ 0,2 mm in Ø
• µm-accurate adjustment directly in the machining center
• Low machine downtime
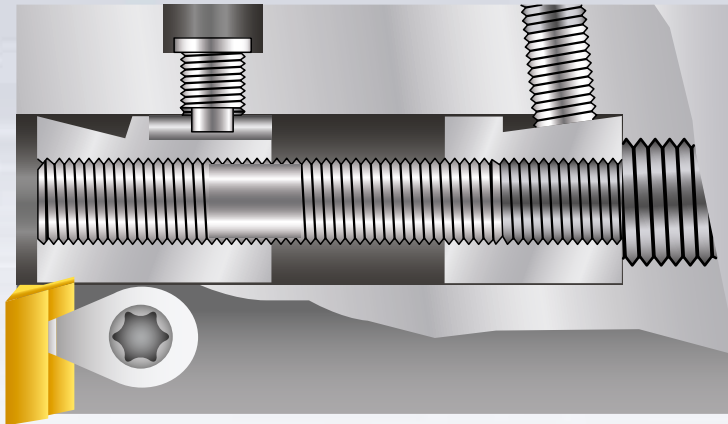
Smart Setting Motion Tools

Pre-setting
and re-adjusting of inserts
within seconds
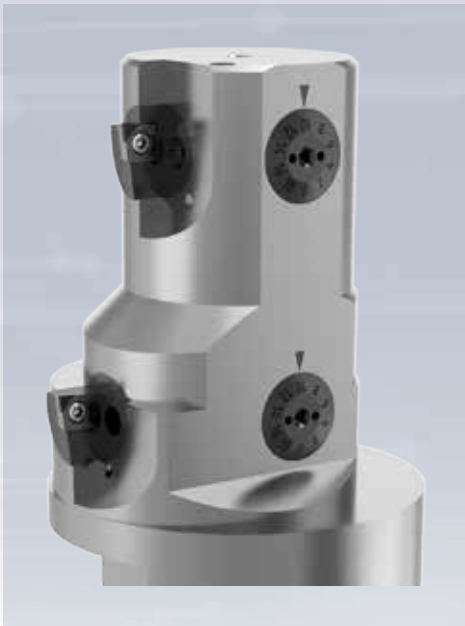
- Individual fine adjustment of all finishing inserts.
  One graduation line equals 0.002 mm in diameter
- Diameter adjustment in both directions, plus and minus
- No special equipment required for pre-setting (i.e. magnetic V-gauges)
- Cartridges available with eccentric adjustment, also available with standard
  ISO insert
- Option: retraction of the inserts via drawbar
  ➝ no workpiece adjustment required
- Option: mechanical operation, using either compressed air or machine coolant
- Time saving of more than 90% per setting cycle

Central adjustment

- Simple pre-setting without special equipment
- Cartridges available with eccentric adjustment, also available with standard
  ISO insert
- Diameter adjustment in both directions, plus and minus via central adjustment
  screw
- Automatic readjustment if required. One rotation equals 0.03 mm on radius
- Retracting of the finishing cartridge by means of compressed air
- Expanding of the finishing cartridge inside the honing undercut
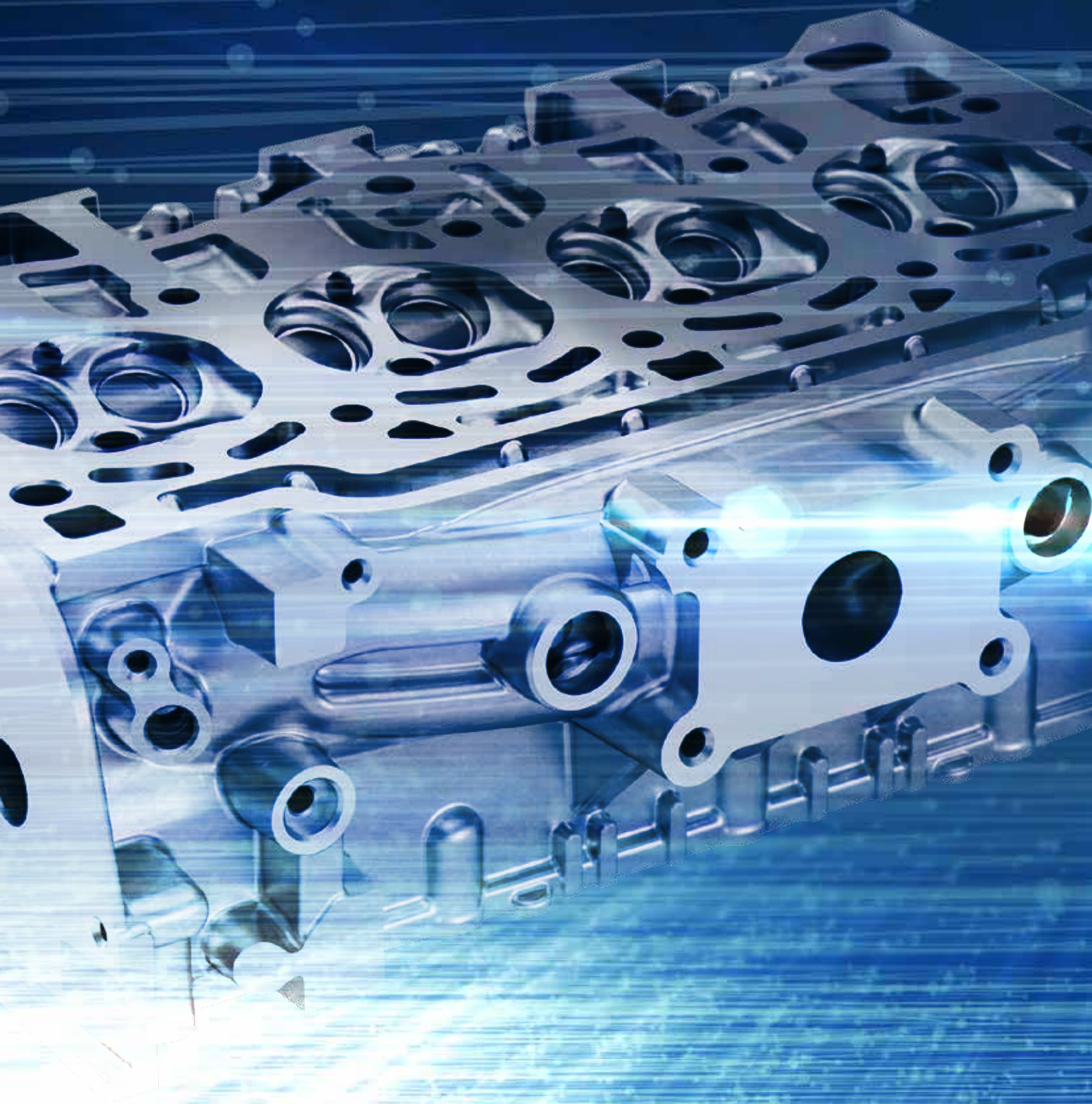
Different adjustment screws

Cylinder
head

HPC rough milling cutter Ø 163 / L = 232 mm / HSK80-A / Teeth = 18

Integrated
coolant exit

Adjustable
PCD inserts

Requirementss

Reduction of cycle times

Solution

HPC rough milling cutter Ø 163 / L = 232 mm / HSK80-A / Teeth = 18

Cutting data

Material		(DIN) ■ AlSi10Mg(Cu) heat-treated
Cutting grade		PCD 30
Cutting speed	m/min	3,000
Feed rate per tooth	mm	0.14
Cutting depth	mm	-6

Result

50% faster than competitors

Longer tool life

Lower power consumption

Customer benefits

Reduced tooling costs per component

Almost chip-free components, lower cleaning costs

Increased productivity and energy efficiency

H Cylinder head

Finish-machining

> **HPC milling cutter with closed chip flutes / Ø250 reduced weight**

> **Teeth = 21 + 3 mixure of inserts / Use of wiper inserts**
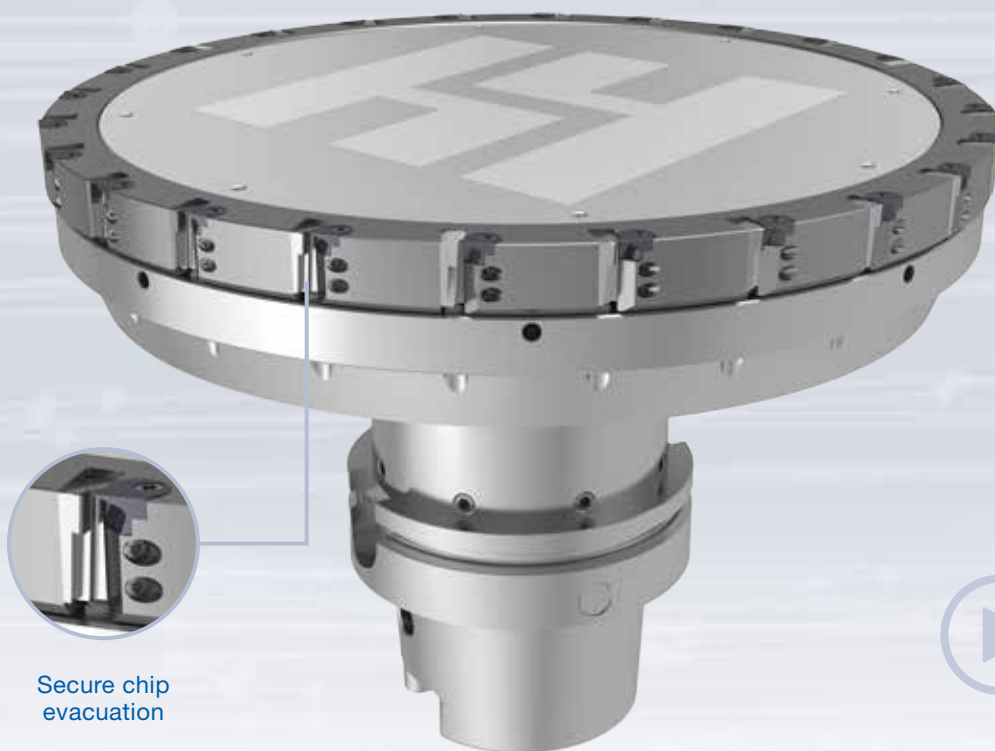
Secure chip
evacuation

Requirements

Chip-free components

Solution

HPC milling cutter with closed chip flutes

Cutting data

Material		(DIN) ■ AlSi10Mg(Cu) heat-treated
Cutting grade		PCD 30
Cutting speed	m/min	3,500
Feed rate per tooth	mm	0.12
Cutting depth	mm	0.5

Result

50% faster than competitors

Longer tool life

Higher surface finish quality

! Customer benefits

Reduced tooling costs per component

Almost chip-free components, lower cleaning costs

Increased productivity and energy efficiency

> **HPC bar cutter Ø315 with HSK-A100 / Teeth = 4 + 4 / Teeth$_{eff.}$ = 8**

> **Radially adjustable cartridge ➜ Compensation unequal flute spacing**
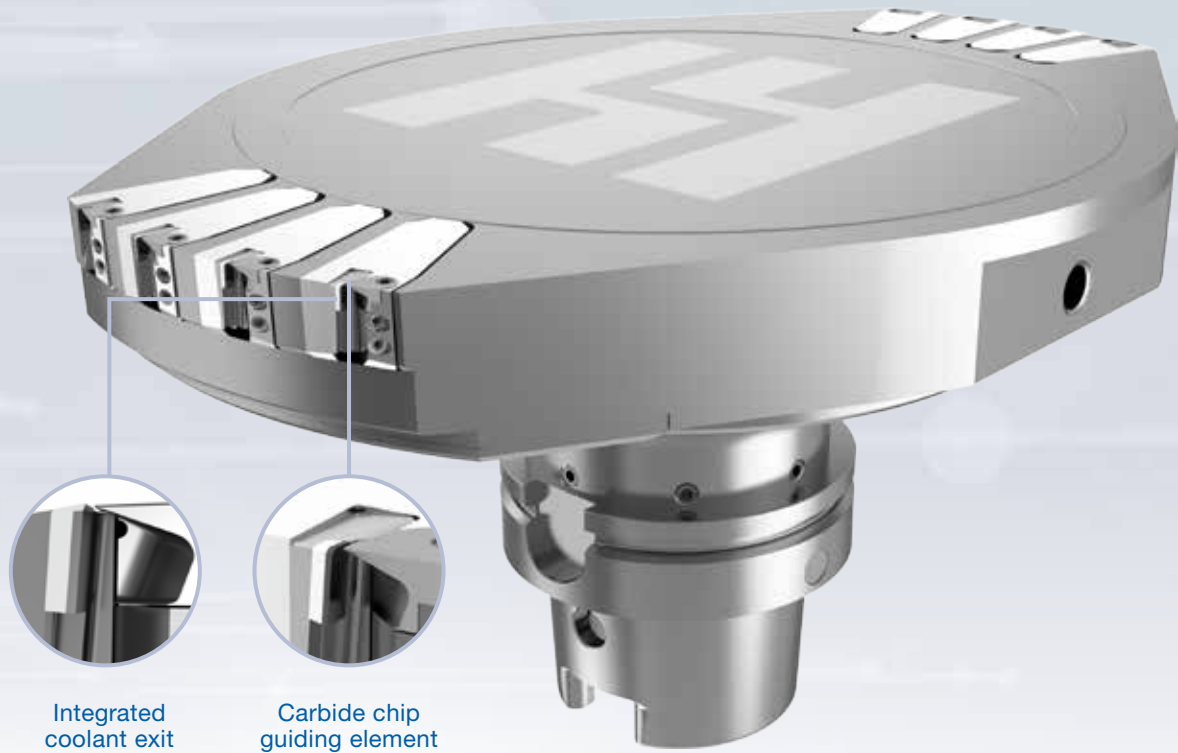
Integrated
coolant exit

Carbide chip
guiding element

Requirements

Combustion chamber milling, required cutter diameter 315 mm	
R$_z$ 6.3 - R$_{max}$ 7 - Wt3 - PMr ➜ 65 %	
Critical capability index Cmk 2.74	
Maximum permissible tool diameter 250 mm	

Solution

HPC bar cutter Ø315 with HSK-A100 / Teeth = 4 + 4 / Teeth$_{eff.}$ = 8

Cutting data

Material		(DIN) ■ GD-AlSi9Cu3
Cutting grade		PCD
Cutting speed	m/min	2,177
Feed rate per tooth	mm	0.13
Cutting depth	mm	0.28

Result

Uniform surface

R$_z$ 1,4 - R$_{max}$ 1,67 - Wt 1,28 - PMr 100 %

Customer benefits

High-precision machining can be carried out on a standard machining center
(no special machine required)

Almost chip-free components, lower cleaning costs

Gang milling cutter / Teeth$_{eff.}$ = 2

Full cut

bearing

bearing

| 19 | 19 | 19 |
| adjustable | adjustable | adjustab |
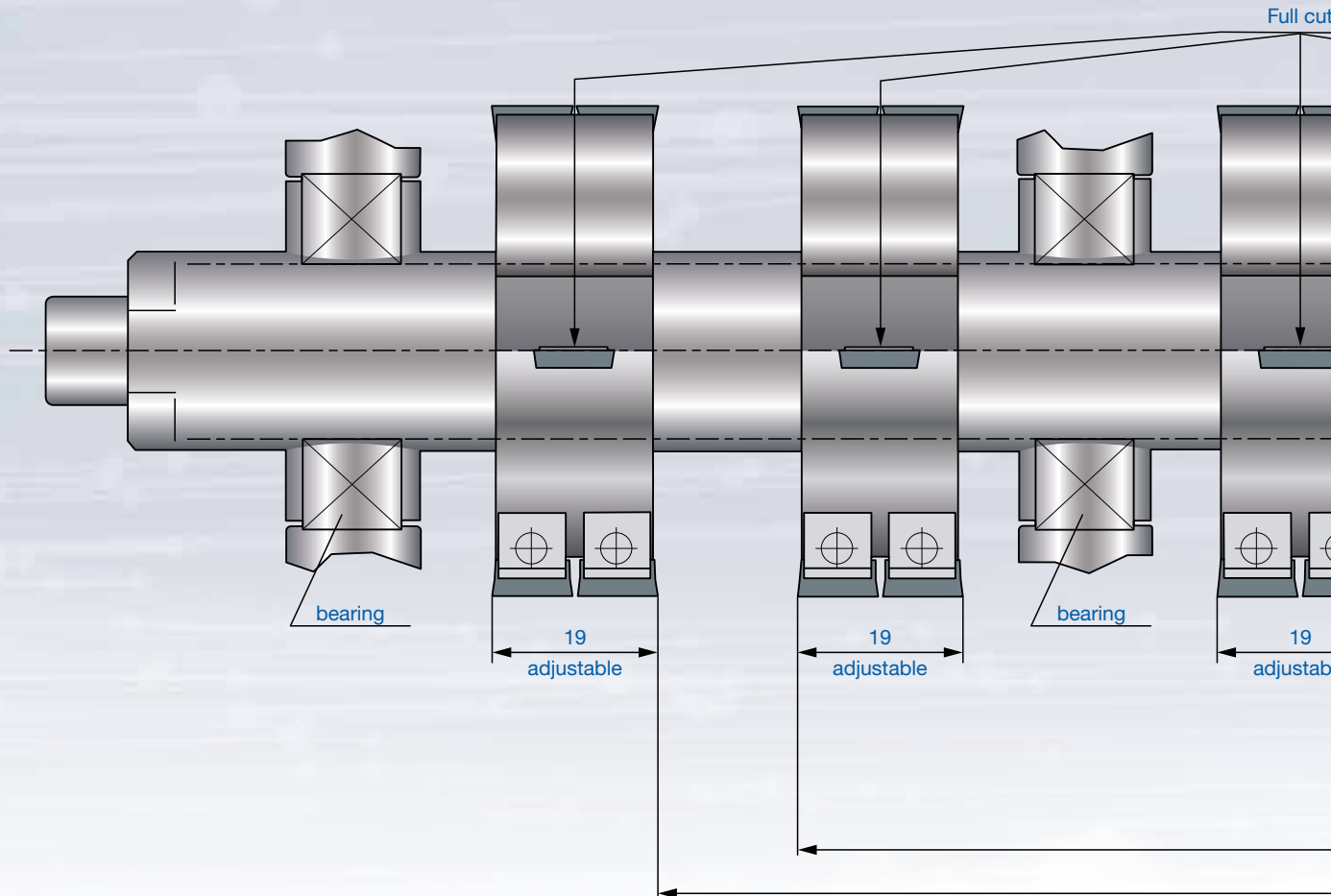
Requirements
Clearance milling, face run-out and milling cutters are adjustable towards each other

Solution
Gang milling cutter / Teeth$_{eff.}$ = 2

Cutting data

Material		(DIN) ■ G-AlSi9Cu
Cutting grade		PCD
Cutting speed	m/min	220
Feed rate per tooth	mm	0.07
Cutting depth	mm	0.7 - 0.8

Result
PCD inserts regrindable and renewable

Narrow tolerances of bearing spacings achievable

Minimal effort for insert change

Customer benefits
Reduced tooling costs per component

Low non-productive times

Ø 58.5 ±0.05

Ø 52.5 ±0.05

19
adjustable

19
adjustable

60 ±0.1 adjustable

124 ±0.1 adjustable

142 ±0.1 adjustable

212 ±0.1 adjustable

230 ±0.1 adjustable
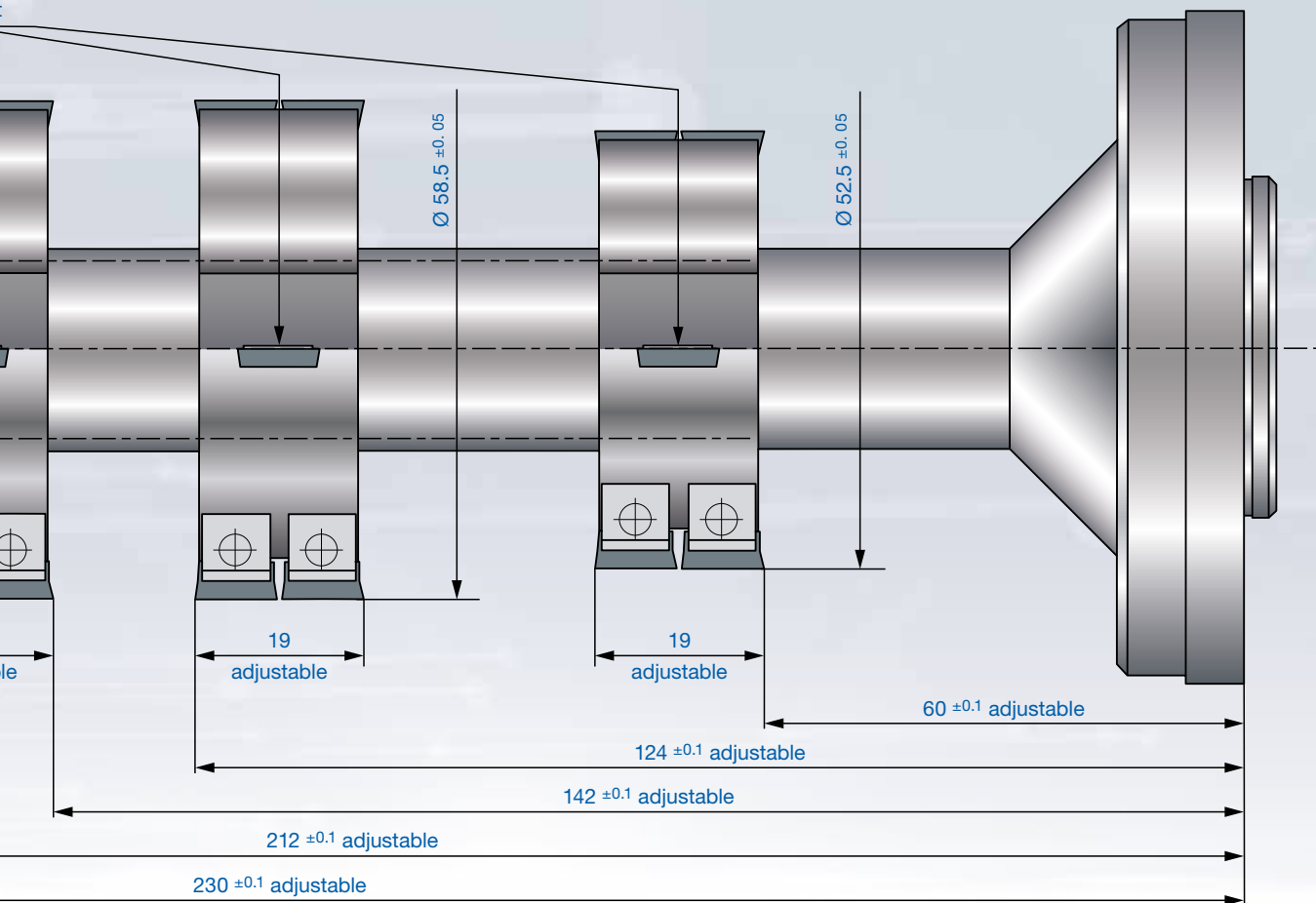
H Cylinder head

Bearing width

HSK 63-C

Ø 25
Ø 50 ±0.05
Ø 37 ±0.05

20.894 adjustable
85.894 adjustable

0.5 x 45° adjustable
0.5 x 45° adjustable
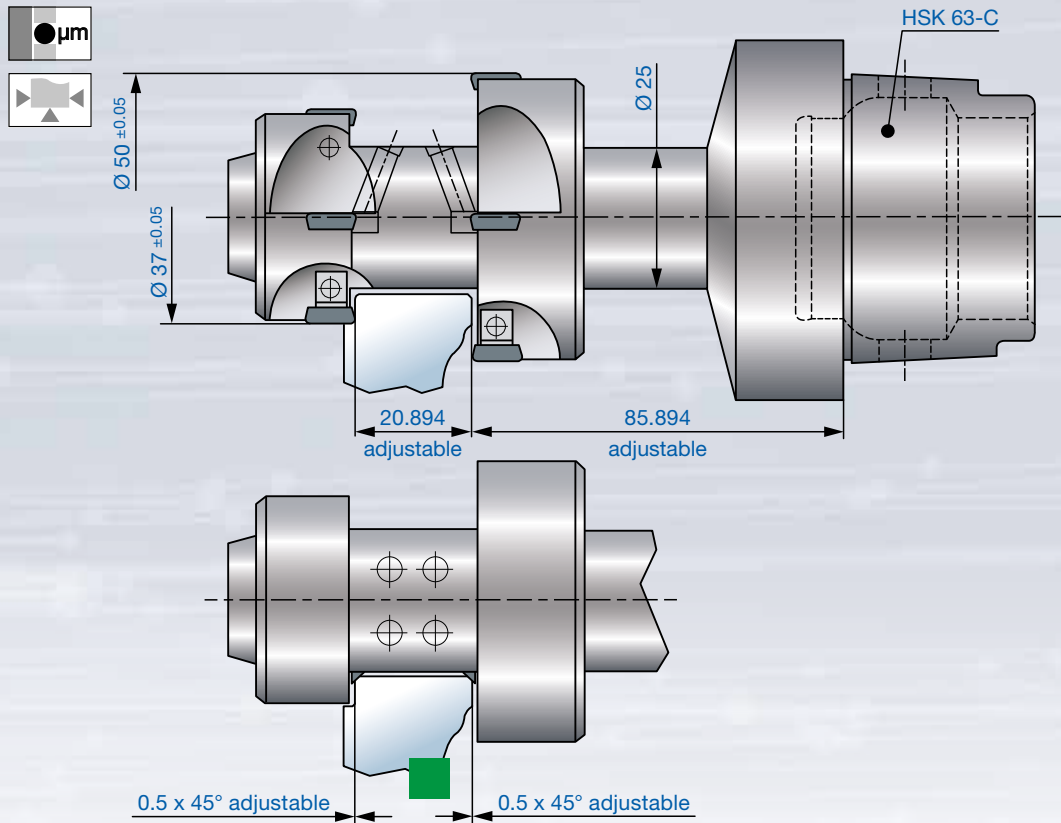
Requirements

Gang milling cutter for milling the bearing width with chamfering

Bearing width and chamfer sizes µm-accurate adjustable

Solution

Gang milling cutter / Teeth = 2 x 4

Cutting data

Material	(DIN) ■ GKAlSi7Mg	
Cutting grade		PCD
Cutting speed	m/min	1,200
Feed rate per tooth	mm	0.1
Cutting depth	mm	2.5

Result

PCD inserts regrindable and renewable

Narrow tolerances of bearing spacings achievable

Minimal effort for insert change

Reduced machining time thanks to combination tool

Customer benefits

Reduced tooling costs per component

Low non-productive times

Reaming tool / Teeth = 1

run out check diameter · run out check diameter · 5x guide pads PCD

(Ø 25.8 ±0.001)

Ø 70

95
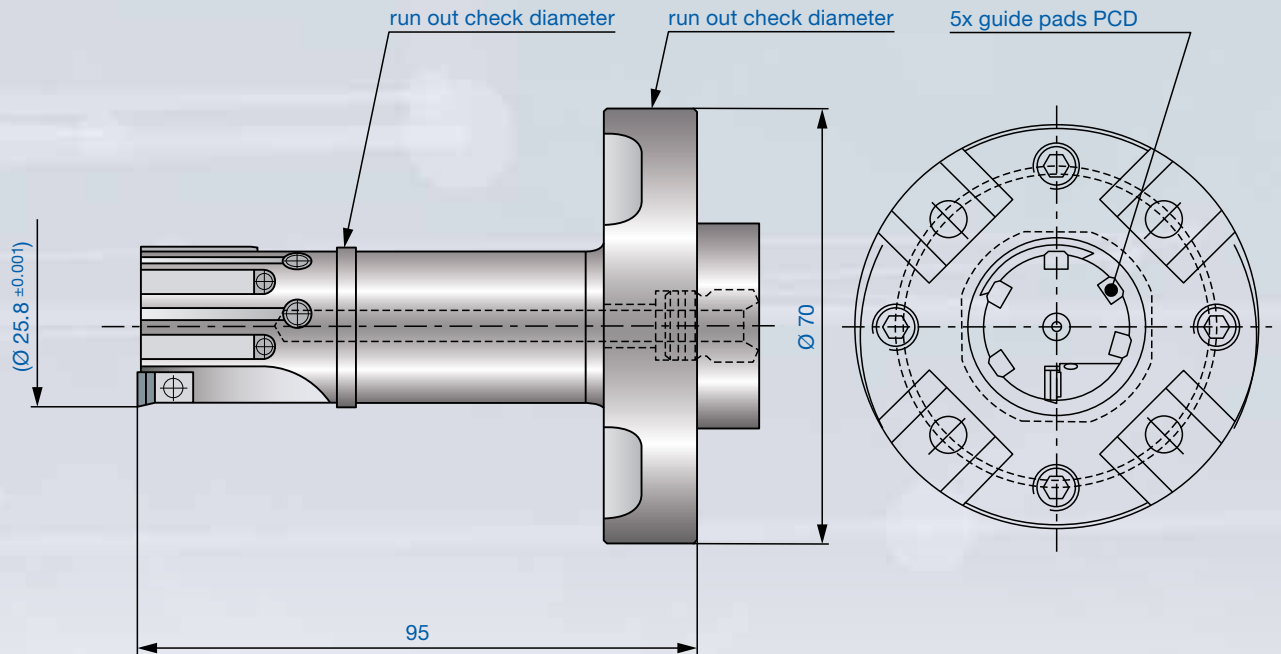
Requirements
Fine machining with PCD guide pads

Solution
Reaming tool / Teeth = 1

Cutting data

Material		(DIN) ■ Al
Cutting grade		PCD
Cutting speed	m/min	800
Feed rate per tooth	mm	0.1
Cutting depth	mm	0.3

Result
Narrow form and position tolerances are maintained
Surface finish quality R_a 0.5

Customer benefits
Higher process reliability
Easy adjustment of the inserts

H Cylinder head

Spring seat

Ø 22.8
Ø 21.6
Ø 10
Ø 9.5
45°
R 0.2
R 0.4
0.5
2.2
30°

Requirements

Complete machining of the hole including the spring support

Solution

Drilling and countersinking tool / Teeth = 2

Profile inserts adjustable and separately replaceable

Cutting data

Material		(DIN) ■ AlSi10Mg(Cu)
Cutting grade		PCD 10
Cutting speed	m/min	590
Feed rate per tooth	mm	0.075

Result

Tool life 85,000 drilled holes

SC-drill regrindable several times

! **Customer benefits**

Lower tool costs per part compared to brazed tools

Form countersinking tool with PCD inserts and integrated SC-drill / Teeth=2

Ø 29.4 adjustable
z = 2

Ø 26.1

Ø 17.5

Ø 10

140°
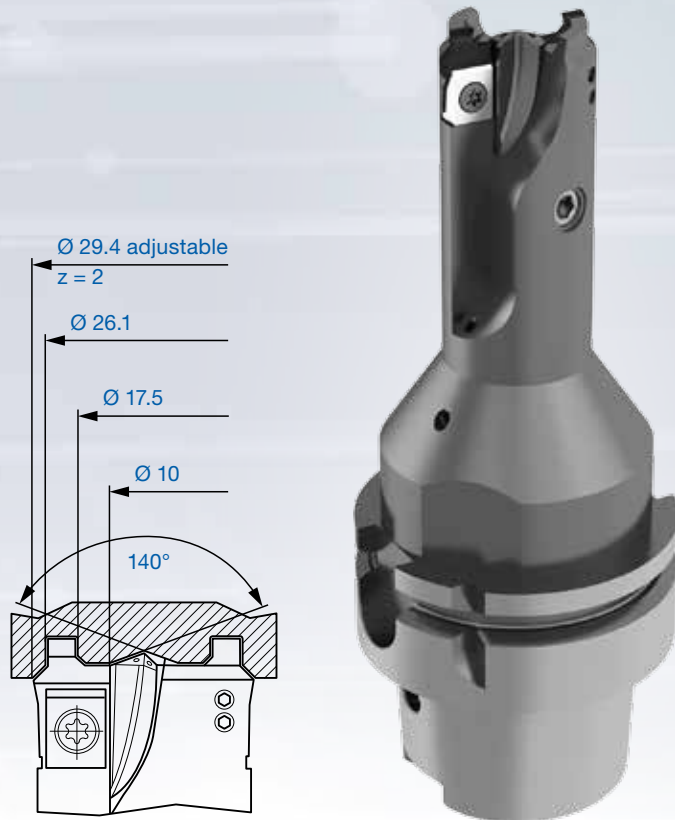
Requirements

Machining of the complete workpiece contour with one tool

Solution

Form countersinking tool with PCD inserts and integrated SC-drill / Teeth=2

Cutting data

Material	(DIN) ■ AlSi9Cu	
Cutting grade		PCD
Cutting speed	m/min	850
Feed rate per tooth	mm	0.15
Cutting depth	mm	4.3

Result

High tool life (>70,000 drilled holes) with simultaneous compliance of
tolerances and surface requirements

Customer benefits

Short processing time

Lower costs per workpiece

Cylinder head

Spring seat

Multi-step fine boring tool / Teeth = 2 per Ø

HSK 63-A

Ø 33.9 adjustable
Ø 32.5 adjustable
Ø 11

107
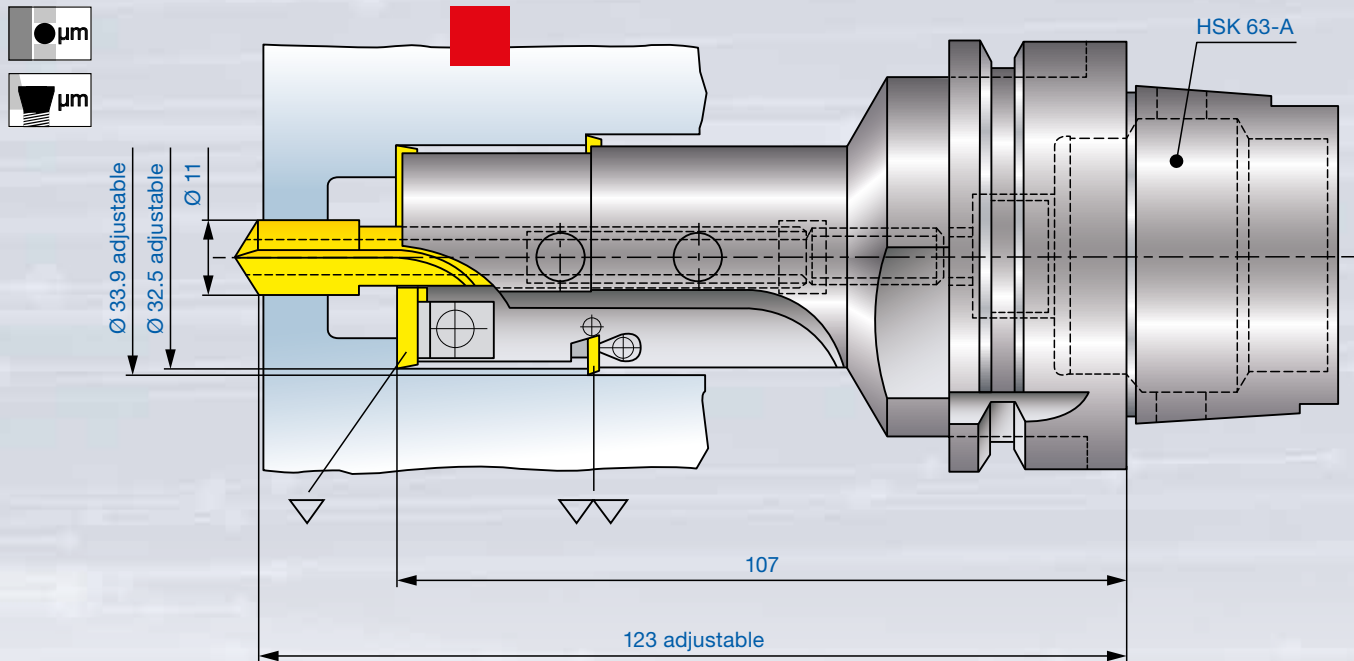
123 adjustable

Requirements

Drilling and fine boring of the spring seat

Drill length adjustable, fine boring diameters adjustable

Solution

Multi-step fine boring tool / Teeth = 2 per Ø

Cutting data

Material		(DIN) ■ GG25
Cutting grade		carbide coated
Cutting speed	m/min	(Ø 11) 88 / (Ø 33.9) 258
Feed rate per tooth	mm	0.07
Cutting depth	mm	-5

Result

SC-drill regrindable several times

Inserts adjustable and separately replaceable

Customer benefits

Reduced tooling costs per component compared to solid carbide tools

Multi-step fine boring tool / Teeth_{eff.} = 1

Multi-step fine boring tool / Teeth$_{eff.}$ = 1

HSK 63-A

µm

µm

Ø 25.7 adjustable

Ø 21.1 adjustable

Ø 7.5 adjustable

205.75

222.7

241
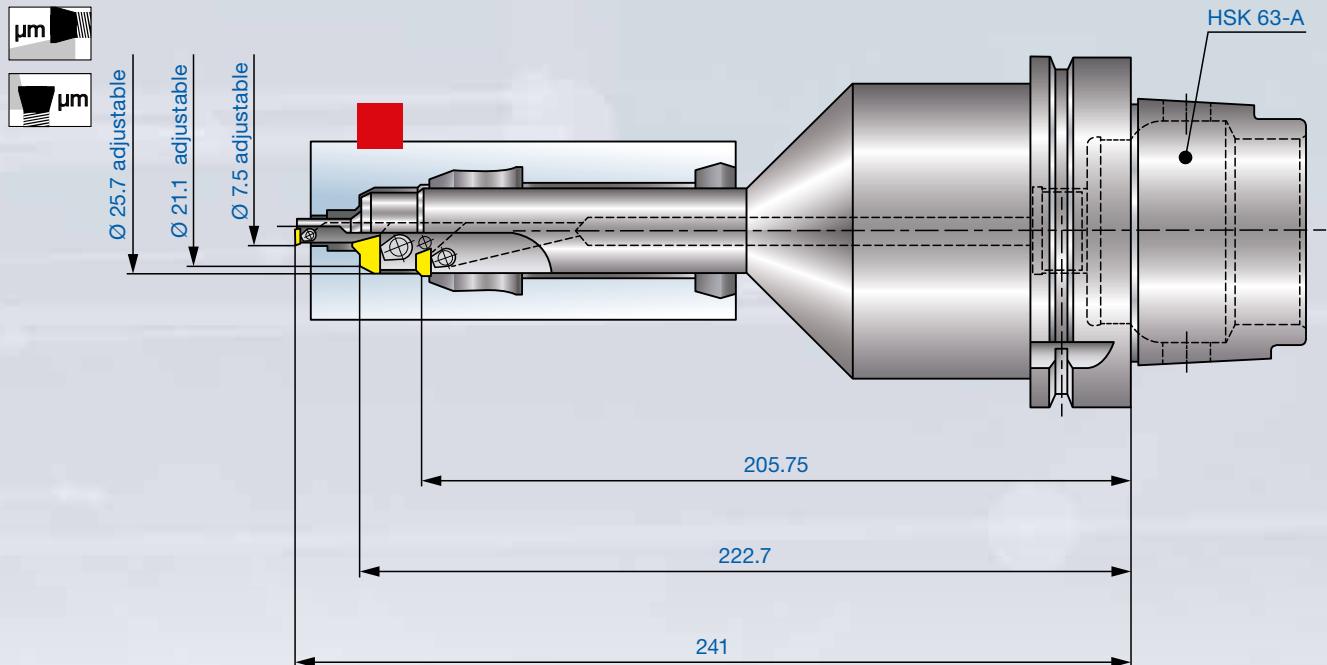
Requirements

Pre-machining, form inserts for special profile

All inserts adjustable

Solution

Multi-step fine boring tool / Teeth$_{eff.}$ = 1

Cutting data

Material		(DIN) ■ GG-Cr
Cutting grade		carbide coated
Cutting speed	m/min	220
Feed rate per tooth	mm	0.07
Cutting depth	mm	0.2-0.8

Result

Inserts adjustable and separately replaceable

Customer benefits

Reduced tooling costs per component compared to solid carbide tools

Cylinder head

Broaching of relief groove
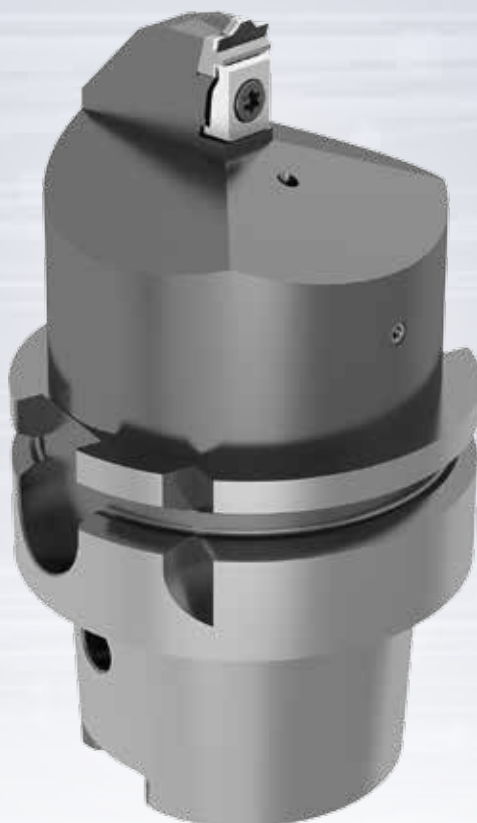
Requirements

Reduction of tool costs and machining time

Elimination of expensive special milling cutters

Solution

Broaching tool / Teeth = 1

Cutting data

Material		(DIN) ■ AlSi10Mg(Cu)
Cutting grade		PCD
Cutting speed	m/min	25
Cutting depth	mm	0.5 per stroke

Result

Long tool life thanks to constant cut

Low tooling costs

Significant reduction in machining time

Customer benefits

Lower machine investment - no expensive milling spindle (high-speed)

Reduced tooling costs per component

Cylinder head

Induction port milling tool / Teeth = 2

PCD inserts adjustable and replaceable

Machining plan
depth of cut 3 mm
forward and backward

Carbide shank

Ø 25 h6

Ø 27 adjustable
Z = 2

56.6

183
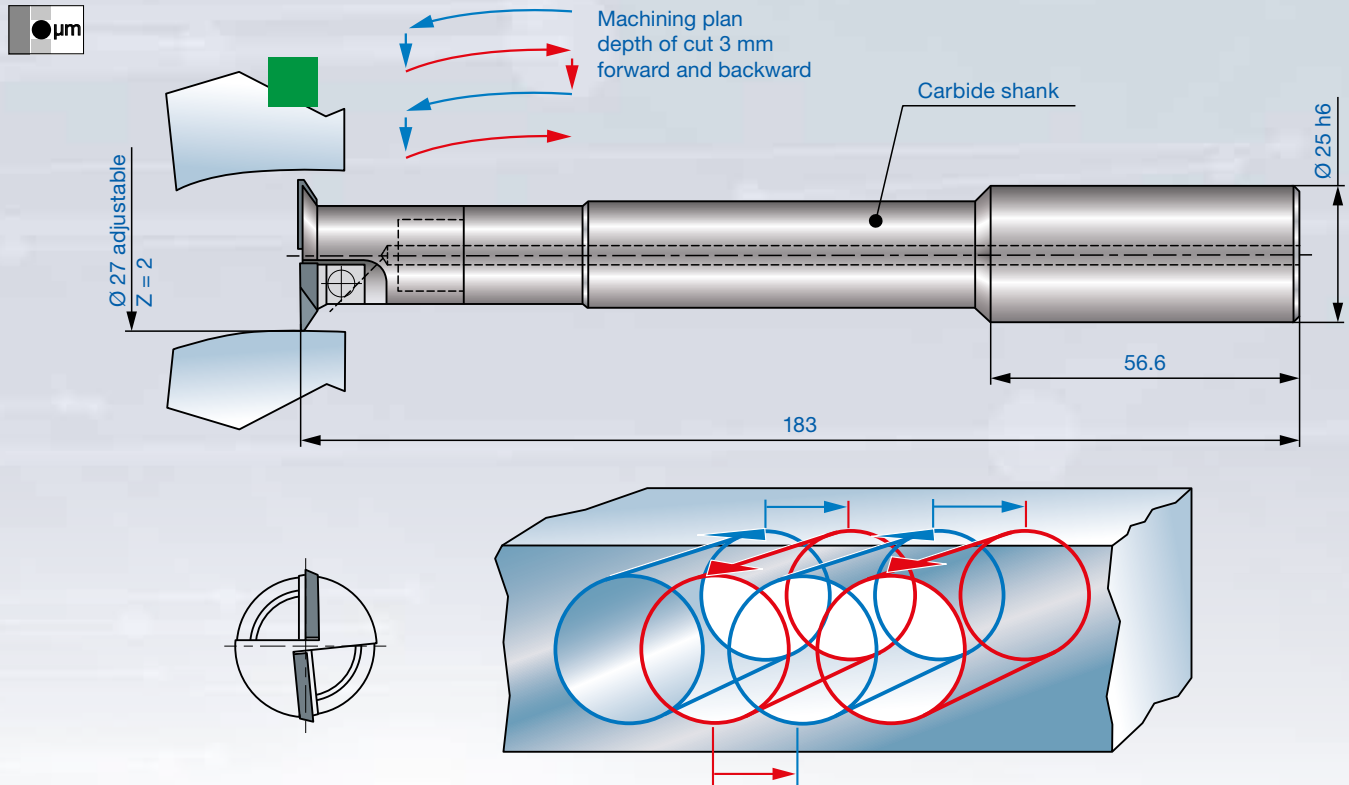
Requirements
Complete machining of the in-and outlet ducts

Solution
Induction port milling tool / Teeth = 2
PCD inserts adjustable and replaceable

Cutting data

Material		(DIN) ■ AlSi10
Cutting grade		PCD 10
Cutting speed	m/min	1,357
Feed rate per tooth	mm	0.35
Cutting depth	mm	3 forward and backward

Result
High feed rates
Consistent surface finish

Customer benefits
Lower tool costs thanks to interchangeable inserts

Cylinder
crankcase
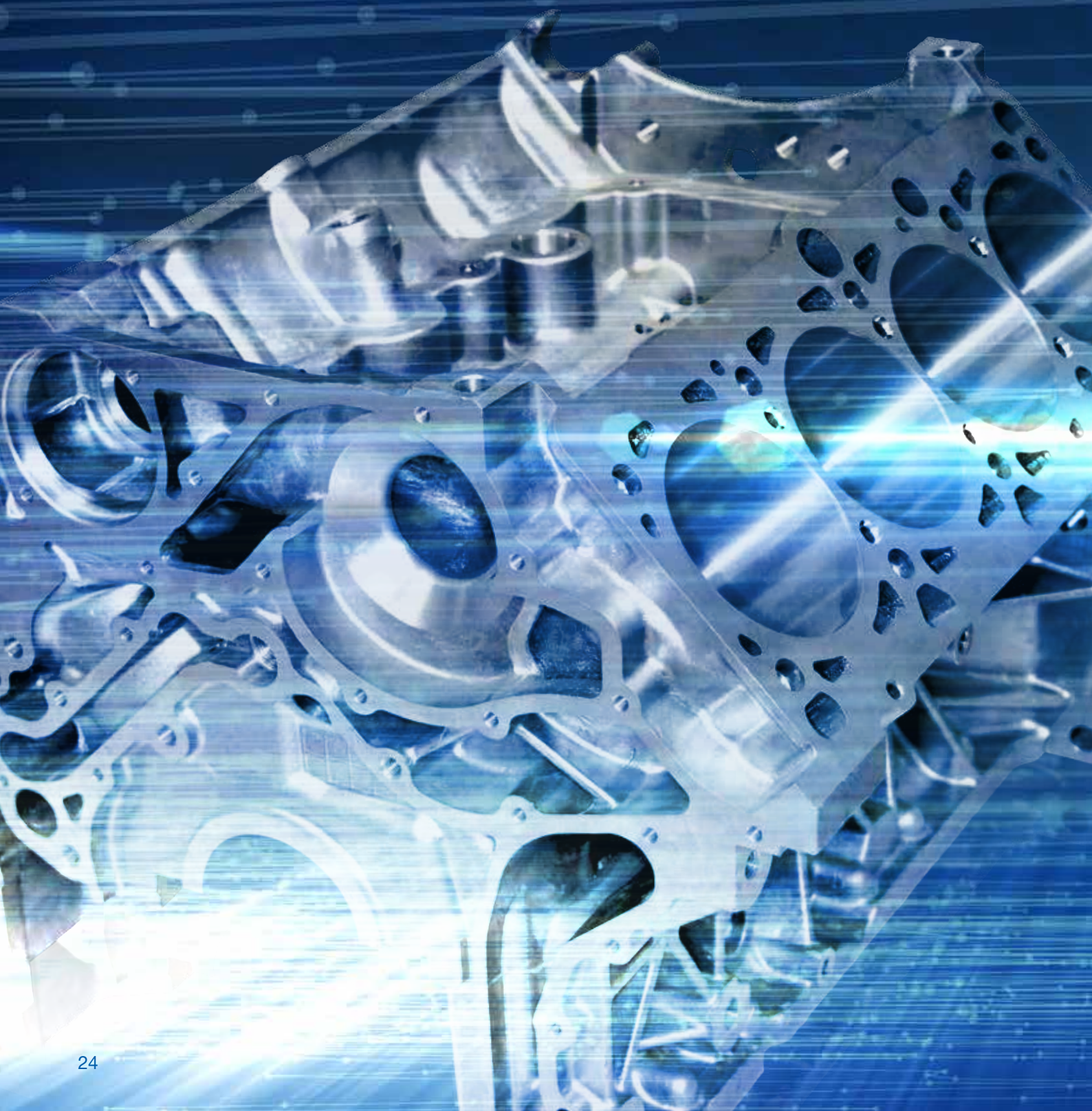
HPC rough milling cutter / Teeth = 15 / up to 8 mm cutting depth

Firm clamping
of the inserts

Requirements

Increase tool life

Minimization of edge breakouts on the component

Solution

HPC rough milling cutter / Teeth = 15

Cutting data

Material	(DIN) ▪ AlSi17Cu4 T5 / T6	
Cutting grade		PCD 30
Cutting speed	m/min	685
Feed rate per tooth	mm	0.14
Cutting depth	mm	~1.5

Result

Tool life improvement by factor 4 to 5

Lower power consumption

No edge breakouts on the component

Customer benefits

Reduced tooling costs per component

Almost chip-free components, lower cleaning costs

Increased productivity and energy efficiency

Bearing width

> **Gang milling cutter / Teeth = 5 per milling cutter**

> **Face run-out and milling cutters adjustable to each other**

455 adjustable / z = 5
378 adjustable / z = 5
355 adjustable / z = 5
281 adjustable / z = 5
260 adjustable / z = 5
185 adjustable / z = 5

7.8

Ø 158
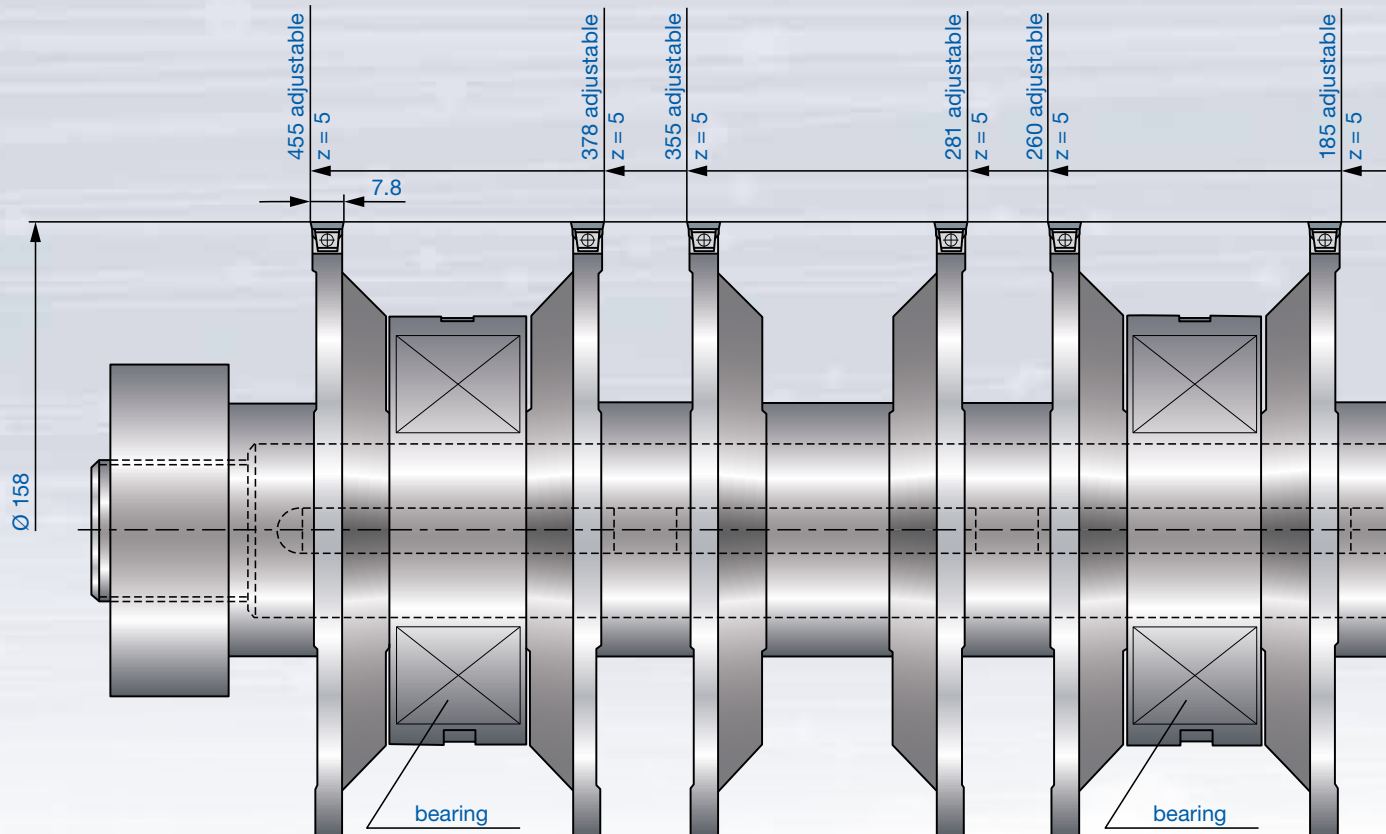
bearing

bearing

Requirements

Milling of the bearing width

Face run-out and milling cutters adjustable to each other

Solution

Gang milling cutter / Teeth = 5 per milling cutter

Cutting data

Material		(DIN) ■ GD-AlSi9
Cutting grade		PCD / K10
Cutting speed	m/min	500
Feed rate per tooth	mm	0.07
Cutting depth	mm	-5

Result

Quick and easy changing of the inserts

Excellent surface finish

PCD inserts usable on both sides

!

Customer benefits

Reduced non-productive times

Half of the costs thanks to double-used PCD inserts

160 adjustable
z = 5

90 adjustable
z = 5

0
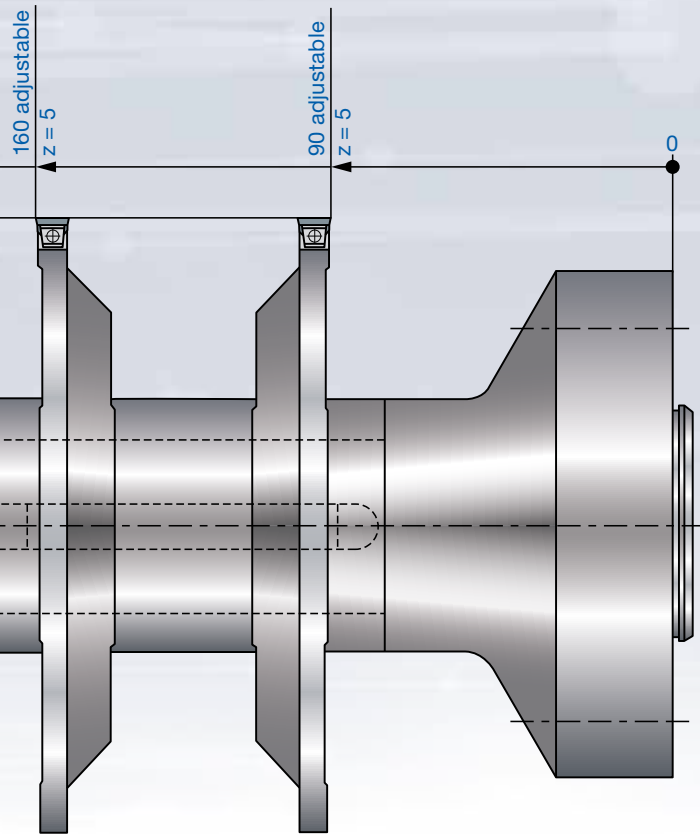
H Cylinder crankcase

Sealing surface

Requirements

Milling of the sealing surface, Aluminium crankcase

All inserts adjustable

Solution

Face milling cutter / Teeth = 52

Cartridge solution

Cutting data

Material		(DIN) ■ GD-AlSi9
Cutting grade		PCD
Cutting speed	m/min	3,000
Feed rate per tooth	mm	0.1
Cutting depth	mm	0.5

Result

Outstanding tool life

Easy adjustment of the inserts

❗ Customer benefits

Low costs per component

Reduced non-productive times

> **Milling cutter with vibration damper / Teeth = 16 / Teeth$_{eff.}$ = 8**

Requirements
Milling the bearing clearances for the crankshaft

Solution
Milling cutter with vibration damper / Teeth = 16 / Teeth$_{eff.}$ = 8

Cutting data

Material		(DIN) ■ AlSi9Cu3
Cutting grade		PCD
Cutting speed	m/min	516
Feed rate per tooth	mm	0.08
Cutting depth	mm	1.5 - 8

Result
Absolutely vibration-free and high quality surface finish

Customer benefits
High tool life of PCD inserts thanks to smoth cutting performance

> **Milling cutter with integrated vibration damper / Teeth = 16 (8 + 8)**

Requirements

Maximum number of cutting edges, vibration damped for high surface quality

Solution

Milling cutter / Teeth = 16 (8 + 8)

Cutting data

Material		(DIN) ■ AlSi12
Insert		PCD
Cutting speed	m/min	650
Feed rate per tooth	mm	0.1

Result

Stable milling operation, surfaces free of vibrations

ⓘ Customer benefits

Cycle time reduction thanks to high number of cutting edges

Excellent surface finish

Milling cutter with vibration damper / Teeth$_{eff.}$ = 3

Ø 56

Ø 329

Ø 279.9
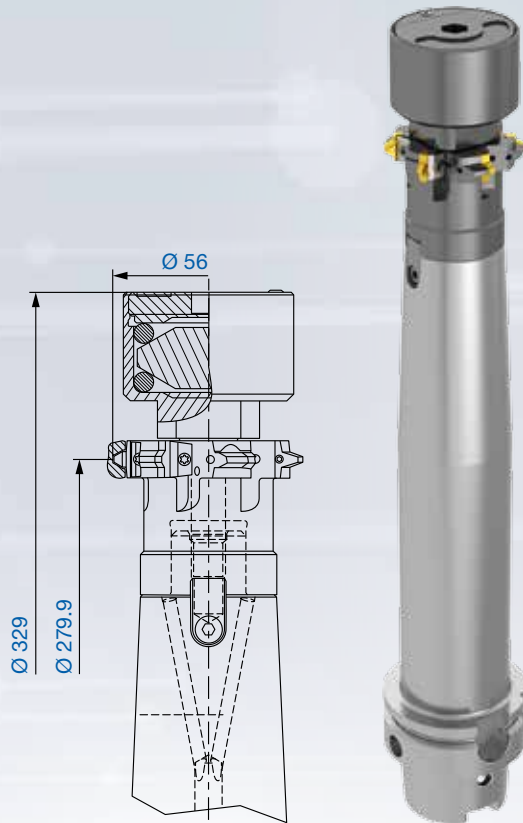
Requirements

Milling a slot in the bearing diameter

Extreme protrusion length

Solution

Milling cutter with vibration damper / Teeth$_{eff.}$ = 3

Cutting data

Material		(DIN) ■ GG25
Cutting grade		carbide coated
Cutting speed	m/min	345
Feed rate per tooth	mm	0.03
Cutting depth	mm	3.5

Result

Smooth cutting performance and good surface quality thanks to the use of a vibration damper

Customer benefits

High quality components

> **Drilling and fine boring tool / Teeth (drilling) = Teeth$_{eff.}$ = 1 / (counterboring) = 2**

Ø 32 adjustable
Ø 31 adjustable

HSK 63-A

103

145

Ø 32 $^{-0.003}$ adjustable
z = 2
Ø 31 adjustable

run out check diameter

Ø 33 adjustable
z = 2

0.75 x 45°

HSK 63-A

340
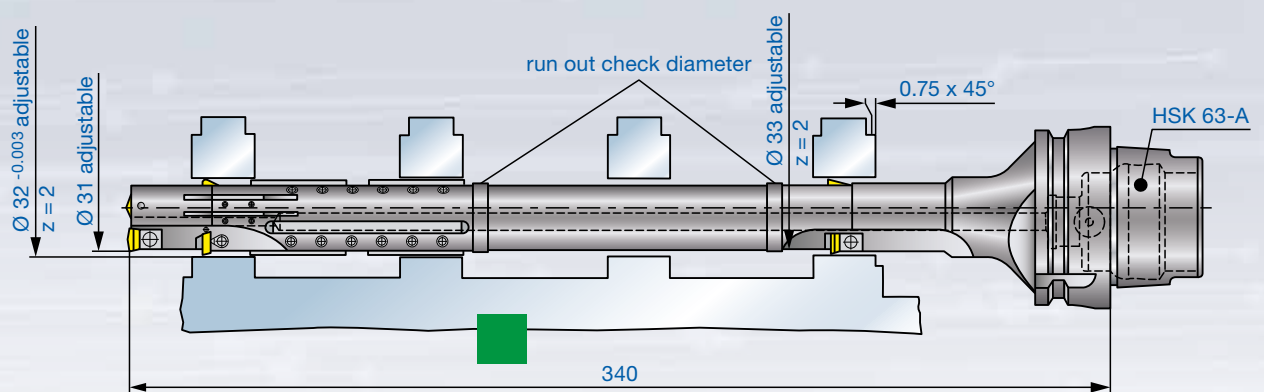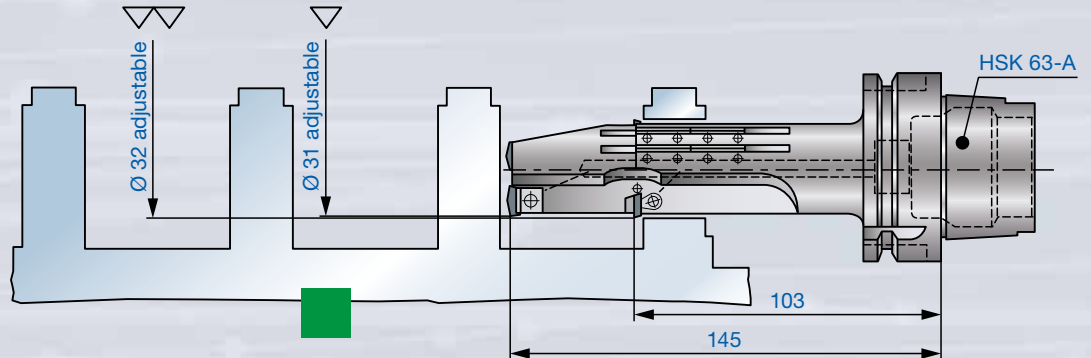
Requirements

Pilot tool with guide pads (drilling into solid - 1. web)

Finish tool with guide pads (drilling into solid)

Solution

Drilling and fine boring tool / Teeth (drilling) = Teeth$_{eff.}$ = 1 / (counterboring) = 2

Cutting data

Material		(DIN) ■ GK-AlSi17Cu4Mg
Cutting grade		K10/PCD
Cutting speed	m/min	320
Feed rate per tooth	mm	0.07
Cutting depth	mm	into solid/0.5

Result

Longer tool life

Customer benefits

Process reliable production processes

Drilling and fine boring tool / Teeth = 2 + 2 + 1

run out check diameter

run out check diameter

(Ø 36.3) adjustable z = 1

Ø 26.03 ±0.01 adjustable z = 2

(Ø 15)

Ø 70

65

80

100

Requirements

Combination tool with solid carbide drill for boring and

adjustable inserts for fine boring and chamfering

Solution

Drilling and fine boring tool / Teeth = 2 + 2 + 1

Cutting data

Material		(DIN) ■ Al	
Cutting grade		PCD	
		drilling	fine boring
Cutting speed	m/min	193	470
Feed rate per tooth	mm	0.3	0.12
Cutting depth	mm	into solid	5.5

Result

Conventional solid carbide drill, regrindable several times

Insert diameter µm-accurate adjustable

Customer benefits

Cost-efficient solution

Cylinder crankcase

Balance shaft bore

Line boring with cartridges and PCD-equipped pilot

Heavy metal holder with carbide guide pads for stabilisation
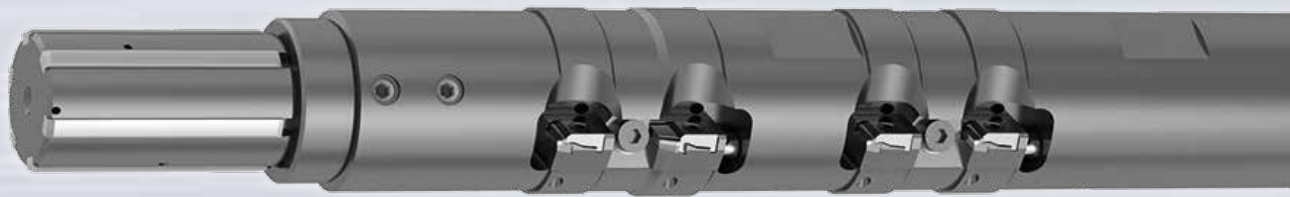
Requirements

Semi-finish machining with counter bearing in the component

All inserts adjustable

Solution

Line boring with cartridges and PCD-equipped pilot

Heavy metal holder with carbide guide pads for stabilisation

Cutting data

Material		(DIN) ■ AlSi9Cu3
Cutting grade		PCD
Cutting speed	m/min	280
Feed rate per tooth	mm	0.12
Cutting depth	mm	0.5

Result

High concentricity of bearing diameters

Simple tool handling
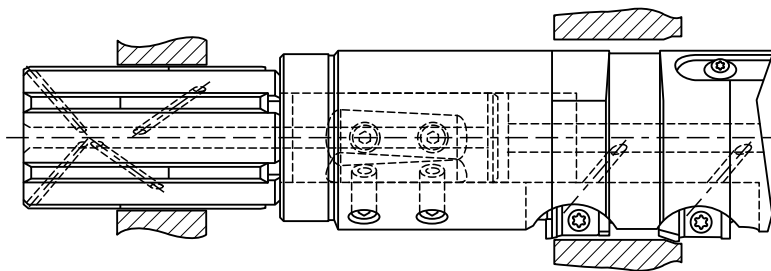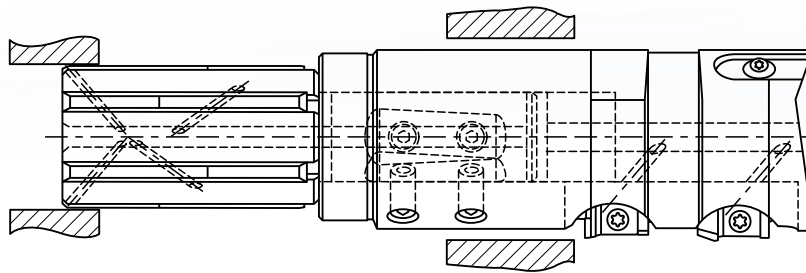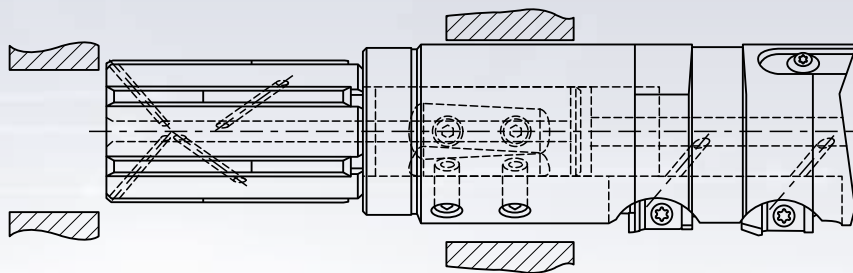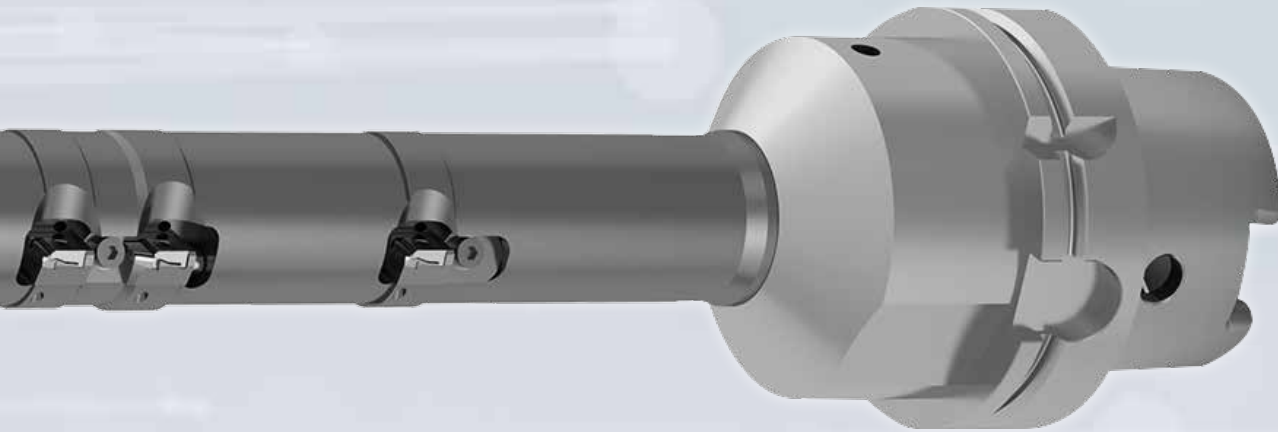
Customer benefits

High process reliability

Form milling cutter / Teeth = 2 x 6

Transition of the insert profile adjustable

HSK 100-A

Ø 100   z = 12   (Z eff. 6)

0.02 | A

adjustable

165

Overlap
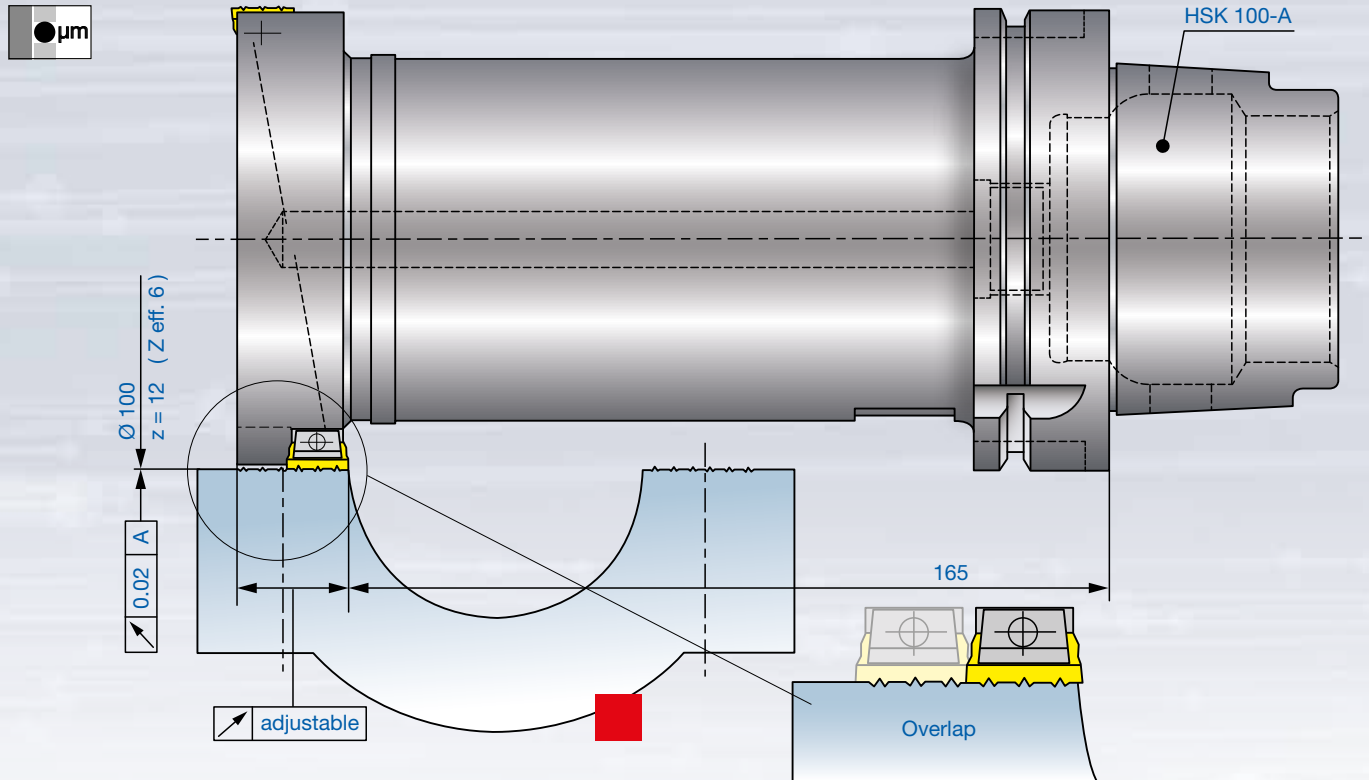
Requirements
Form milling cutter for machining bearing caps

Solution
Form milling cutter / Teeth = 2 x 6

Transition of the insert profile adjustable

Cutting data

Material		(DIN) ■ GGG40
Cutting grade		carbide coated
Cutting speed	m/min	240
Feed rate per tooth	mm	0.1
Cutting depth	mm	1

Result
Low cutting forces thanks to cutting division

Customer benefits

Cost-effective interchangeable inserts solution

Cylinder crankcase

Crankshaft bore

Operation 1: counterboring tool / Teeth = 2

20   20   23   BT 50

Ø 52.5
z = 2

215

Operation 2: fine boring tool / Teeth = 1

● µm

guide pads   BT 50

Ø 52.7 adjustable
z = 1

23

100

105
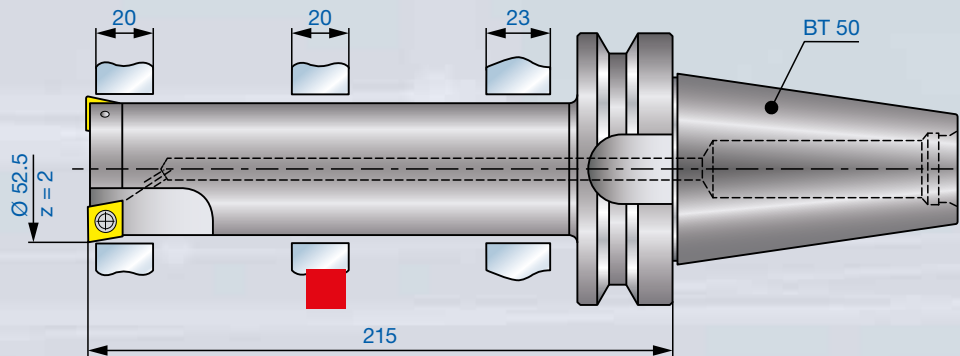
Requirements

Operation 1: pre-machining from 2 sides	
Operation 2: pilot bore	

Solution

Operation 1: counterboring tool / Teeth = 2	
Operation 2: fine boring tool / Teeth = 1	

Cutting data		Operation 1	Operation 2
Material		(DIN) ■ GG	
Cutting grade		carbide coated	
Cutting speed	m/min	150	135
Feed rate per tooth	mm	0.2	0.1
Cutting depth	mm	2.5	0.1

Result

Simple tool handling thanks to eccentric pin adjustment

Guide pads easily replaceable

! **Customer benefits**

Reduced non-productive times

High quality components

Operation 3: fine boring tool / Teeth = 1 + 1

run out check diameter   guide pads CBN   guide pads carbide   run out check diameter

compensations adapter

BT 50

(Ø 53.012 -0.003) z = 1

(Ø 52.7 -0.003) z = 1

20.5   20   20   20   23

35   285

442

450

Requirements

Operation 3: finish-machining

Solution

Operation 3: fine boring tool / Teeth = 1 + 1

Cutting data		Operation 3
Material		(DIN) ■ GG
Cutting grade		carbide coated
Cutting speed	m/min	238
Feed rate per tooth	mm	0.1
Cutting depth	mm	0.1

Result

Simple tool handling thanks to eccentric pin adjustment

Guide pads easily replaceable

Customer benefits

Reduced non-productive times

High quality components

> **Boring tool with integrated vibration damper, adjustable cartridges and ISO indexable inserts / Teeth = 5**
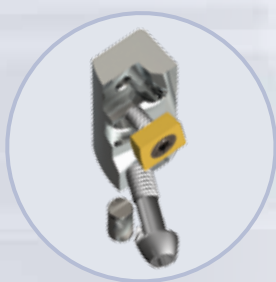
KV400 KKH
axially adjustable

Requirements

Roughing operation

Ø 74±01

Solution

Boring tool with adjustable cartridges and ISO indexable inserts / Teeth = 5

Cutting data

Material		(DIN) ■ GG25
Cutting grade		carbide coated
Cutting speed	m/min	150
Feed rate per tooth	mm	0.2
Cutting depth	mm	Ø 1 - 1.5

Result

Very good tool life

Stable machining process

Customer benefits
Low costs per component

**Boring system GA 200 Vario /
Teeth = 2 for roughing and finish-machining**

44 - 130 mm

Ø
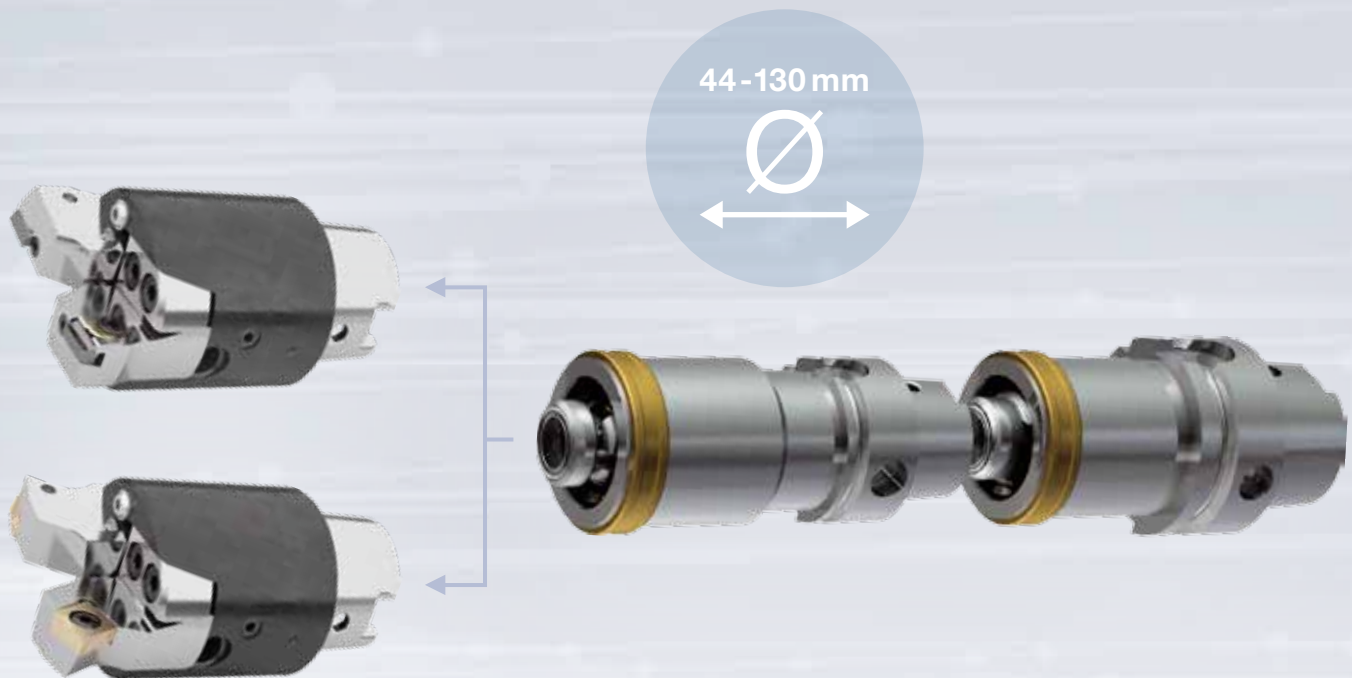
Requirements

Roughing operation

Ø 72.5±0.2 R_z 100

Solution

GA 200 Vario / Teeth = 2

Cutting data

Material		(DIN) ■ GG
Cutting grade		CBN
Cutting speed	m/min	649
Feed rate per tooth	mm	0.2
Cutting depth	mm	Ø 1.5 - 2

Result

Increased tool life

Simple tool handling

! **Customer benefit**
Low cost per component

Tight cutting edge spacing

Various cutting materials can be used

With a stable core cross-section, this robust solution can achieve high feed rates

Requirements

Circular milling a clearance cut for the honing tool into the cylinder bore

Mixed machining Aluminium and Cast Iron

Solution

Circular milling cutter with fixed insert seat

Double positive cutting geometry

Cutting data

Material		■AlSi9 / ■GG25
Cutting grade		PCD / PROTON coated carbide
Cutting speed	m/min	242
Feed rate per tooth	mm	0.18
Cutting depth	mm	6-7

Result

Short machining time with high cutting depth

Customer benefits

Solid solution ➜ high feeds possible

Inserts can be changed individually

➜ lower costs per component

H Cylinder crankcase

Cylinder bore

Automatically adjustable tool / Teeth = 1

SMART SETTING MOTION TOOLS concept

Requirements
Simple tool handling

Solution
Automatically adjustable tool / Teeth = 1
SMART SETTING MOTION TOOLS concept

Cutting data
Material		(DIN) ■ GG25
Cutting grade		CBN
Cutting speed	m/min	750
Feed rate per tooth	mm	0.28
Cutting depth	mm	0.3

Result
Fully automatic diameter adjustment

! Customer benefits
Increase in tool life quantity
Very easy handling and very precise adjustment

Automatically adjustable tool / Teeth = 3 + 2

SMART SETTING MOTION TOOLS concept and control of the drawbar via compressed air

Requirements

Reduction of processing costs

Solution

Automatically adjustable tool / Teeth = 3 + 2

SMART SETTING MOTION TOOLS concept

Control of the drawbar via compressed air

Cutting data

Material		(DIN) ■ GG
Cutting grade		CBN
Cutting speed	m/min	700
Feed rate per tooth	mm	0.18
Cutting depth	mm	0.3

Result

Semi-finish and finishing machining in one tool

No retraction marks thanks to retractable inserts

Customer benefits

High process reliability

Simple tool handling

Cylinder crankcase

Crankshaft bearing passage

Line boring bar / Teeth = 5 + 5 / Teeth$_{eff.}$ = 1 + 1

SMART SETTING MOTION TOOLS concept

Requirements

Reduced non-productive time and cycle time	
Defined surface R$_z$ 12 - 20	

Solution

Line boring bar / Teeth = 5 + 5 / Teeth$_{eff.}$ = 1 + 1	
SMART SETTING MOTION TOOLS concept	

Cutting data

Material		(DIN) ■ GG25
Cutting grade		solid carbide
Cutting speed	m/min	185
Feed rate per tooth	mm	0.27 / 0.2
Cutting depth	mm	0.5

Result

Non-productive times for re-adjusting reduced from 20 minutes to 2 minutes	
Simple handling	

Customer benefits

High process reliability

Dramatic reduction of non-productive time
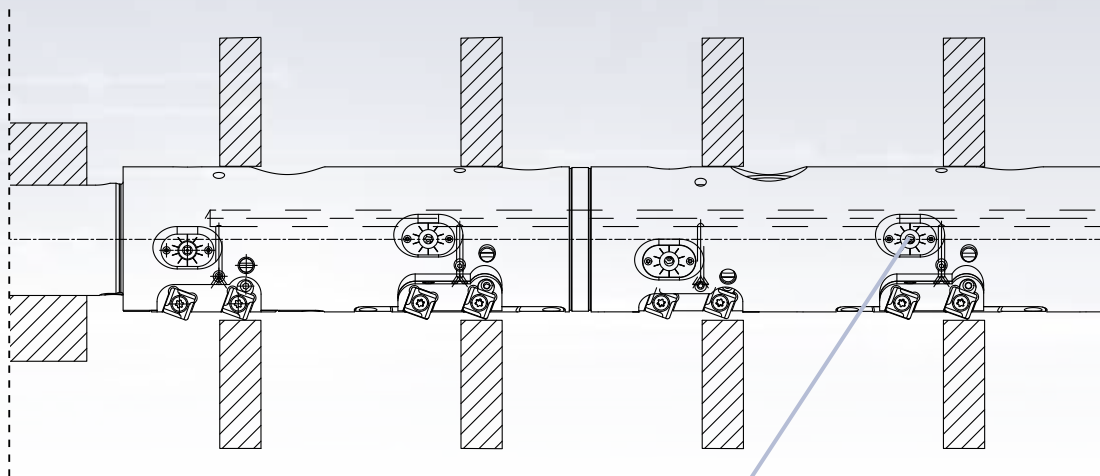
➡ Machining direction

Bearing position 2
>ǀǀ< = 0.002 mm in Ø
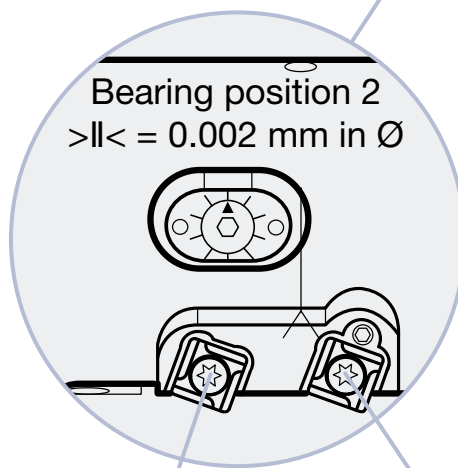
Finish-machining   Semi-finish-machining

Gearbox
components
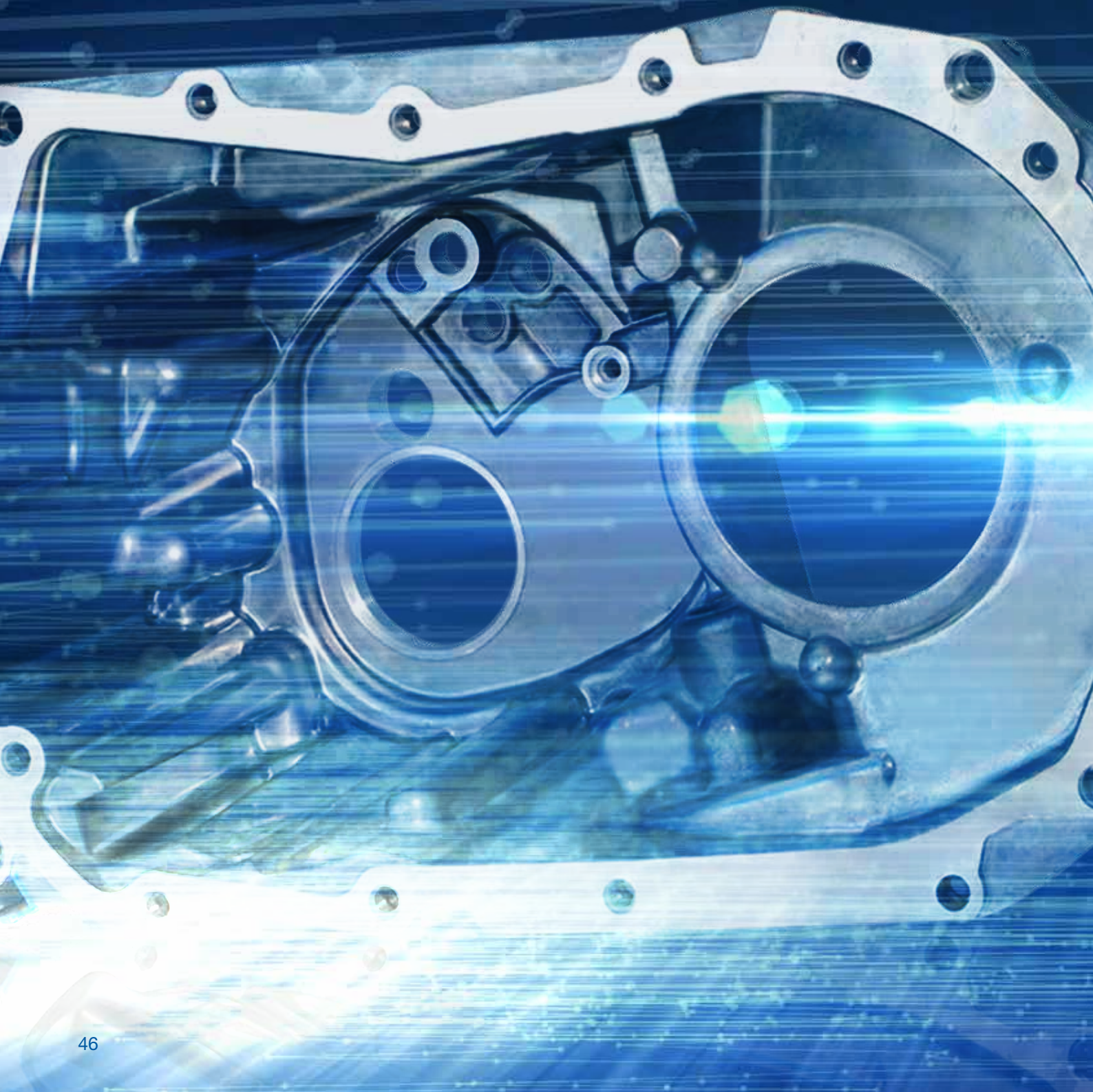
> **HPC gang milling cutter Ø 380 mm / Teeth = 2 x 33**

> **Adjustable distance between milling cutters (Dimension 280 mm)**
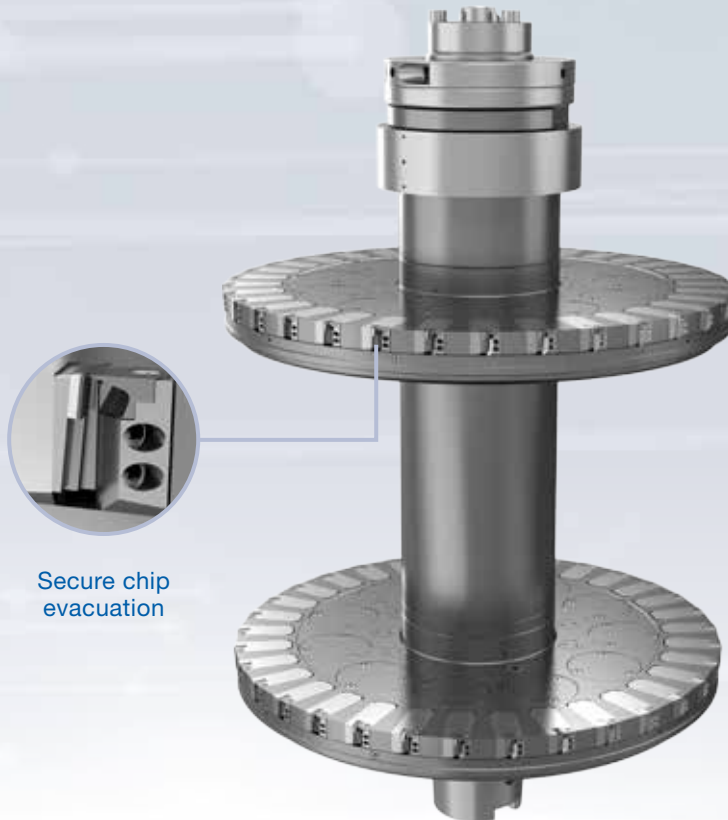
Secure chip
evacuation

Requirements

Machining of the sealing surface

Chip free components

Simultaneous machining of two components

Solution

HPC gang milling cutter Ø 380 mm / Teeth = 2 x 33

Adjustable distance between milling cutters (Dimension 280 mm)

Cutting data

Material		(DIN) ■ AlSi7
Cutting grade		PCD
Cutting speed	m/min	780
Feed rate per tooth	mm	0.07
Cutting depth	mm	0.5

Result

Excellent surface finish

Very good tool life

Customer benefits

Almost chip-free components, lower cleaning costs

Reduced tooling costs per component

H Gearbox case

Pre-machining

> **Stepped countersinking tool Ø 206 mm + Ø 209 mm + Ø 285 mm / Teeth = 2 + 2 + 2**

> **Basic tool body in steel and aluminium with cartridges**
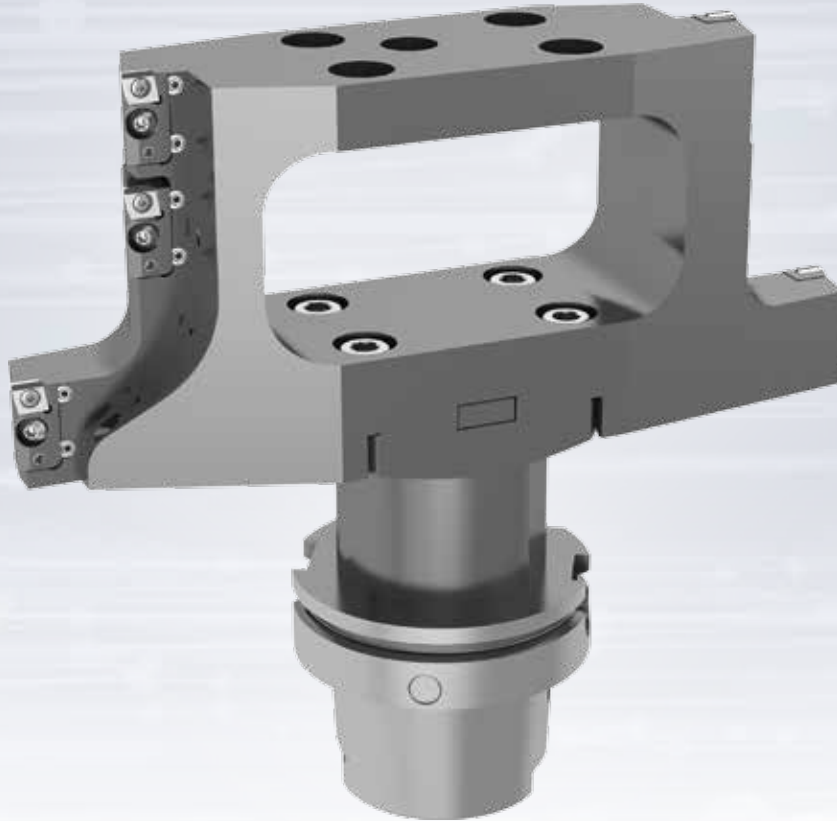
Light-weight design

Requirements

Minimization of tool weight and tool dimensions

Solution

Stepped countersinking tool / Teeth = 2 + 2

Basic tool body in steel and aluminium with cartridges

Cutting data

Material		(DIN) ■ AlADC10
Cutting grade		PCD
Cutting speed	m/min	1,200
Feed rate per tooth	mm	0.12

Result

Reduced tool weight

Customer benefits

Slim design saves space within the tool magazine of the machine

Low costs thanks to standard cartridges and ISO inserts

> **Stepped countersinking tool Ø 219 mm + Ø 220 mm /
> Teeth = 2 + 4**

> **Basic tool body in steel and aluminium with cartridges**

Light-weight
design

Requirements

Minimization of tool weight and tool dimensions

Solution

Stepped countersinking tool / Teeth = 4 + 2

Basic tool body in steel and aluminium with cartridges

Cutting data

Material		(DIN) ■ AlADC10
Cutting grade		PCD
Cutting speed	m/min	1,200
Feed rate per tooth	mm	0.1

Result

Reduced tool weight

Customer benefits

Reduced machining times

Low costs thanks to standard cartridges and ISO inserts

◫ Gearbox case

Shoulder machining

> **Multi tooth cutter Ø 125 / Teeth = 36 / Teeth$_{eff.}$ = 12**
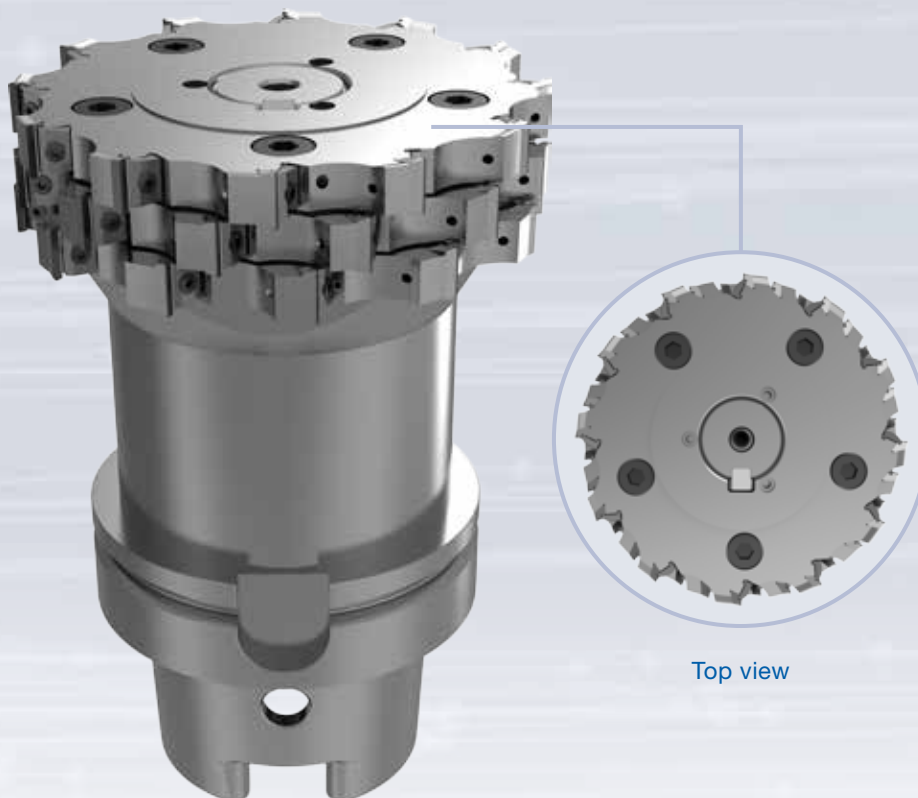
Top view

Requirements

High surface quality on face and shoulder surface

Solution

Multi tooth cutter / Teeth = 36 / Teeth$_{eff.}$ = 12

Cutting data

Material		(DIN) ■ AlSi9Cu3
Cutting grade		PCD 10
Cutting speed	m/min	2,500
Feed rate per tooth	mm	0.12
Cutting depth	mm	0.8

Result

Almost uninterrupted shoulder thanks to high concentricity

Customer benefits

Inserts separately replaceable

Increased productivity and energy-efficiency

Combination tool with adjustable inserts - eccentric pin adjustment / Teeth = 5 / Teeth$_{eff.}$ = 1

Ø 41.566 z = 1 adjustable

Ø 41.366 z = 1 adjustable

Ø 9.989 z = 1 adjustable
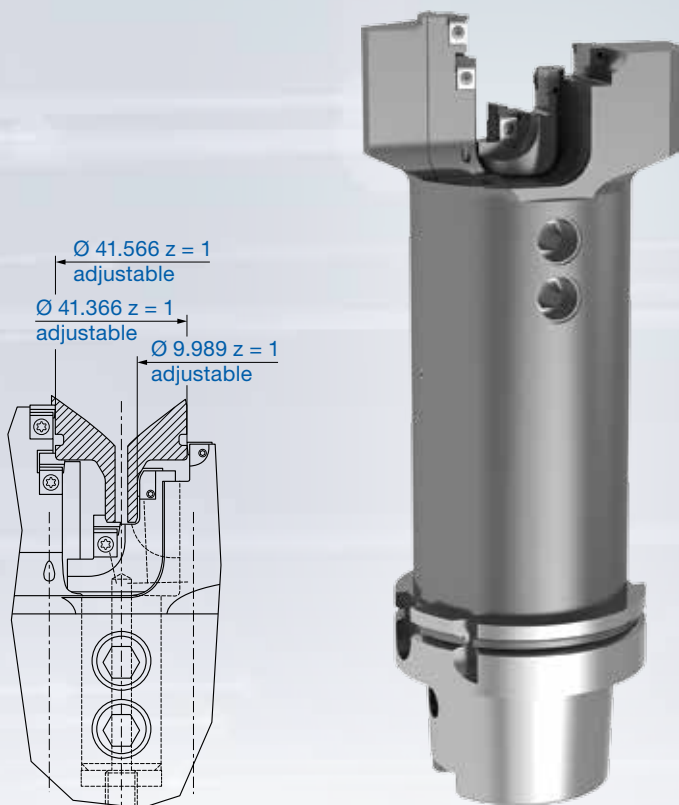
Requirements

High concentricity requirements and concentricity of the individual diameters to each other

Adjustability of inserts

Solution

Combination tool with adjustable inserts - eccentric pin adjustment / Teeth = 5 / Teeth$_{eff.}$ = 1

Cutting data

Material	(DIN) ■ AlSi9	
Cutting grade		PCD
Cutting speed	m/min	1,380
Feed rate per tooth	mm	0.15

Result

Easy readjustment of the inserts

Customer benefits

Reduced non-productive times

Cost-effective interchangeable inserts solution

Fine boring and circular milling tool / Teeth = 3 per Ø

HSK 100-A

Ø 84 adjustable
Ø 66 adjustable
Ø 56 adjustable

37

280

Operation 1

Operation 2
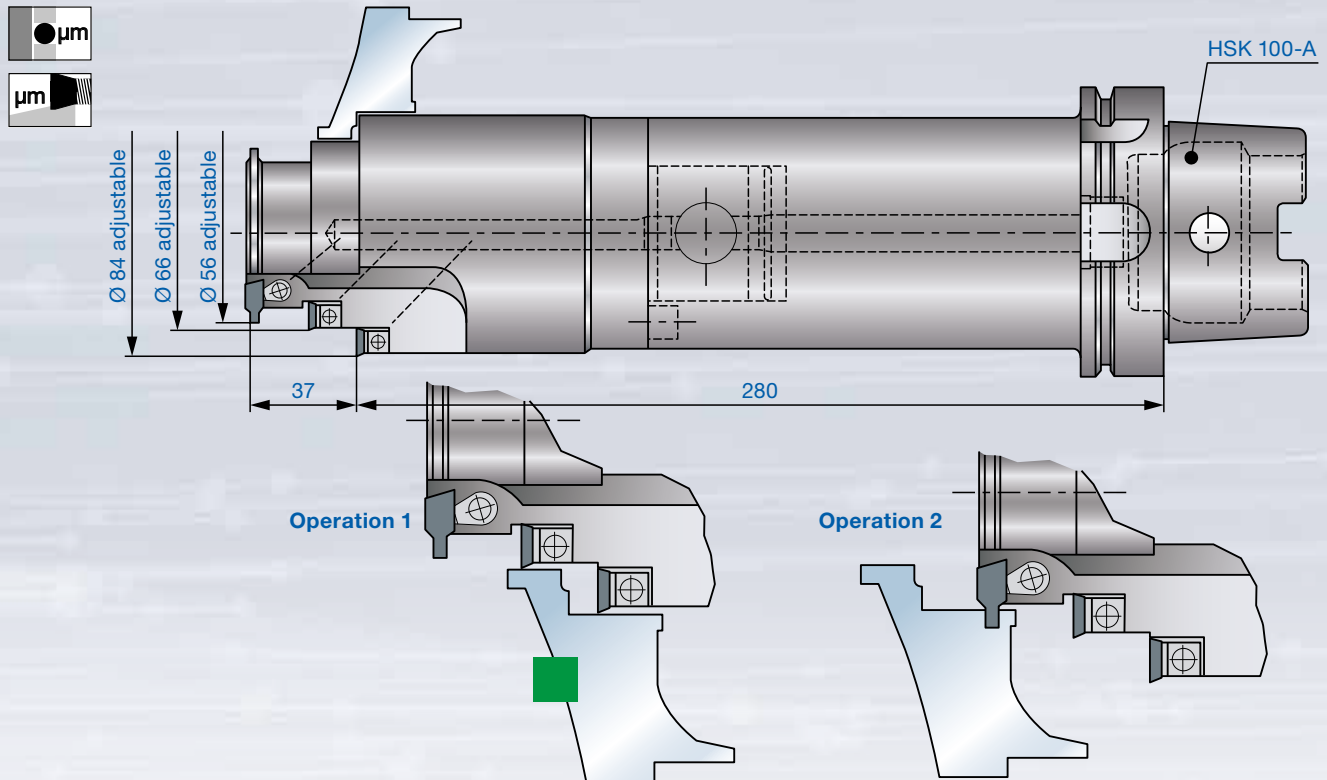
Requirements

Combination tool for fine boring and circular milling

Solution

Fine boring and circular milling tool / Teeth = 3 per Ø

Cutting data

Material		(DIN) ■ AlSi9	
Cutting grade		PCD	
		fine boring	milling
Cutting speed	m/min	450	517
Feed rate per tooth	mm	0.08	0.12
Cutting depth	mm	-4	-4

Result

Inserts separately replaceable

! **Customer benefits**

Reduced tooling costs per component

Fine boring tool / Z = 5 / Teeth$_{eff.}$ = 1

Ø 169
Ø 151 adjustable
Ø 85 adjustable
25
395
HSK 100-A

Operation 1

Operation 2   Machining plan

Start
n = 0
Operation 1
Operation 2
n = 0
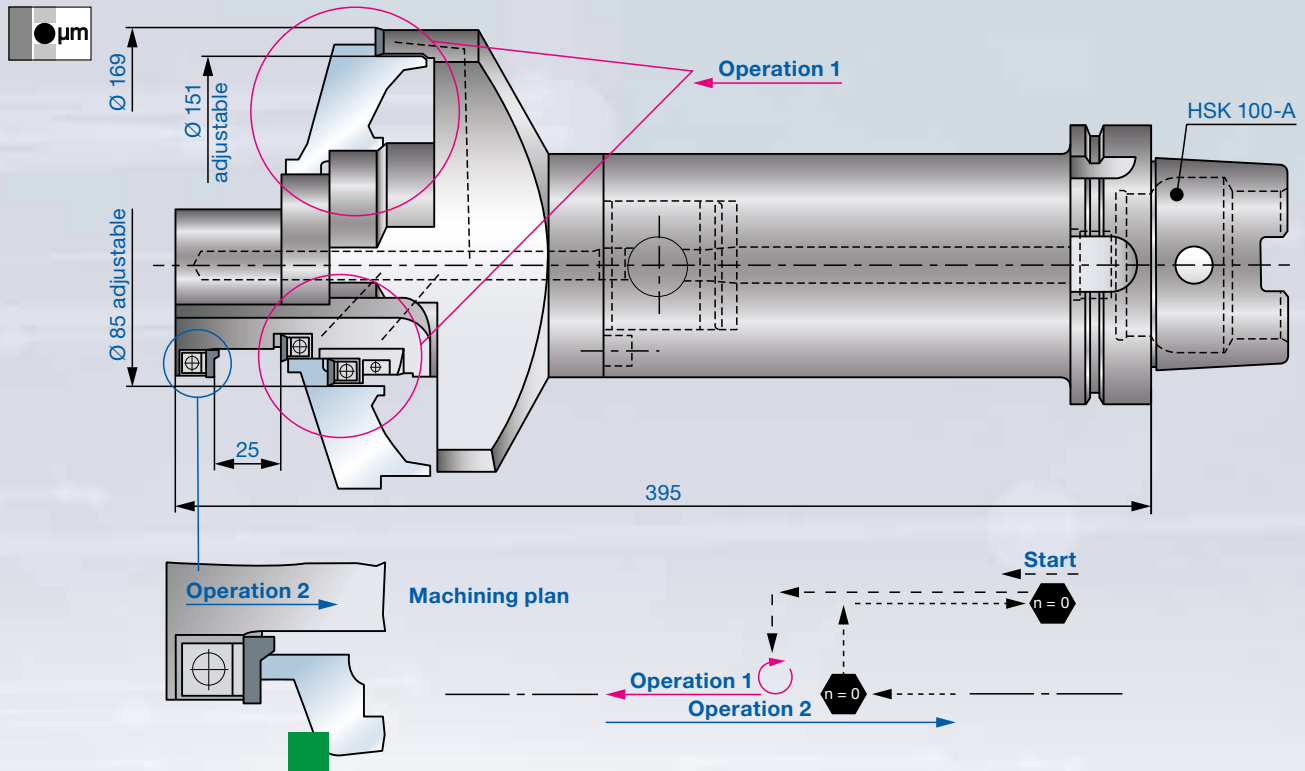
Requirements

Combination tool for forward and backward fine boring
and for over turning of outside diameter

Solution

Fine boring tool / Teeth = 5 / Teeth$_{eff.}$ = 1

Cutting data

Material		(DIN) ■ AlSi9
Cutting grade		PCD
Cutting speed	m/min	(Ø 85) 450
Feed rate per tooth	mm	0.12

Result

Inserts separately replaceable

Customer benefits

Reduced machining times
Reduced tooling costs per component

⊞ Gearbox case

Valve plate

Requirements

Axial plunging into the component, face miling of the surface through the clamping device

PMr(3) >50 % - R_z 8 - R_{max} 10 and axially adjustable

Solution

Face milling cutter with heavy metal shank (anti-vibration effect) / Teeth = 8

Cutting data

Material		(DIN) ■ GD-AlSi9Cu3
Cutting grade		PCD
Cutting speed	m/min	2,700
Feed rate per tooth	mm	0.034 - 0.069 - 0.086
Cutting depth	mm	0.6

Result

Excellent surface finish

PMr(3) 100 % - R_z 2.2 - R_{max} 2.6

Customer benefits

Very high tool life quantity

Excellent surface finish quality

Fine machining tool with heavy metal shank and twisted guide shank / Teeth = 1

Ø 15.96

Ø 190
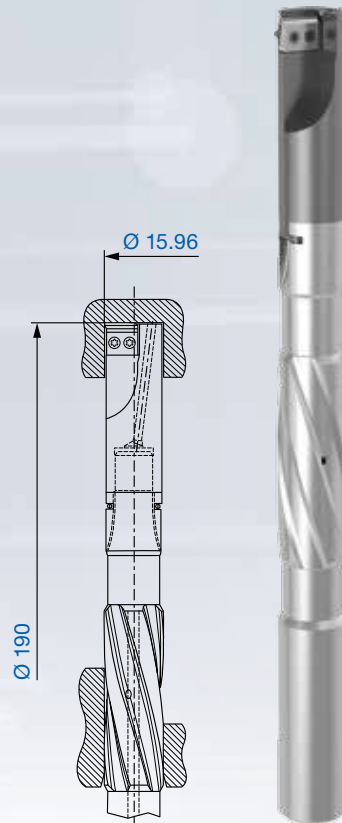
Requirements

Precise diameter and high coaxiality

Solution

Fine machining tool with heavy metal shank and twisted guide shank / Teeth = 1

Cutting data

Material		(DIN) ■ Al
Cutting grade		PCD
Cutting speed	m/min	449
Feed rate per tooth	mm	0.056
Cutting depth	mm	-8

Result

Excellent surface finish quality

Customer benefits

Fewer tools required for machining

Electric
motor

> **Tangential inserts tool / Teeth = 4 + 4 + 4**

> **External and internal diameter machining Ø 218 mm + Ø 214 + Ø 160 mm**

> **Basic tool body in steel and aluminium with cartridges**

Light-weight design
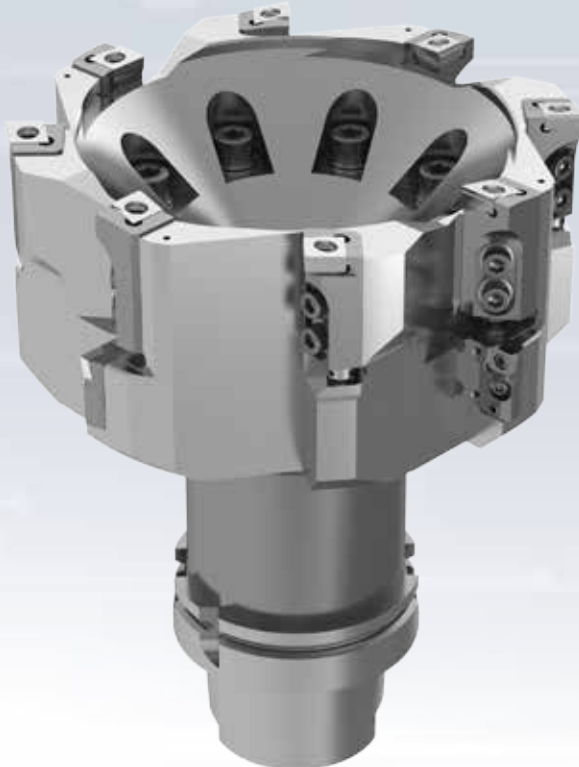
Requirements

Strongly fluctuating allowances and machining several steps reliably

Safety cut required for bottom surface over 28 mm width

Solution

Light-weight stepped countersinking tool / Teeth = 4 + 4 + 4

Tangential inserts with underhand grip installed in the cartridge, thus very stable embedding

Cutting data

Material		■ AlSi10MgCu-T6
Cutting grade		PCD
Cutting speed	m/min	600 m/min
Feed rate per tooth	mm	0.15

Result

Process reliable machining combined with high feed rates

Long tool life thanks to a stable tool

Customer benefits

Roughing with only one tool

Reduced cycle times

H Electric motor

Semi-finish machining stator bore

> **Adjustable pre-machining tool / Teeth = 4 + 4 + 2 + 2 + 2**

> **Light-weight tool concept with cartridges and PCD guide pads**

Light-weight design

Requirements
Exact premachining for finishing tool

Solution
Adjustable ISO indexable inserts combined with different diameters

Light-weight construction with aluminium base body

Cutting data

Material		■ AlSi10MgCu-T6
Cutting grade		PCD
Cutting speed	m/min	820
Feed rate per tooth	mm	0.12

Result
Stable machining process

Customer benefits
Pre-machining and finishing of several steps

Low cycle time thanks to multi-teeth tool

> **Multi-teeth fine boring tool / Teeth = 6 + 2 + 2 + 2**

> **Light-weight tool concept with cartridges and PCD guide pads**

Light-weight
design

Requirements
Fitting Ø with high surface quality and short cycle time

Solution
6-fluted tool with mixture of inserts

Light-weight construction with aluminium base body

Cutting data

Material		■ AlSi10MgCu-T6
Cutting grade		PCD
Cutting speed	m/min	1,000
Feed rate per tooth	mm	0.18

Result
Compliance with all tolerances and surface requirements

Customer benefits
Low cycle time thanks to a high feed rate

Excellent surface finish quality

Pumps

Multi-step fine boring tool / Teeth = 4 / Teeth$_{eff.}$ = 1
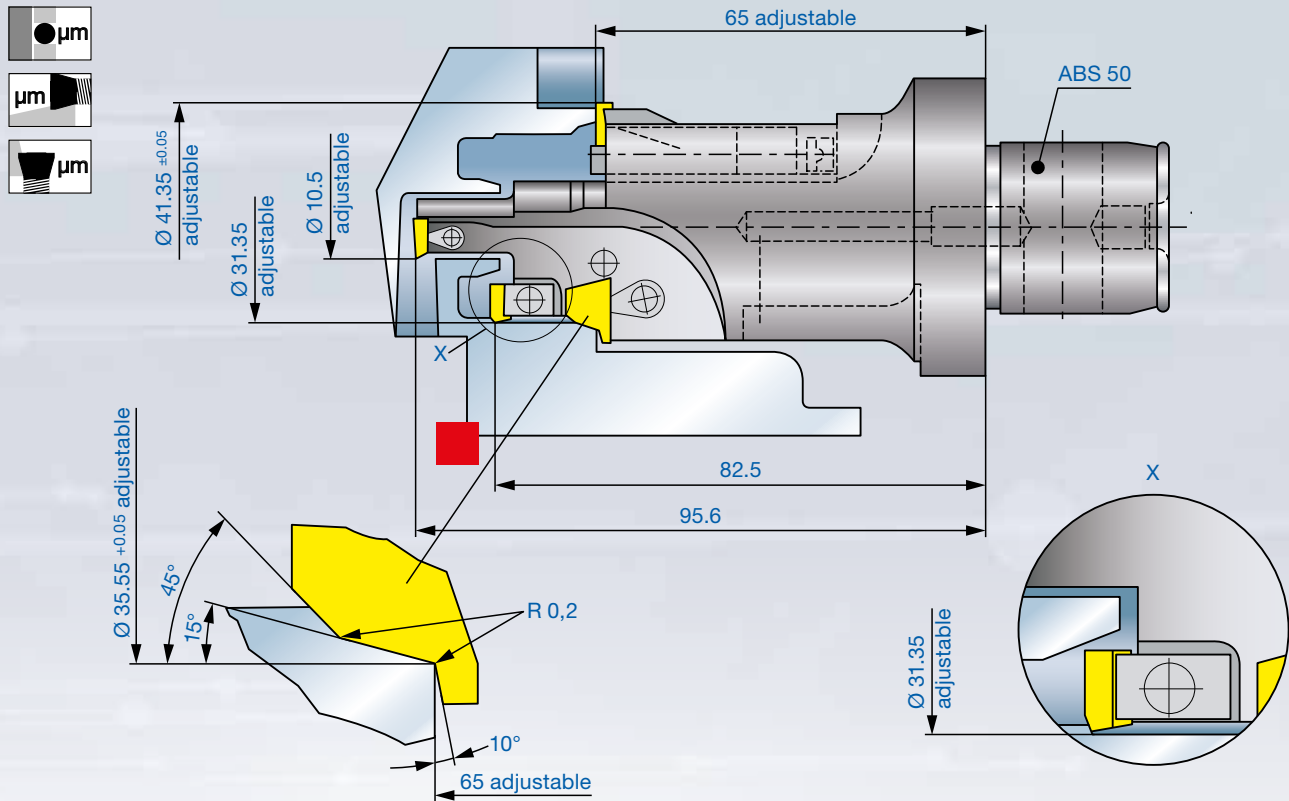
65 adjustable

ABS 50

Ø 41.35 ±0.05 adjustable

Ø 31.35 adjustable

Ø 10.5 adjustable

Ø 35.55 +0.05 adjustable

45°

15°

X

R 0,2

10°

65 adjustable

82.5

95.6

X

Ø 31.35 adjustable

Requirements

Combination tool, all diameters adjustable

Solution

Multi-step fine boring tool / Teeth = 4 / Teeth$_{eff.}$ = 1

Cutting data

Material		(DIN) ■ GGG40
Cutting grade		carbide coated
Cutting speed	m/min	(Ø 41.35) 197
Feed rate per tooth	mm	0.15
Cutting depth	mm	-3

Result

Flexible tool design

Inserts separately adjustable

Customer benefits

High flexibility of diameter offsets

⟨H⟩ Oil pump

Pump cavity

> **Operation 1: multi-step fine boring tool / Teeth = 3 + 5**

> **Operation 2: step milling cutter / Teeth = 4 + 8**

> **Operation 3: multi-step fine boring tool / Teeth = 1 + 1 / 3**

Operation 1

HSK 63-A

Ø 62.6 adjustable
z = 5

Ø 27.6 adjustable
z = 3

45°

1.2 = 1 x 45°
on finish Ø 28

84

105
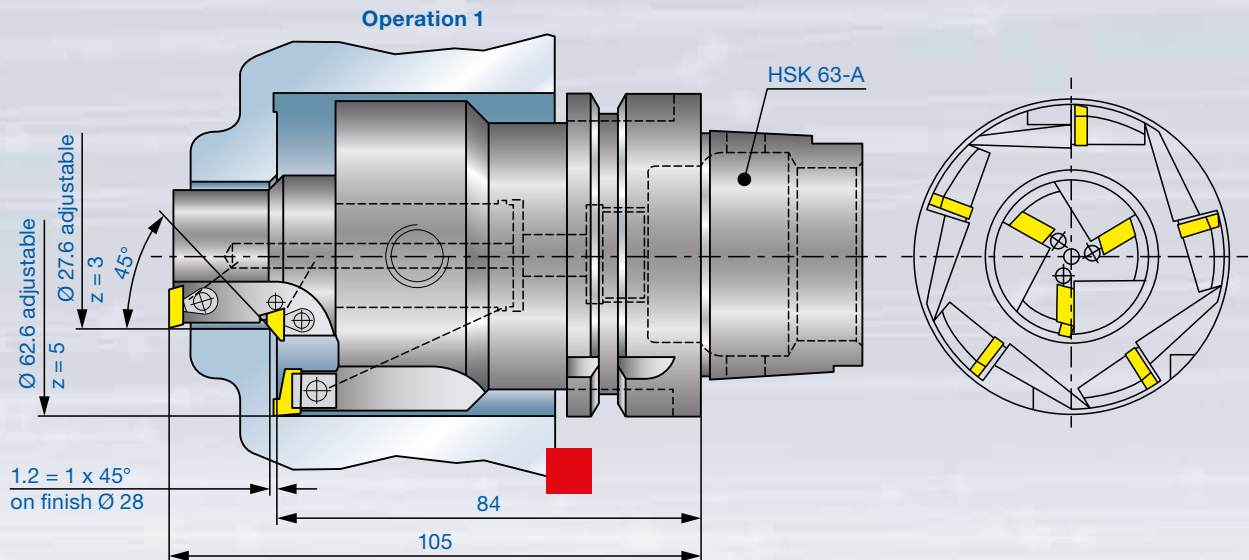
Requirements

Operation 1: fine boring tool for rough machining of the pump cavity

Operation 2: step milling cutter for simultaneous milling of the sealing surfaces,
distance (dim. 49) µm-accurate adjustable

Operation 3: fine machining of both diameters with CBN

Solution

Operation 1: multi-step fine boring tool / Teeth = 3 + 5

Operation 2: step milling cutter / Teeth = 4 + 8

Operation 3: multi-step fine boring tool / Teeth = 1 + 1 / 3

Cutting data		*Operation 1*	*Operation 2*	*Operation 3*
Material		(DIN) ■ GG25		
Cutting grade		carbide coated	carbide coated	CBN
Cutting speed	m/min	(Ø 27.6) 108 (Ø 62.6) 242	(Ø 23) 92 (Ø 63) 250	240
Feed rate per tooth	mm	(Ø 27.6) 0.15 (Ø 62.6) 0.09	(Ø 23) 0.12 (Ø 63) 0.06	0.1
Cutting depth	mm	-3	~ 2	0.2

Result

Reduced machining time

ⓘ Customer benefits

Low costs per component

Higher process reliability

Operation 3: fine machining of both diameters with CBN
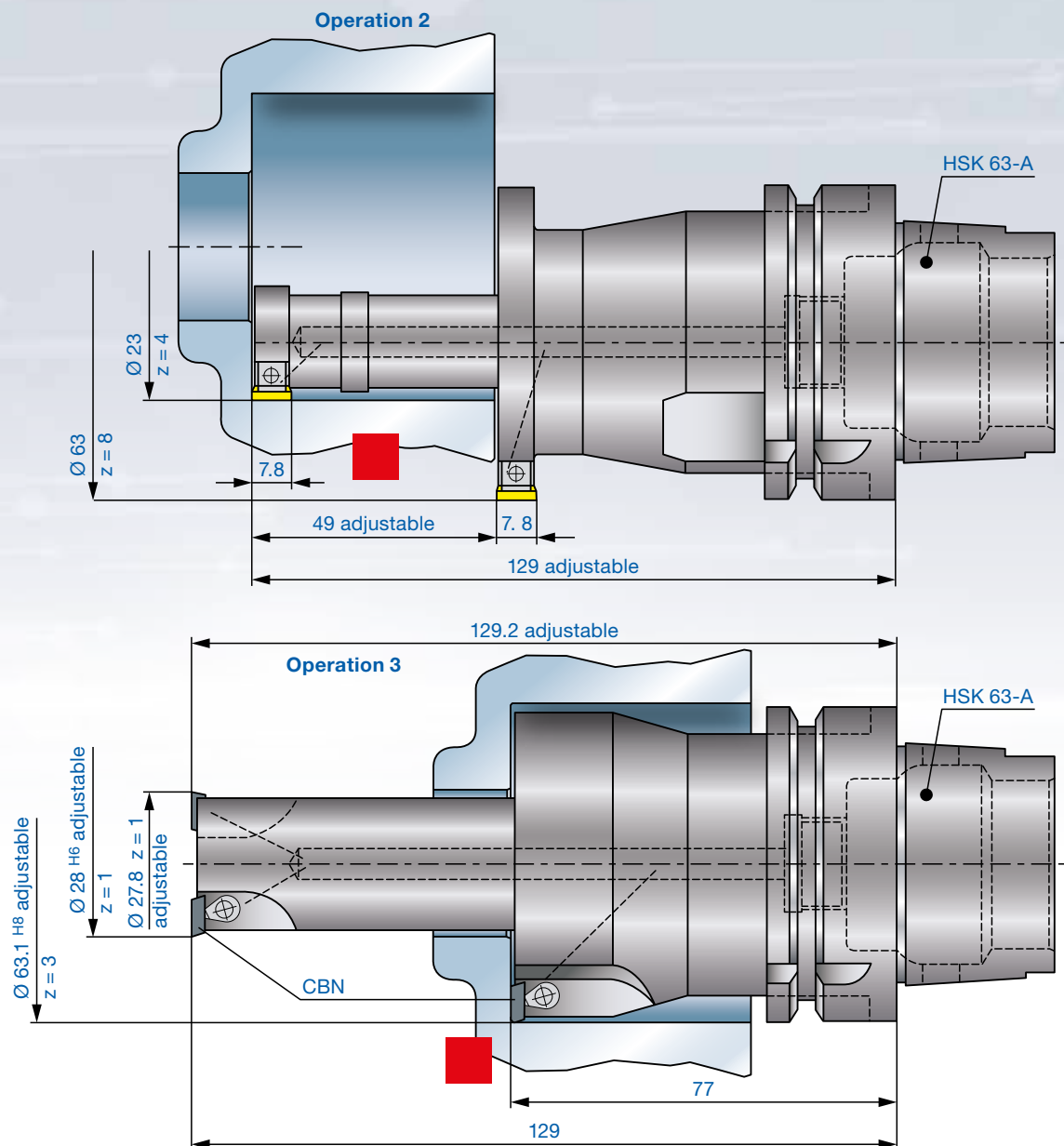
Operation 2

HSK 63-A

Ø 23
z = 4

Ø 63
z = 8

7.8

49 adjustable

7. 8

129 adjustable

129.2 adjustable

Operation 3

HSK 63-A

Ø 63.1 ^{H8} adjustable
z = 3

Ø 28 ^{H6} adjustable
z = 1

Ø 27.8 z = 1
adjustable

CBN

77

129

H Oil pump

Forward and backward fine boring tool / Teeth = 7 / Teeth$_{eff.}$ = 1

Operation 1 Operation 2 Operation 3

HSK 50-C

EM Ø 62 H8
EM Ø 42 H8
EM Ø 34.8 $^{+0,4}$

14
17

Ø 32

68
105
140

Machining plan

n = 0
n = 0

Operation 3
Operation 2
Operation 1
Start
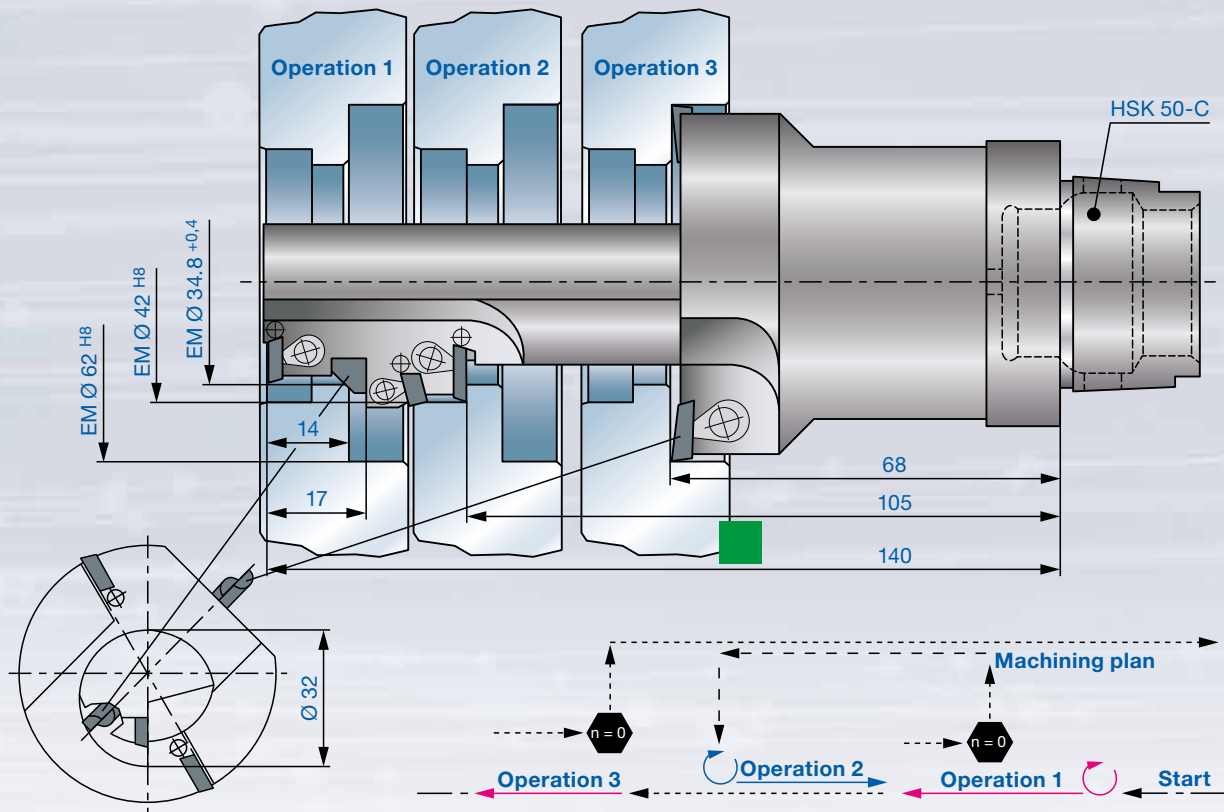
Requirements

Combination tool for 6 machining steps

All inserts adjustable

Solution

Forward and backward fine boring tool / Teeth = 7 / Teeth$_{eff.}$ = 1

Cutting data

Material		(DIN) ■ AlSi9
Cutting grade		PCD
Cutting speed	m/min	(Ø 62) 467
Feed rate per tooth	mm	0.12
Cutting depth	mm	0.5

Result

Short processing time

Inserts can be changed separately

! **Customer benefits**

Low costs per component

Multi-step fine boring tool / Teeth$_{eff.}$ = 2

Requirements

Multi-step machining with one tool

Solution

Multi-step fine boring tool / Teeth$_{eff.}$ = 2

Cutting data

Material		(DIN) ■ ENAC-AlSi12CuNiMg
Cutting grade		PCD 10
Cutting speed	m/min	1,500
Feed rate per tooth	mm	0.13

Result

Short machining time

Very good surface quality and dimensional accuracy

Inserts can be changed separately depending on wear

Customer benefits

Cycle time reduction thanks to combination of several machining steps

Low costs per component

H Injection pump

Flange machining

Modular designed fine boring tool

Angular position of inserts for sealing surface adjustable
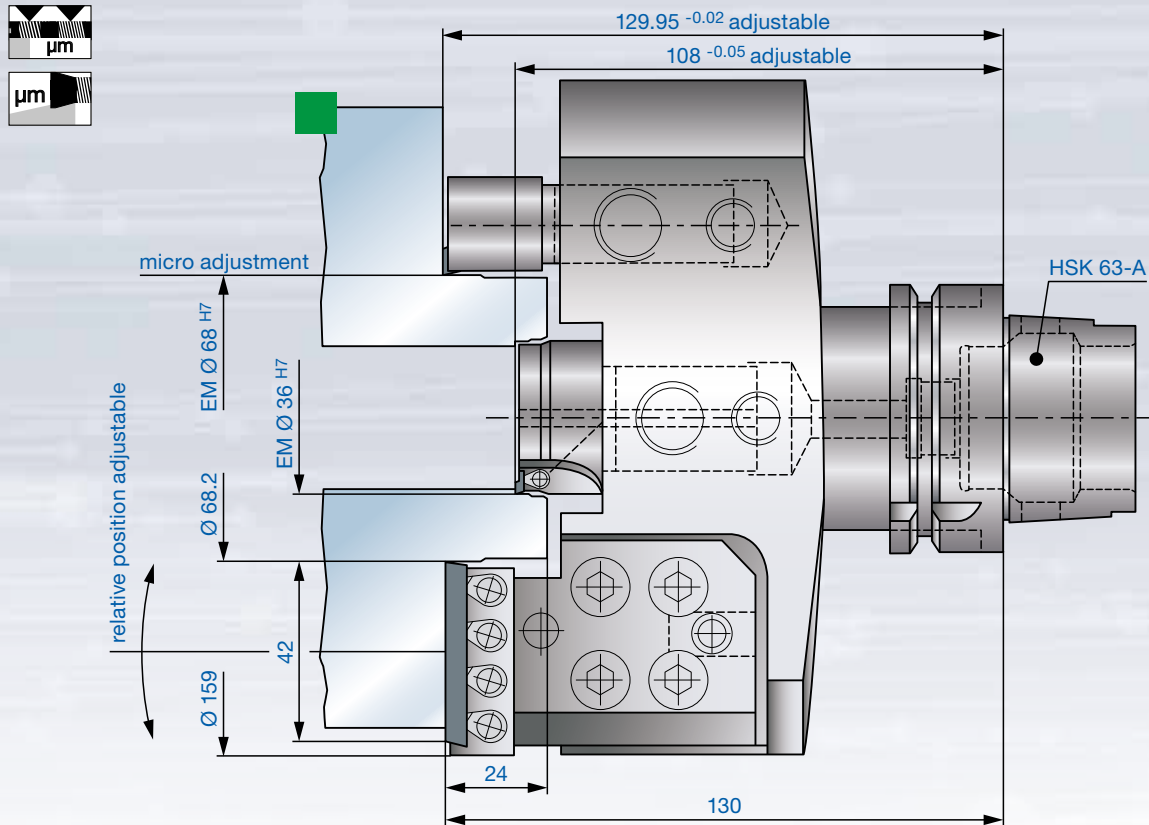
Requirements

Combination tool for 6 machining steps, cartridges for different types of workpieces

Inserts adjustable in diameter

Solution

Modular designed fine boring tool

Angular position of inserts for sealing surface adjustable

Cutting data

Material		(DIN) ■ GD-AlSi12Cu
Cutting grade		PCD
Cutting speed	m/min	(Ø 68) 641
Feed rate per tooth	mm	0.12
Cutting depth	mm	-4

Result

Flexible tool design for high requirements

Customer benefits

High process reliability

Micro-adjustment
allows the precise adjustment of the tool diameter directly in the machine without using any devices, this leads to a reduction of non-productive times in continuously running processes e.g. mass production of automotive components.
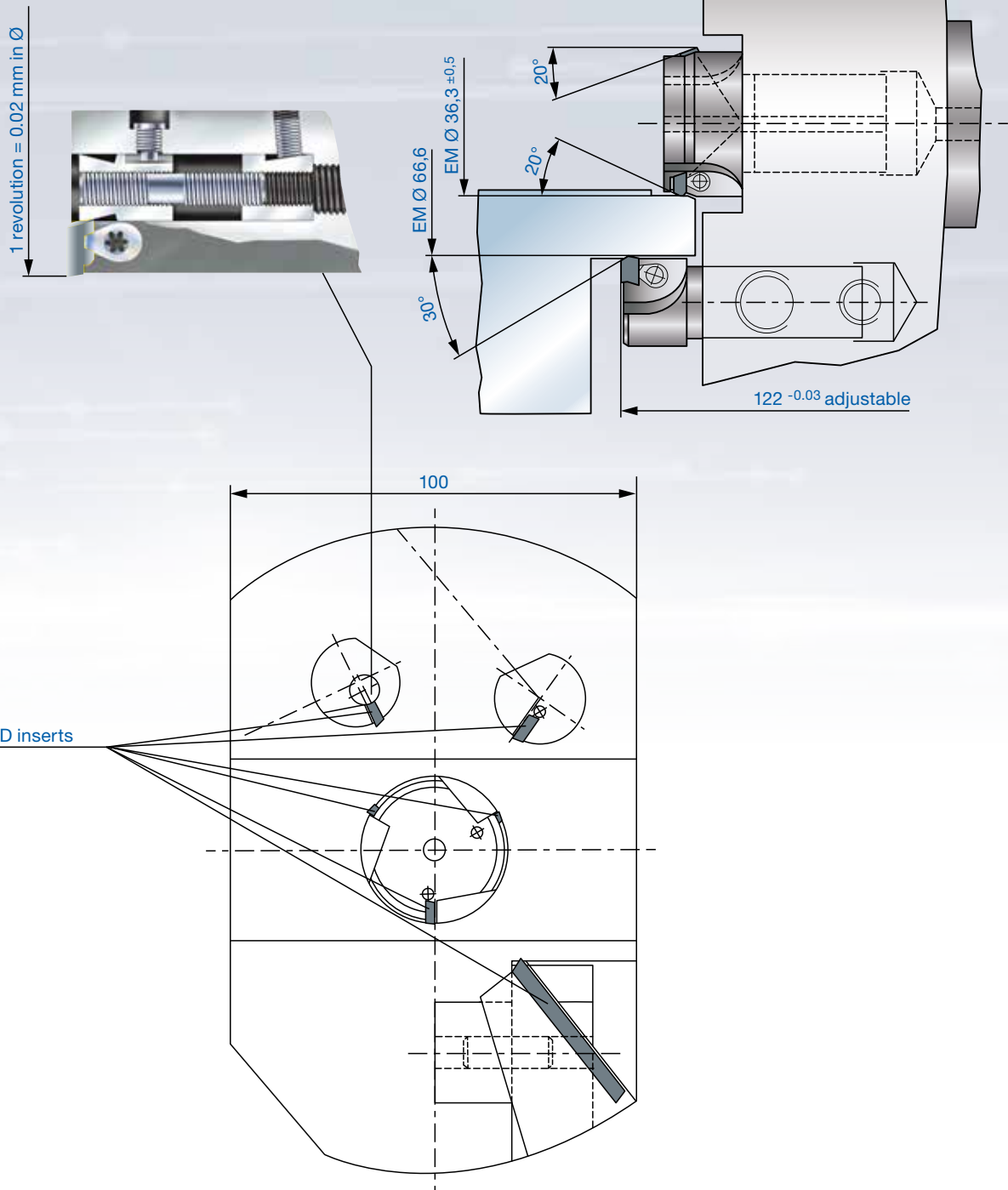
1 revolution = 0.02 mm in Ø

20°

20°

30°

EM Ø 36,3 ±0,5

EM Ø 66,6

122 $^{-0.03}$ adjustable

100

PCD inserts

H Injection pump

Axial grooving

> **Axial grooving tool with heavy metal shank / Teeth = 2 / Teeth$_{eff.}$ = 1**

> **Replaceable head design**

Ø 26.45 adjustable

Ø 15.95 adjustable

39
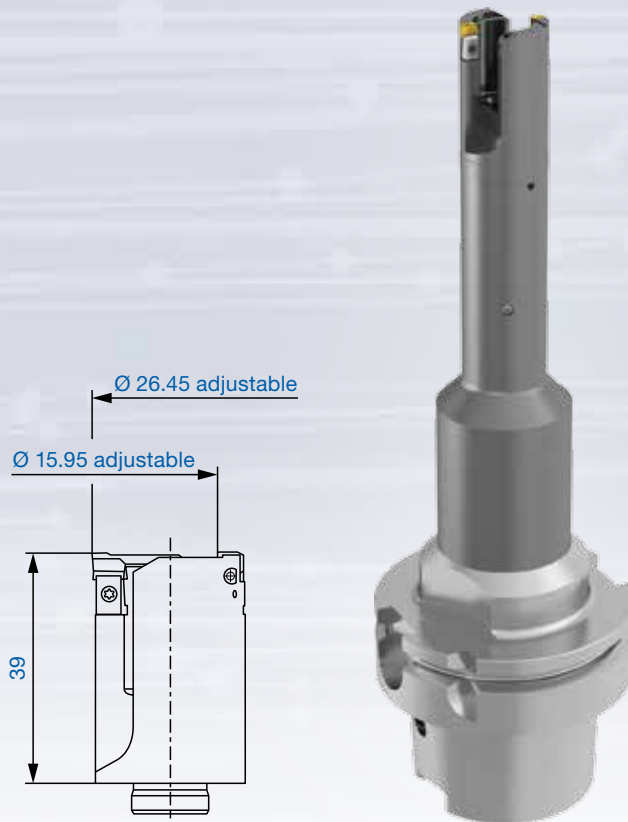
Requirements

Grooving tool with adjustable inserts

Solution

Axial grooving tool with heavy metal shank / Teeth = 2 / Teeth$_{eff.}$ = 1

Replaceable head design

Cutting data

Material		(DIN) ■ 20MnCr5
Cutting grade		carbide coated
Cutting speed	m/min	(Ø 21,2) 121
Feed rate per tooth	mm	0.08
Cutting depth	mm	into solid

Result

Good chip control thanks to cutting division

Excellent surface finish

! Customer benefits

High process reliability

Sealing surface, hard machining

Fine boring tool / Teeth = 1 ➤

● µm

relative position adjustable

HSK 63-A

Ø 15.5

63.8

129,8
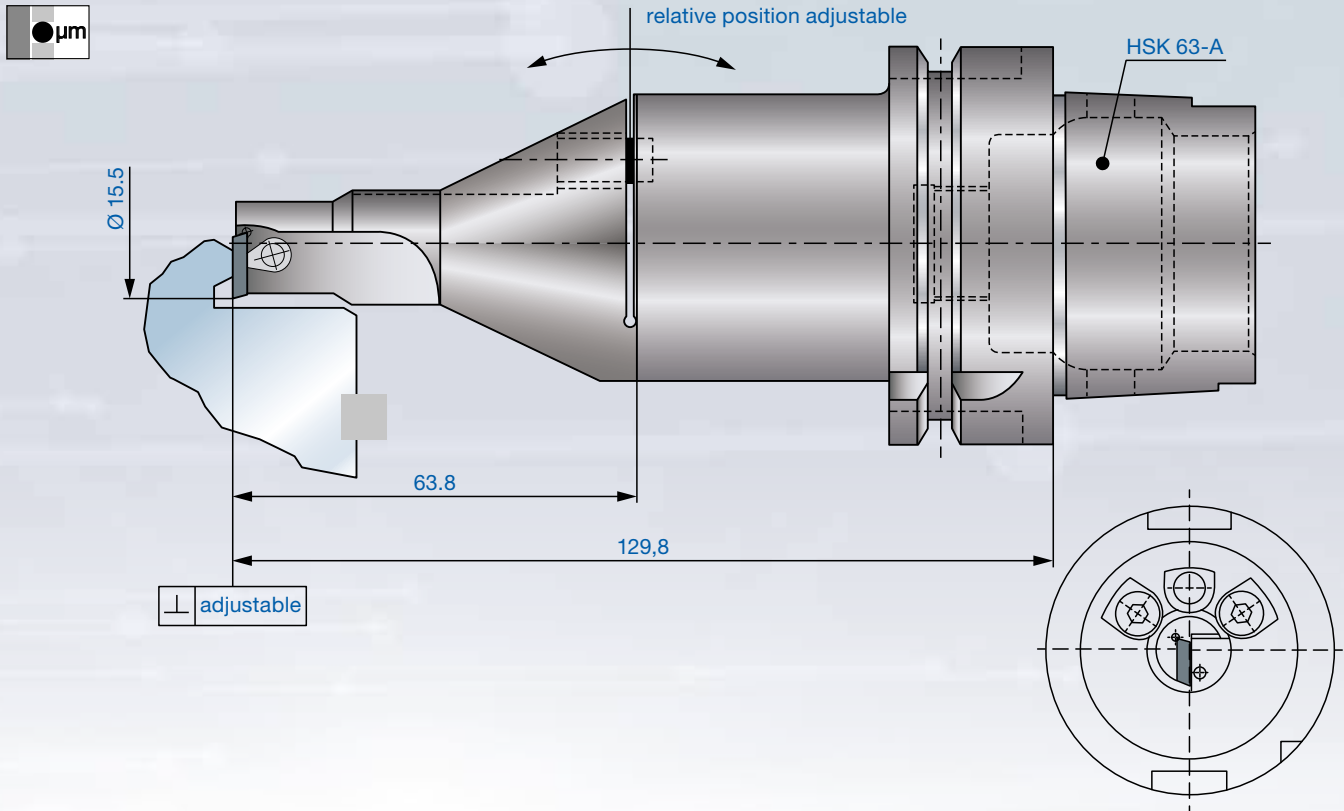
⊥ adjustable

Requirements

Hard machining of the sealing surface

Angular position of inserts on tool holder adjustable

Solution

Fine boring tool / Teeth = 1

Cutting data

Material	60 - 62 HRC		(DIN) ■ 20MnCr5
Cutting grade			CBN
Cutting speed		m/min	195
Feed rate per tooth		mm	0.025
Cutting depth		mm	0.2

Result

Excellent surface finish quality

Very good tool life

Regrindable CBN inserts

! **Customer benefits**
Low costs per component

Injection pump

Cam cavity

Ø 63.3 $^{+0.1}$ adjustable
Ø 66.5 ^{h8} adjustable
Ø 47.1 ^{H8} adjustable
Ø 19.1 ^{H9} adjustable
Ø 13.7 ^{H7} adjustable

HSK 63-A

18

3°

85 ±0.02

101.3 ±0.02 adjustable

152.5 ±0.02

Requirements

Combination tool for 5 machining steps

Solution

Multi-step fine boring tool / Teeth = 7 / Teeth$_{eff.}$ = 1 / (Ø66.5 + Ø63.3) Teeth = 2

Cutting data

Material		(DIN) ■ 20MnCr5
Cutting grade		carbide coated
Cutting speed	m/min	(Ø 13.7) 37 (Ø 66.5) 180
Feed rate per tooth	mm	(Ø 13.7) 0.15 (Ø 66.5) 0.075
Cutting depth	mm	(Ø 13.7) 0.5 (Ø 66.5) 0.5 - 1.5

Result

Inserts separately adjustable and replaceable

Customer benefits

Low costs per component

Fine boring/grooving tool / Teeth = 2 + 2

● µm

ANSI-CAT 40

Ø 87.7 adjustable

Ø 64.6 adjustable

100
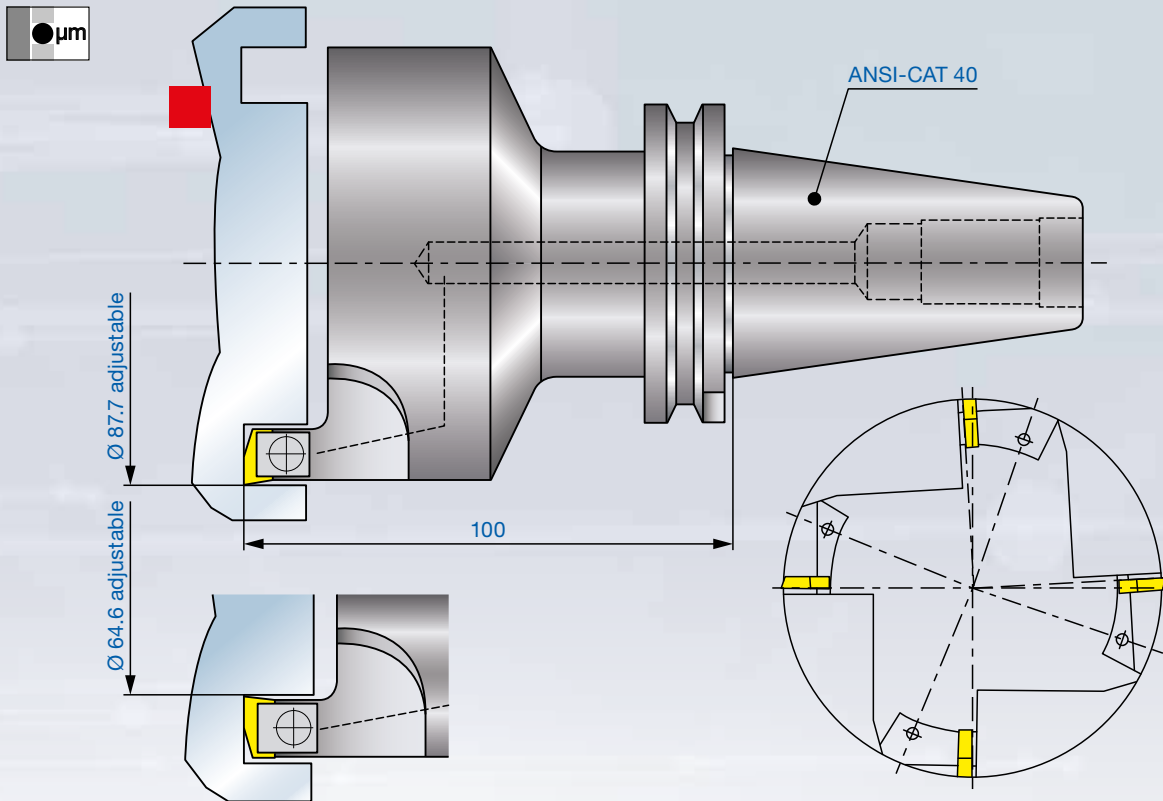
Requirements

Inside and outside diameter adjustable

Solution

Fine boring/grooving tool / Teeth = 2 + 2

Cutting data

Material		(DIN) ■ GG25
Cutting grade		carbide coated
Cutting speed	m/min	220
Feed rate per tooth	mm	0.1
Cutting depth	mm	~ 12, entire cutting width

Result

Very good tool life

Customer benefits

Low costs per component

High process reliability

Simple tool handling

ℍ Injection pump

Pre-machining connecting flange

Requirements

Reduction of cycle times

Solution

OD turning tool, stationary tool (turning machine) / Teeth$_{eff.}$ = 2 / 1

Cutting data

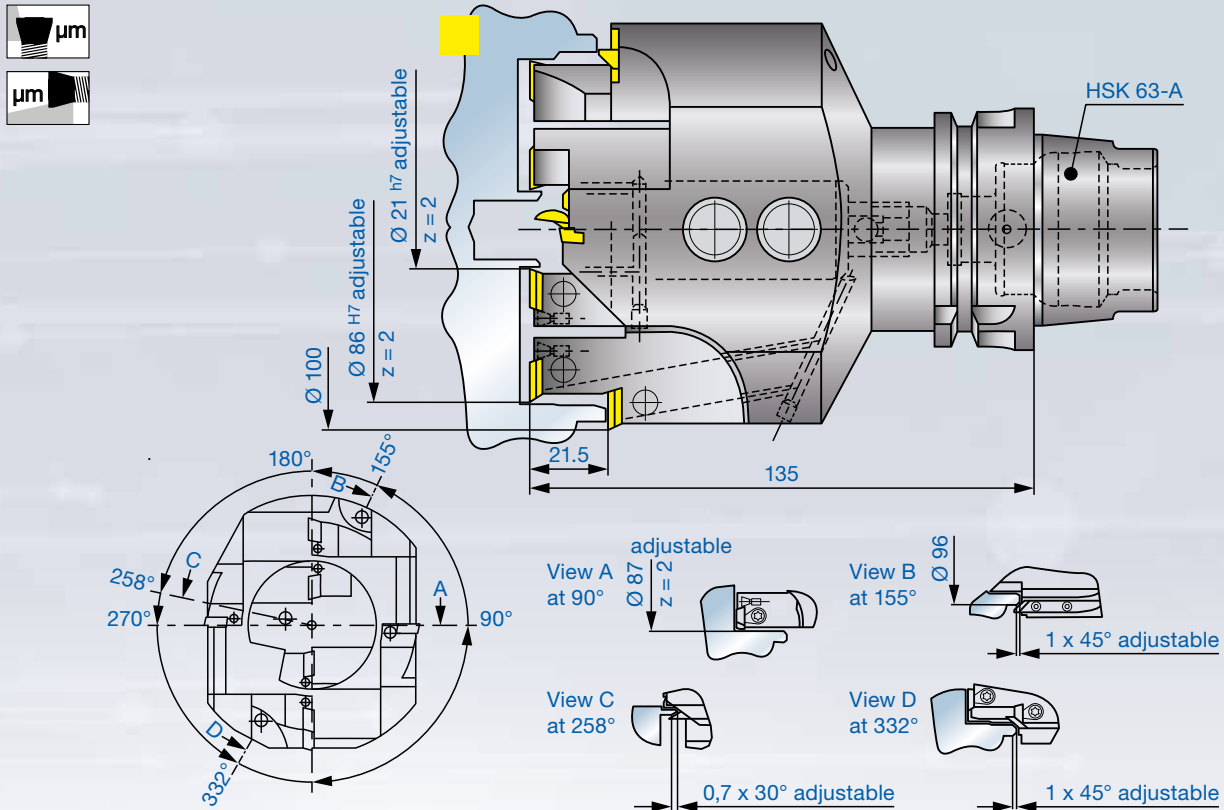| Material		(DIN) ■ X17CrNi16 / 1.4057
Cutting grade		carbide coated
Cutting speed	m/min	200
Feed rate per tooth	mm	0.125
Cutting depth	mm	4

Result

Faster machining with consistent quality

Customer benefits

Reduced cycle times up to 66 %

Multi-step fine boring tool / Teeth = 2 + 2 + 2 + 1 + 1 + 1 + 1

HSK 63-A

Ø 21 h7 adjustable / z = 2
Ø 86 H7 adjustable / z = 2
Ø 100
21.5
135

180°
155°
258°
270°
332°
90°
A
B
C
D

View A at 90°
adjustable
Ø 87 / z = 2

View B at 155°
Ø 96
1 x 45° adjustable

View C at 258°
0,7 x 30° adjustable

View D at 332°
1 x 45° adjustable

Requirements
Combination tool, all diameters adjustable

Solution
Multi-step fine boring tool / Teeth = 2 + 2 + 2 + 1 + 1 + 1 + 1

Cutting data

Material		(DIN) ■ X2CrNi19-11
Cutting grade		carbide coated
Cutting speed	m/min	25 - 100
Feed rate per tooth	mm	0.025
Cutting depth	mm	0.4

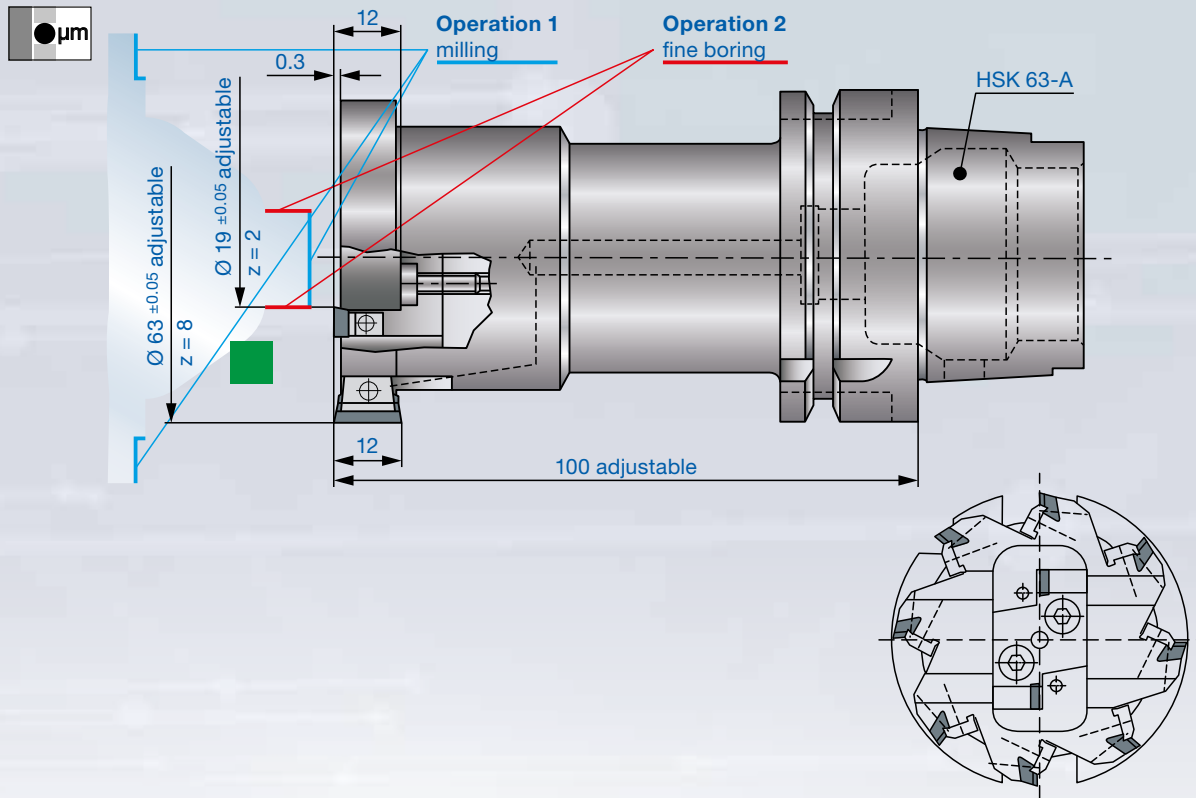### Result
Flexible tool design

Customer benefits
Short machining time
Low costs per component

Various automotive components

Milling and overturning tool / Teeth = 8 (milling), 2 (fine boring)

Operation 1 milling

Operation 2 fine boring

HSK 63-A

12 · 0.3 · Ø 19 ±0.05 adjustable · z = 2 · Ø 63 ±0.05 adjustable · z = 8 · 12 · 100 adjustable

Requirements
Milling and overturning of a stud with one tool
Face runout of the milling cutter and diameter of the fine boring tool are adjustable

Solution
Milling and overturning tool / Teeth = 8 (milling), 2 (fine boring)

Cutting data

Material		(DIN) ■ GDAlSi12	
Cutting grade		PCD	
		milling	fine boring
Cutting speed	m/min	(Ø 63) 1.800	(Ø 19) 543
Feed rate per tooth	mm	0.12	0.12
Cutting depth	mm	0.8	0.8

Result
Reduced machining time thanks to combination tool

Customer benefits
Low costs per component
Increased productivity

Drive slot

HSK 80-C

Ø 160

z = 18

z = 14

53.5

55.5

170
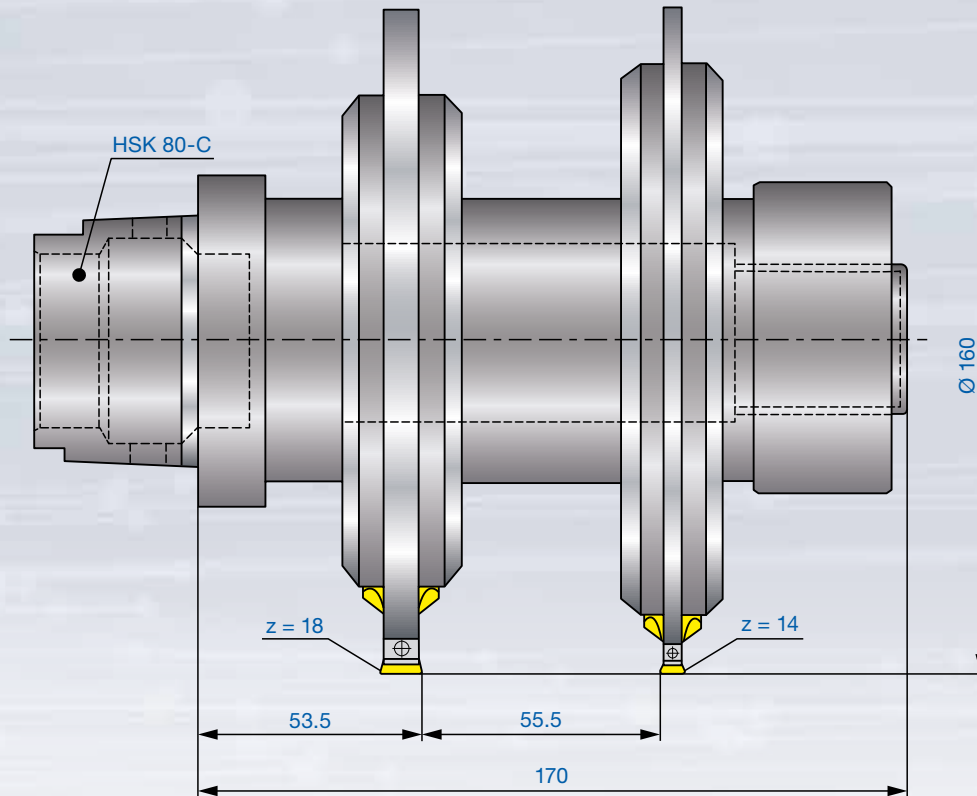
Requirements

Machining of two types of camshafts with only one tool

Solution

Gang milling cutter / Teeth = 18/14

Cutting data

Material		(DIN) ■ GGG40
Cutting grade		carbide coated
Cutting speed	m/min	80
Feed rate per tooth	mm	0.06
Cutting depth	mm	Teeth = 18/16 Teeth = 14/7

Result

Reduced non-productive times
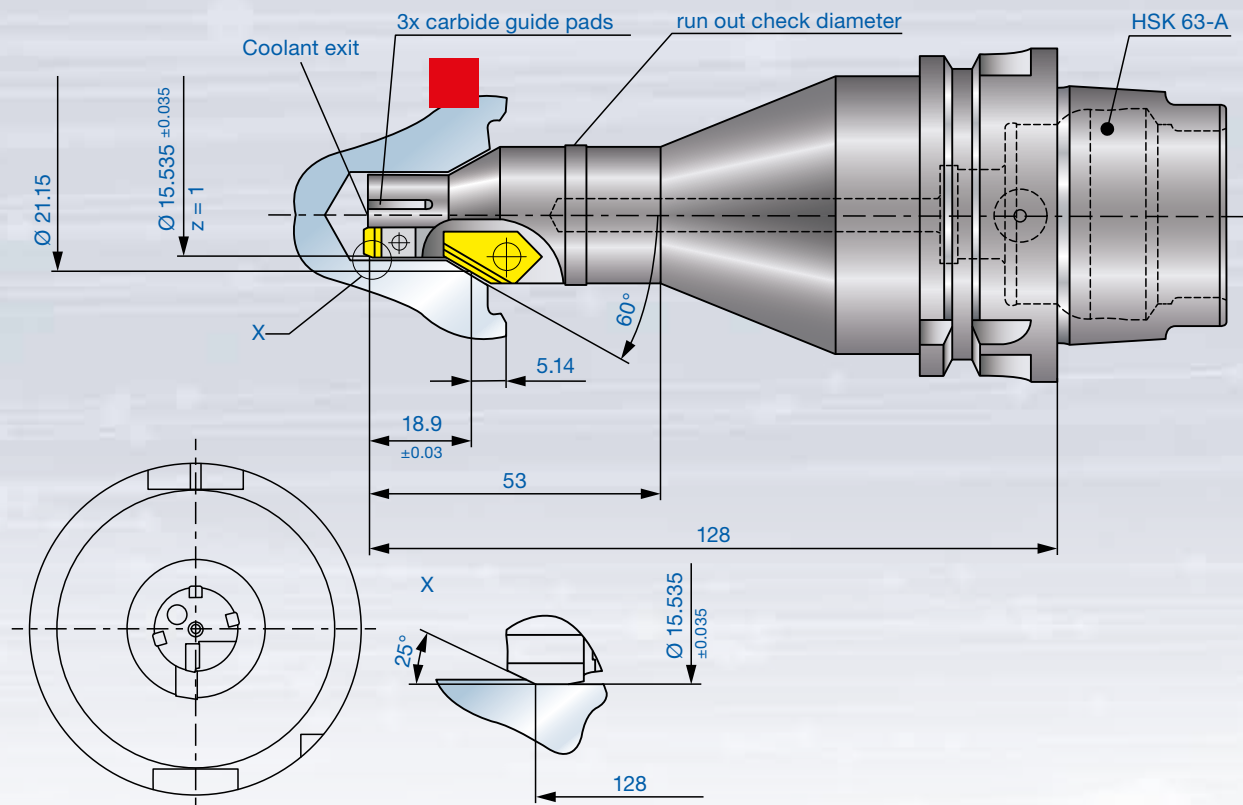
Reduced machining stations

Customer benefits

Increased productivity

μm

Ø 160

z = 6

z = 18

0.6 ±0.2 x 45° adjustable

15.4 ±0.1

9.8 ±0.05 adjustable

z = 3

z = 14

0.4 ±0.2 x 45° adjustable

6.5 ±0.1

4.6 ±0.05 adjustable

Crankshaft

Fine boring and chamfer tool / Teeth = 1 + 1

Coolant exit — **3x carbide guide pads** — **run out check diameter** — **HSK 63-A**

- Ø 21.15
- Ø 15.535 ±0.035 z = 1
- 5.14
- 18.9 ±0.03
- 53
- 128
- 60°
- 25°
- Ø 15.535 ±0.035
- 128
- X
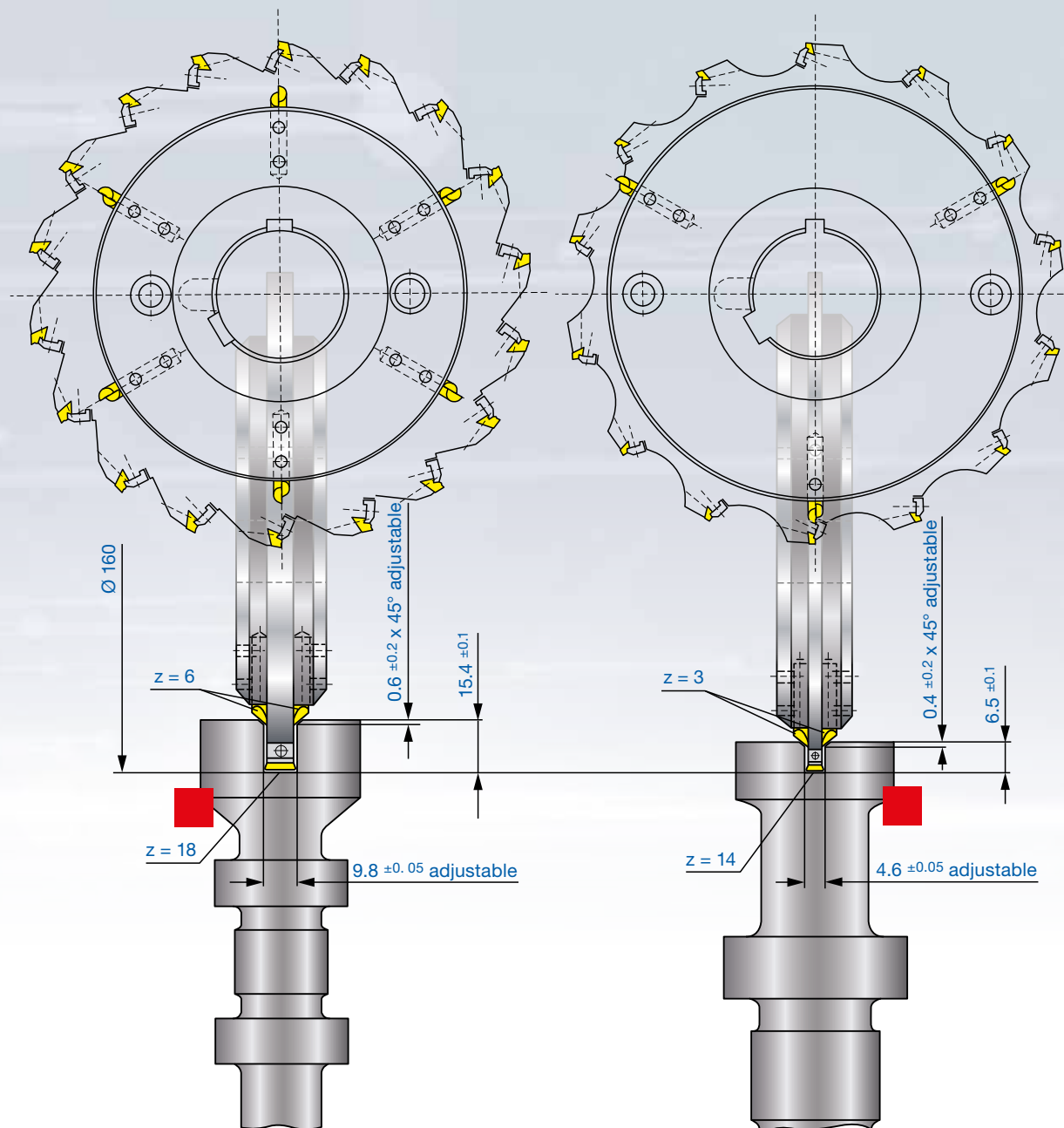
Requirements

Fine boring tool with carbide guide pads for machining of the flange bore

Solution

Fine boring and chamfer tool / Teeth = 1 + 1

Cutting data

Material	(DIN) ■	GGG60
Cutting grade		carbide coated
Cutting speed	m/min	80
Feed rate per tooth	mm	0.12
Cutting depth	mm	0.15

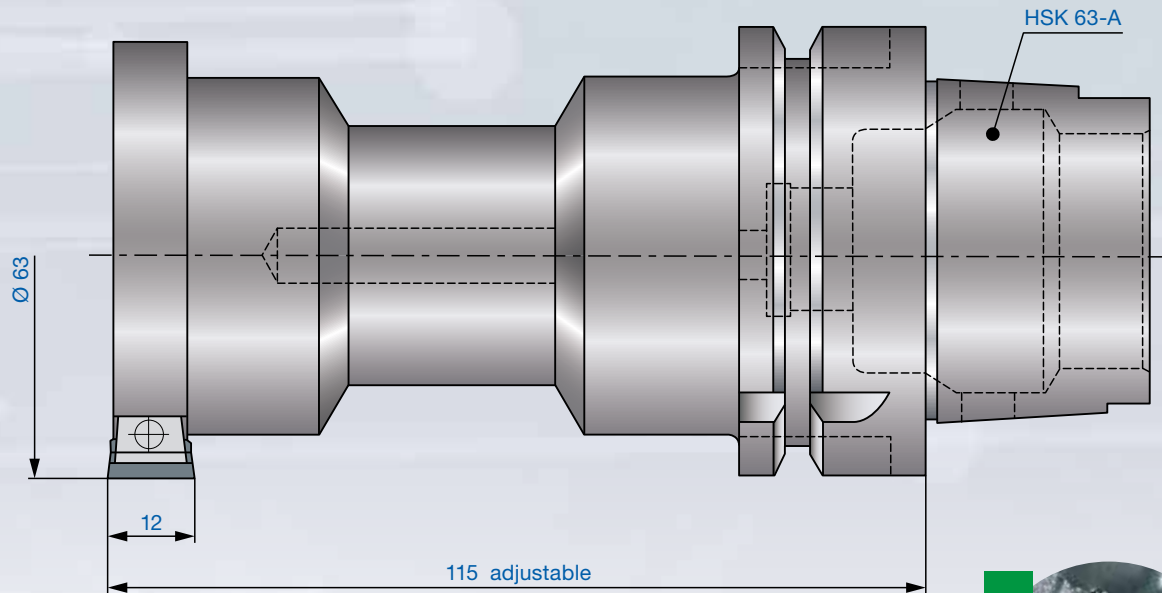**Result**

High dimensional accuracy thanks to tool concept with guide pads

Customer benefits

Higher process reliability

Special face milling cutter / Teeth = 8

Equipped with standard PCD inserts

HSK 63-A

Ø 63

12

115 adjustable

R$_z$15 - 18

Requirements

Milling of the sealing surface with a defined surface roughness

All inserts axially adjustable

Solution

Special face milling cutter / Teeth = 8

Equipped with standard PCD inserts

Cutting data

Material	(DIN) ■ AlSi12Cu	
Cutting grade		PCD
Cutting speed	m/min	3560
Feed rate per tooth	mm	0.16

Result

High machining speed thanks to special insert geometry

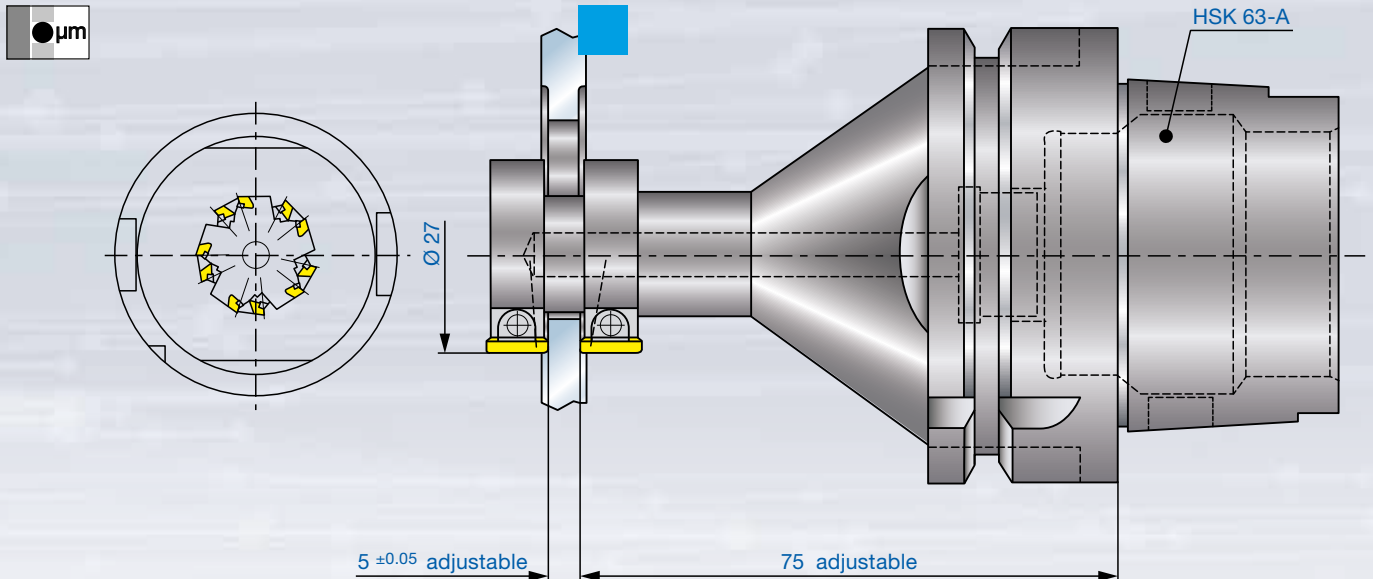Constant wear - all inserts set to same height

Customer benefits

Low costs per component

Increased productivity

H Gearshift fork

●µm

HSK 63-A

Ø 27

5 ±0.05 adjustable   75 adjustable

Requirements

Very unstable component, requires low cutting forces of the tool

Machining of the two ring surfaces in one cut

Solution

Gang milling cutter (monoblock) / Teeth = 10 / Teeth$_{eff.}$ = 5

Inserts interchangeable among each other thus both cutting edges of the inserts can be used

All inserts adjustable (dim. 5 mm)

Cutting data

Material		(DIN) ■ C35-520 N/mm²
Cutting grade		carbide coated
Cutting speed	m/min	120
Feed rate per tooth	mm	0.1
Cutting depth	mm	both sides 0.6

Result

Short machining time

Inserts usable on both sides

Customer benefits
Low costs per component

Gang milling cutter

> *Large radii can be achieved*

> *Tangential inserts with PCD cutting edges*

Requirements
Milling connection taps in a single step

Solution
Gang milling cutter for double-sided milling of two taps

Cutting data

Material		■ AlSi9
Cutting grade		PCD
Cutting speed	m/min	1,250
Feed rate per tooth	mm	0.1
Cutting depth	mm	3-12!

Result
Process reliable machining of combined work steps

Customer benefit
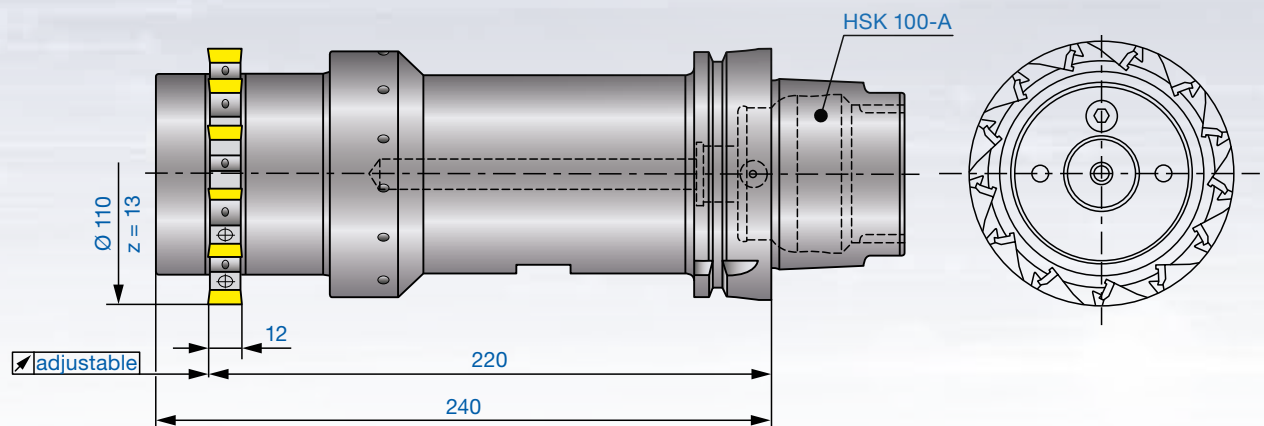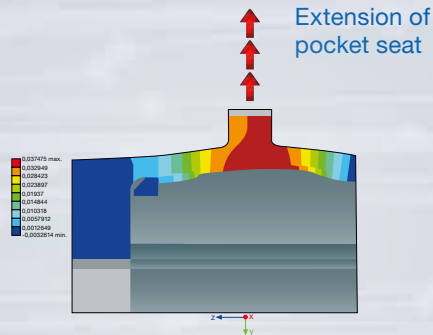
Long tool life thanks to PCD-coated cutting inserts

Short machining times as a result of multiple operations being combined in one tool

H Steering housing

- Diameter μm-accurate adjustable
- Adjustment to both directions
- Adjustment range 60 μm for diameter
  ➜ 5 μm per turn
- Interchangeable inserts

Extension of
pocket seat

HSK 100-A

Ø 110

z = 13

adjustable

12

220

240

Requirements

Diameter μm-accurate adjustable in both directions

Solution

Reaming tool / Teeth = 13

Adjustment range 60 μm for diameter ➜ 5 μm per turn

Freely selectable and exchangeable inserts

Cutting data

Material		(DIN) ■ GGG50
Cutting grade		carbide coated
Cutting speed	m/min	160
Feed rate per tooth	mm	0.2
Cutting depth	mm	0.25

Result

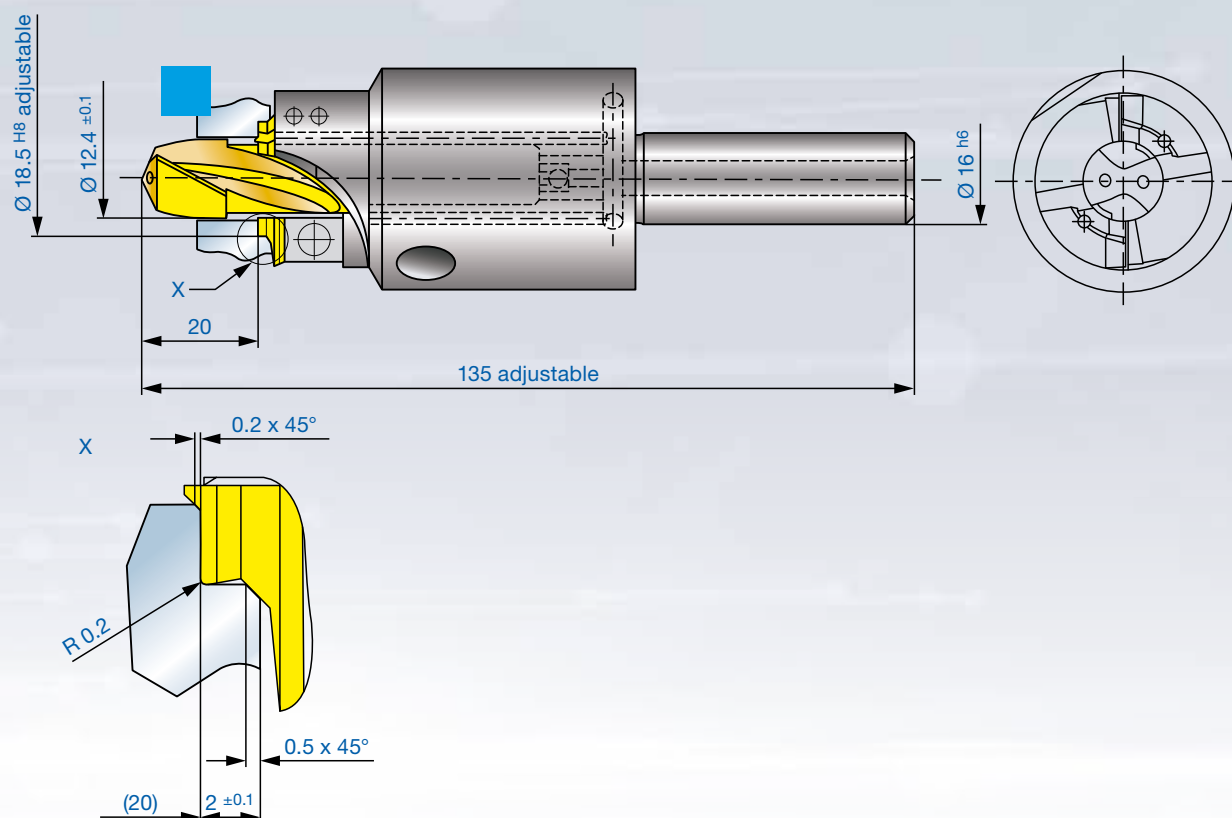Reduced non-productive time thanks to adjustment options on the machine

Customer benefits

High process reliability

High productivity

Combination tool for the complete component contour

Ø 18,5 H8 adjustable by means of eccentric pin adjustment

Requirements
Combination tool for the complete component contour

Solution
Drilling and fine boring tool / Teeth = 2

Ø 18,5 H8 adjustable by means of eccentric pin adjustment

Cutting data

Material		(DIN) ■ Ck45	
Cutting grade		carbide coated	
		drilling	fine boring
Cutting speed	m/min	71	141
Feed rate per tooth	mm	0.12	0.08
Cutting depth	mm	into solid	3

Result
Reduction of machining time thanks to combination tool

Customer benefits

Low costs per component

Increased productivity

H Balance shaft housing

129 carbide

HSK 63-A

Ø 23

Ø 43 ±0.1
z = 6

Z

7.8

Ø 27 -0.03/-0.05
adjustable

116 adjustable

155

(Ø 43)

Ø 42.4

Z

(0.3)

45°
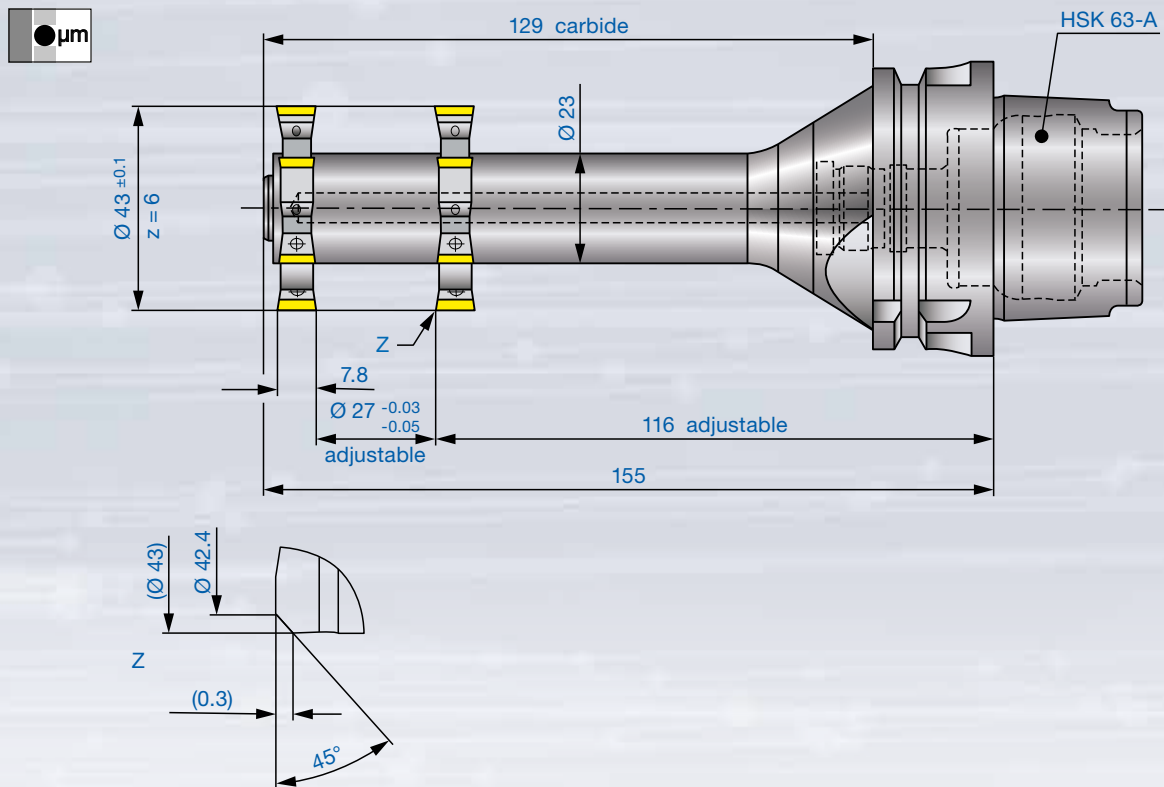
Requirements
Machining of both ring surfaces in one cut

Solution
All inserts adjustable (dim. 5 mm)

Cutting data

Material		(DIN) ■ GG25
Cutting grade		carbide coated
Cutting speed	m/min	270
Feed rate per tooth	mm	0.15
Cutting depth	mm	0.2

Result
Short machining time

Inserts usable on both sides

Customer benefits
Low costs per component

Circular milling cutter / Teeth = 2 + 2 + 2 + 2 + 2
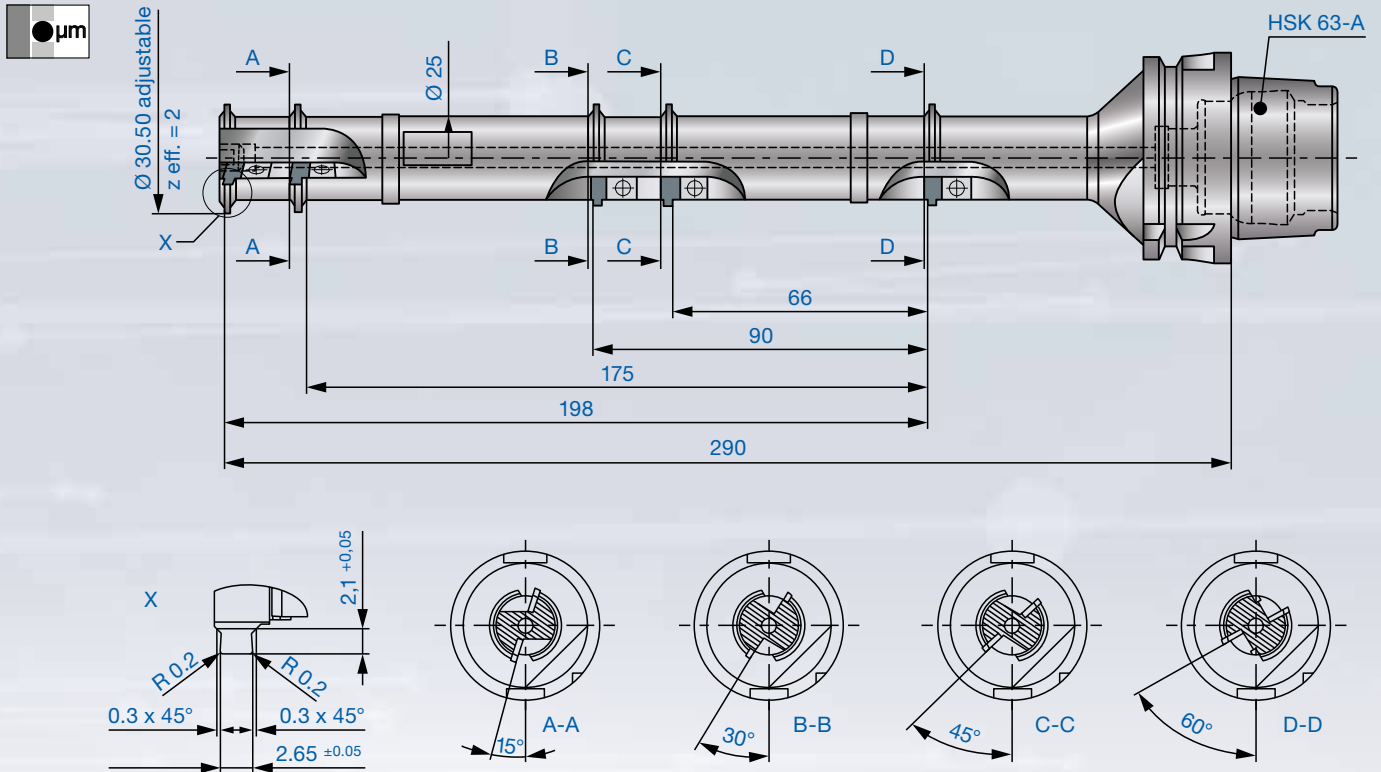
Requirements
Circular milling cutter for the machining of grooves

Solution
Circular milling cutter / Teeth = 2 + 2 + 2 + 2 + 2

Cutting data

Material		(DIN) ■ Al
Cutting grade		PCD
Cutting speed	m/min	490
Feed rate per tooth	mm	0.1
Cutting depth	mm	0.5 - 1.0

Result
Tool life tripled

Customer benefits
Reduced tooling costs
Reduced handling costs

Brake caliper

1. Step → positioning 1,25 mm ex centre

1.25

2.7
32
211.5

HSK 100-A

2. Step → entering by interpolation to nominal diameter
3. Step → countersinking Ø 37 mm

55.25
Ø 39
Ø 37 adjustable
z = 1
R 1
Ø 45.85 ±0.15
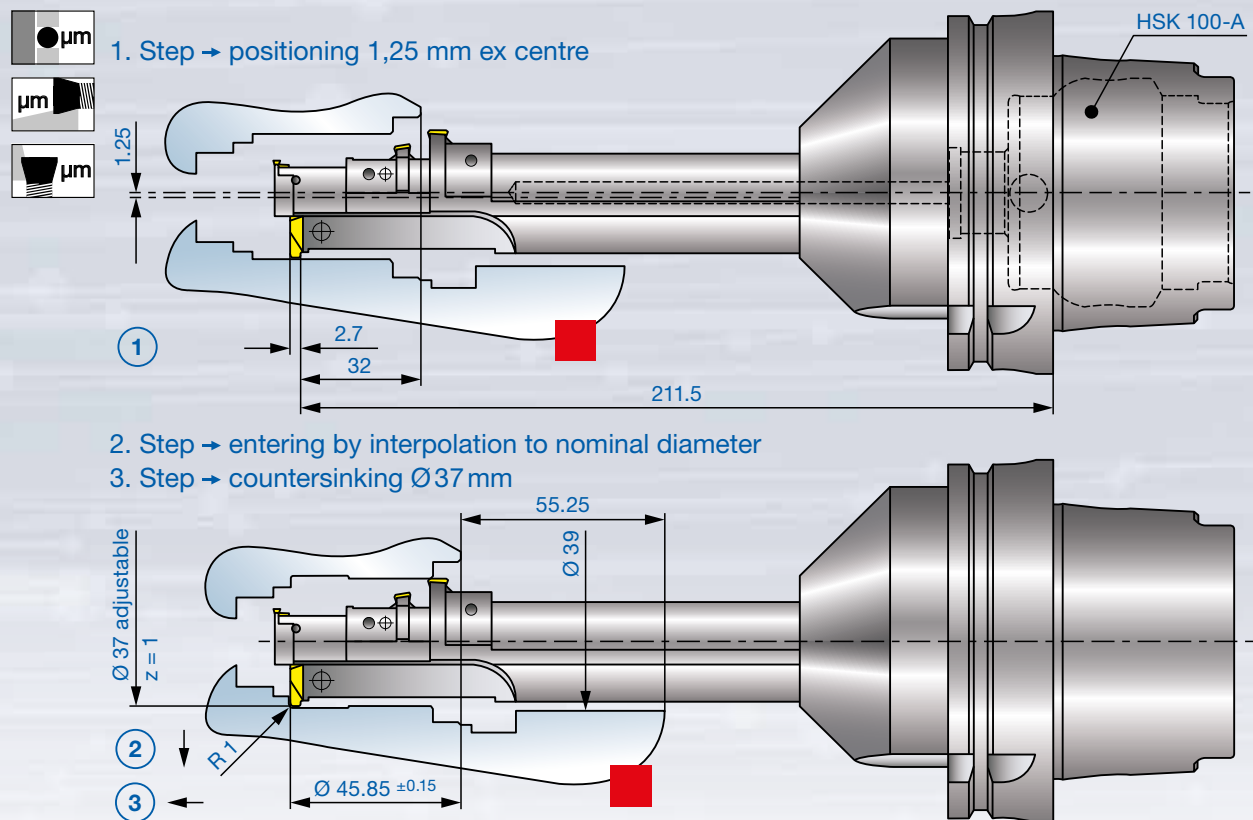
Requirements

Combination tool for Ø 37 mm plus seal grooves

Solution

Interpolation turning tool / Teeth = 4 + 1

Cutting data

Material		(DIN) ■ GGG45
Cutting grade		carbide coated
Cutting speed	m/min	70
Feed rate per tooth	mm	0.12
Cutting depth	mm	0.75

Result

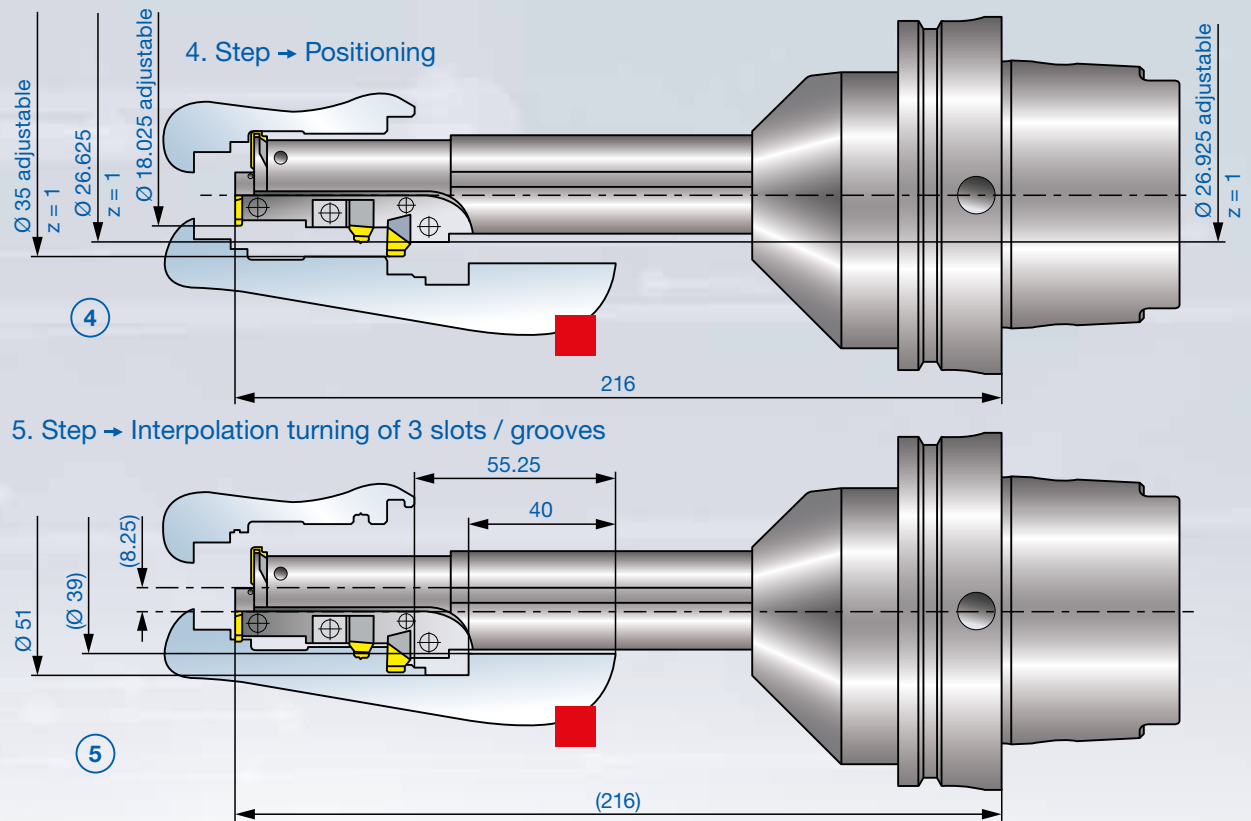Reduction of machining time thanks to combination tool

Long tool life thanks to constant cut (interpolation turning process)

Customer benefits

Low costs per component

High productivity

4. Step → Positioning

Ø 35 adjustable
z = 1
Ø 26.625
z = 1
Ø 18.025 adjustable

Ø 26.925 adjustable
z = 1

④

216

5. Step → Interpolation turning of 3 slots / grooves

55.25

40

(8.25)

Ø 39

Ø 51

⑤

(216)

Drilling and countersinking tool with interchangeable inserts

Requirements
Machining of the complete workpiece contour with one tool

Solution
Step tool with interchangeable inserts

Cutting data

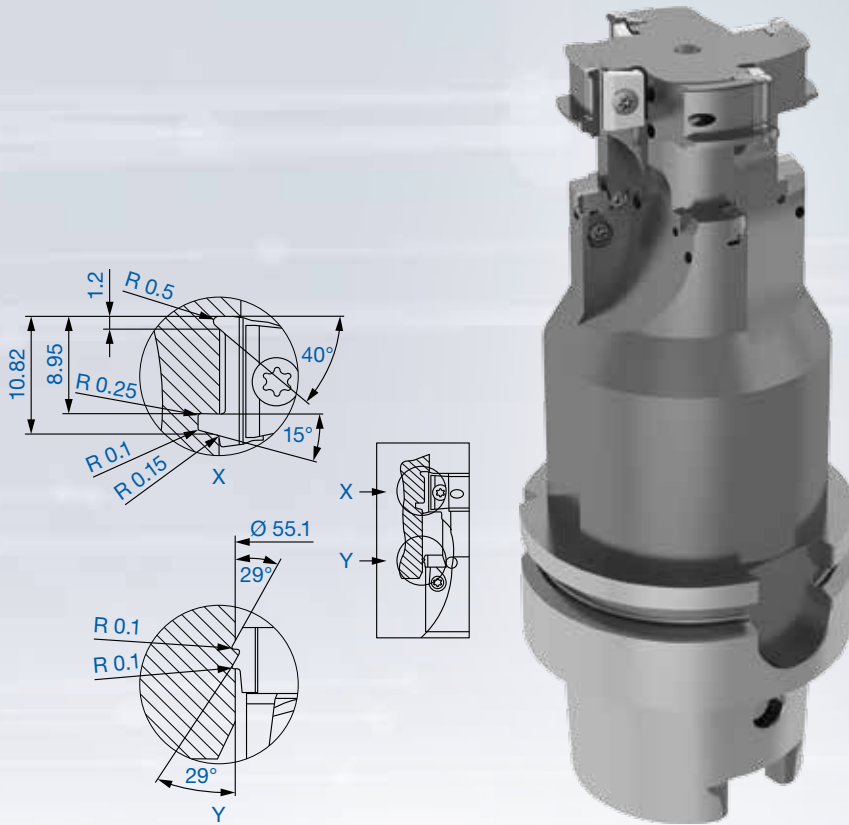| Material		(DIN) ■ GGG40
Cutting grade		carbide coated
Cutting speed	m/min	52 (Ø 27.7)
Feed rate per tooth	mm	0.28
Cutting depth	mm	into solid

Result
Tool life tripled

Customer benefits
Reduced tooling costs
Reduced handling costs

Circular milling cutter with form inserts / Teeth = 4 + 4

Requirements
Grouping of several groove machining operations

Solution
Circular milling cutters with form inserts / Teeth = 4 + 4

Cutting data

Material		(DIN) ■ GD-AlSi9Cu3
Cutting grade		PCD
Cutting speed	m/min	1,060
Feed rate per tooth	mm	0.13

Result
High positional accuracy of the grooves and edge outlines in relation to each other

Several grooves can be produced with one tool

Customer benefits
High process reliability

High productivity

Multi-fluted OD tool / Teeth = 3 + 1

Coolant outlet at front for 1-channel MQL system

1 MQL
BY HOLLFELDER GÜHRING

Requirements

Reduction of costs per component

Solution

Multi-fluted OD tool / Teeth = 3 + 1

Cutting data

Material		(DIN) ■ C56E2
Cutting grade		carbide coated
Cutting speed	m/min	160
Feed rate per tooth	mm	0,2
Cutting depth	mm	6 mm in Ø

Result

Increased tool life by 60 %
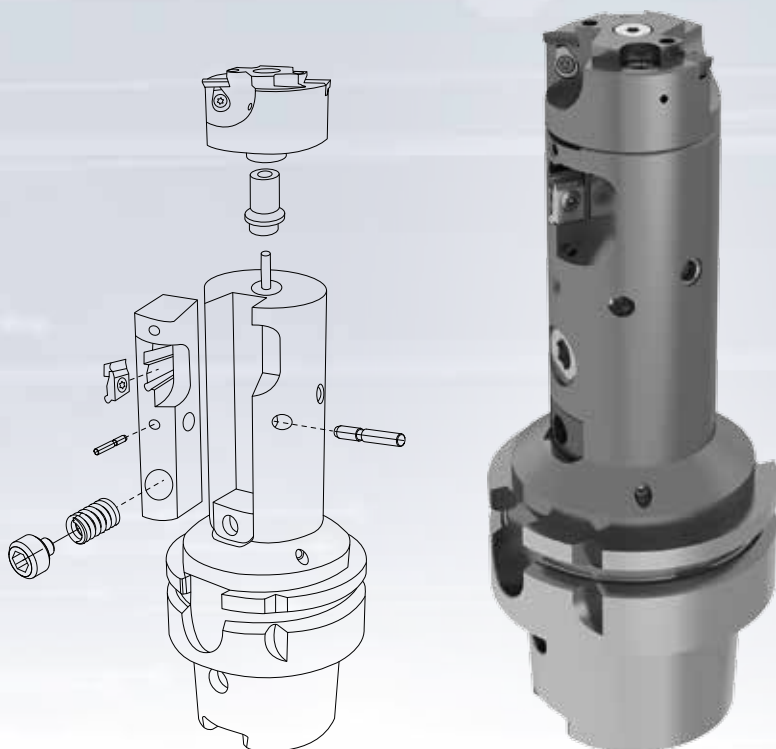
Low cutting forces

Very good chip control

Customer benefits

Significant reduced costs per component

Automatically adjustable tool / Teeth = 2 + 1

SMART SETTING MOTION TOOLS concept

Machining diameter can be set µm-accurately larger and smaller by means of a central adjusting screw

Smart
Setting
Motion
Tools

Requirements
Reduction of non-productive times

Solution
Automatically adjustable tool / Teeth = 2 + 1

SMART SETTING MOTION TOOLS concept

Machining diameter can be set µm-accurately larger and smaller by means of a central adjusting screw

Cutting data

Material	(DIN) ■	36MnVS4
Cutting grade		carbide coated
Cutting speed	m/min	138
Feed rate per tooth	mm	0.1 / 0.2

Result
High tool life quantity (it is re-adjusted approx. 2x per tool life)

Easy handling by readjusting the machining diameter directly in the machine spindle
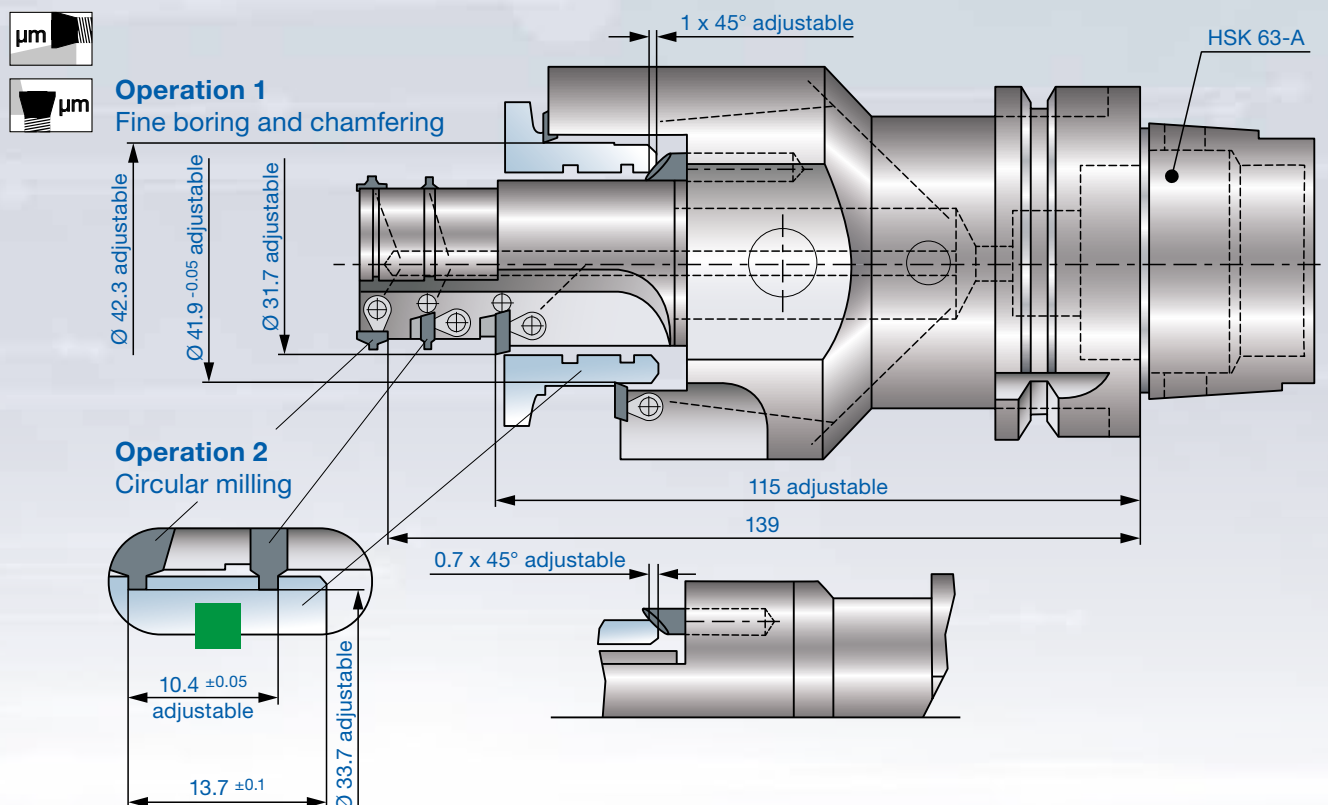
Customer benefits
High productivity

General
engineering

Fine boring, chamfering and circular milling tool
Teeth = 8 / Teeth_eff. = 1 per Ø (fine boring) / Teeth = 8 / eff. 2 per Ø (milling)

Middle part exchangeable for different types of components

All inserts adjustable

1 x 45° adjustable

HSK 63-A

Operation 1
Fine boring and chamfering

Ø 42.3 adjustable
Ø 41.9 −0.05 adjustable
Ø 31.7 adjustable

Operation 2
Circular milling

10.4 ±0.05 adjustable

Ø 33.7 adjustable

13.7 ±0.1

115 adjustable

139

0.7 x 45° adjustable

Requirements

Combination tool for fine boring, chamfering and milling

Solution

Fine boring, chamfering and circular milling tool / Teeth = 8 / Teeth_eff. = 1 je Ø (fine boring) / Teeth = 8 / Teeth_eff. = 2 je Ø (milling)

Middle part exchangeable for different types of components

All inserts adjustable

Cutting data

Material	(DIN) ■ GD-AlSi9Cu3	
Cutting grade	PCD	
Cutting speed	m/min	(Ø 31.7) 750 (Ø 42.3) 1000
Feed rate per tooth	mm	(milling) 0.065 0.13
Cutting depth	mm	2 - 3

Result

Short machining time

High dimensional accuracy

Customer benefits

Low costs per component

Reduced non-productive times

![H] Gearbox case

for angle grinders

> **Fine boring, chamfering and face tool / Teeth = 6 eff. 1 per Ø**

> **All inserts adjustable**

> **Exchangeable cartridges for different types of housings**
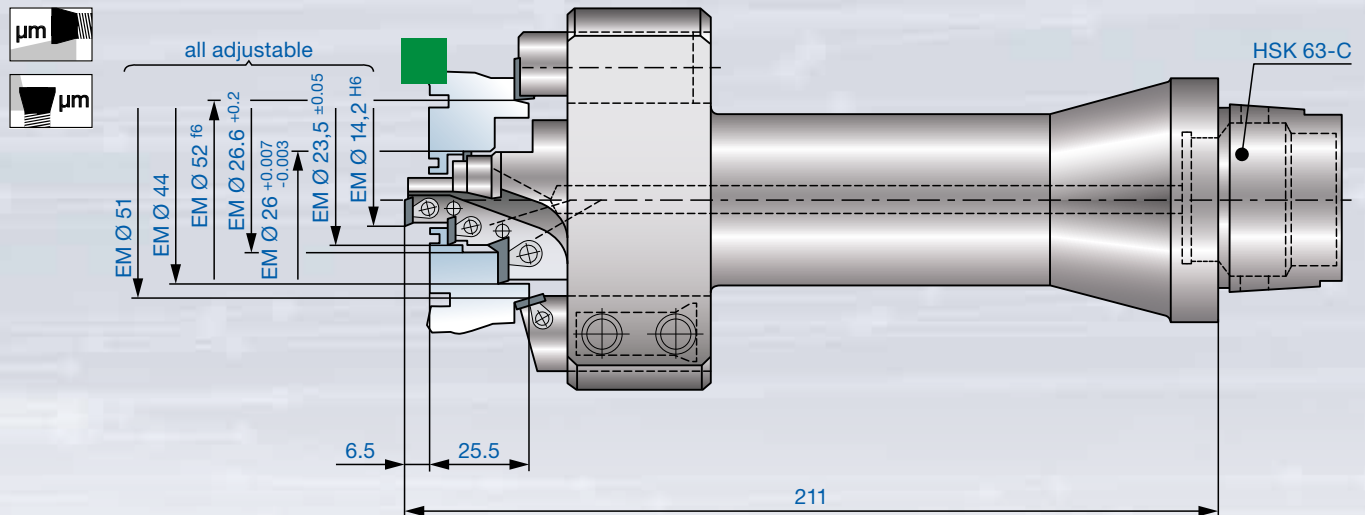
Requirements

Combination tool for 6 machining steps

Solution

Fine boring, chamfering and face tool / Teeth = 6 eff. 1 per Ø

All inserts adjustable

Exchangeable cartridges for different types of housings

Cutting data

Material	(DIN) ■	GD-AlSi9Cu3
Cutting grade		PCD
Cutting speed	m/min	800
Feed rate per tooth	mm	-0.15
Cutting depth	mm	0.5

Result

Short machining time

High dimensional accuracy

Customer benefits

Low costs per component

Reduced non-productive times

Drilling and fine boring tool

Inserts adjustable

Operation 1
drilling and fine boring

ABS 50

Ø 15.5 adjustable

Ø 30 ±0.1 adjustable

Ø 20.75 ±0.05 adjustable

Ø 14.5

30 adjustable

90

120

Operation 2
circular chamfering

45°

1 x 45°

Requirements

Combination tool for 5 machining steps

Diameter of the chamfer and the facegroove adjustable

Solution

Drilling and fine boring tool

Inserts adjustable

Cutting data

		drilling and chamfering	fine boring and chamfering
Material		(DIN) ■ AlSi12	
Cutting grade		carbide coated	
Cutting speed	m/min	(Ø 14.5) 160	(Ø 30) 331
Feed rate per tooth	mm	0.15	0.07
Cutting depth	mm	7.25	4.9

Result

Short machining time

High dimensional accuracy

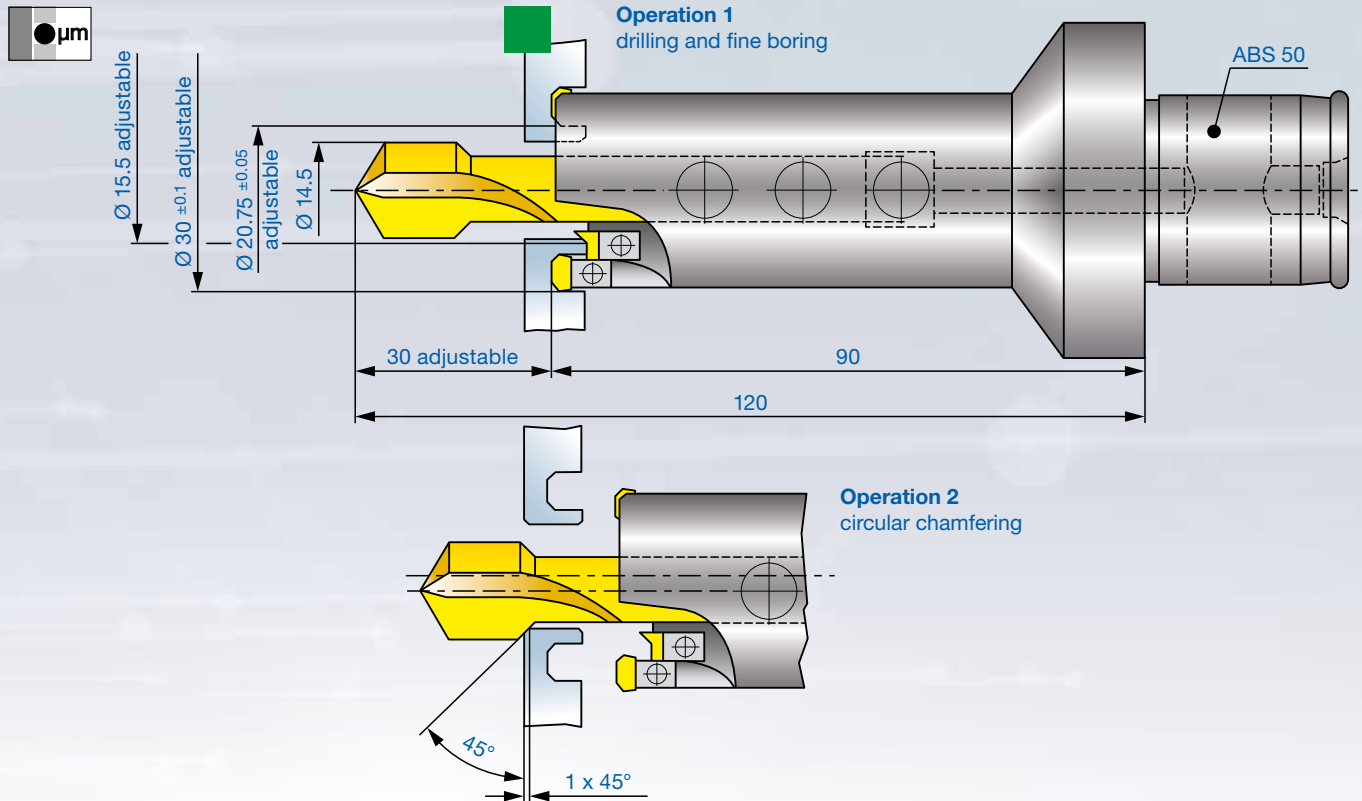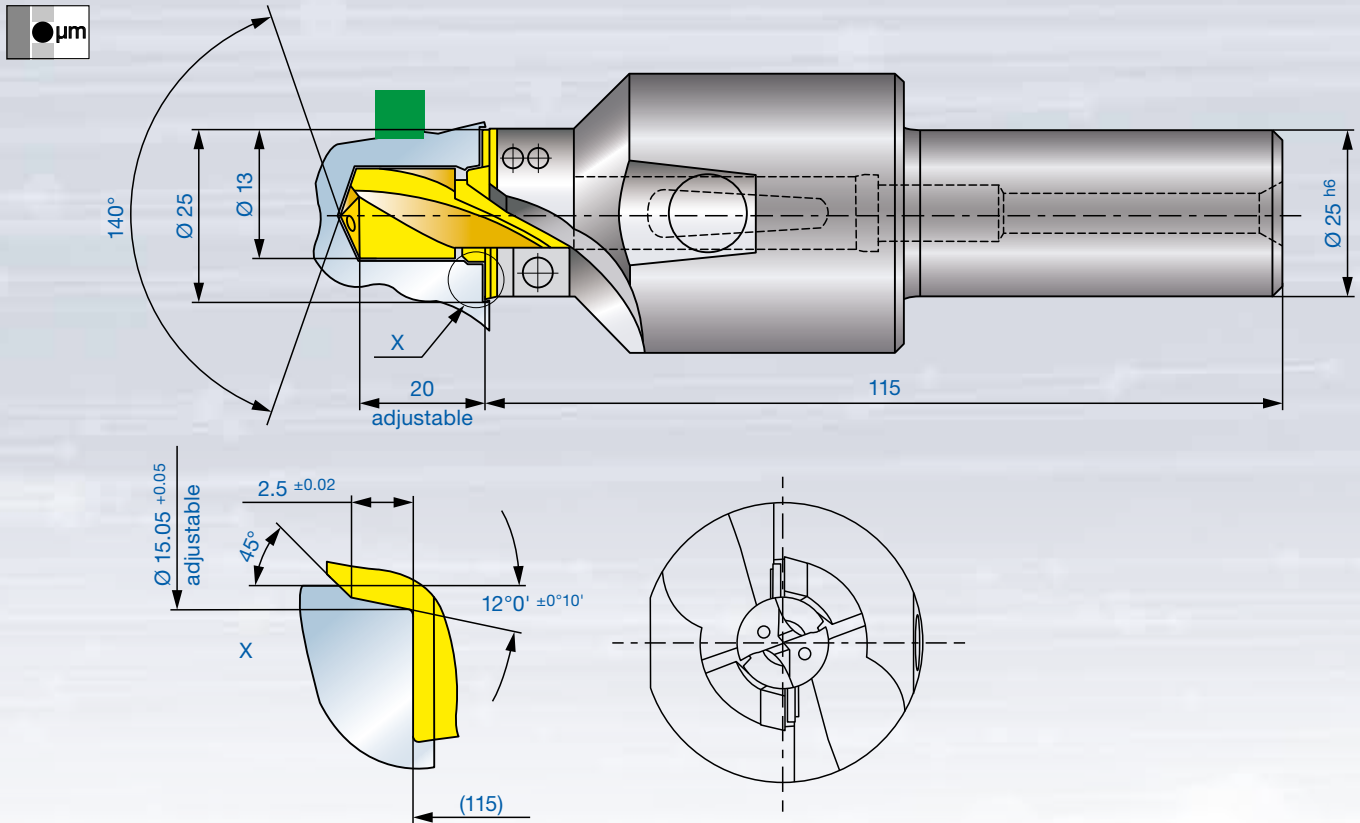## Customer benefits

Low costs per component

Reduced non-productive times

Drilling and fine boring tool

Requirements

Drilling, chamfering and fine boring in one tool

Solution

Drilling and fine boring tool

Cutting data

Material		(DIN) ■ Al	
Cutting grade		K10	
		drilling	fine boring
Cutting speed	m/min	374	374
Feed rate per tooth	mm	0.38	0.09
Cutting depth	mm	into solid	1.3

Result

Short machining time

High dimensional accuracy
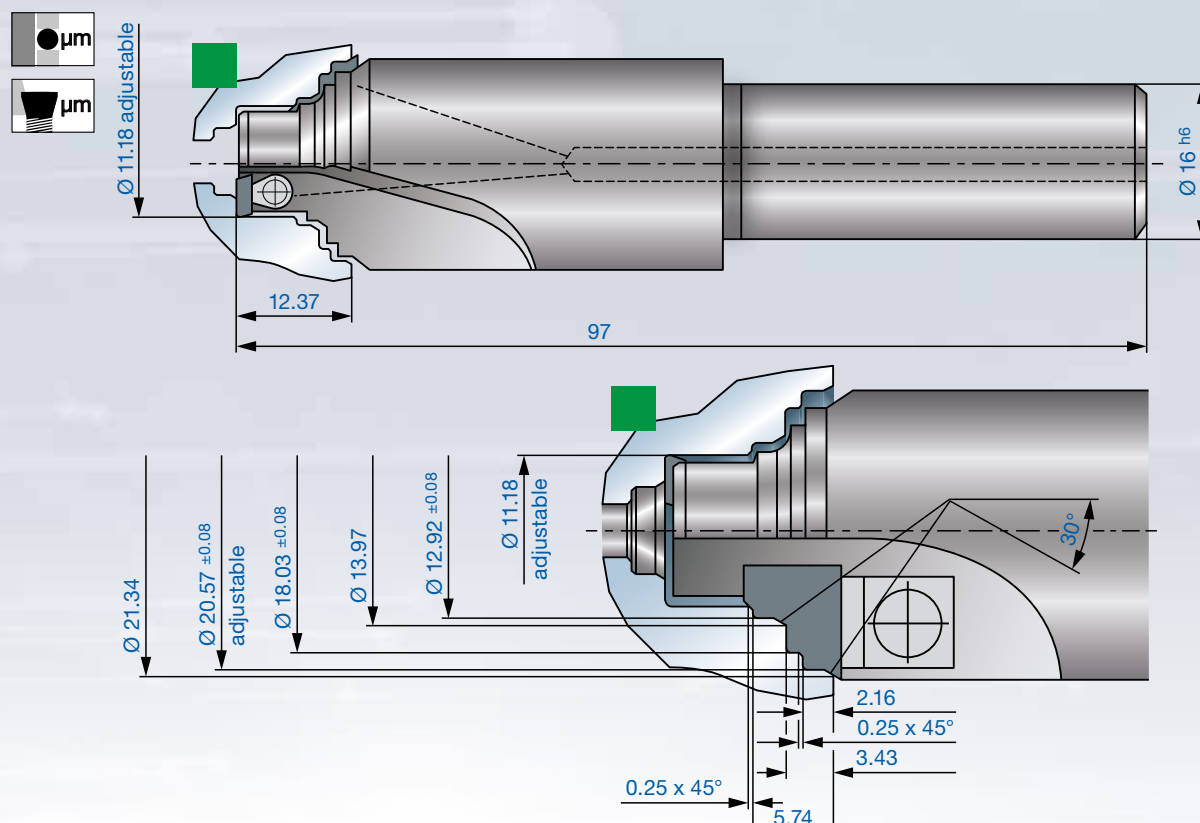
Solid carbide drill regrindable for several times

Customer benefits

Low costs per component

Reduced non-productive times

Fine boring and chamfering tool with indexable inserts

PCD-form inserts with 5 steps, all diameters adjustable

97

Requirements

Multi-step fine boring tool for hydraulic connection

Solution

Fine boring and chamfering tool with indexable inserts

PCD-form inserts with 5 steps, all diameters adjustable

Cutting data

Material		(DIN) ■ GDAlSi9
Cutting grade		PCD
Cutting speed	m/min	(Ø 21.34) 700
Feed rate per tooth	mm	0.1
Cutting depth	mm	-5

Result

Simple correction of diameters by means of taper screw or eccentric pin adjustment
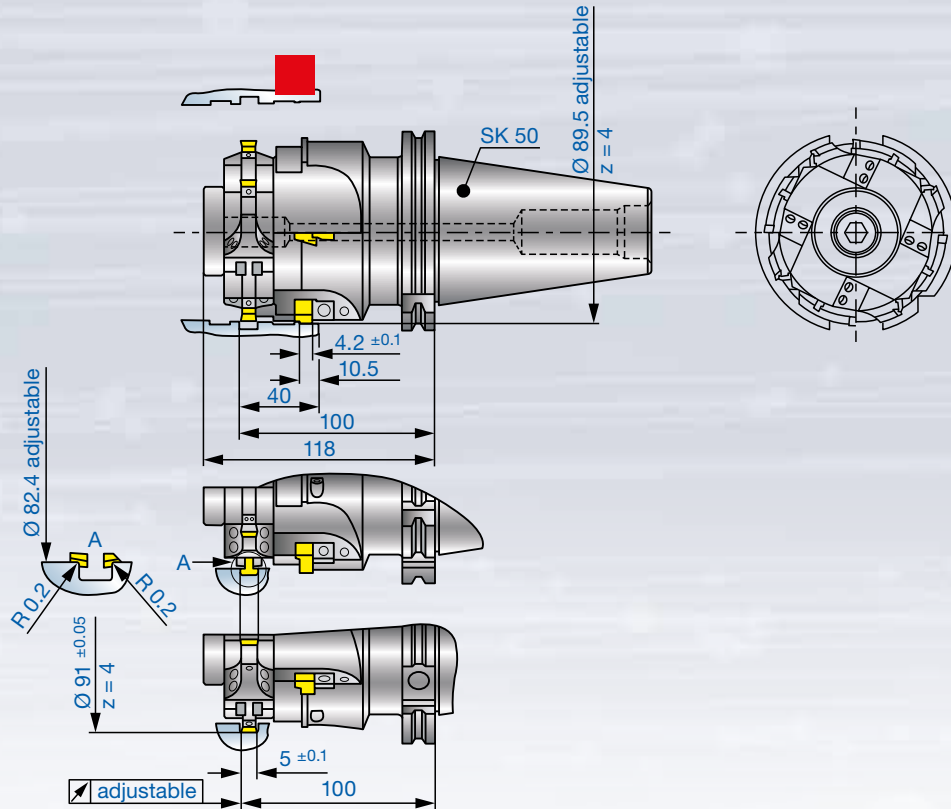
Inserts separately replaceable

Customer benefits
Low costs per component

Circular milling cutter / Teeth = 16 / Teeth$_{eff.}$ = 4

Ø 89.5 adjustable
z = 4

SK 50

4.2 ±0.1
10.5
40
100
118

Ø 82.4 adjustable

R 0.2
R 0.2
A
A

Ø 91 ±0.05
z = 4

5 ±0.1
adjustable
100

Requirements

Multi-step circular milling cutter for machining grooves

Solution

Circular milling cutter / Teeth = 16 / Teeth$_{eff.}$ = 4

Cutting data

Material		(DIN) ■ GGG40
Cutting grade		carbide coated
Cutting speed	m/min	95
Feed rate per tooth	mm	0.11
Cutting depth	mm	4

Result
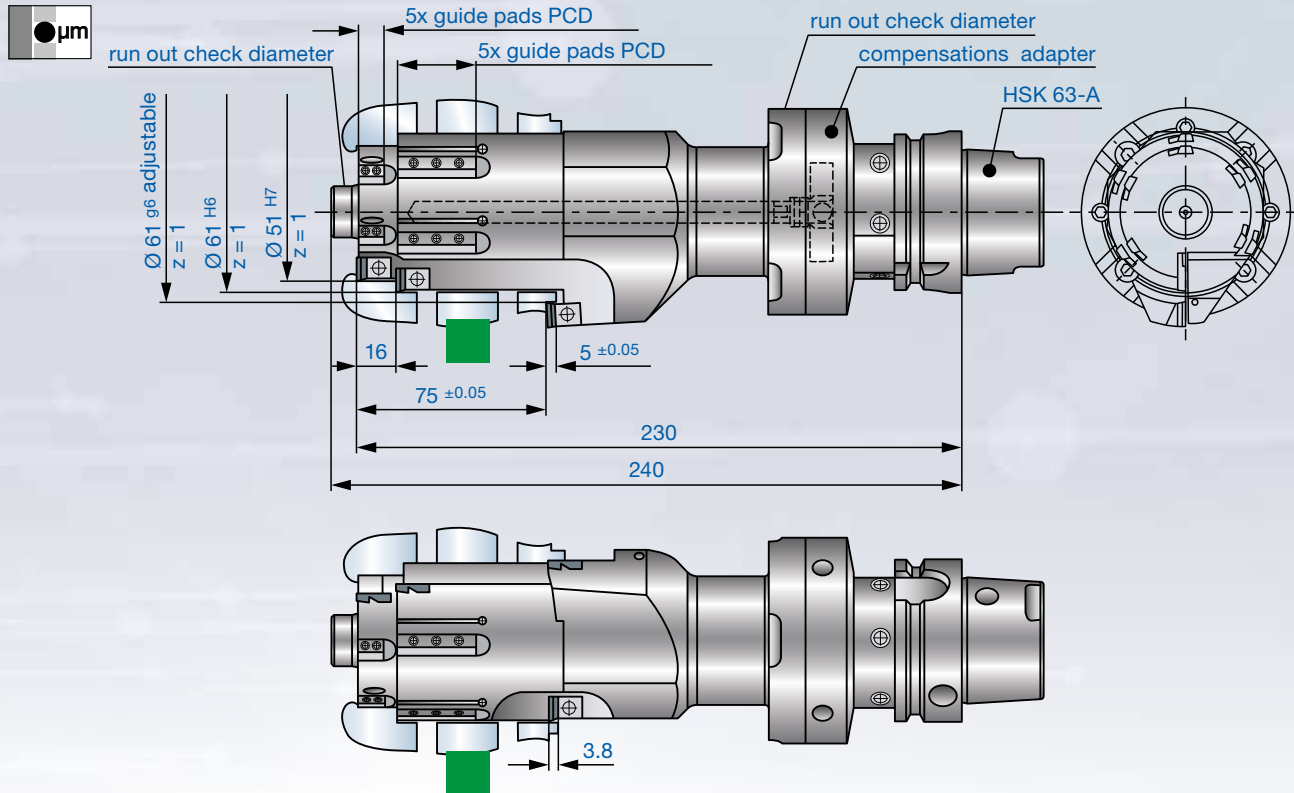
Short machining time

High dimensional accuracy

Customer benefits

Low costs per component

Reduced non-productive times

Stepped fine boring tool with clamped PCD guide pads / Teeth = 4 / Teeth$_{eff.}$ = 1

All inserts adjustable

Requirements

Multi-step fine boring tool

Solution

Stepped fine boring tool with clamped PCD guide pads / Teeth = 4 / Teeth$_{eff.}$ = 1

All inserts adjustable

Cutting data

Material	(DIN) ■ AlSi11Cu2(Fe)	
Cutting grade		PCD
Cutting speed	m/min	600
Feed rate per tooth	mm	0.1
Cutting depth	mm	0.2

Result

Excellent surface finish

Simple tool handling

Customer benefits

Higher process reliability

Low costs for replacing the PCD guide pads, if necessary

H Compressor housing

Mixed assembly: semi finish inserts (Teeth = 8) and wiper inserts (Teeth = 3)

● µm

Ø 27 H6

Ø 51

Ø 80 ±0.05

12

55

run out check diameter

adjustable

uneven tooth-pitch

Requirements

Surface finish R_z max. 20 µm	
Flatness 0.05 mm	

Solution

Put on milling cutter Ø 80 mm / Teeth = 8 + 3

Mixed assembly: semi finish inserts (Teeth = 8) and wiper inserts (Teeth = 3)

Cutting data

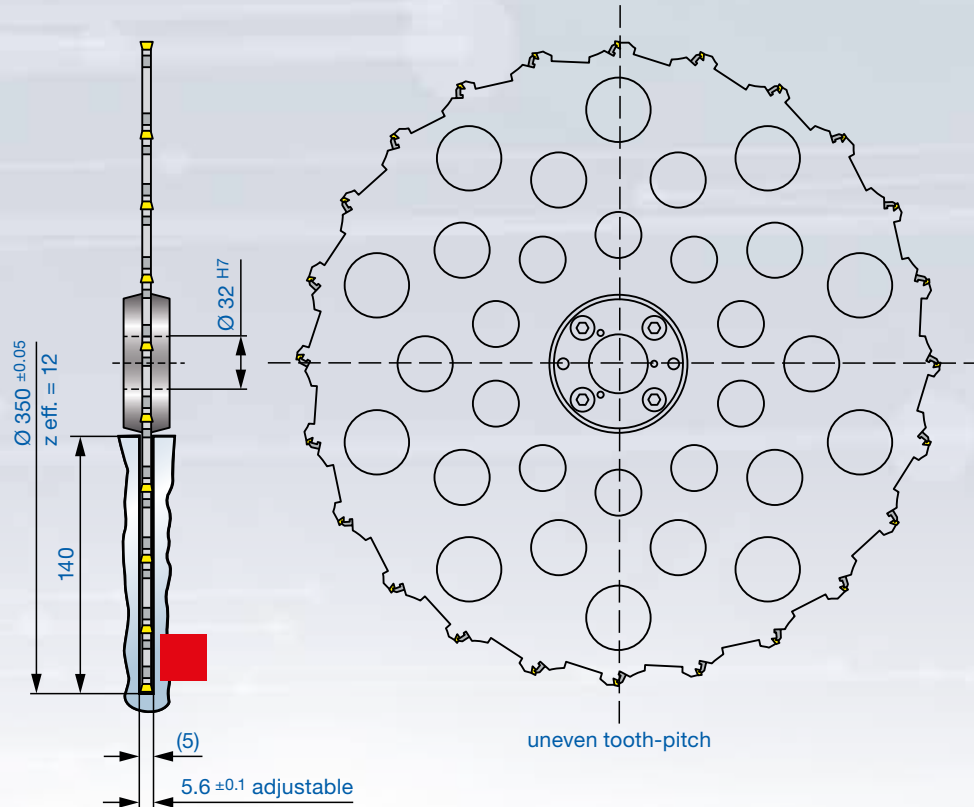|		
Material	(DIN) ■	GG25
Cutting grade		CBN
Cutting speed	m/min	1,200
Feed rate per tooth	mm	0.140
Cutting depth	mm	0.10

Result

Increased tool life by 300 - 400 %

Customer benefits

Dramatically reduced costs per component

Side milling cutter Ø 350 mm / Teeth = 12 + 12

Width 5.6 mm adjustable

Ø 32 H7

Ø 350 ±0.05

z eff. = 12

140

(5)

5.6 ±0.1 adjustable

uneven tooth-pitch

Requirements

Milling of the rotor grooves

Solution

Side milling cutter Ø 350 mm / Teeth = 12 + 12

Width 5.6 mm adjustable

Cutting data

Material		(DIN) ■ GGG50
Cutting grade		carbide coated
Cutting speed	m/min	80
Feed rate per tooth	mm	0.05
Cutting depth	mm	140

Result

Finish machining of slots in one cut

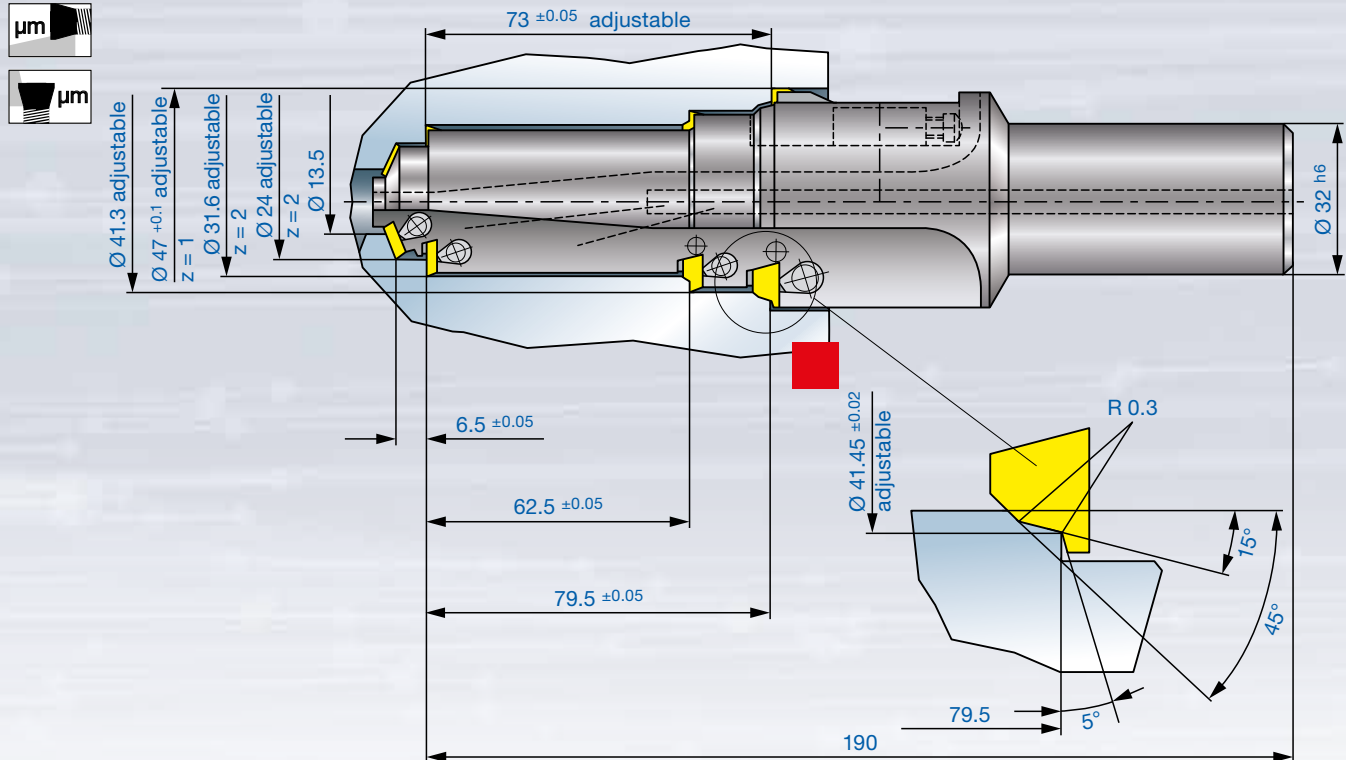Therefore dramatic shortening of processing time compared to the grinding process

Customer benefits

Dramatically reduced costs per component

Connection holes valve block

> **Multi-step fine boring tool with adjustable inserts /**
> **Teeth = 8 / Teeth$_{eff.}$ = 2**

73 ±0.05 adjustable

Ø 41.3 adjustable
Ø 47 +0.1 adjustable z = 1
Ø 31.6 adjustable z = 2
Ø 24 adjustable z = 2
Ø 13.5

Ø 32 h6

6.5 ±0.05

62.5 ±0.05

79.5 ±0.05

190

Ø 41.45 ±0.02 adjustable

R 0.3

15°
45°
79.5
5°

Requirements

Tool for hydraulic connection

All diameters adjustable

Solution

Multi-step fine boring tool with adjustable inserts / Teeth = 8 / Teeth$_{eff.}$ = 2

Cutting data

Material		(DIN) ■ GGG50
Cutting grade		carbide coated
Cutting speed	m/min	(Ø 47) 180
Feed rate per tooth	mm	(Ø 47 / Ø 41) 0.1
Cutting depth	mm	-5

Result
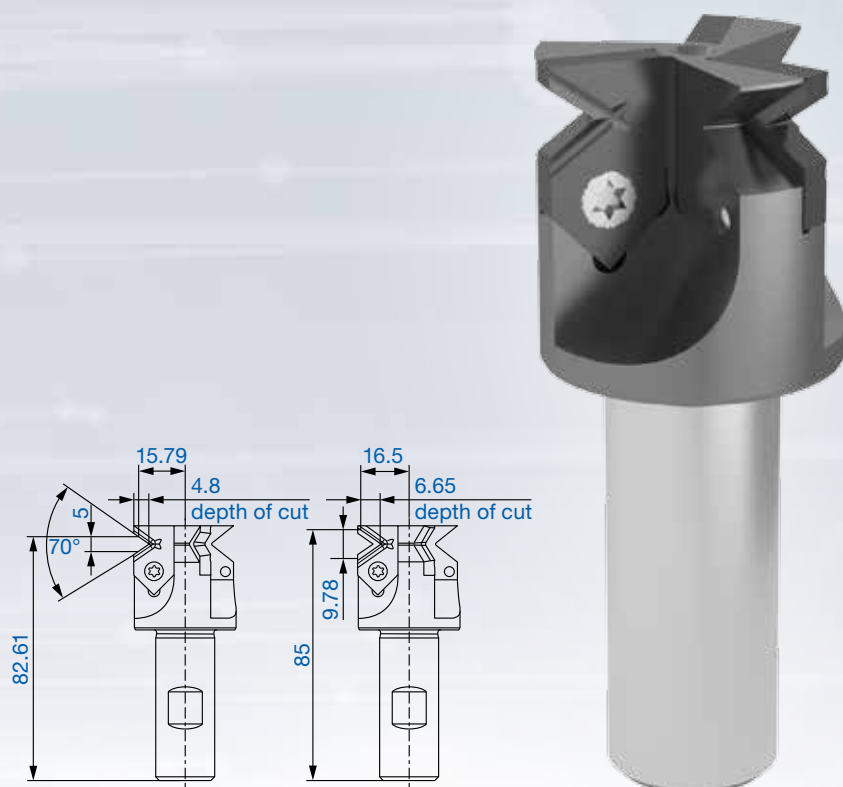
Short machining time

Stable machining process

Customer benefits

Low costs per component

Milling tool with fixed insert seat / Teeth = 3

Machining of different sizes with one holder and different interchangeable inserts

Requirements

Geometric shape accuracy

Mixed machining (Steel unhardened / hardened)

Faster machining

Solution

Milling tool with fixed insert seat / Teeth = 3

Cutting data

Material		(DIN) ■ Toolox 33
Cutting grade		CBN / carbide
Cutting speed	m/min	CBN 250 / carbide 140
Feed rate per tooth	mm	CBN 0.03 / carbide 0.03
Cutting depth	mm	4.8 resp. 6.65

Result

Higher surface finish quality
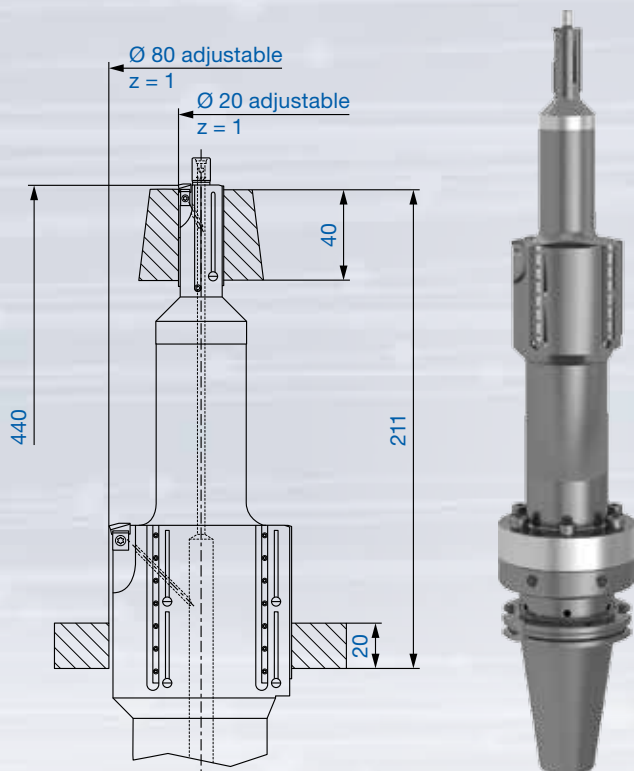
Reduced tooling costs

Customer benefits

Cycle time reduction with higher surface quality

Only one tool required for different workpiece geometries

Reduced tooling costs

Countersinking tool with guide pads / Teeth = 1 + 1

Ø 80 adjustable
z = 1

Ø 20 adjustable
z = 1

40

440

211

20

Requirements

Manufacturing of fitting diameters

High surface finish quality

Solution

Countersinking tool with guide pads / Teeth = 1 + 1

Cutting data

Material		(DIN) ■ GG25
Cutting grade		carbide coated
Cutting speed	m/min	88
Feed rate per tooth	mm	0.075
Cutting depth	mm	0.2

Result

Very good coaxiality despite the long distance to be bridged

Diameter can be set with micrometre precision

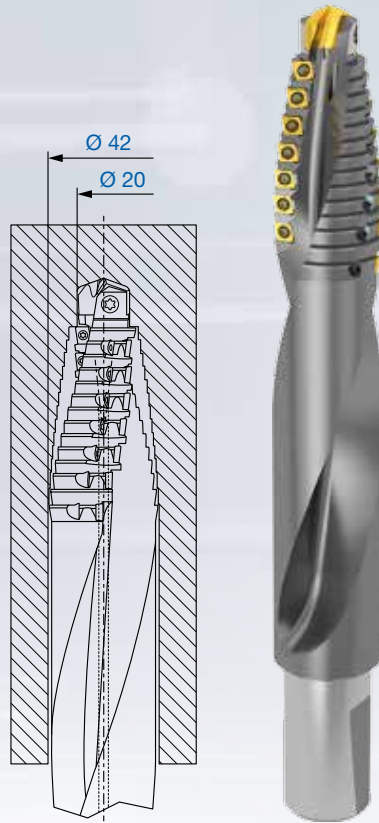### Customer benefits

Reduction of the number of tools

Long tool life

Drilling and countersinking tool (HT 800 + 14 steps) / Teeth = 16

Ø 42
Ø 20

Requirements

Increasing the process reliability

Solution

Drilling and countersinking tool (HT 800 + 14 steps) / Teeth = 16

Cutting data

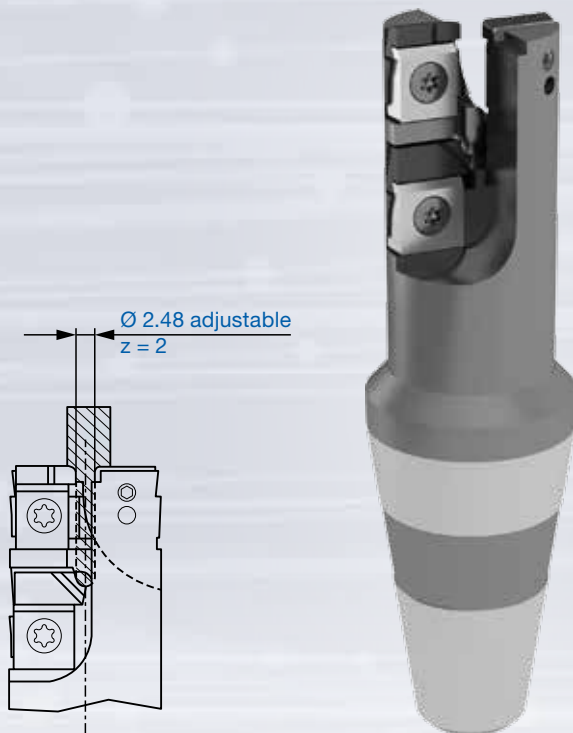| Material		(DIN) ■ GGG40
Cutting grade		carbide
Cutting speed	m/min	120
Feed rate per tooth	mm	0.4
Cutting depth	mm	into solid

Result

Faster machining time

Customer benefits

High process reliability

Longer tool life

**Fine boring tool with adjustable form inserts /
Teeth = 2 + 1**

Ø 2.48 adjustable
z = 2

Requirements
Alternative solution to a ground carbide tool

Solution
Fine boring tool with adjustable form inserts / Teeth = 2 + 1

Cutting data

Material		(DIN) ■ CuZn39Pb3R500
Cutting grade		carbide uncoated
Cutting speed	m/min	76
Feed rate per tooth	mm	0.065
Cutting depth	mm	into solid

Result
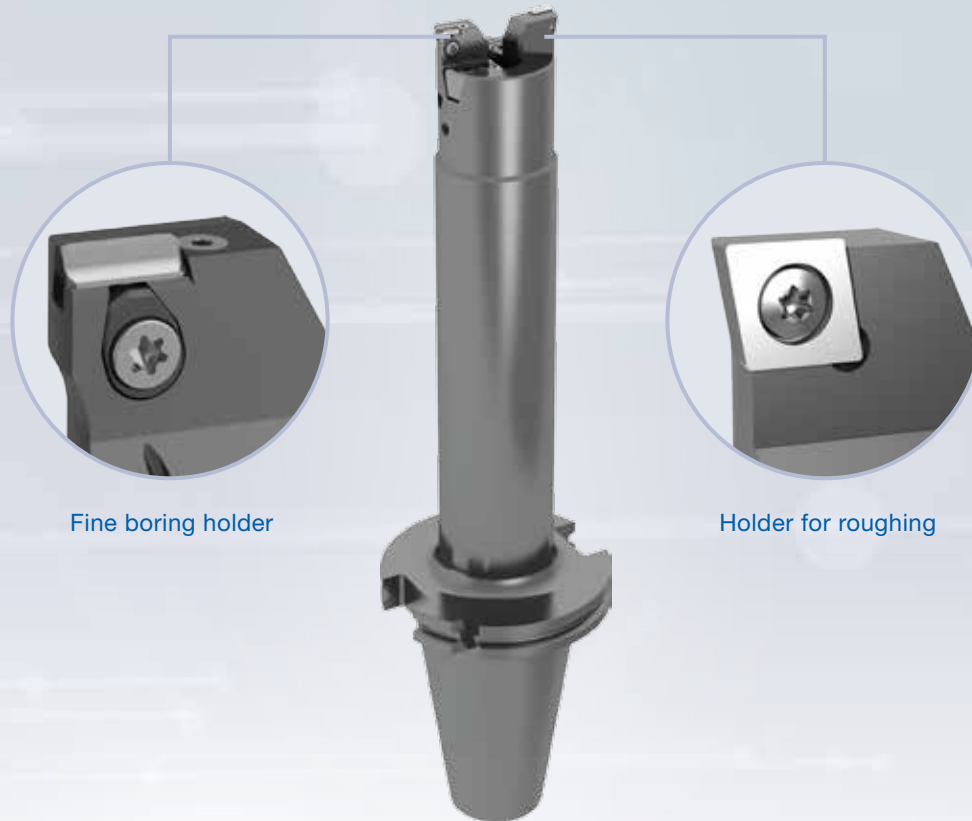Tool life: 1,000,000 plug contacts

µm-accurate adjustability of diameters

Customer benefits
No regrinding of the entire tool necessary

Reduced storage costs

GA200 Vario special solution (roughing/finishing combination) / Teeth = 1 + 1

Fine boring holder

Holder for roughing

Requirements

Reduction of machining time

Solution

GA200 Vario special solution (roughing/finishing combination) / Teeth = 1 + 1

Cutting data

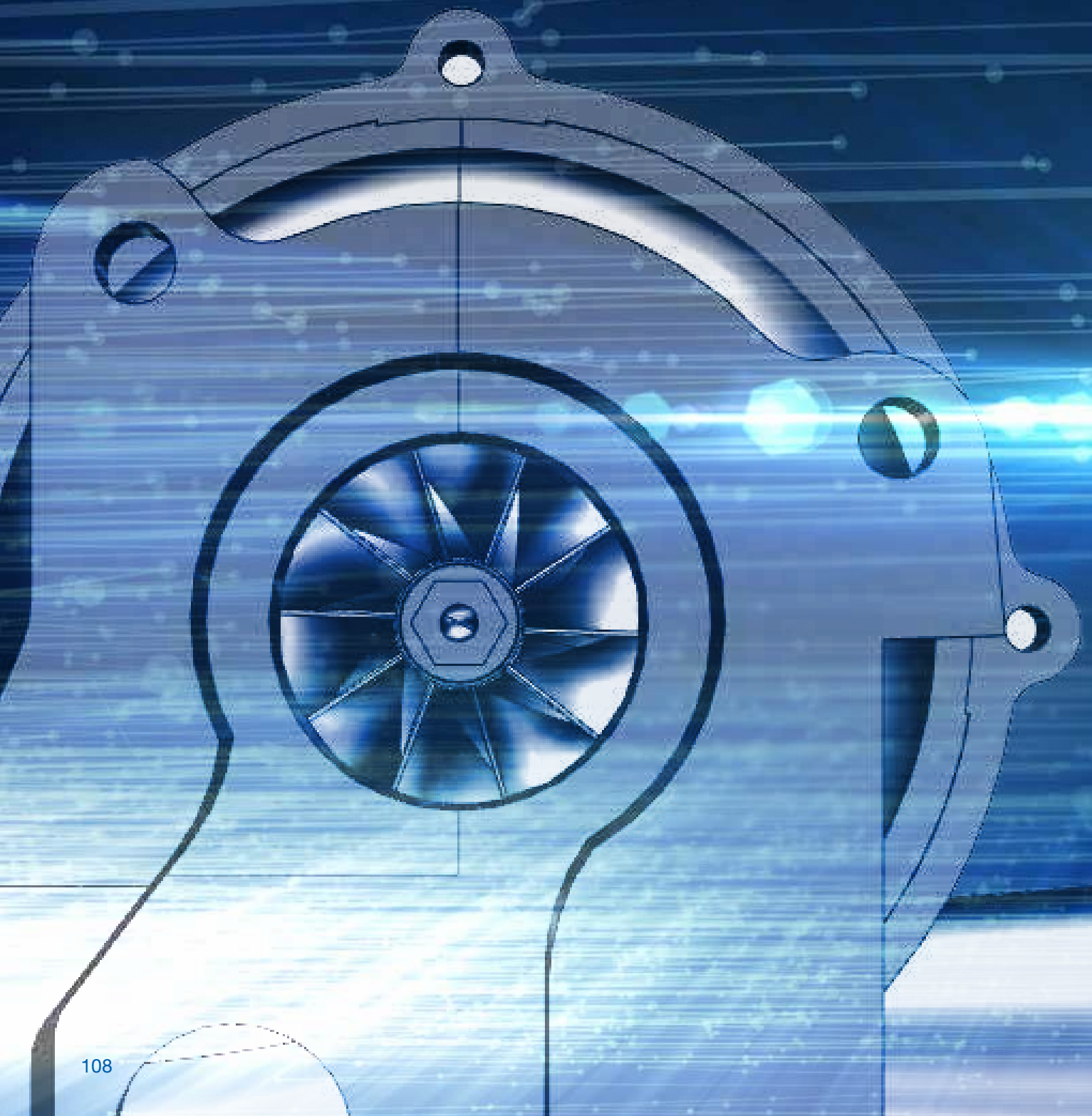| Material		(DIN) ■ CuZn35Pb2Al
Cutting grade		carbide / PCD
Cutting speed	m/min	300
Feed rate per tooth	mm	0.06
Cutting depth	mm	4

Result

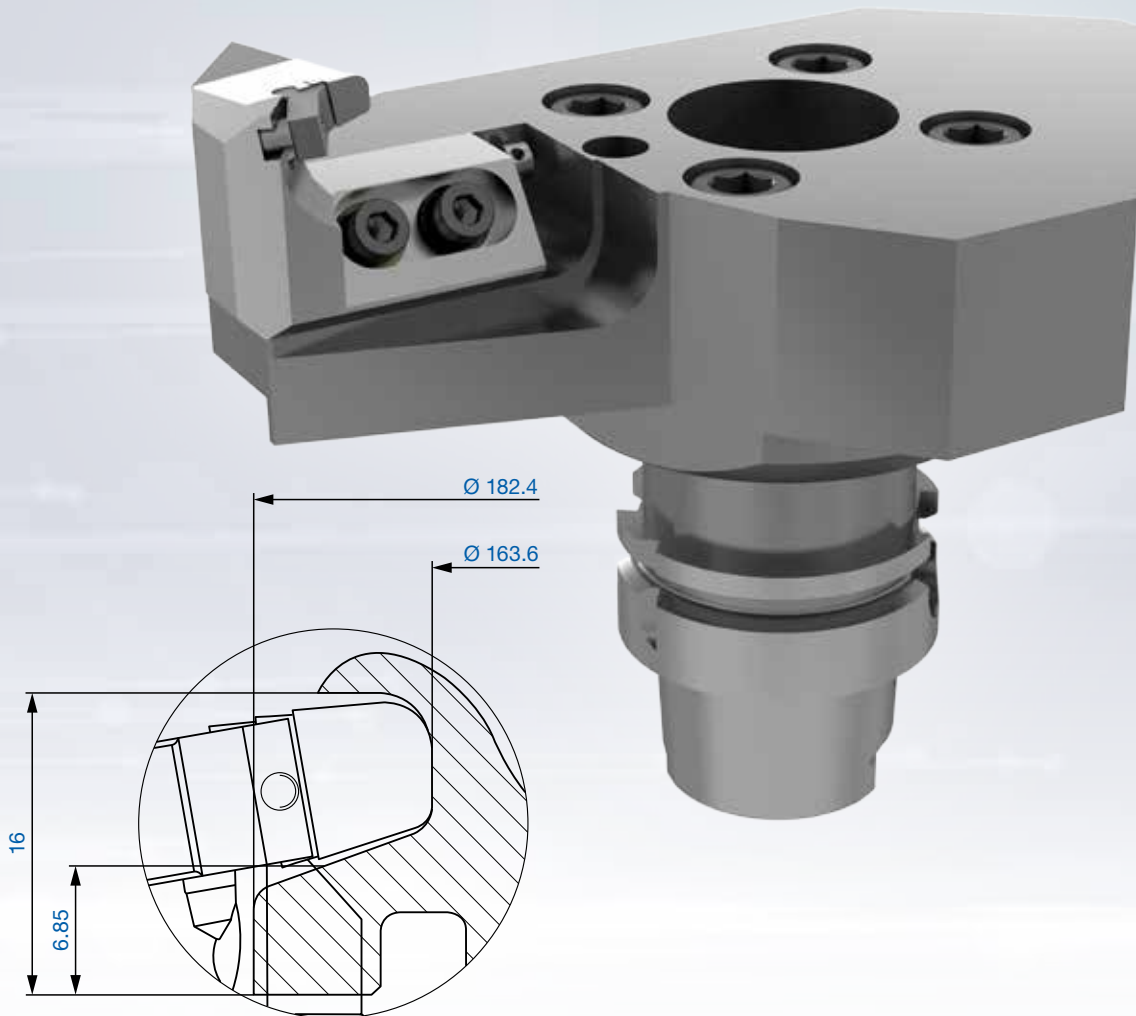Reduction of required tools from 2 to 1

Customer benefits

Cycle time reduction machining with consistent quality

Reduced tooling costs

Turbocharger
housing

Interpolation turning tool / Teeth = 1

Ø 182.4

Ø 163.6

16

6.85

Requirements
Machining of a V-contour despite limited space conditions

Solution
Interpolation turning tool / Teeth = 1

Cutting data

Material		(DIN) ▪ GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	100
Feed rate per tooth	mm	0.1

Result
Very short machining time

Flexible and stable tool concept with cartridge

Long tool life

Customer benefits
Low costs per component

Requirements

Several machining steps in one tool

Solution

Stepped countersinking tool

Various inserts adjustable

Cutting data

Material		(DIN) ■ GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	95
Feed rate per tooth	mm	0.1

Result

Very short machining time thanks to maximum possible number of teeth

Thanks to the division of the chip spaces, it is possible

to combine several machining steps

Customer benefits

Lower tool costs by using ISO inserts

Reduced cycle times

> **Fine boring tool / Teeth = 1 + 1**

> **Adjustment of the diameter by fine adjustment**

Smart
Setting
Motion
Tools

Requirements

Step tool for finishing operation

Solution

Countersinking tool / Teeth = 1 + 1

Adjustment of the diameter by means of thread wedge adjustment

Cutting data

Material		(DIN) ■ GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	120
Feed rate per tooth	mm	0.075

Result

Short machining time

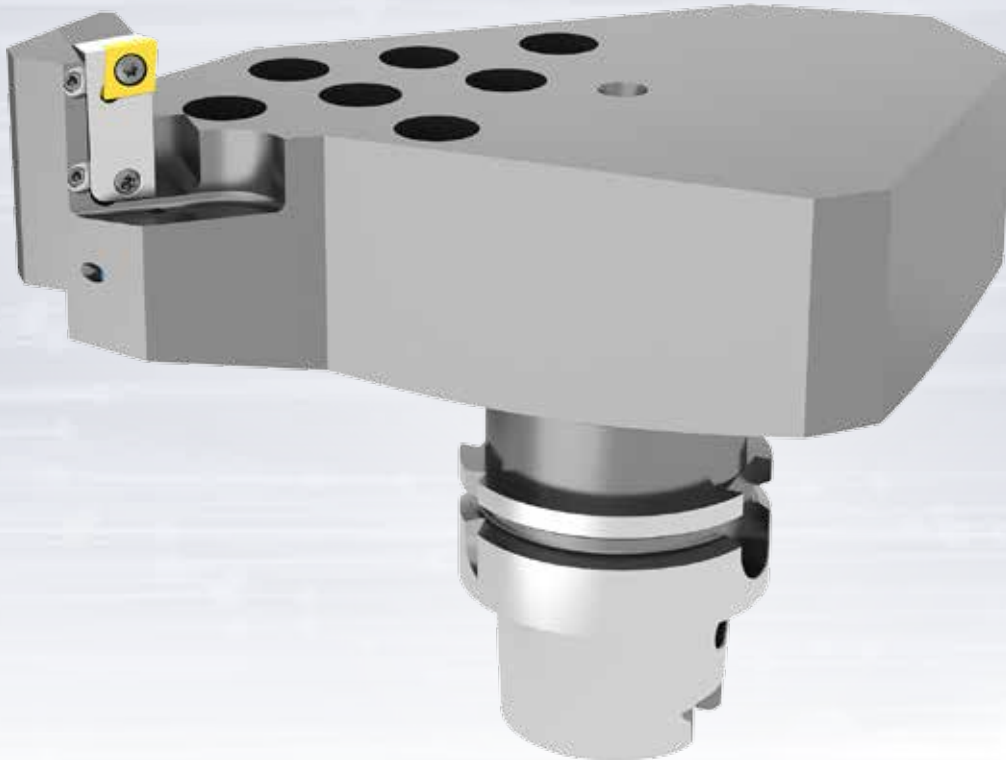**Customer benefits**

Lower tool costs by using ISO inserts

µm accurate adjustment directly at the spindle ➜ low machine downtime

Countersinking and interpolation tool in one Ø 182.4 mm
➜ Finishing

Plane surface from 182.4 to 155.698 mm
➜ Interpolation process

Requirements
Different machining processes in one tool

Solution
Countersinking and interpolation tool in one Ø 182.4 mm ➜ Finishing

Plane surface from 182.4 to 155.698 mm ➜ Interpolation process

Cutting data
Material	(DIN) ■	GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	100
Feed rate per tooth	mm	0.1

Result
2 machining processes in one tool

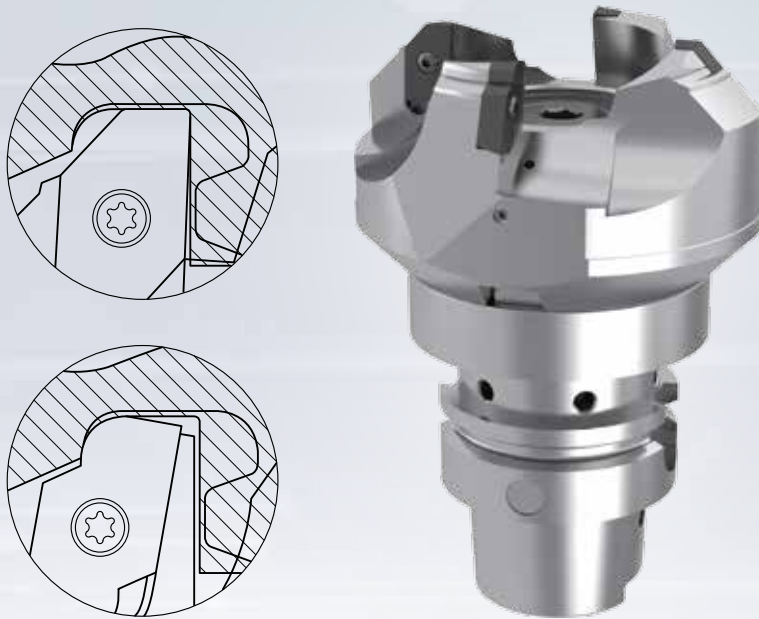Adjustment of the diameter by means of thread wedge adjustment

Customer benefits
Lower tool costs by using ISO inserts

Axial grooving tool / Teeth = 2 + 2

Division of the contour into two different cutting insert geometries

Compact tool concept

Requirements

Pre-machining of a complex contour

Solution

Axial grooving tool / Teeth = 2 + 2

Division of the contour into two different cutting insert geometries

Compact tool concept

Cutting data

Material		(DIN) ■ GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	110
Feed rate per tooth	mm	0.125

Result

Simple tool handling

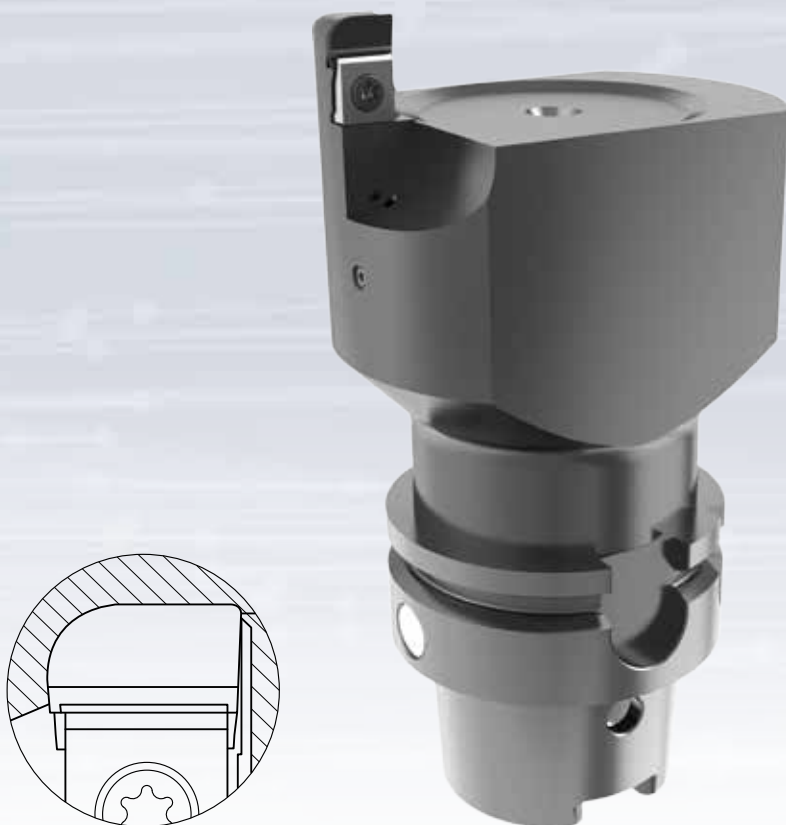**Customer benefits**

Low costs per component thanks to multi-fluted insert

Finish-machining

Axial grooving tool with profile insert / Teeth = 1

Requirements

Finishing of a complex contour

Solution

Axial grooving tool with profile insert / Teeth = 1

Cutting data

Material	(DIN) ■	GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	100
Feed rate per tooth	mm	0.1

Result

Very good surface quality and dimensional accuracy

µm-accurate adjustability of diameter

Customer benefits

Low costs per component

> *Axial grooving tool, adjustable diameter / Teeth = 1 + 1*

> *Division of the contour on two different inserts*

> *Compact tool concept*

Requirements

Pre-machining of a complex contour

Solution

Axial grooving tool, adjustable diameter / Teeth = 1 + 1

Division of the contour on two different inserts

Compact tool concept

Cutting data

Material	(DIN) ■	GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	95
Feed rate per tooth	mm	0.09

Result

Simple tool handling

Inserts µm-accurate adjustable

Customer benefits

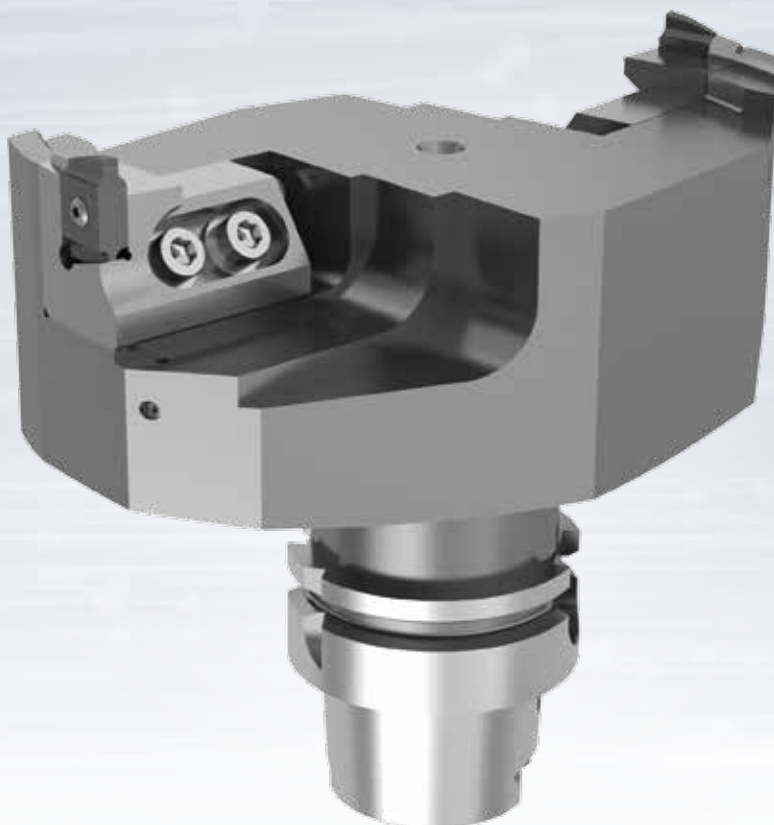Low costs per component thanks to long tool life

Turbocharger housing

Pre-machining

> **Axial grooving tool, adjustable diameter / Teeth = 1 + 1**

> **Division of the contour into two different cutting inserts**

> **Compact tool concept with cartridges**

Requirements

Pre-machining of a complex contour

Solution

Axial grooving tool, adjustable diameter / Teeth = 1 + 1

Division of the contour into two different cutting inserts

Compact tool concept with cartridges

Cutting data

Material		(DIN) ■ GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	110
Feed rate per tooth	mm	0.15

Result

Simple tool handling

! **Customer benefits**
Low costs per component thanks to multi-edge insert

Interpolation turning tool / Teeth = 1

Requirements

Machining of a V-contour despite limited space conditions

Solution

Interpolation turning tool / Teeth = 1

Cutting data

Material		(DIN) ■ GX40NiCrSiNb38-19
Cutting grade		carbide coated
Cutting speed	m/min	110
Feed rate per tooth	mm	0.15

Result

Very short machining time

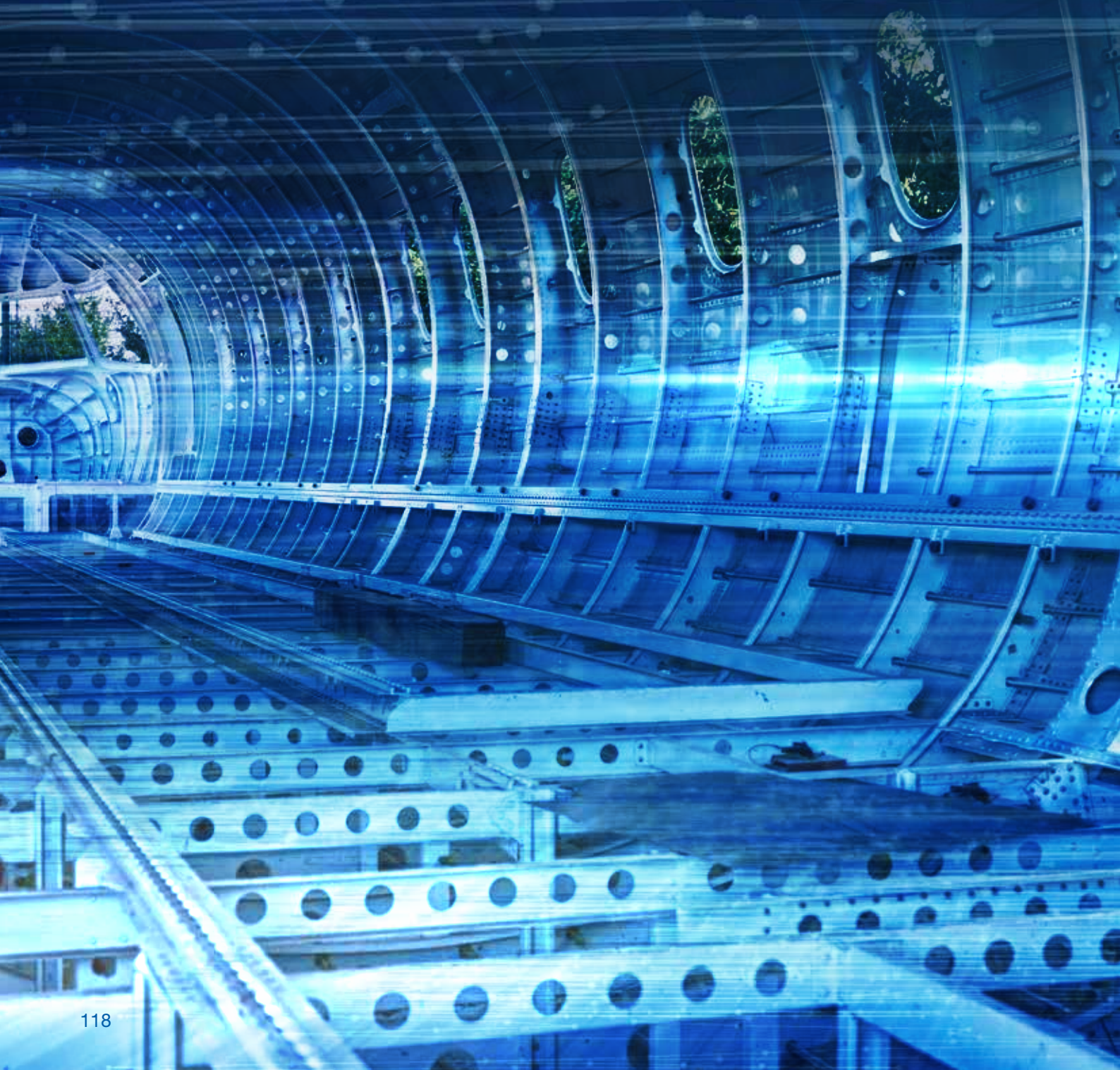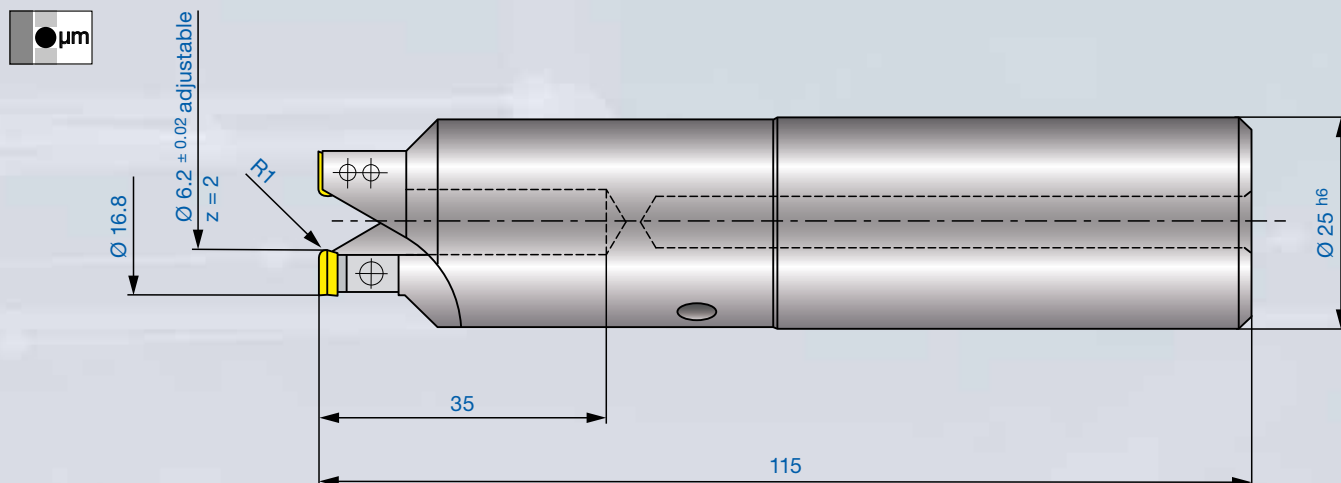Flexible and stable tool concept with cartridge

Long tool life

Customer benefits

Low costs per component

Aviation
technology

Ø 6.2 ± 0.02 adjustable
z = 2
Ø 16.8
R1
Ø 25 h6
35
115

Requirements

Machining of various outside diameters

with high requirements for diameter tolerance and roundness

Reduction of machining time

Solution

Axial grooving tool / Teeth = 2

Cutting data

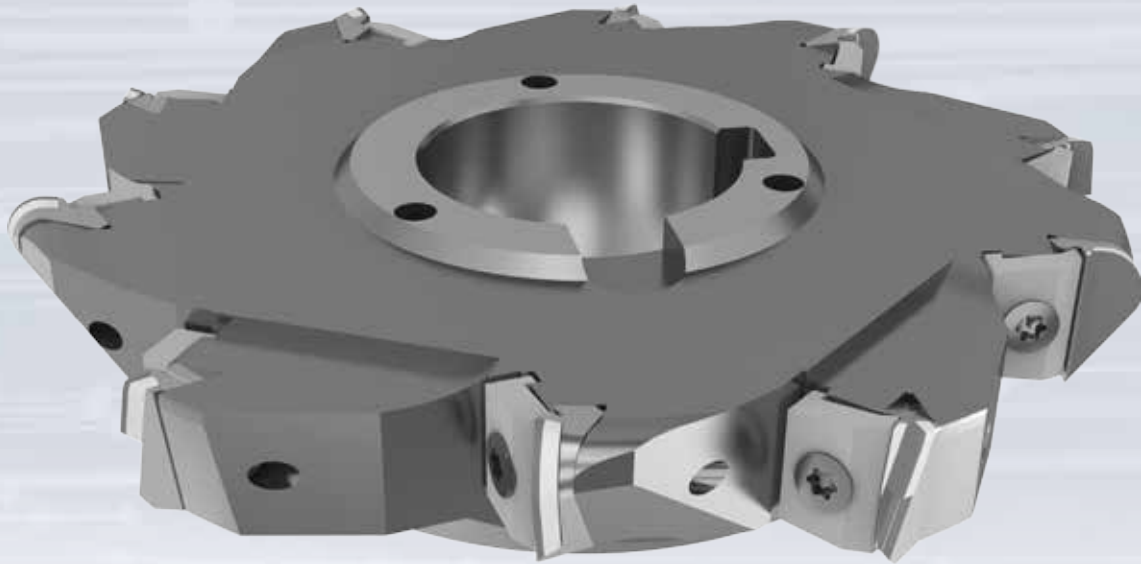| Material		(DIN) ■ TiAl6V4
Cutting grade		carbide
Cutting speed	m/min	48
Feed rate per tooth	mm	0.03
Feed rate per tooth	mm	0.25

Result

Significantly shorter machining time due to double fluted tool

Uniform distribution of cutting forces compared to a single-fluted tool -

resulting in very high roundness and uniform wall thickness

Customer benefits

High process reliability

H Aircraft wing

Requirements

Increase in process reliability

Reduction of delamination with so called mesh material

Solution

Side milling cutter with distribution of cut / Teeth = 10 / Teeth$_{eff}$ = 5

Cutting data

Material		(DIN) ■ Composite / CFK
Cutting grade		PCD
Cutting speed	m/min	370
Feed rate per tooth	mm	0.08
Cutting width	mm	0

Result

Increase in tool life quantity

! Customer benefits

Higher quality, therefore lower costs for re-work

Drilling and countersinking tool with interchangeable inserts / Teeth = 1

Insert diameter µm-accurate adjustable

1 **MQL**
BY HOLLFELDER GÜHRING

Requirements

Machining of rivet holes

Burr-free transition from holes to chamfer

Solution

Drilling and countersinking tool with interchangeable inserts / Teeth = 1

Insert diameter µm-accurate adjustable

Cutting data

Material		(DIN) ■ CFK / titanium
Cutting grade		PCD
Cutting speed	m/min	380
Feed rate per tooth	mm	0.11
Cutting depth	mm	into solid

Result

High quality of chamfer or transition thanks to PCD cutting insert

High concentricity accuracy of the solid carbide drill due to use of hydraulic chuck
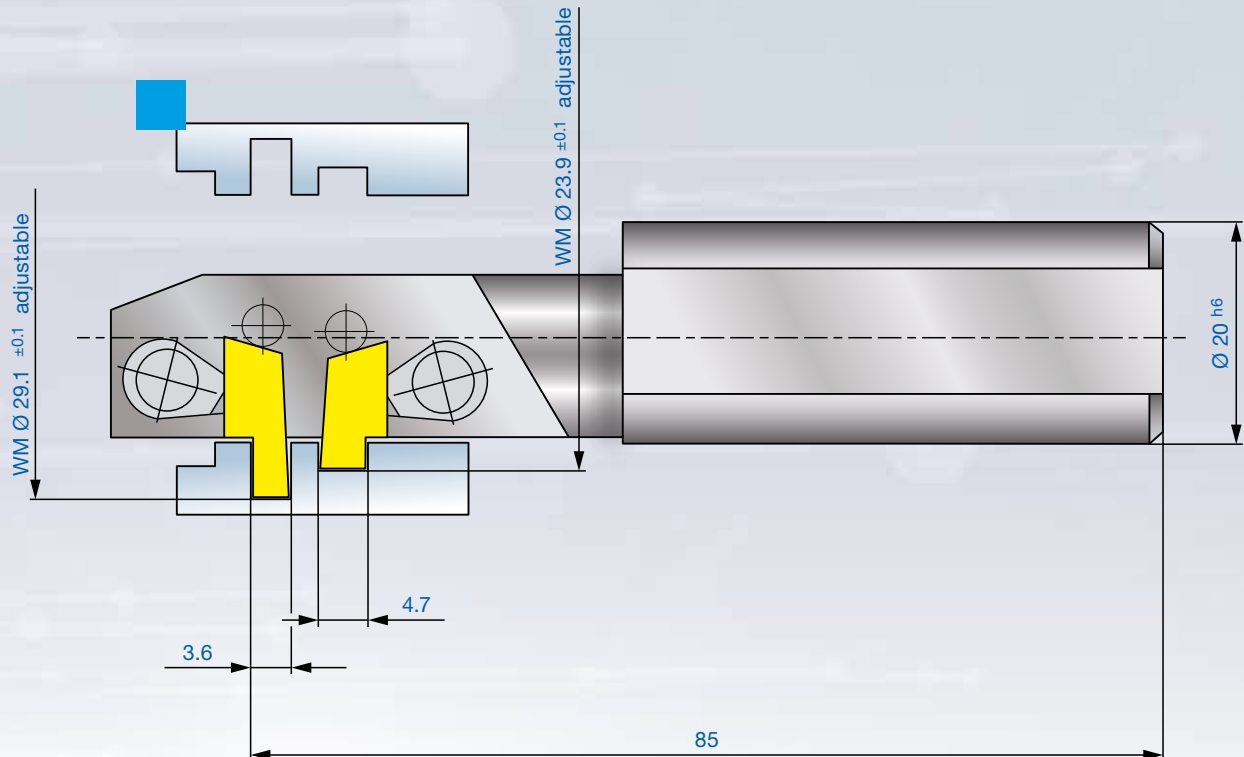
Customer benefits

High process reliability

Low costs per component

Turning
tools

Grooving tool for turning machines / Teeth = 2 / Teeth$_{eff.}$ = 1

Grooving inserts adjustable towards each other

Requirements

Narrow tolerances of the grooves to each other

Reduction of machining time

Solution

Plunging tool for turning machines / Teeth = 2 / Teeth$_{eff.}$ = 1

Grooving inserts adjustable towards each other

Cutting data

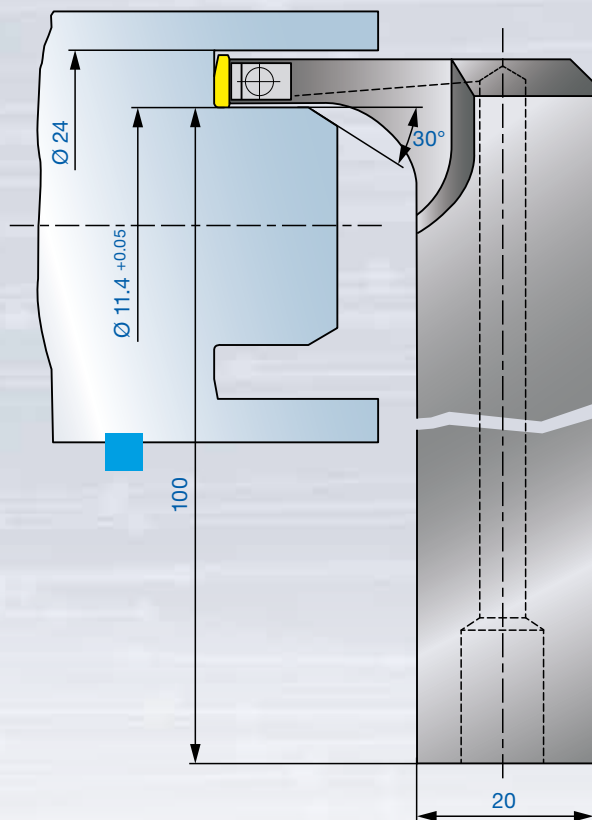|		
Material		(DIN) ■ Sind D 11 (sintered metal)
Cutting grade		carbide coated
Cutting speed	m/min	(Ø 29.1) 220
Feed rate per tooth	mm	0.1
Cutting depth	mm	~ 4.5

Result

Reduced machining time thanks to combination tool

Customer benefits

Low costs per component

Reduced non-productive times thanks to simple tool handling

Requirements

Finish machining chamfer 30° and Ø 11.4 + 0.05

Solution

Grooving tool / Teeth = 1

Cutting data

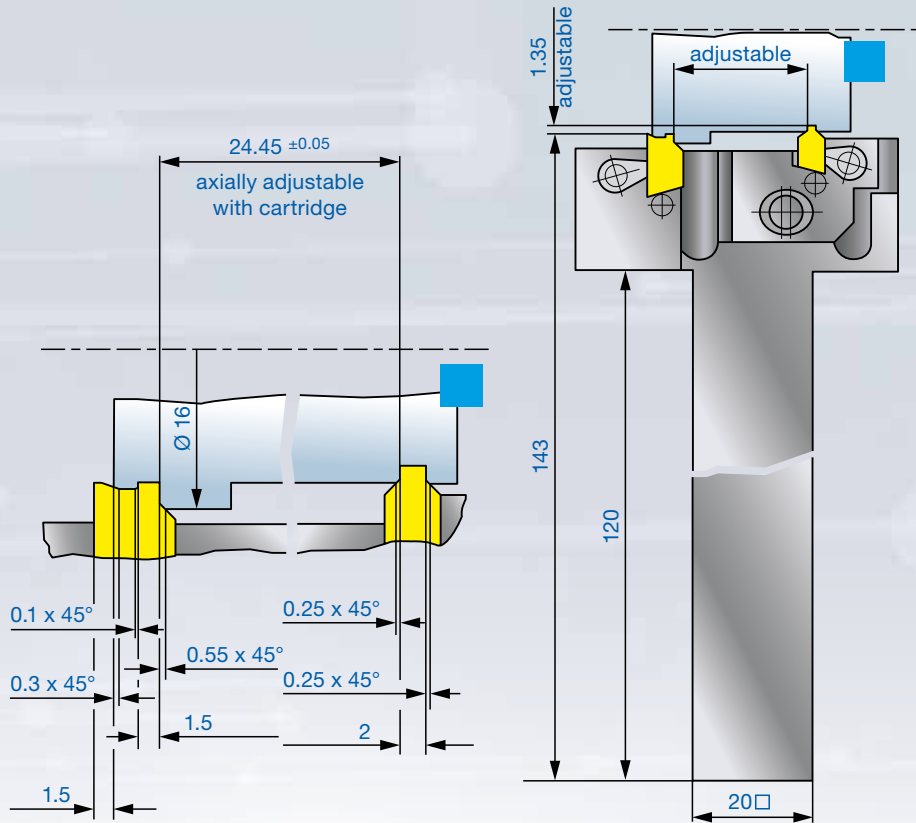| Material		(DIN) ■ 9SMn28K
Cutting grade		carbide coated
Cutting speed	m/min	(Ø 11.4) 95
Feed rate per tooth	mm	0.12
Cutting depth	mm	-1

Result

High dimensional accuracy thanks to precision-ground cutting insert

Customer benefits

High process reliability thanks to stable insert clamping

Grooving tool / Teeth = 2 / Teeth$_{eff.}$ = 1

μm

24.45 ±0.05
axially adjustable
with cartridge

Ø 16

0.1 x 45°
0.3 x 45°
0.55 x 45°
1.5
1.5

0.25 x 45°
0.25 x 45°
2

adjustable
adjustable
1.35

143
120
20□

Requirements
Groove turning - profil recess
Recesses adjustable towards each other
Solution
Grooving tool / Teeth = 2 / Teeth$_{eff.}$ = 1
Cutting data
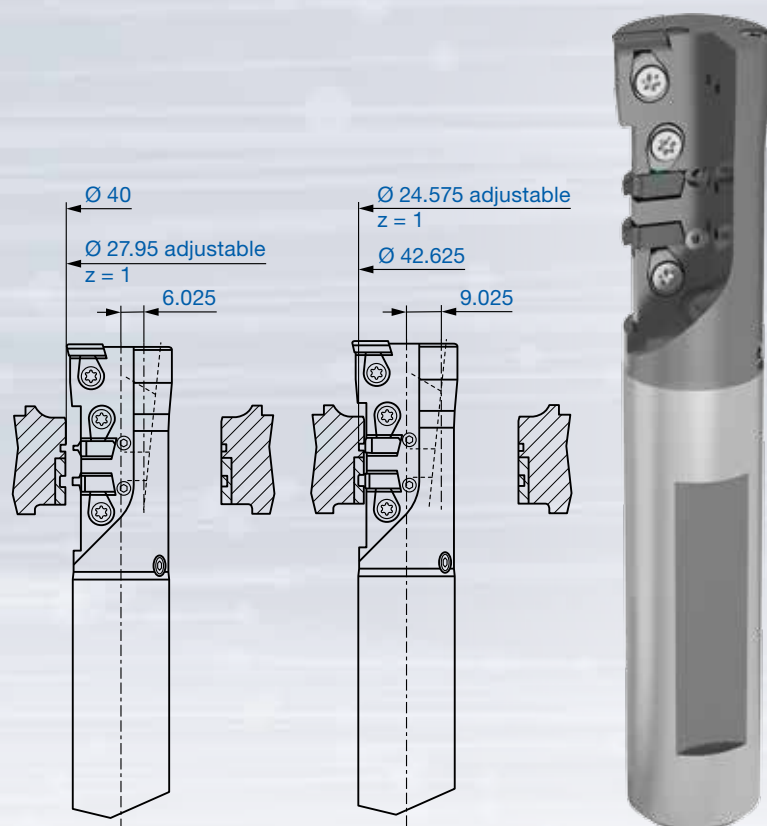|		
Material	(DIN) ■	9SMn28K
Cutting grade		carbide coated
Cutting speed	m/min	120
Feed rate per tooth	mm	0.1
Cutting depth	mm	2

Result
Complete machining with one tool

Customer benefits
Cycle time reduction

Combi turning tool (finishing/grooving) / Teeth = 3 / Teeth$_{eff.}$ = 1 + 1

Ø 40
Ø 27.95 adjustable z = 1
6.025

Ø 24.575 adjustable z = 1
Ø 42.625
9.025

Requirements

Reduction of cycle time

Solution

Combi turning tool (finishing/grooving) / Teeth = 3 / Teeth$_{eff.}$ = 1 + 1

Cutting data

Material		(DIN) ■ AlSi12Cu1(Fe) EN-AC47100/11SMn30+C1,0715	
Cutting grade		carbide coated/uncoated	
		grooving	finishing
Cutting speed	m/min	240	320
Feed rate per tooth	mm	0.12	0.1

Result

Reduced machining times

Customer benefits

Saving of tool places on turret

Holder for skiving operations / Teeth = 1

Requirements

Very high surface quality

Reduction of machining time

Solution

Holder for skiving operations / Teeth = 1

Cutting data

Material		(DIN) ■ steel
Cutting grade		carbide coated
Cutting speed	m/min	225
Feed rate per tooth	mm	1.5
Cutting depth	mm	0.4

Result

Very fast machining time

Excellent surface finish quality

Customer benefits

Cycle time reduction

Up to 10x faster than conventional turning

Saving of one work step (grinding)

H Enquiry form
for special tools

Customer _____ Date _____

Contact person _____ Telephone _____

Street _____ Fax _____

Town/post code _____ E-Mail _____

Workpiece _____ Drawing number _____

Material _____ Hardness/tensile strength _____

Machining
☐ Into solid   ☐ Pre cast   ☐ Pre bored
☐ Blind hole   ☐ Through hole
☐ Continous cut   ☐ Interrupted cut   ☐ Highly interrupted cut
☐ Others _____

Required surface finish R_a = _____ R_z = _____ Others _____

Stock _____ mm ☐ In Radius ☐ In diameter a_p = _____ a_e = _____

Fixture ☐ Stable ☐ Instable ☐ Very instable

Interference ☐ No ☐ Yes _____ mm

Machine ☐ MC ☐ Transferline ☐ Lathe ☐ Turn / milling centre ☐ Boring head ☐ Multi-spindle

Spindle Steep taper DIN _____ Size ☐ 30 ☐ 40 ☐ 45 ☐ 50

HSK DIN _____ Size ☐ 32 ☐ 40 ☐ 50 ☐ 63 ☐ 80 ☐ 100

Others _____ Internal coolant ☐ Yes ☐ No

max. Rpm _____ Power _____ kW

Tool ☐ Right-hand cutting ☐ Left-hand cutting ☐ Non-Rotating ☐ Rotating
☐ Face milling cutter ☐ Groove/end milling cutter ☐ Disc milling cutter Power _____

Shank style/Form _____ Size _____

Tool balanced ☐ No ☐ Yes > Balancing grade G _____ at _____ 1/min

Necessary cutting data v_c = _____ m/min f = _____ mm/U ☐ mm/teeth ☐ mm/min

Coolant ☐ Internal ☐ External ☐ Without
☐ Emulsion ☐ Oil ☐ MQL ☐ Dry

Remarks _____

_____

Please complete the enquiry form and fax to: +49 (0) 911 / 64 19 22-10 or scan and send e-mail to info@hollfelder-guehring.de. An online enquiry can be found at www.hollfelder-guehring.de
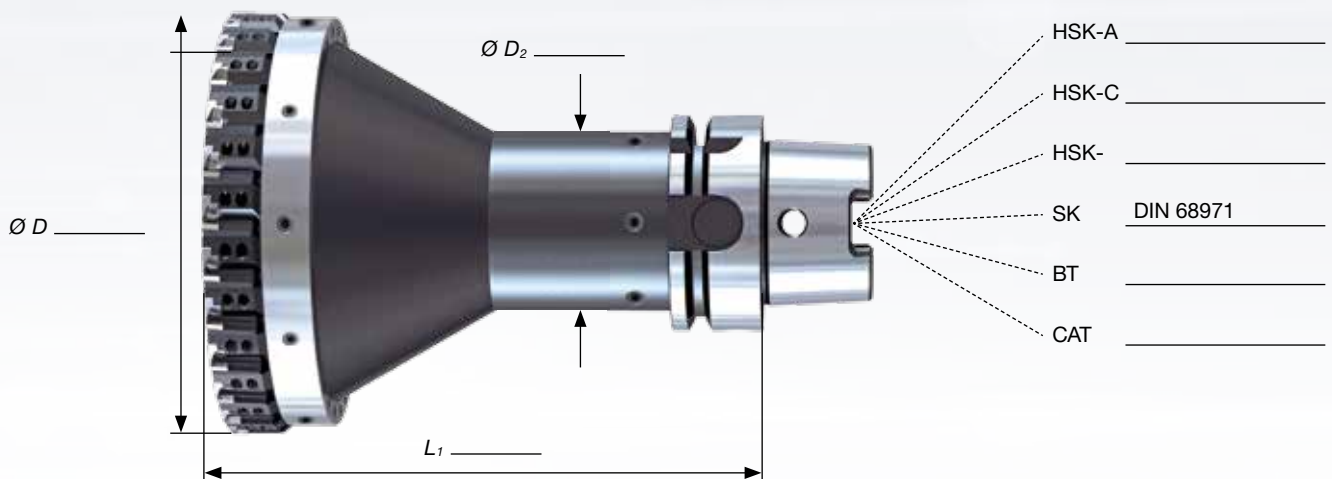
_____
Company name/no. if available

_____
Street

_____
Telephone

_____
Date

_____
Contact person

_____
Town/post code

_____
e-mail address

_____
Signature

$\emptyset\, D_2$ _____

$\emptyset\, D$ _____

L_1 _____

HSK-A _____

HSK-C _____

HSK- _____

SK   DIN 68971 _____

BT _____

CAT _____

Workpiece _____

Material _____

Allowance (a_p) _____

Surface finish R_z _____

Width of cut (a_e) _____

IC (bar) _____

MQL 1 channel ☐

MQL 2 channel ☐

Maximum no. of teeth ☐

Reduced no. of teeth _____

Maximum tool weight _____

Rough milling cutter ☐

Finish milling cutter ☐

H Enquiry form

for automatically adjustable tools

Customer _____   Date _____

Contact person _____   Telephone _____

Street _____   Fax _____

Town/post code _____   e-mail _____

Workpiece _____   Drawing number _____

Material _____   Hardness/tensile strength _____

Designation workpiece / 3D model required!

Machining   ☐ Crankshaft bearing passage   ☐ Balance shaft   ☐ Cylinder liner

Required surface finish R_a = _____ R_z = _____   Others _____

Stock _____ mm   ☐ in radius   ☐ in Diameter

Machine   ☐ MC   ☐ Transferline   ☐ Multi-spindle machining

Machine manufacturer _____

Machine type _____

Spindle   ☐ Steep taper DIN _____   Size _____
           ☐ HSK DIN _____   Size _____
           ☐ Others _____   ☐ With Internal coolant
           ☐ max. Rpm _____   ☐ Without internal coolant
                                         ☐ Power _____ KW

Retraction of the inserts required (drawbar)?   ☐ Yes   ☐ Air   ☐ Emulsion   ☐ Mechanical
                                                 ☐ No

Hubmechanismus   ☐ Yes   ☐ No

Lagerung   ☐ Intermediate bearing   ☐ Counter bearing ➞ drawing required!

Tool   ☐ Right-hand cutting   ☐ Left-hand cutting

Cutting data (current process) v_c = _____ m/min   f = _____ mm/U   ☐ mm/teeth   ☐ mm/min

Coolant   ☐ Emulsion   ☐ MQL   ☐ Air (dry)

Description of machining strategy (e.g., maching direction? roughing/finishing?)

_____

_____

_____

_____

Our innovative tooling systems are used all over the world in many areas
in the metal cutting industry. Both the highly precise standard tools
which can be used flexibly as well as our customer specific innovative tooling
solutions qualify us as a reliable partner in the metal machining industry.
Thanks to many years of experience and our specific know-how
we will increase your productivity.

Challenge us with your requirements!

HOLLFELDER
GÜHRING
CUTTING TOOLS