

We bring out
the genius
in you.

STEINER

I N G E N I O U S C U T T I N G T O O L S

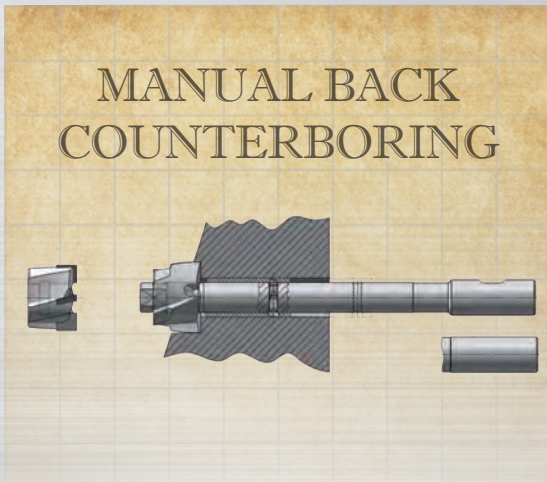
AUTOFACER



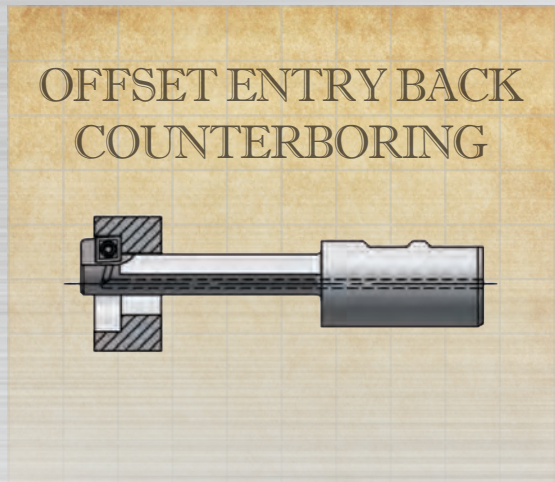
KA
AUTOFACER



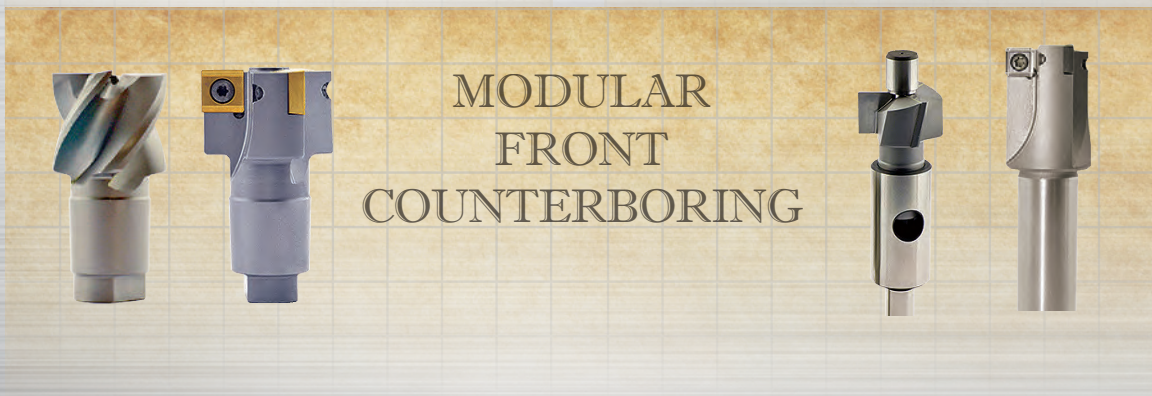
MANUAL BACK
COUNTERBORING



OFFSET ENTRY BACK
COUNTERBORING



MODULAR
FRONT
COUNTERBORING



STEINER

INGENIOUS CUTTING TOOLS

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We bring out
the genius
in you.

STEINER

INGENIOUS CUTTING TOOLS



The most ingenious
Automatic Back Boring Tools
on the planet

Save up to 80 percent part operation cycle time.

Ingenious results, reliability and performance

80% savings or more - Custom guided tools allow aggressive speeds and feeds. Automatic operation eliminates operator intervention as well as costly secondary operations.

Guaranteed tool performance -All tools are designed for a specific application and the machine to be utilized to ensure the highest level of reliability and performance.

We provide local technical support at your facility to set up and prove out the tools.

The Autofacer will do the job it was designed to do; we guarantee it.

Improve safety-Eliminates manual tool changes and high-risk processes.

No operator climbing into machines changing out two piece systems.

Outstanding product and tech support -Steiner has an international network of trained sales representatives, industrial distributors and an experienced team of in-house application engineers.

What makes Steiner the world leader?

Most comprehensive product offering of back boring tools in the marketplace.

Engineered activation methods ensuring the most reliable performance for your application

Quick delivery on custom tools due to our large inventory of stock components and manufacturing process.

More than 40 years' experience designing and building the patented Autofacer custom back boring tool.



Industries capitalizing on the Autofacer Advantage:

Power Generation

General Electric

Siemens

Solar Turbine

Vestas

Clipper

Dong Fang Turbine

Voith Hydro

Aerospace

Space X

Boeing

Raytheon

Moog

Bell Helicopters

Rolls-Royce

Automotive

Allison Transmission

Dana Corp.

Cummins Engine

Eaton

Ford

American Axle

Heavy Equipment

Caterpillar

John Deere

Case New Holland

Vernier

Bucyrus

Pump & Valve

Goulds Pumps

Milwaukee Valve

Cooper Cameron

Patterson Pumps

Ariel Corp.

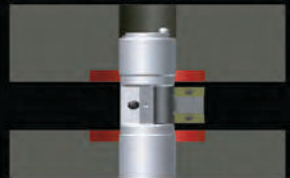
Patented mechanical activation methods guaranteed to work.



Counterbore



Countersink



Front and Back



ID Chamfer



OD Chamfer



Special Form



Spherical



Spot Face

Torque Bar Style Autofacer utilizes an anti-rotation device to activate the blade during spindle reversal.

Air or Coolant Style Autofacer is activated with coolant or air pressure to open and spring pressure to close the blade.

Bump or Cone Style Autofacer grips the face of the work piece to open and close the blade.

Flywheel or Inertia Autofacer utilizes machine spindle inertia generated during rapid spindle acceleration and deceleration.

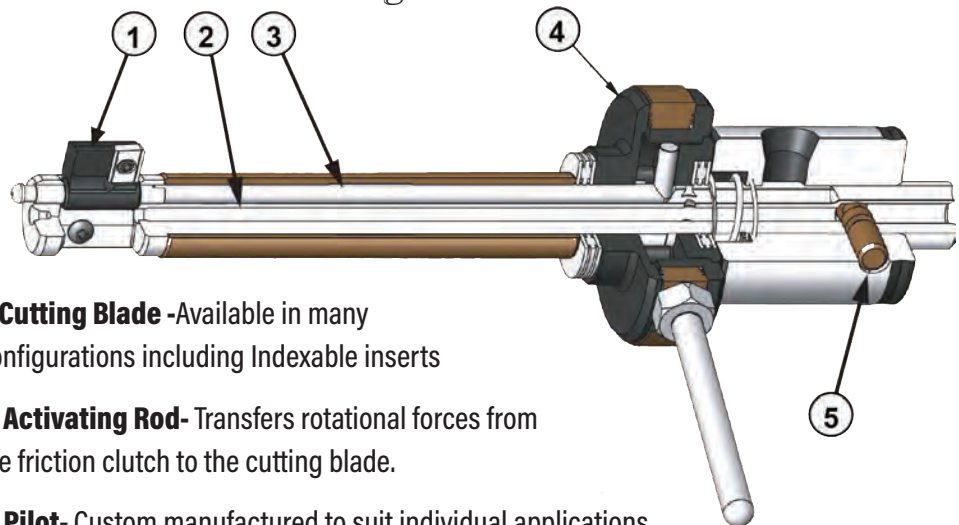
Pad or Ring Style Autofacer grips inside diameter of the part hole to activate.

Additional application tools:

Bearing Guided Autofacer is a unique solution for the most demanding applications where ultra-high precision tolerances are required.

Extended Range Autofacer offers the largest hole to spot face diameter ratio in the industry. This design features a cutting blade that folds out like a jackknife

The Autofacer Advantage



1. Cutting Blade -Available in many configurations including Indexable inserts

2. Activating Rod- Transfers rotational forces from the friction clutch to the cutting blade.

3. Pilot- Custom manufactured to suit individual applications. Allows the tool to run at carbide speeds and feeds, and in long length-to-diameter applications.

4. Friction Clutch -Generated the force necessary to open and close blade. Ensures the blade is held open and closed when required.

5. Shear Pin -Safety feature which provides additional protection against axial overload.

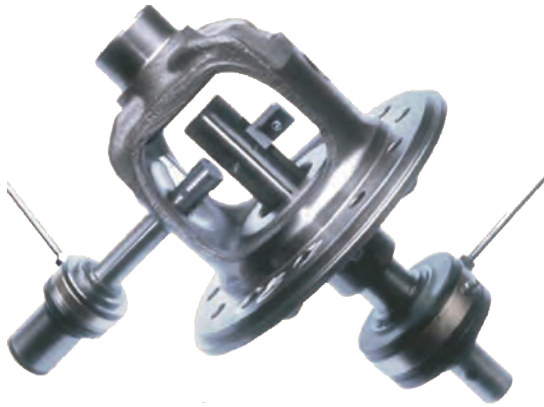


Success:

“This is the greatest tool introduced to our facility in the last ten years.”

– stated by a Power Generation industry production manager, one of many Steiner success stories.

Differential Case



Application Details:

- 300 SF/Min, .002 IPR (Spherical cut), .004 IPR (Thrust Face cut)
- Thrust gear faces must be parallel within $\pm .002$ "
- R2.050" spherical radius must be held within $\pm R.002$ "

Machine Used: CNC Horizontal Machining Center

Autofacer Advantage:

- Eliminated costly special purposes machines required by alternative process
- Able to run on standard CNC machines

Application Details:

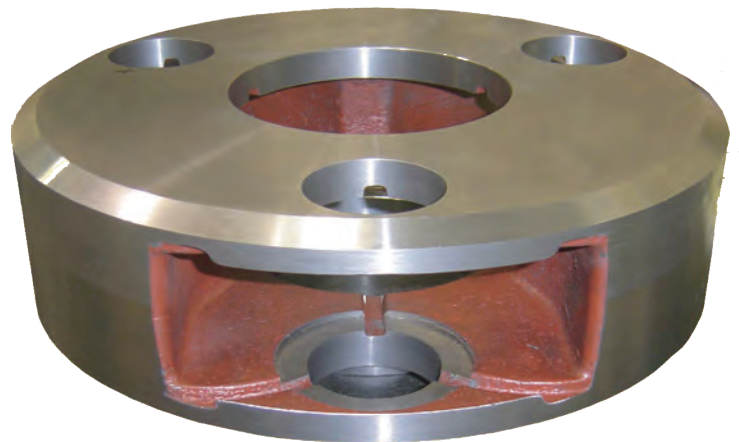
- 275 SF/Min, .003 IPR
- \emptyset alt+0216 through hole, $\emptyset 3.638$ spot face
- Must hold $\pm .002$ " perpendicularity between front and back faces and through hole
- Heavy interrupted cut

Machine Used: CNC Vertical Machining Center

Autofacer Advantage:

- Eliminated costly secondary broaching operation
- Machined front and back faces in one operation without indexing part
- Successfully maintained spot face and perpendicularity tolerances through heavy interrupted cut

Planetary Gear Carrier



Application Details:

- 250 SF/Min, .006 IPR
- $\emptyset 3.111$ through hole, $\emptyset 5.018$ spot face
- 17" thick part
- Heavy interrupted cut

Machine Used: CNC Vertical Gantry Mill

Autofacer Advantage:

- Operation process time was reduced from 48 minutes per hole to under 5 minutes per hole
- Eliminated the need for second operator to change old cutter head from manual system

Steam Turbine Housing



We bring out
the genius
in you.

STEINER™

INGENIOUS CUTTING TOOLS



**The KA Series
Modular Autofacer®
The most robust
seat pocket tool
available anywhere!**

**INCREASED
PRODUCTIVITY**

**REDUCED
INVESTMENT**

IMPROVE PART PROFITABILITY BY:

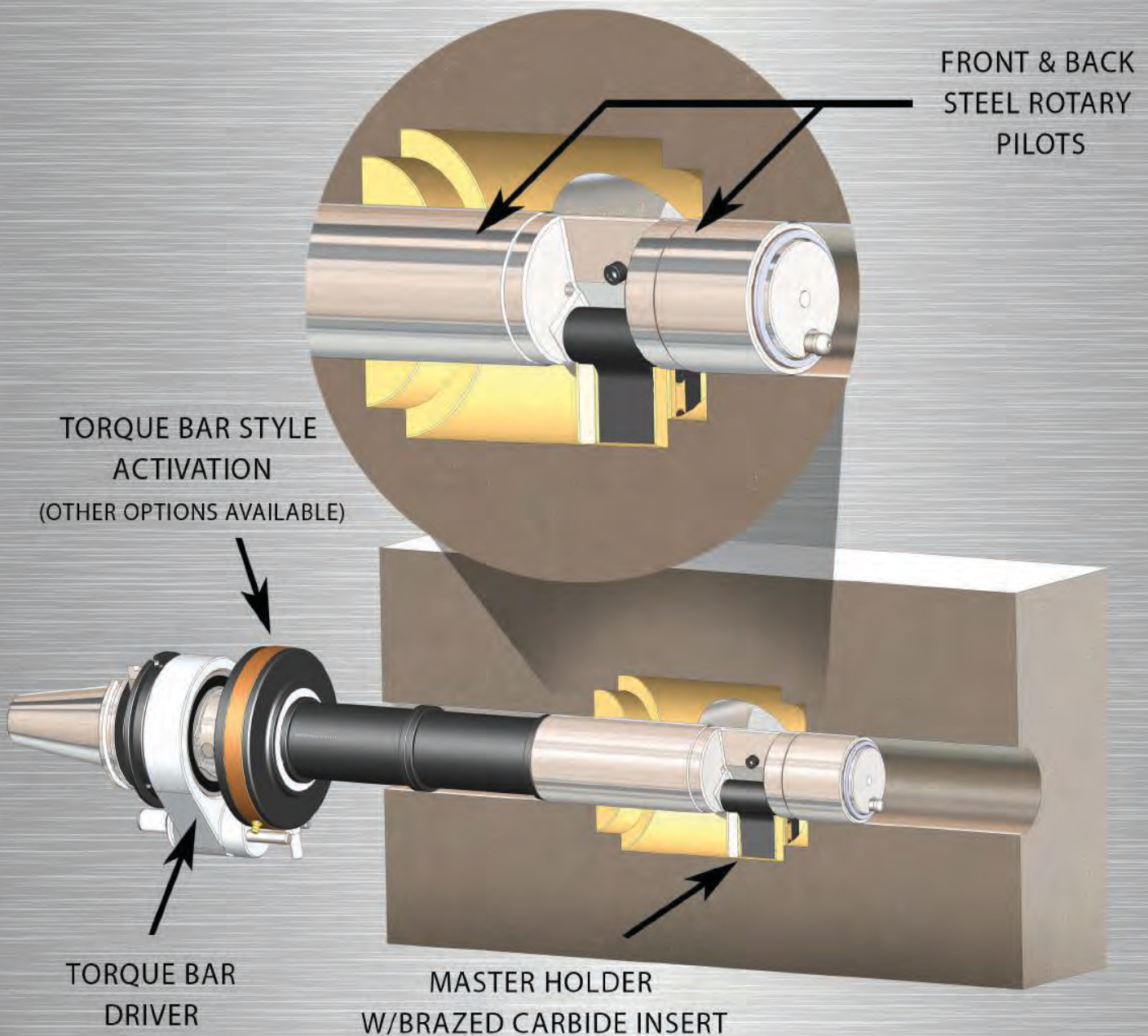
- Reducing Cycle Times by 80% or more
- Automating the Manufacturing Process
- Eliminating the Secondary Operation
- Enhancing Worker Safety



TO BORE

Torque Bar Activated Autofacer®

- Must machine part bore to specified tolerance
- Support bushing is integral component of Autofacer® assembly
- Autofacer® is designed for specific application (Hole \varnothing / Part length)
- Variety of available sizes (1/4" to 8" hole \varnothing)
- Mechanical activations + supported cutting = High metal removal rates



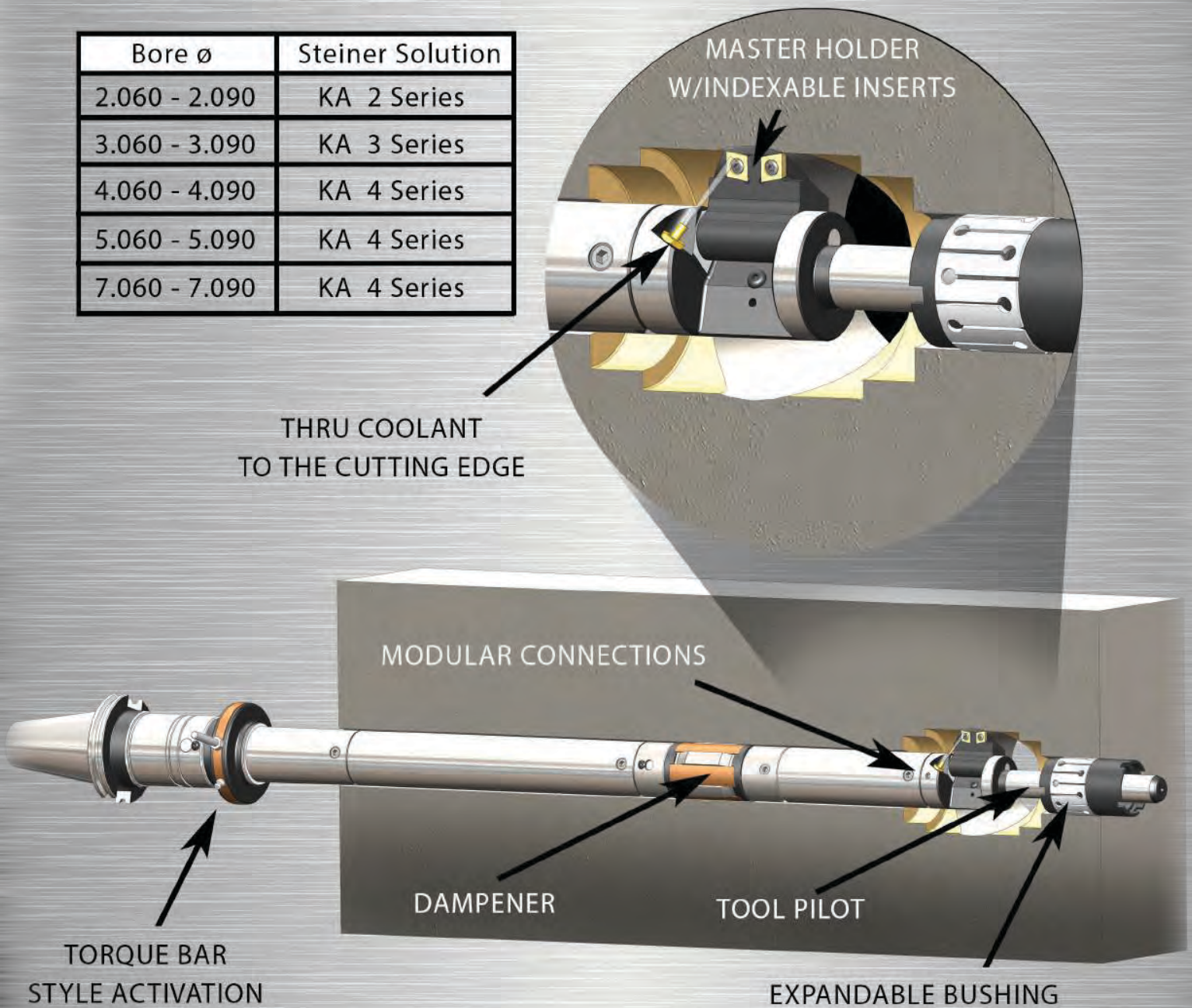


OR NOT TO BORE

KA Series Modular Autofacer®

- Expandable bushing is installed into part bore which provides support while cutting
- Modular design offers flexibility for multiple application lengths
- Dampener assembly provides additional support for extra long length applications
- Can be used on standard CNC machine tools - No "W" axis required
- Gate valve flow bore \varnothing 's

Bore \varnothing	Steiner Solution
2.060 - 2.090	KA 2 Series
3.060 - 3.090	KA 3 Series
4.060 - 4.090	KA 4 Series
5.060 - 5.090	KA 4 Series
7.060 - 7.090	KA 4 Series





CASE STUDY 1

Machine Shop Drastically Reduces Back Boring Cycle Times!

Challenge:

Determine the most cost effective process for machining seat pockets on re-work gate valves with Inconel inlay.

Application Details:

4", 5", and 7" Gate Valves w/ variety of seat pocket features. Material is Inconel 718 inlay weld. The industry "standard" solution is an expensive generating head with 24 week delivery and requires a machine tool with a "W" axis spindle.

Steiner Solution:

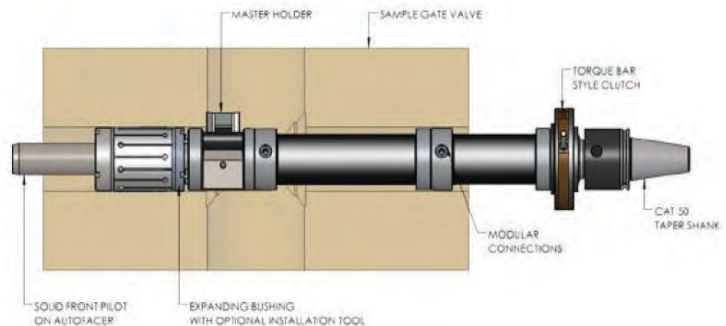
Utilize Steiner KA style modular Autofacer® to automatically front and back bore seat pocket features. Modular design allowed for quick change from roughing to finishing heads. Adjustability of finish boring head provides quick & reliable functionality. Modularity also allowed modification of tool lengths and cutter heads for use in the different valve sizes. Expandable bushing supports Autofacer® in the bore and adjustable insert cartridge allows for precise diameter adjustment. The Steiner Autofacer® does not require a "W" axis spindle..

Results:

The industry "standard" cycle time on these large valves is approximately 4-6 hours per seat pocket. The Steiner Autofacer cycle time was 30 minutes per seat pocket on the 4" gate valve. The tooling investment was half the cost of the generating head and delivery was 6 weeks.

Additional Benefits:

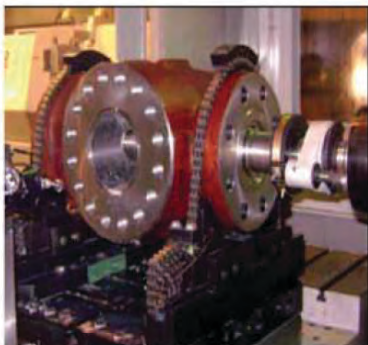
The Steiner Autofacer® does not require a CNC boring mill with an expensive "W" axis. The customer was able to use KA4 Series to machine all the 4", 5" & 7" gate valves by easily changing out expanding bushings and cutting heads.



CASE STUDY 2

Quality Oil Tools, Inc. Cuts Machining Time by 95% with the Steiner Autofacer®

Challenge: Develop a new process to increase production throughput and profitability on their gate valve product lines.



Application Details: These valves had a 3" flow bore and maximum reach requirement of 12" with a variety of seat pockets up to 5" Ø. Tightest finish tolerance was +/- .003" and surface finish of 32. Existing processes were machining most of the features on a Haas EC300 HMC and then finish the seat pockets on a manual lathe. The materials were either medium alloy steels or stainless steel. The original process was 1 hour cycle time per seat pocket back boring on the standard manual lathe. Maintaining finish & size control was a challenge.

Steiner Solution: The robust and reliable torque bar activated Autofacer® with a CT50 shank was determined to be the best fit on the Haas EC300. For the steel gate valves the Autofacer® was run at 250 RPM with a feed rate of .003 IPR. The customer was required to machine the flow bore to a +/- .002" tolerance to provide proper support to the Autofacer® while cutting. The Autofacer® rotary pilot was designed to this bore size.

Results: The seat pocket machining cycle time was reduced to 3 minutes per pocket. The surface finish requirement is held consistently because of the supported cutting. The seat pocket bore tolerance of +/- .003 is met consistently because of guided cutting and adjustability of the finishing Master Insert Holder.

Additional Benefits: Eliminated costly secondary operation on manual lathe. Greatly reduced scrap rate by eliminating manual operation. The large heavy valves were difficult to load and unload from the lathe also and causing problems for the operators back.

max.
2,5 x d

GG(G)

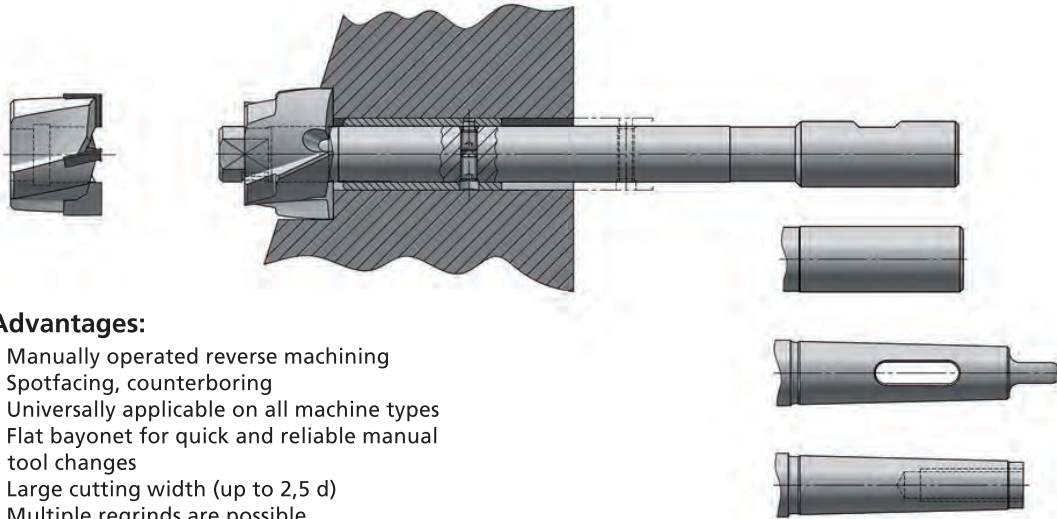
ALU

NE

ST(AHL)

manually operated

Reverse counterbore system TU

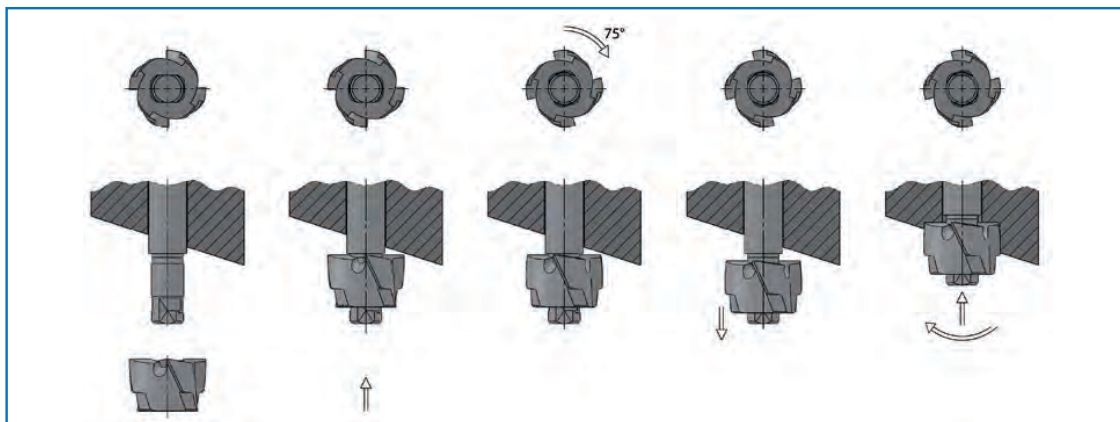


Advantages:

- Manually operated reverse machining
- Spotfacing, counterboring
- Universally applicable on all machine types
- Flat bayonet for quick and reliable manual tool changes
- Large cutting width (up to 2,5 d)
- Multiple regrinds are possible
- Several diameter combinations of counterbores and holders
- The same basic holder (TUHW) plus adjusted guide sleeves (TUB) can cover several guidance diameters

Cutting data recommendation

Counterbore-Ø d mm		Low alloy steel	High alloy steel	Stainless steel	Cast iron	Aluminium
		z.B. / e.g. CK 45	z.B. / e.g. 42CrMo4V	z.B. / e.g. X15Cr13	z.B. / e.g. GG26, GGG50	z.B. / e.g. G-AlSi12
HSS	Vc	50-70	50-70	25-40		65-230
HM/Carbide	Vc	130-260	100-230	100-230	160-300	130-260
10.0-20.0 (.393-.787")	f	.0035-.008	.0035-.008	.003-.008	.004-.008	.004-.010
21.0-36.0 (.827-1.417")	f	.006-.012	.005-.010	.004-.010	.006-.012	.006-.012
37.0-54.0 (1.457-2.125")	f	.008-.013	.006-.012	.005-.012	.010-.015	.010-.015
55.0-115.0 (2.165-4.528")	f	.008-.013	.007-.014	.006-.012	.012-.024	.012-.024



Counterbore TU

Ø		10,0 - 20,0		Best.-Nr. / Ord.-No.	
d	d ₁	l	HSS	HM brazed carbide	
Counterbore-Ø 10,0 - 13,0					
10,0			TU1000501	TU1000505	
10,4			TU1040501	TU1040505	
11,0	5	28	TU1100501	TU1100505	
12,0			TU1200501	TU1200505	
13,0			TU1300501	TU1300505	

Counterbore-Ø 13,5 - 15,0		Best.-Nr. / Ord.-No.		
d	d ₁	l	HSS	HM brazed carbide
13,5			TU1350601	TU1350605
14,0	6	30	TU1400601	TU1400605
14,5			TU1450601	TU1450605
15,0			TU1500601	TU1500605

Counterbore-Ø 16,0 - 20,0		Best.-Nr. / Ord.-No.		
d	d ₁	l	HSS	HM brazed carbide
16,0			TU1600801	TU1600805
16,5			TU1650801	TU1650805
17,0			TU1700801	TU1700805
17,5	8	32	TU1750801	TU1750805
18,0			TU1800801	TU1800805
19,0			TU1900801	TU1900805
20,0			TU2000801	TU2000805

Holder

with Cyl. shank						Best.-Nr. / Ord.-No.	
d	d ₁	e	d ₂	l			
Guidance-Ø 5,3 - 7,0							
5,3*						TUH0530500	
5,5*						TUH0550500	
6,4	5	72	8	162		TUH0640500	
6,6						TUH0660500	
7,0						TUH0700500	

Guidance-Ø 8,4 - 9,5						Best.-Nr. / Ord.-No.	
d	d ₁	e	d ₂	l			
Guidance-Ø 8,4 - 9,5							
8,4						TUH0840600	
9,0	6	70	10	162		TUH0900600	
9,5						TUH0950600	

Guidance-Ø 8,4 - 14,0						Best.-Nr. / Ord.-No.	
d	d ₁	e	d ₂	l			
Guidance-Ø 8,4 - 14,0							
8,4*						TUH0840800	
9,0						TUH0900800	
10,0						TUH1000800	
10,5						TUH1050800	
11,0	8	88	12	182		TUH1100800	
11,5						TUH1150800	
12,0						TUH1200800	
13,0						TUH1300800	
13,5						TUH1350800	
14,0						TUH1400800	

Holder

with MT shank						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
Guidance-Ø 5,3 - 7,0							
5,3*						TUH0530501	
5,5*						TUH0550501	
6,4	5	72	1	167		TUH0640501	
6,6						TUH0660501	
7,0						TUH0700501	

Guidance-Ø 8,4 - 9,5						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
Guidance-Ø 8,4 - 9,5							
8,4						TUH0840601	
9,0	6	70	1	167		TUH0900601	
9,5						TUH0950601	

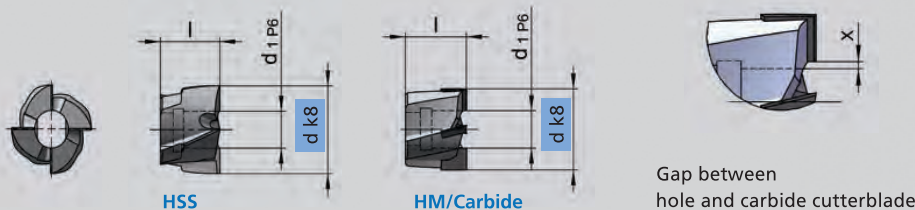
Guidance-Ø 8,4 - 14,0						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
Guidance-Ø 8,4 - 14,0							
8,4*						TUH0840802	
9,0						TUH0900802	
10,0						TUH1000802	
10,5						TUH1050802	
11,0	8	88	2	200		TUH1100802	
11,5						TUH1150802	
12,0						TUH1200802	
13,0						TUH1300802	
13,5						TUH1350802	
14,0						TUH1400802	

to be used only with TU/HSS

All holders are also available with oil grooves for better coolant and lubrication of counterbore and pilot particularly in vertical position, on short notice. When ordering, please add "S" to Ord.-No.
Ordering example: TUHW212125S; internal coolant on request

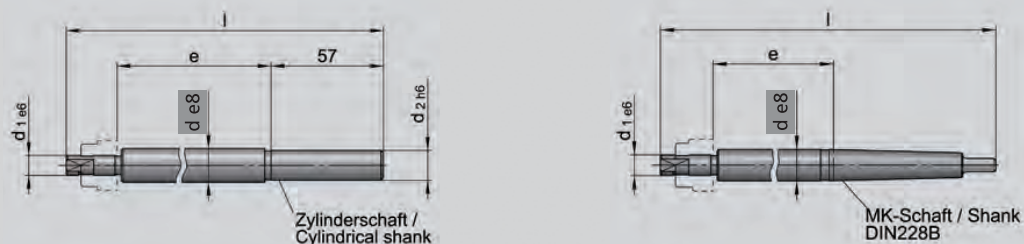
TUHW holders can be used without sleeve for guidance Ø d₃ in combination with TU/HSS only
Intermediate sizes on request

Counterbore TU



d	10 - 24	25 - 71	72 - 115
x	0,2	0,5	1,0

Holder TUH



Counterbore TU

Ø		21,0 - 43,0		Best.-Nr. / Ord.-No.	
d	d ₁	l	HSS	HM brazed carbide	
Counterbore-Ø 21,0 - 24,0					
21,0	9	22	TU2100901	TU2100905	
22,0			TU2200901	TU2200905	
23,0			TU2300901	TU2300905	
24,0			TU2400901	TU2400905	

Counterbore-Ø 25,0 - 30,0		Best.-Nr. / Ord.-No.		
d	d ₁	l		
25,0	11	24	TU2501101	TU2501105
26,0			TU2601101	TU2601105
27,0			TU2701101	TU2701105
28,0			TU2801101	TU2801105
29,0			TU2901101	TU2901105
30,0			TU3001101	TU3001105

Counterbore-Ø 31,0 - 36,0		Best.-Nr. / Ord.-No.		
d	d ₁	l		
31,0	13	26	TU3101301	TU3101305
32,0			TU3201301	TU3201305
33,0			TU3301301	TU3301305
34,0			TU3401301	TU3401305
35,0			TU3501301	TU3501305
36,0			TU3601301	TU3601305

Counterbore-Ø 37,0 - 43,0		Best.-Nr. / Ord.-No.		
d	d ₁	l		
37,0	17	28	TU3701701	TU3701705
38,0			TU3801701	TU3801705
39,0			TU3901701	TU3901705
40,0			TU4001701	TU4001705
41,0			TU4101701	TU4101705
42,0			TU4201701	TU4201705
43,0			TU4301701	TU4301705

Holder TUHW 1pc.** / 2pcs. with sleeve***

with Weldon shank		Best.-Nr. / Ord.-No.	
d	d ₁	e	d ₂
Guidance-Ø 10,5 - 11,0			
10,5	9	110	12
11,0			
Guidance-Ø ≥ 12,0			
9,0	9	110	12
			185
		d ₄	l ₂
		≥12	30

Guidance-Ø 12,0 - 13,5		1pc.		
d	d ₁	e	d ₂	
12,0	11	130	12	
13,0				205
13,5				
Guidance-Ø ≥ 14,0				
11,0	11	130	12	
			205	
		d ₄	l ₂	
		≥14	35	

Guidance-Ø 15,0 - 15,5		1pc.	
d	d ₁	e	d ₂
15,0	13	150	16
15,5			
Guidance-Ø ≥ 16,0			
13,0	13	150	16
			230
		d ₄	l ₂
		≥16	40

Guidance-Ø 19,0		1pc.	
d	d ₁	e	d ₂
19,0	17	167	20
			252
Guidance-Ø ≥ 22,0			
17,0	17	167	20
			252
		d ₄	l ₂
		≥20	50

Holder TUH**

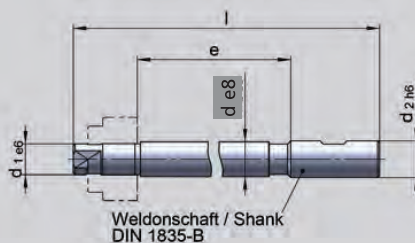
with MT shank		Best.-Nr. / Ord.-No.		
d	d ₁	e	l	
Guidance-Ø 10,5 - 16,0				
10,5	9	118	2	
11,0				220
12,0				
13,0				
13,5				
14,0				
15,0				
16,0				

Guidance-Ø 12,0 - 20,0		Best.-Nr. / Ord.-No.		
d	d ₁	e	l	
12,0	11	135	3	
13,0				259
13,5				
14,0				
15,0				
16,0				
17,0				
17,5				
18,0				
19,0				
20,0				

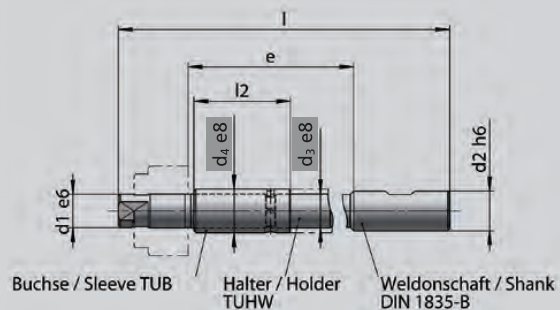
Guidance-Ø 15,0 - 25,0		Best.-Nr. / Ord.-No.		
d	d ₁	e	l	
15,0	13	154	3	
16,0				280
17,0				
17,5				
18,0				
19,0				
20,0				
21,0				
22,0				
23,0				
24,0				
25,0				

Guidance-Ø 19,0 - 30,0		Best.-Nr. / Ord.-No.		
d	d ₁	e	l	
19,0	17	172	3	
20,0				301
21,0				
22,0				
23,0				
24,0				
25,0				
26,0				
28,0				
30,0				

Holder TUHW



Holder TUHW 2pcs. with sleeve



MTZ without slotted shank

Counterbore TU

Ø		Best.-Nr. / Ord.-No.	
d	d ₁	HSS	HM brazed carbide
Counterbore-Ø 44,0 - 48,0			
44,0	19	32	TU4401901 TU4401905
45,0			TU4501901 TU4501905
46,0			TU4601901 TU4601905
47,0			TU4701901 TU4701905
48,0			TU4801901 TU4801905

Holder TUHW** 2pcs. with sleeve***

with Weldon shank						Best.-Nr. Ord.-No.
d ₃	d ₁	e	d ₂	l		
Guidance-Ø ≥ 22,0						2pcs.
19,0	19	183	20	272		TUHW191920
Sleeve						
d ₄ l ₂						TUB(d ₄)1955

Holder TUH**

with MT shank					Best.-Nr. Ord.-No.
d	d ₁	e	MK MT	l	
Guidance-Ø 22,0 - 33,0					
22,0	19	188	3	321	TUH2201903
23,0					TUH2301903
24,0					TUH2401903
25,0					TUH2501903
26,0					TUH2601903
28,0					TUH2801903
30,0					TUH3001903
32,0					TUH3201903
33,0					TUH3301903

Counterbore-Ø 49,0 - 54,0			
d	d ₁	l	Best.-Nr. / Ord.-No.
49,0	21	34	TU4902101 TU4902105
50,0			TU5002101 TU5002105
51,0			TU5102101 TU5102105
52,0			TU5202101 TU5202105
53,0			TU5302101 TU5302105
54,0			TU5402101 TU5402105

Guidance-Ø ≥ 24,0						2pcs.
d ₃	d ₁	e	d ₂	l		
21,0	21	199	25	296		TUHW212125
Sleeve						
d ₄ l ₂						TUB(d ₄)2160

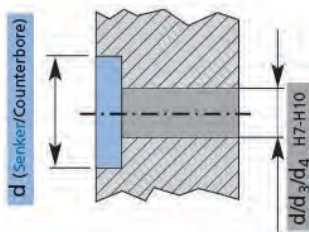
Guidance-Ø 24,0 - 36,0					
d	d ₁	e	MK MT	l	Best.-Nr. / Ord.-No.
24,0	21	205	4	364	TUH2402104
25,0					TUH2502104
26,0					TUH2602104
28,0					TUH2802104
30,0					TUH3002104
32,0					TUH3202104
33,0					TUH3302104
35,0					TUH3502104
36,0					TUH3602104

Counterbore-Ø 55,0 - 62,0			
d	d ₁	l	Best.-Nr. / Ord.-No.
55,0	25	36	TU5502501 TU5502505
56,0			TU5602501 TU5602505
57,0			TU5702501 TU5702505
58,0			TU5802501 TU5802505
59,0			TU5902501 TU5902505
60,0			TU6002501 TU6002505
61,0			TU6102501 TU6102505
62,0			TU6202501 TU6202505

Guidance-Ø ≥ 28,0						2pcs.
d ₃	d ₁	e	d ₂	l		
25,0	25	218	25	317		TUHW252525
Sleeve						
d ₄ l ₂						TUB(d ₄)2565

Guidance-Ø 28,0 - 39,0					
d	d ₁	e	MK MT	l	Best.-Nr. / Ord.-No.
28,0	25	224	4	385	TUH2802504
30,0					TUH3002504
32,0					TUH3202504
33,0					TUH3302504
35,0					TUH3502504
36,0					TUH3602504
39,0					TUH3902504

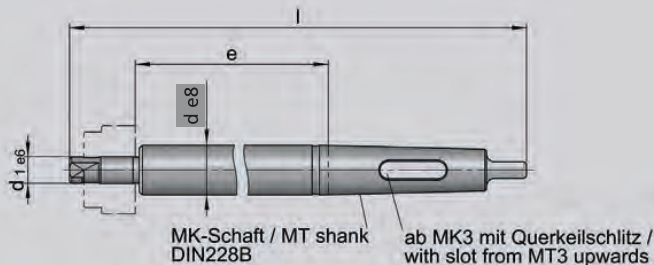
Ordering example for counterbore d = 45 and through/hole d₄ = 25H9



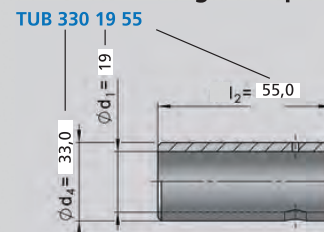
Counterbore d = 45, HSS	TU	450	19 01
Holder d ₃ = 19, Weldon	TUHW	19 19	20
Sleeve* d ₄ = 25	TUB	250	19 55
alternative: one-piece-holder			
Holder d = 25, MK 3	TUH	250	19 03

Scope of delivery for TUHW (2pcs.-version): complete with 4 threaded pins to secure the sleeve; TUB sleeves must be ordered separately.
* for double guidance length: order 2pcs. TUB

Holder TUH



Sleeve ordering example



Counterbore TU

Ø		Best.-Nr. / Ord.-No.	
d	d ₁	HSS	HM brazed carbide
Counterbore-Ø 63,0 - 71,0			
63,0	28	38	TU6302801 TU6302805
64,0			TU6402801 TU6402805
65,0			TU6502801 TU6502805
66,0			TU6602801 TU6602805
67,0			TU6702801 TU6702805
68,0			TU6802801 TU6802805
69,0			TU6902801 TU6902805
70,0			TU7002801 TU7002805
71,0	TU7102801 TU7102805		

Holder TUHW** 2pcs. with sleeve***

with Weldon shank						Best.-Nr. / Ord.-No.	
d ₃	d ₁	e	d ₂	l			
Guidance-Ø ≥ 32,0							
28,0	28	235	32	341		2pcs.	TUHW282832
					d ₄ l ₂	Sleeve	
					≥32 70	TUB(d ₄)2870	

Holder TUH**

with MT shank						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
Guidance-Ø 32,0 - 45,0							
32,0	28	241	4	405			TUH3202804
33,0						TUH3302804	
35,0						TUH3502804	
36,0						TUH3602804	
39,0						TUH3902804	
40,0						TUH4002804	
42,0						TUH4202804	
45,0						TUH4502804	

Counterbore-Ø 74,0 - 80,0			
d	d ₁	l	Best.-Nr. / Ord.-No.
74,0	30	50	TU7403001 TU7403005
76,0			TU7603001 TU7603005
78,0			TU7803001 TU7803005
80,0			TU8003001 TU8003005

Guidance-Ø ≥ 33,0						2pcs.	
d ₃	d ₁	e	d ₂	l			
30,0	30	250	32	364		2pcs.	TUHW303032
					d ₄ l ₂	Sleeve	
					≥33 75	TUB(d ₄)3075	

Guidance-Ø 33,0 - 36,0						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
33,0	30	256	5	460			TUH3303005
36,0						TUH3603005	

Counterbore-Ø 82,0 - 90,0			
d	d ₁	l	Best.-Nr. / Ord.-No.
82,0	35	50	TU8203501 TU8203505
85,0			TU8503501 TU8503505
90,0			TU9003501 TU9003505

Guidance-Ø ≥ 39,0						2pcs.	
d ₃	d ₁	e	d ₂	l			
35,0	35	250	40	374		2pcs.	TUHW353540
					d ₄ l ₂	Sleeve	
					≥39 80	TUB(d ₄)3580	

Guidance-Ø 36,0 - 48,0						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
36,0	35	258	5	460			TUH3603505
39,0						TUH3903505	
42,0						TUH4203505	
45,0						TUH4503505	
48,0						TUH4803505	

Counterbore-Ø 92,0 - 100,0			
d	d ₁	l	Best.-Nr. / Ord.-No.
92,0	40	60	TU9204001 TU9204005
95,0			TU9504001 TU9504005
98,0			TU9804001 TU9804005
100,0			TU10004001 TU10004005

Guidance-Ø ≥ 45,0						2pcs.	
d ₃	d ₁	e	d ₂	l			
40,0	40	260	40	394		2pcs.	TUHW404040
					d ₄ l ₂	Sleeve	
					≥45 85	TUB(d ₄)4085	

Guidance-Ø 42,0 - 52,0						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
42,0	40	266	5	480			TUH4204005
45,0						TUH4504005	
48,0						TUH4804005	
52,0						TUH5204005	

Counterbore-Ø 105,0 - 115,0			
d	d ₁	l	Best.-Nr. / Ord.-No.
105,0	45	70	TU10504501 TU10504505
107,0			TU10704501 TU10704505
110,0			TU11004501 TU11004505
112,0			TU11204501 TU11204505
115,0			TU11504501 TU11504505

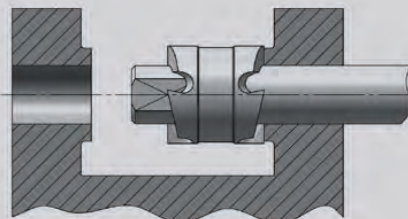
Guidance-Ø ≥ 48,0						2pcs	
d ₃	d ₁	e	d ₂	l			
45,0	45	250	50	404		2pcs	TUHW454550
					d ₄ l ₂	Sleeve	
					≥48 90	TUB(d ₄)4590	

Guidance-Ø 48,0 - 62,0						Best.-Nr. / Ord.-No.	
d	d ₁	e	MK MT	l			
48,0	45	256	5	480			TUH4804505
52,0						TUH5204505	
62,0						TUH6204505	

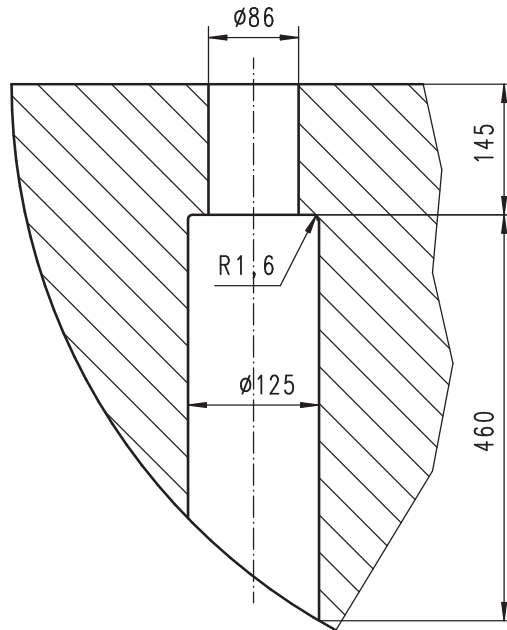
Holder with Morse-Taper shank and fastening thread on request



Spot-Facer T3 (forward-backward) with suitable holders on request



The Customer's Problem



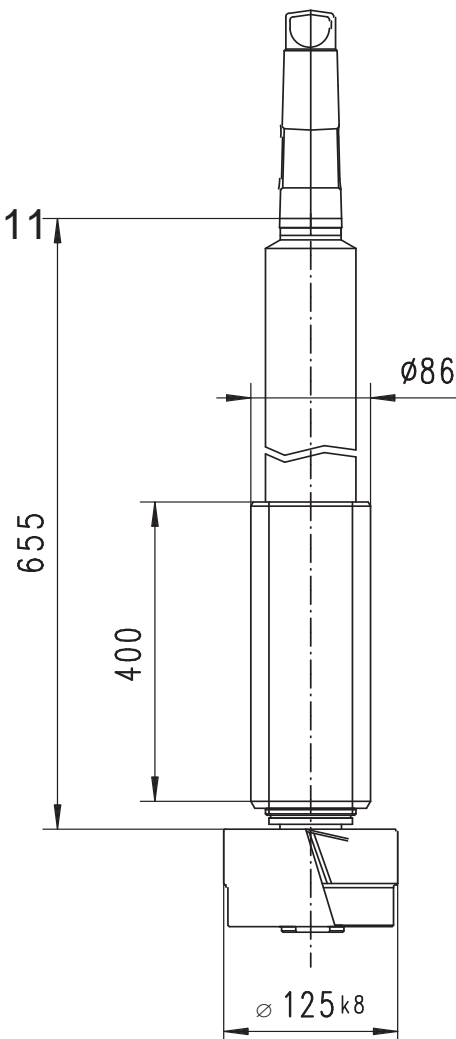
Workpiece: Generator casing
 Workpiece Material: GS17CrMoV511
 Machine Tool: Transfer Line
 Cutting Process: Back -
 Counterboring

The Bilz Solution:

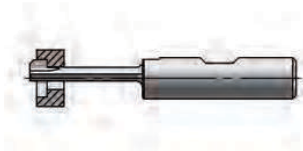
Back - Countersink HSS
 D = 125 x 45 mm

Holder
 D = 86 x 45 mm

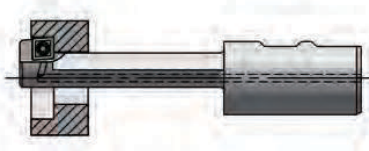
$n = 50$ rev/min
 $V_c = 24$ m/min
 $V_f = 10$ mm/min
 $f = 0,2$ mm/rev



RBSM max. $1,9 \times d_1$	RBSM TiAlN	RBS+ max. $1,8 \times d_1$	RBS+ for $d > 20$	RFS
GG(G)	ALU	NE	ST(AHL)	

Reverse boring bar
RBS-Micro RBSM

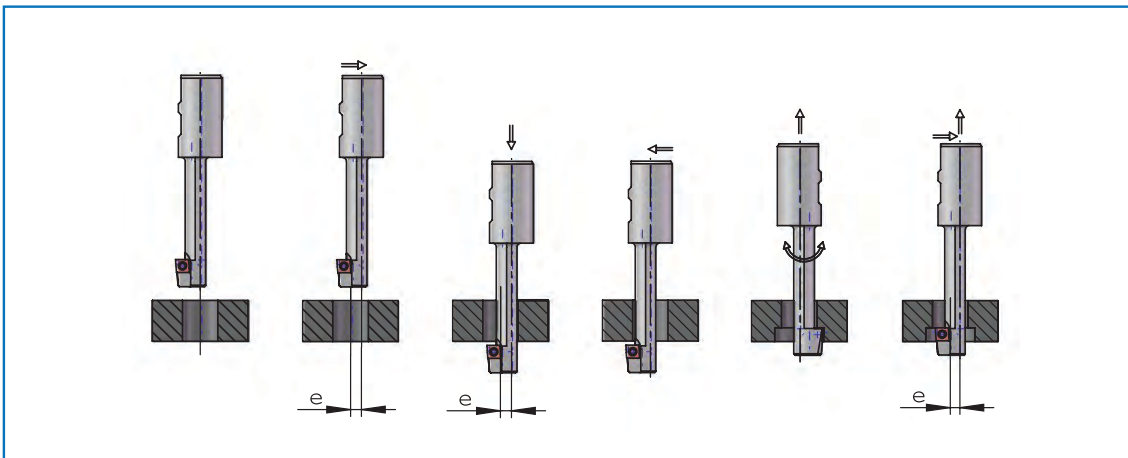
Reverse boring bar RBS+

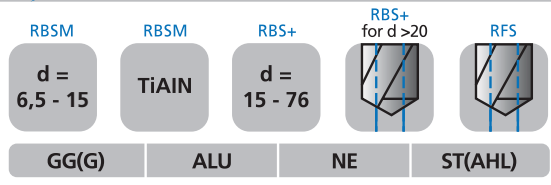


Reverse chamfering bar RFS

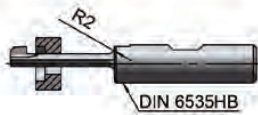
**Advantages:**

- For spotfacing, chamfering and deep counterboring of areas with difficult access
- For screw head counterbores M3 to M48 in all common materials
- For counterboring up to 1.9 times the bore diameter
- RBS+ and RFS are very stable and rigid with surface treatment and FEM-optimized geometry
- Large E-modulus of solid-carbide RBS-Micro ensure max. stability
- Internal coolant for RFS and RBS+ starting from $d=20$
- Wide choice of different PCD-, carbide- and HSS-indexable inserts
- For requests of specials e. g. for larger cutting width, in solid carbide or heavy metal, adjustable, for radiuses, grooves and chamfers please use the Technical Questionnaire on page 14 or at www.hermann-bilz.de

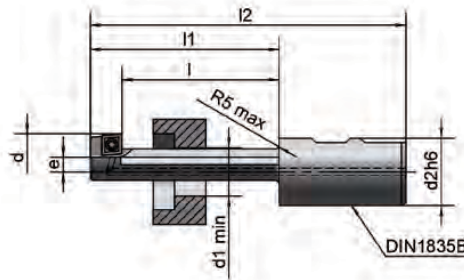




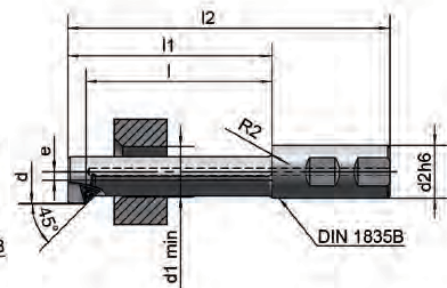
Reverse boring bar
RBS-Micro RBSM



Reverse boring bar RBS+



Reverse chamfering bar RFS



RBSM/RBS+/RFS

d	d _{1min}	l	d ₂	e	l ₁	l ₂	Best-Nr.* Ord.-No			
RBS-Micro RBSM (solid carbide, counter clockwise)										
6,5	3,4	12	8	1,7	15,4	51,4	RBSM 34065			
8	4,5	19	10	1,9	23	63	RBSM 45080			
10	5,5	23	12	2,4	28	73	RBSM 55100			
11	6,6	28	12	2,4	33	78	RBSM 66110			
15	9,0	35	16	3,2	42	90	RBSM 90150			
RBS+ (indexable insert version, counter clockwise)										
15	9,0	35	20	3,2	45	95	RBS 081509020	100264	TX 206	04
18	10,5	40	25	4,0	52	108	RBS 101810525	TX 25050	TX 108-25	06
20	13,0	45	25	3,7	57	113	RBS 122013025	TX 25050	TX 108-25	06
24	15,0	55	25	4,7	67	123	RBS 142415025	TX 25050	TX 108-25	06
26	17,0	55	25	4,7	67	123	RBS 162617025	TX 25050	TX 108-25	06
30	19,0	65	25	6,0	77	133	RBS 183019025	TX 25050	TX 108-25	06
33	21,0	70	25	6,5	85	141	RBS 203321025	TX 35075	TX 115-35	09
36	23,0	75	32	7,0	90	150	RBS 223623032	TX 35075	TX 115-35	09
40	25,0	85	32	8,0	100	160	RBS 244025032	TX 35075	TX 115-35	09
43	30,0	90	32	7,0	105	165	RBS 274330032	TX 35075	TX 115-35	09
46	30,0	90	32	8,5	105	165	RBS 274630032	TX 35075	TX 115-35	09
48	33,0	105	32	8,0	120	180	RBS 304833032	TX 35075	TX 115-35	09
50	33,0	105	32	9,0	125	185	RBS 305033032	TX 45115	TX 115-45	12
53	36,0	110	40	9,0	130	200	RBS 335336040	TX 45115	TX 115-45	12
54	36,0	110	40	9,5	130	200	RBS 335436040	TX 45115	TX 115-45	12
57	39,0	120	40	9,5	140	210	RBS 365739040	TX 45115	TX 115-45	12
58	39,0	120	40	10,0	140	210	RBS 365839040	TX 45115	TX 115-45	12
66	45,0	135	50	11,0	155	235	RBS 426645050	TX 45115	TX 115-45	12
76	52,0	155	50	12,5	180	260	RBS 487652050	TX 45135	TX 115-45	16
RFS (indexable insert version, clockwise)										
15	10,0	42	16	2,7	48	96	RFS 01 1015	TX 20048	TX 206	06
20	14,0	48	20	3,2	53	103	RFS 01 1420	TX 20048	TX 206	06
23	17,5	57	25	3,0	67	123	RFS 01 1723	TX 22060	TX 207	09
27	21,0	78	25	3,5	87	143	RFS 01 2127	TX 22060	TX 207	09
31	24,0	88	25	4,0	97	153	RFS 01 2431	TX 22060	TX 207	09

* incl.
 ** order separately

Highlighted items stock at Steiner Technologies, Inc.

Indexable inserts for RBS+ und RFS

RBS+			Best.-Nr. ... Ord.-No. ...	Grade							
Precision ground Indexable Inserts		06	MCEX060204FRH...	AK1	K1	K9		P5	P9	S6	
		09	MCEX090304FRH...	AK1	K1	K9		P5	P9	S6	
		12	MCEX120404FRH...	AK1	K1	K9		P5	P9	S6	
		16	MCEX160604FRH...	AK1	K1	K9		P5	P9	S6	
Precision PCD-Inserts		06	MCEW060204FR5...								D1
		09	MCEW090304FR5...								D1
		12	MCEW120404FR5...								D1
ISO-Indexable Inserts		04	CPGT04T1043...				P2	P5	P9		
		06	MCMT060204EN...		K1		P2	P5	P9		
		09	MCMT090304EN...		K1	K9	P2	P5	P9		
		12	MCMT120404EN...		K1	K9	P2	P5	P9		
		16	MCMT160604EN...		K1		P2				
RFS											
Precision ground Indexable Inserts		06	TCEW060104FN...		K1	K9					
		09	TCEW090204FN...		K1	K9					
Precision ground Indexable Inserts		06	TCEX060104FL...	AK1	K1	K9					
		09	TCEX090204FL...	AK1	K1				P9	S6	
ISO-Indexable Inserts		09	TCMT090204EN...			K9					

Grades

Grade	DIN ISO 513	Cutting material	Application example
D1	DP-N20	PCD	Aluminium
AK1	HF-N20	carbide	Aluminium
K1	HF-K20	carbide	Grey cast iron
K9	HC-K10	carbide	Nodular cast iron
P2	HF-P30	carbide	Steel
P5	HC-K40/P40	carbide	Nodular cast iron
P9	HC-P10	carbide	High alloy steel
S6	-	HSSE	Steel

Order example:

- ⇒ 2 Stück / Pieces RFS 011015
- ⇒ 10 Stück / Pieces TCEX 060104FL K9

Cutting data recommendation

Counterbore-Ø d mm		Low alloy steel z.B. / e.g. CK 45	High alloy steel z.B. / e.g. 42CrMo4V	Stainless steel z.B. / e.g. X15Cr13	Cast iron z.B. / e.g. GG26, GGG50	Aluminium z.B. / e.g. G-AlSi12
HM / Carbide	Vc	295-395	330-390	160-300	260-450	330-490
HSS	Vc	65-130	50-100	50-80		
6.5-11.0 (.255-.433")	f	.002-.004	.002-.003	.001-.002	.0015-.004	.002-.006
15.0-30.0 (.590-1.181")	f	.001-.004	.001-.003	.001-.004	.0015-.005	.002-.006
33.0-76.0 (1.300-2.992")	f	.0025-.005	.002-.005	.0025-.005	.003-.006	.003-.007

Cutting speed	SFPM	Infeed	IPR
---------------	------	--------	-----

Sufficient coolant supply needed

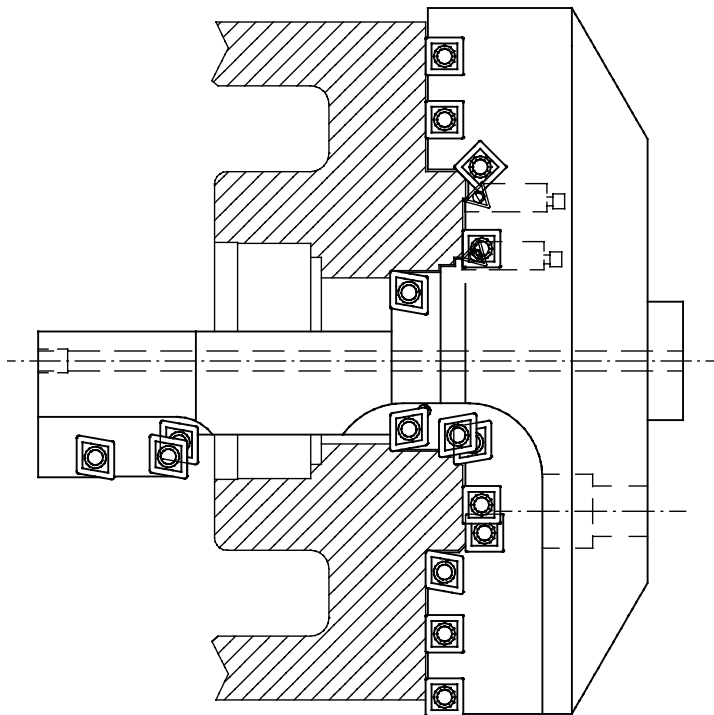
The Customer's Problem:

Workpiece: Housing

Workpiece Material: GGG - 40

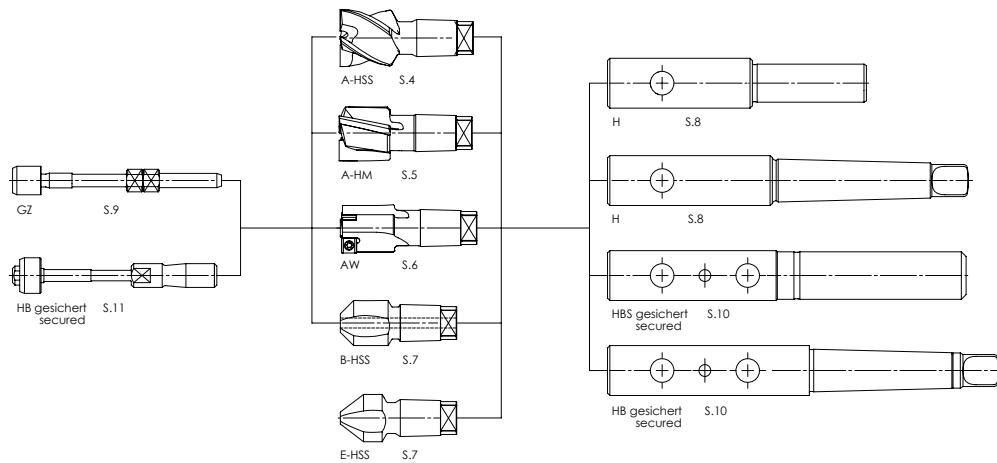
Machine Tool: Machining Center

Cutting Process: Back- and Forward-
Spotfacing and Chamfering



The Bilz Solution:

Step - Counterbore with ISO - Indexable Inserts



Modular Counterboring/Countersinking & Spotfacing Systems

- Available in two types of HSS as well as carbide tipped
- Can be used with interchangeable pilot and modular style holders
- Low cutting forces due to large rake angle
- High stock removal rates
- Universal field of applications
- Many variations
- Micrograin carbide for optimal wear resistance
- Ability to be re-ground



Quick Change Holders with Many Shank Configurations

- For all counterboring and re-boring tools with Bilz taper and bore
- For guiding tools on conventional machines
- Many diameter variations and combinations possible
- Highly wear resistant hardened steel



Modular Inserted Re-boring Tools

- Counterboring, deep hole countersinking, re-boring
- Alternative to HSS or brazed carbide
- For all materials
- Exchangeable pilots
- High stock removal rates
- Universal application using HSS, Carbide, or Cermet indexable inserts
- Tight bore tolerances and chatter free machining using ground indexable inserts with guide lands



Integral Shank Re-boring & Circular Milling Tools

- For spotfacing, boring, and circular milling
- Fixed diameter as well as adjustable
- High stock removal rates
- Tight bore tolerances
- Usable on rigid machines without pilot
- Special sizes and multiple stepped diameters available
- Many shanks available (Straight, HSK, CT, etc)



Contact Steiner Technologies, Inc. for More Information

DATE



QUOTE REQUEST FORM

END USER INFORMATION

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DISTRIBUTOR INFORMATION

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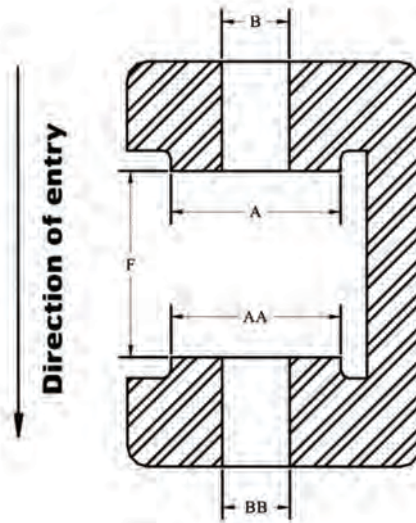
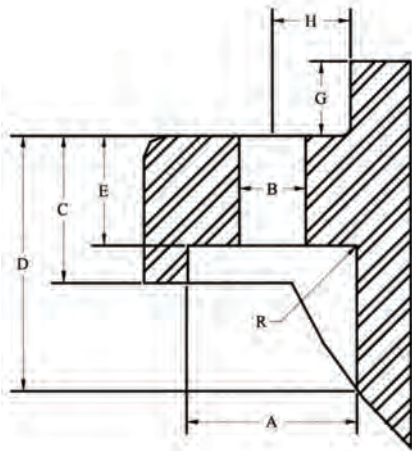
PHONE EMAIL

MACHINE INFORMATION

MAKE/MODEL SPINDLE TYPE QUILL TYPE

THROUGH TOOL COOLANT: NONE SPINDLE FLANGE COOLANT PRESSURE

WORKPIECE INFORMATION



A +/- 0.010in

AA +/- 0.010in

B +/- 0.005in

BB +/- 0.005in

C D

E F

G H

R

ANNUAL VOLUME

PART/REF # MATERIAL

GRADE HARDNESS

NOTES:

STEINER

I N G E N I O U S C U T T I N G T O O L S

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FAIRPORT NY 14450

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Fax: 585-425-5913

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