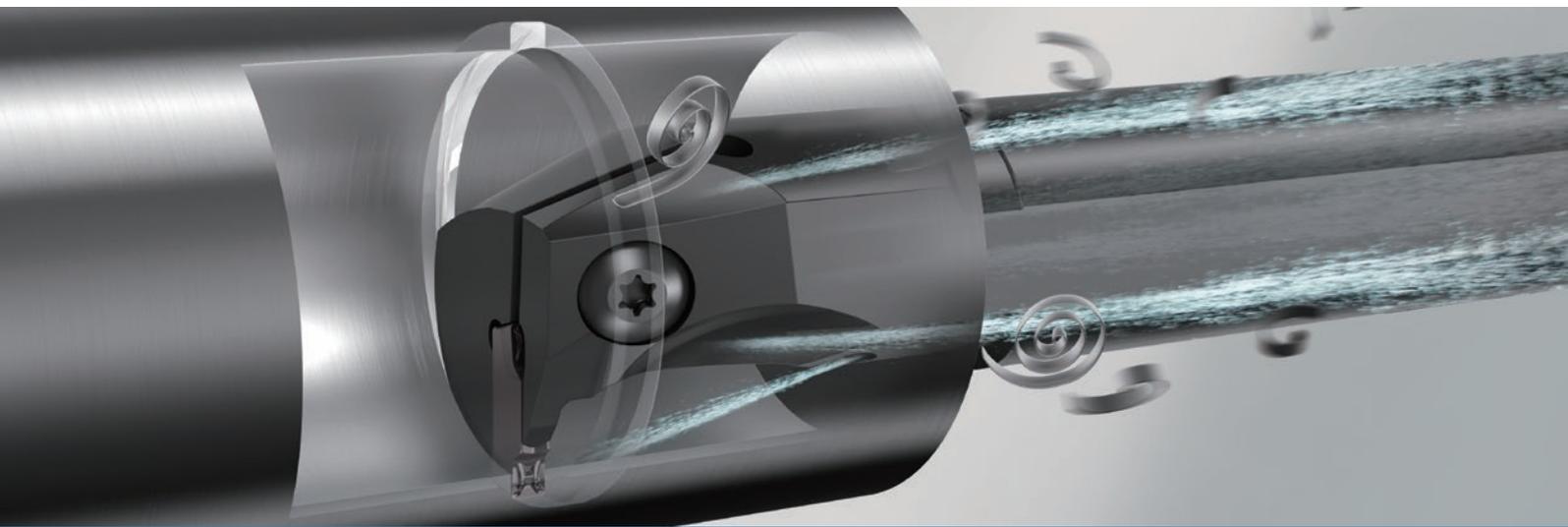


THE NEW VALUE FRONTIER



Internal grooving | **KGDI**

# KGDI



**Stable machining with excellent chip control and smooth chip evacuation**

Good chip control with special chipbreaker.

Smooth chip evacuation by new chip pocket design.

Low cutting forces and stable machining.

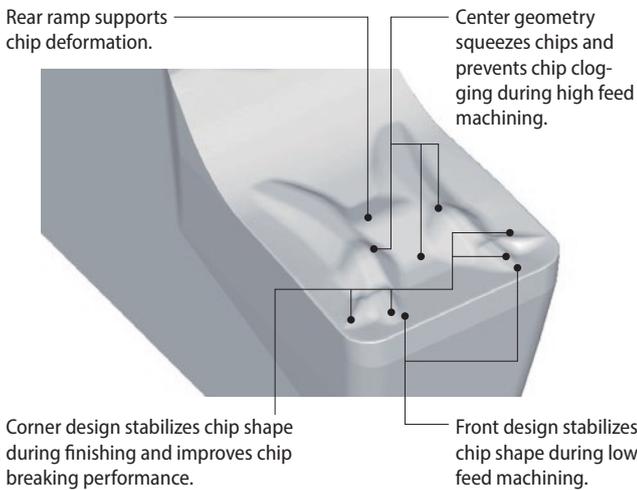


# KGDI

Stable machining with excellent chip control and smooth chip evacuation.

## 1 Excellent chip control with GMI chipbreaker for internal grooving

- Evenly breaks chips in various cutting conditions with newly designed chipbreaker geometry.
- Good chip control even in finishing applications with small depths of cut.



Chip control comparison (In-house evaluation)



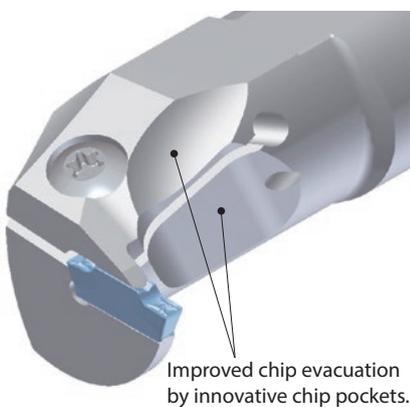
GMI chipbreaker      Competitor A      Conventional F

- Smooth chip control with stable chip shape compared with competitor A and conventional F.
- Prevents frequent machine stops caused by tangled chips.

Cutting conditions:  $V_c = 100$  m/min,  $f = 0.07$  mm/rev; Toolholder: KGDIR3225B-3  
Insert: GDM3015N-040GMI; Workpiece: 20Cr4

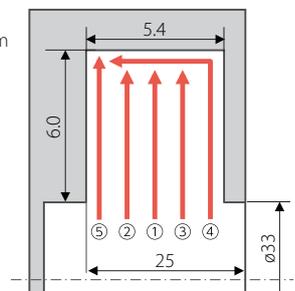
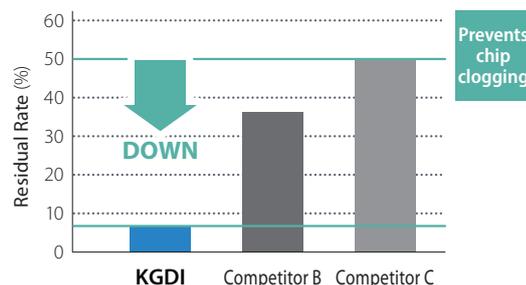
## 2 Smooth chip evacuation by creating chip pocket

Smooth chip evacuation when grooving and finishing.



Cutting Conditions:  $V_c = 100$  m/min  
①:  $a_p = 3$  mm, ②③:  $a_p = 1$  mm, ④⑤:  $a_p = 0.2$  mm  
 $f = 0.08$  mm/rev  
Toolholder: KGDIR3225B-3  
Insert: GDM3015N-040GMI  
Workpiece: 15CrMo4

Residual chips (In-house evaluation)



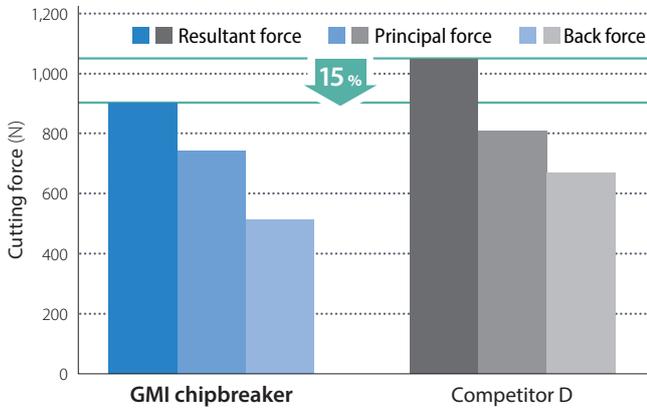
Chips remaining in machined bore were greatly reduced compared with competitor B and C.

# 3

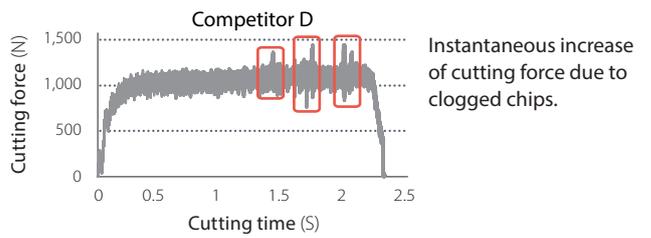
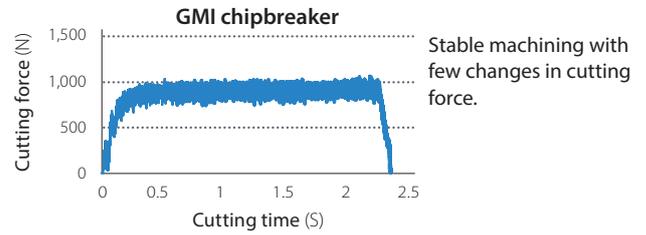
## Low cutting forces and stable machining

GMI chipbreaker prevents chip clogging and reduces cutting forces.

Cutting force comparison (In-house evaluation)



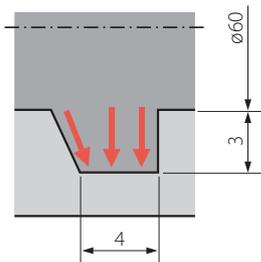
Cutting conditions:  $V_c = 150$  m/min,  $f = 0.1$  mm/rev; Toolholder: KGDIR3225B-3; Insert: GDM3015N-040GMI; Workpiece: 15CrMo4



### Case studies

#### Bearing: 15CrMo4

$V_c = 250$  m/min  
 $f = 0.15$  mm/rev  
Wet  
KGDIR3225B-3  
GDM3015N-040GMI / PR1225



#### GMI Chipbreaker

1200 pcs/edge

1.5 times

#### Competitor E

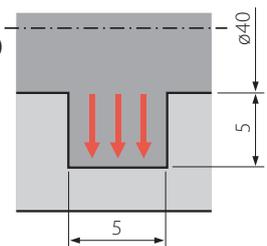
800 pcs/edge

- GMI chipbreaker PR1225 showed longer tool life compared with competitor E.
- Stable machining without chattering and cutting noise.

(User evaluation)

#### Automotive parts: 1.0040

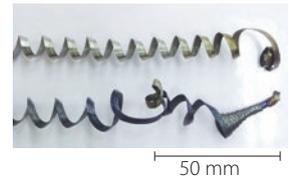
$V_c = 100$  m/min  
 $f = 0.08$  mm/rev  
Wet  
KGDIR3225B-3  
GDM3015N-040GMI / PR1225



#### GMI Chipbreaker



#### Conventional G



- Competitor G creates scratches on the workpiece with long chips.
- GMI chipbreaker has no problem because of good chip control.

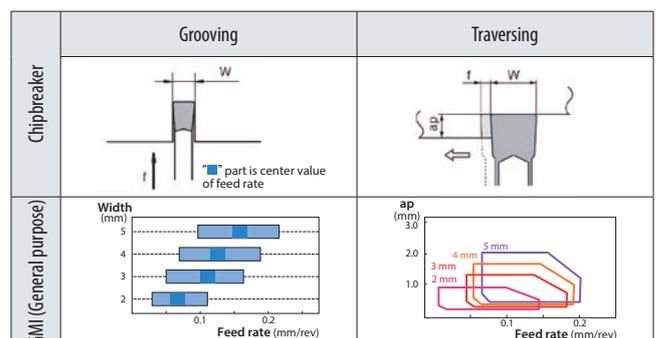
(User evaluation)

### Recommended cutting conditions (Cutting speed)

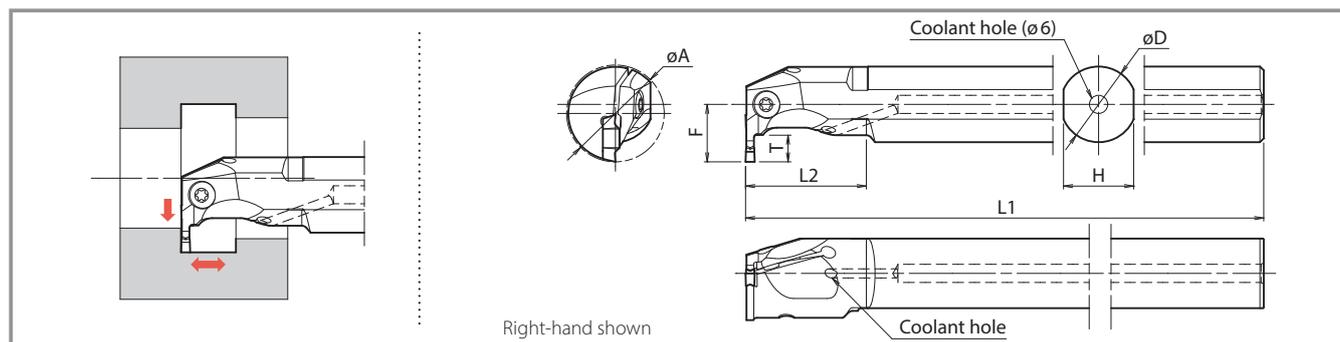
★ 1st choice ☆ 2nd choice

Workpiece	Chipbreaker	Recommended insert grade ( $V_c$ : m/min)				Notes
		Cermet	MEGACOAT NANO	MEGACOAT		
		TN620	PR1535	PR1225	PR1215	
Carbon steel	GMI CM	☆ 100–220	☆ 80–150	★ 80–200	☆ 100–200	Wet
Alloy steel		☆ 80–200	☆ 70–150	★ 70–180	☆ 80–180	
Stainless steel		☆ 70–180	★ 60–150	★ 60–150	☆ 60–150	
Cast iron				★ 100–200		

### Recommended cutting conditions ( $f$ , $ap$ )



# KGDI toolholder



## Toolholder dimensions

Description	Availability		Min. bore dia.		Dimensions (mm)						Edge width W (mm)		Spare parts			
	R	L	øA		øD	H	L1	L2	F	T	MIN.	MAX.	Clamp screw		Wrench	
			With GMI	With CM												
KGDI R/L 1816B-2	●	●	18	—	16	15	150	25	9.5	4.5	2	2	GS-50	—	LW-3	—
2520B-2	●	●	25	—	20	18	180	30	14.5	6	2	2	GS-50	—	LW-3	—
3225B-2	●	●	32	—	25	23	200	40	19	7	2	2	—	SB-5TR	—	LTW-20
KGDI R/L 2016B-3	●	●	20	21	16	15	150	25	11.5	5.5	3	3	GS-50	—	LW-3	—
2520B-3	●	●	25	26	20	18	180	30	14.5	6	3	3	GS-50	—	LW-3	—
3225B-3	●	●	32	33	25	23	200	40	19	8	3	3	—	SB-5TR	—	LTW-20
KGDI R/L 3225B-4	●	●	32	40 (34*)	25	23	200	40	19	8.5	4	5	—	SB-5TR	—	LTW-20
4032B-4	●	●	40	48 (42*)	32	29	220	50	23.5	11	4	5	—	SB-5TR	—	LTW-20
KGDI R/L 3225B-5	●	●	32	37 (34*)	25	23	200	40	19	8.5	5	5	—	SB-5TR	—	LTW-20
4032B-5	●	●	40	45 (42*)	32	29	220	50	23.5	11	5	5	—	SB-5TR	—	LTW-20

\* Possible by slightly chamfering toolholder's tip about 0.5 mm

●: Available

## Applicable inserts

Usage classification	P	Carbon steel / alloy steel	●	☺	●	☺	Applicable toolholder
	●: Continuous - light interruption / 1st choice ☺: Continuous - light interruption / 2nd choice ●: Continuous / 1st choice ○: Continuous / 2nd choice	M	Stainless steel		●	☺	
	K	Cast iron				●	KGDI R/L...-3

Shape	Description	Dimensions (mm)					Cermet	MEGACOAT NANO	MEGACOAT		Applicable toolholder
		W*	rε	M	L	H			TN620	PR1535	
	GDM2013N-020GMI	2.0	0.2	1.5	13.5	4.3	●	●	●	●	KGDI R/L...-2
	GDM3015N-040GMI	3.0	0.4	2.4	15.5	4.6	●	●	●	●	KGDI R/L...-3
	GDM4020N-040GMI	4.0	0.4	3.4	20	4.3	●	●	●	●	KGDI R/L...-4
	GDM5020N-040GMI	5.0	0.4	4.4	20	4.3	●	●	●	●	KGDI R/L...-4 KGDI R/L...-5
	GDM5020N-080GMI	5.0	0.8	4.4	20	4.3	●	●	●	●	KGDI R/L...-4 KGDI R/L...-5
	GDM3015N-150R-CM	3.0	1.5	2.3	16.3	4.6	○	○	●	●	KGDI R/L...-3
	GDM4020N-200R-CM	4.0	2.0	3.3	20	4.3	○	○	●	●	KGDI R/L...-4
	GDM5020N-250R-CM	5.0	2.5	4.2	21	4.3	○	○	●	●	KGDI R/L...-4 KGDI R/L...-5

\*Tolerance: ±0.03 for W = 2.0 and 3.0 and 4.0, ±0.04 for W = 5.0

●: Available ○: Check availability