

TURNLINE Small CBN insert series

MINI T-CBN

Expansion
of grade

For boring down to $\varnothing 4.5$ mm with CBN inserts



The World's smallest diameter tool for boring on hardened steel and sintered metals with its * $\varnothing 4.5$ mm

* with indexable tools

The smallest indexable CBN inserts in the world

When comparing to conventional brazed tool

- Higher cutting edge repeatability
- Reduced tool change time
- Longer tool life even at low cutting speeds

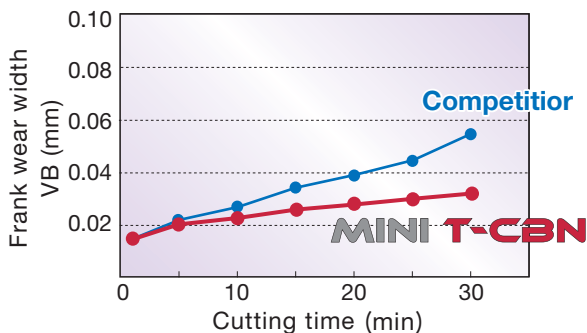
Applications

- Fuel injector components
- Boring of rocker arms



High wear resistance

Offers long tool life even when boring small diameters



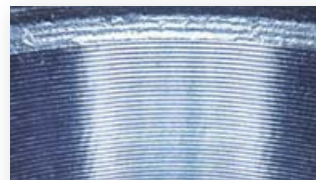
Insert : 1QP-CCGW04T102 BX310
 Toolholder : E06H-SCLCR04-D070
 Work material : Alloy steel
 SCM415H (60 HRC)
 Cutting speed : $V_c = 100$ m/min
 Depth of cut : $a_p = 0.1$ mm
 Feed : $f = 0.05$ mm/rev
 Machining mode: Internal turning
 Machine : Swiss type lathe

Excellent surface finish

Sharp cutting edge reduces the cutting forces

→ Prevents chattering and provides the finest machined surface.

MINI T-CBN vs Competitor A



Outstanding surface quality



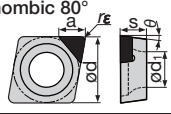
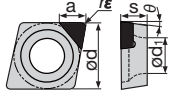
Chattering

Insert : 1QP-CCGW04T104 BX310
 Toolholder : E06H-SCLCR04-D070
 Work material : Alloy steel
 SCM415H (60 HRC)
 Cutting speed : $V_c = 100$ m/min
 Depth of cut : $a_p = 0.1$ mm
 Feed : $f = 0.05$ mm/rev
 Boring dia. : $\varnothing 8$ mm

Standard cutting conditions

Application	Grades	Machining mode	Cutting Speed V_c (m/min)	Depth of cut a_p (mm)	Feed f (mm/rev)
H Hard Materials	BX310	Continuous cutting	30 - 150	0.03 - 0.20	0.03 - 0.10
S Sintered metals	BX470				

Inserts positive type

Application	Shape	Cat. No	Grade		No. of corner	Dimensions (mm)					
			BX310	BX470		Clearance angle θ	I.C. dia ϕd	Thickness s	Hole dia. ϕd_1	Corner radius r_ϵ	CBN Length a
Finishing to medium cutting	Rhombic 80° 	1QP-CCGW03X102	●	●	1	7°	3.57	1.39	1.9	0.2	1.4
		1QP-CCGW03X104	●	●	1	7°	3.57	1.39	1.9	0.4	1.3
		1QP-CCGW04T102	●	●	1	7°	4.37	1.79	2.3	0.2	1.9
		1QP-CCGW04T104	●	●	1	7°	4.37	1.79	2.3	0.4	1.8
	Rhombic 75° 	1QP-EPGW03X102	●	●	1	11°	3.57	1.39	1.9	0.2	1.4
		1QP-EPGW03X104	●	●	1	11°	3.57	1.39	1.9	0.4	1.3
		1QP-EPGW040102	●	●	1	11°	3.97	1.59	2.3	0.2	1.7
		1QP-EPGW040104	●	●	1	11°	3.97	1.59	2.3	0.4	1.6

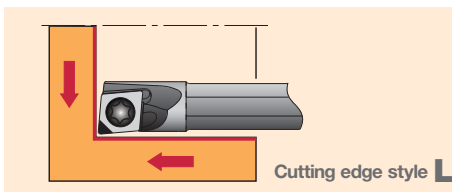
Toolholders

STREAMJETBARMINI
TUNGALOY

SCLCR/L

Boring & internal facing

S-type (Positive, screw-on)



Right hand (R) shown

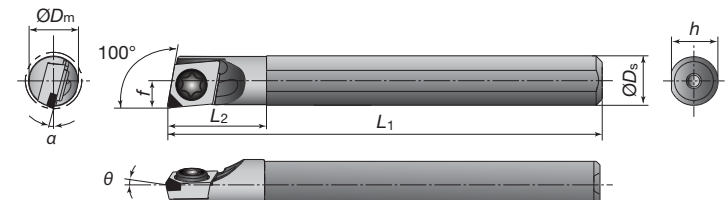
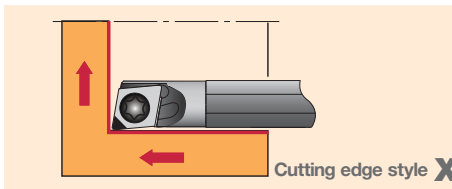
Carbide shank

Cat. No	Stock		Min bore dia. ϕD_m	Dimensions (mm)								Std. corner radius r_ϵ	Insert	Parts		Torque (N·m)
	R	L		ϕD_s	f	L ₁	L ₂	h	f ₂	θ	α			Clamping screw	Wrench	
E04G-SCLCR/L03-D050	●	●	5	4	2.5	90	9	3.8	-	0°	-15°	0.2	1QP-CCGW03X1**	CSTA-1.6	T-6F	0.6
E05G-SCLCR/L03-D060	●	●	6	5	3	90	10	4.8	-	0°	-13°	0.2	1QP-CCGW03X1**	CSTA-1.6	T-6F	0.6
E06H-SCLCR/L04-D070	●	●	7	6	3.5	100	12	5.75	-	0°	-13°	0.2	1QP-CCGW04T1**	CSTB-2	T-6F	0.6
E07H-SCLCR/L04-D080	●	●	8	7	4	100	14	6.75	-	0°	-11°	0.2	1QP-CCGW04T1**	CSTB-2	T-6F	0.6

SEXPR/L

Boring & internal facing

S-type (Positive, screw-on)



Right hand (R) shown

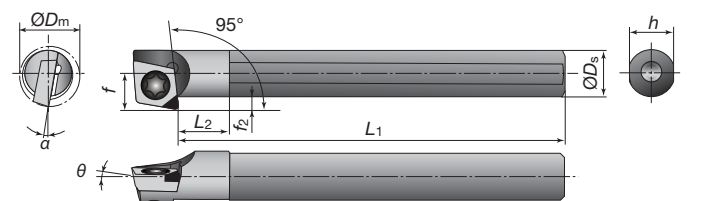
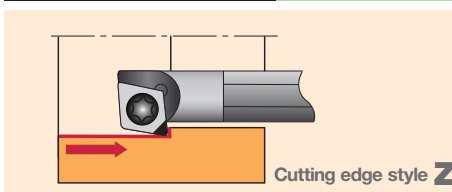
Carbide shank

Cat. No	Stock		Min bore dia. ϕD_m	Dimensions (mm)								Std. corner radius r_ϵ	Insert	Parts		Torque (N·m)
	R	L		ϕD_s	f	L ₁	L ₂	h	f ₂	θ	α			Clamping screw	Wrench	
E04G-SEXPR/L03-D045	●	●	4.5	4	2.3	90	9	3.8	-	0°	-15°	0.2	1QP-EPGW03X1**	CSTA-1.6	T-6F	0.6
E04G-SEXPR/L03-D050	●	●	5	4	2.5	90	9	3.8	-	0°	-13°	0.2	1QP-EPGW03X1**	CSTA-1.6	T-6F	0.6
E05G-SEXPR/L04-D055	●	●	5.5	5	2.65	90	10	4.8	-	0°	-12°	0.4	1QP-EPGW0401**	CSTB-2	T-6F	0.6
E06H-SEXPR/L04-D070	●	●	7	6	3.5	100	12	5.75	-	0°	-12°	0.4	1QP-EPGW0401**	CSTB-2	T-6F	0.6

SEZPR/L

Internal retracting

S-type (Positive, screw-on)



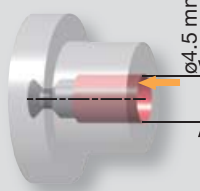
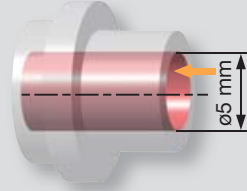
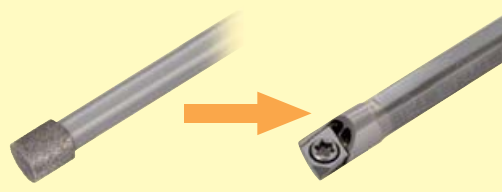
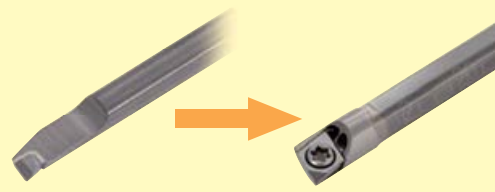
Right hand (R) shown

Carbide shank

Cat. No	Stock		Min bore dia. ϕD_m	Dimensions (mm)								Std. corner radius r_ϵ	Insert	Parts		Torque (N·m)
	R	L		ϕD_s	f	L ₁	L ₂	h	f ₂	θ	α			Clamping screw	Wrench	
E04G-SEZPR/L03-D055	●	●	5.5	4	3.2	90	5	3.8	1.2	0°	-8°	0.2	1QP-EPGW03X1**	CSTA-1.6	T-6F	0.6
E05G-SEZPR/L03-D065	●	●	6.5	5	3.7	90	6	4.8	1.2	0°	-6°	0.2	1QP-EPGW03X1**	CSTA-1.6	T-6F	0.6

● : Stocked items

Practical examples

Workpiece type		Fuel injection part in common rail system	Automotive part (turbo charger component)
Insert		1QP-EPGW03X102	1QP-CCGW03X102
Grade		BX310	BX310
Work material		SUJ2 / B1 (60 HRC)	SCM435H / 34CrMo4 (60 HRC)
			
Cutting conditions	Cutting speed V_c (m/min)	60	70
	Feed f (mm/rev)	0.04	0.05
	Depth of cut a_p (mm)	0.1	0.06
	Machining mode	Internal turning (continuous cutting)	Internal turning (continuous cutting)
	Coolant	Wet	Wet
Results		 <p>Internal grinding MINI T-CBN</p> <p>Process time is reduced by 50% compared with grinding.</p>	 <p>CBN brazed tool MINI T-CBN</p> <p>Tool cost: Reduced by 60% Tool change time: 1/10</p>



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