

TZ120

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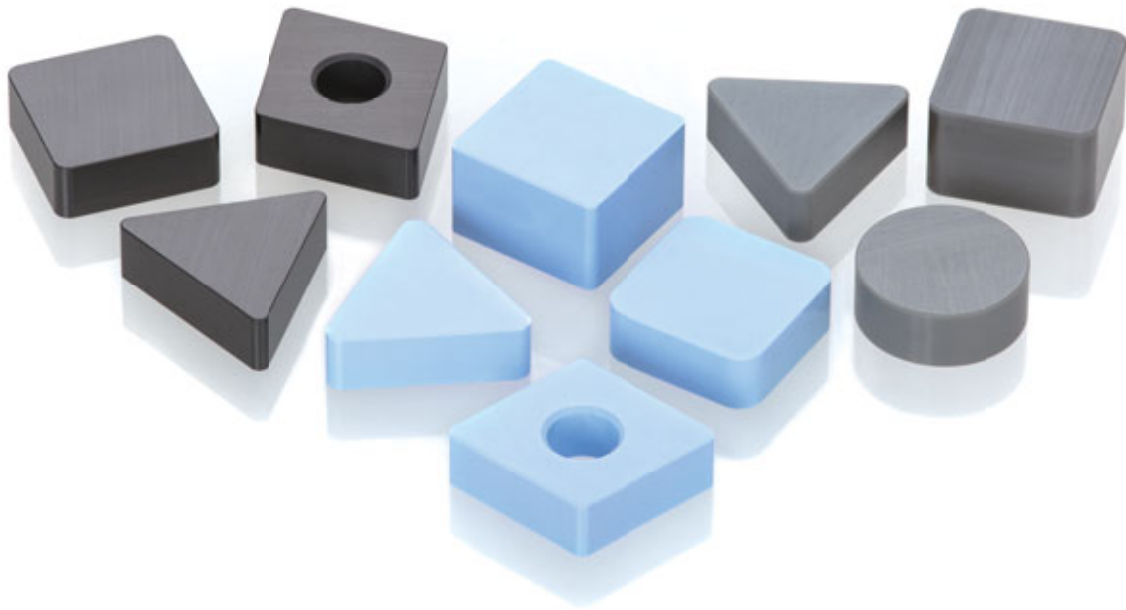
Tungaloy Report No. 532-US

Ceramic inserts for **high speed** turning of cast iron





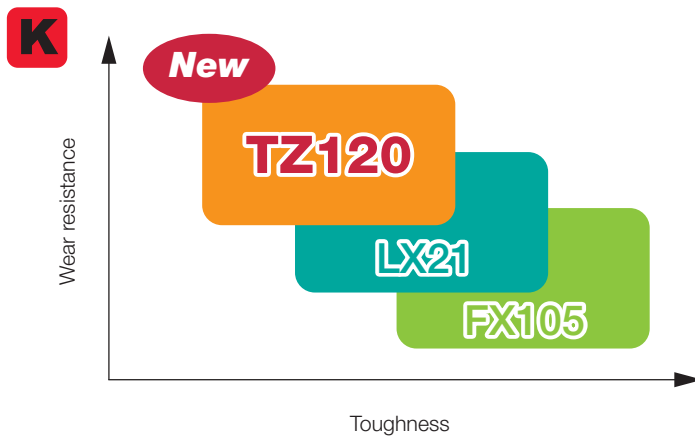
ACCELERATED MACHINING



Ceramic grades for **high speed turning** of cast iron

New ceramic inserts for cast iron high speed machining

APPLICATION RANGE



New

TZ120 ($\text{Al}_2\text{O}_3\text{-ZrO}_2$)

- Excellent wear resistance
- High speed continuous turning of cast iron without coolant

LX21 ($\text{Al}_2\text{O}_3\text{-TiC}$)

- High hardness and moderate fracture toughness
- General turning of cast iron

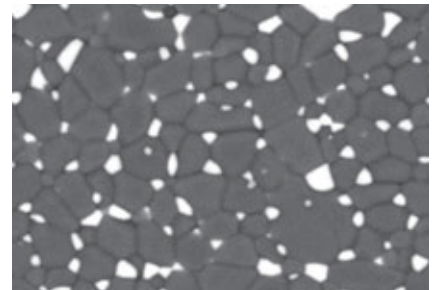
FX105 (Si_3N_4)

- Mechanical and thermal shock resistance
- Interrupted & rough machining

New

TZ120

- TZ120 ceramic grade with high strength and excellent wear resistance by adding ZrO_2 to Al_2O_3 with high oxidation resistance
- Components are well dispersed to improve fracture resistance and boundary wear resistance
- Suitable for dry roughing and finishing of special cast iron (cylinder liner, etc.)

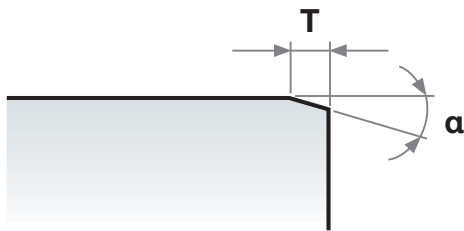


STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Cutting mode	Coolant	Grades	Cutting speed Vc (sfm)	Feed f (ipr)	Depth of cut ap (inch)
K	Gray cast iron	Continuous	Dry	New TZ120	1312 - 2789	0.004 - 0.012	0.020 - 0.079
		Continuous, light interrupted	Dry	LX21	1312 - 2625	0.004 - 0.016	0.020 - 0.079
		Continuous, interrupted	Dry, Wet	FX105	984 - 1969	0.008 - 0.024	0.020 - 0.157
	Centrifugal cast iron	Continuous	Dry	New TZ120	492 - 1312	0.004 - 0.012	0.020 - 0.079

- TZ120 is suitable for dry continuous turning

STANDARD EDGE PREPARATION



K	Grades	New TZ120	LX21	FX105
	T (inch)	0.0039	0.0039	0.0078
α	20°	30°	25°	

Insert NEGATIVE TYPE

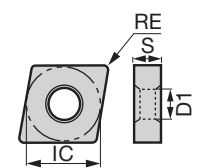
- : Continuous cutting
- (with dot) : Light interrupted cutting
- (with asterisk) : Heavy interrupted cutting

CN



**Rhombic, 80°
with hole**

P Steel																				
M Stainless																				
K Cast iron	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
N Non-ferrous																				
S Superalloy																				
H Hard material	●																			



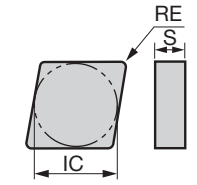
Application			Designation			Ceramic			Dimension (inch)				
Application	Chipbreaker	Designation			TZ120	LX21	FX105	RE	IC	S	D1		
			Inch	Metric								RE	IC
Finishing to medium cutting	-	CNMA 432	CNMA120408		●			0.031	0.500	0.187	0.203		
		CNMA 433	CNMA120412		●			0.047	0.500	0.187	0.203		
		CNMA 434	CNMA120416		●			0.063	0.500	0.187	0.203		
	-	CNGA 431	CNGA120404		● ●			0.016	0.500	0.187	0.203		
		CNGA 432	CNGA120408	●	● ●			0.031	0.500	0.187	0.203		
		CNGA 433	CNGA120412		● ●			0.047	0.500	0.187	0.203		
		CNGA 434	CNGA120416		●			0.063	0.500	0.187	0.203		

CN



**Rhombic, 80°
without hole**

P Steel																				
M Stainless																				
K Cast iron	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
N Non-ferrous																				
S Superalloy																				
H Hard material	●																			



Application			Designation			Ceramic			Dimension (inch)				
Application	Chipbreaker	Designation			TZ120	LX21	FX105	RE	IC	S	D1		
			Inch	Metric								RE	IC
Finishing to medium cutting	-	CNGD 453	CNGD120712		●			0.047	0.500	0.313	-		
		CNGD 454	CNGD120716		●			0.063	0.500	0.313	-		
		* with dimple	* with dimple										
	-	CNGN 432	CNGN120408		●			0.031	0.500	0.187	-		
		CNGN 433	CNGN120412		●			0.047	0.500	0.187	-		
		CNGN 434	CNGN120416		● ●			0.063	0.500	0.187	-		
		CNGN 435	CNGN120420		● ●			0.078	0.500	0.187	-		
		CNGN 452	CNGN120708		● ●			0.031	0.500	0.313	-		
		CNGN 453	CNGN120712		● ●			0.047	0.500	0.313	-		
		CNGN 454	CNGN120716		● ●			0.063	0.500	0.313	-		
CNGN 455	CNGN120720		●			0.078	0.500	0.313	-				

- : Line up
- (red) : New

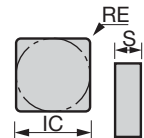
Insert NEGATIVE TYPE

● : Continuous cutting
 ● : Light interrupted cutting
 ✱ : Heavy interrupted cutting

SN

**Square, 90°
without hole**

P	Steel																		
M	Stainless																		
K	Cast iron	●	●	●	●														
N	Non-ferrous																		
S	Superalloy																		
H	Hard material	●																	

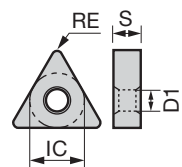


Application	Chipbreaker	Designation		Ceramic			Dimension (inch)				
		Inch	Metric	TZ120	LX21	FX105	RE	IC	S	D1	
Finishing to medium cutting		-	SNGD 453	SNGD120712		●		0.047	0.500	0.313	-
			SNGD 454	SNGD120716		●		0.063	0.500	0.313	-
		* with dimple	* with dimple								
	-	SNGN 322	SNGN090308		●		0.031	0.375	0.125	-	
		SNGN 432	SNGN120408		●		0.031	0.500	0.187	-	
		SNGN 433	SNGN120412	●	●		0.047	0.500	0.187	-	
		SNGN 434	SNGN120416		●		0.063	0.500	0.187	-	
		SNGN 435	SNGN120420		●		0.078	0.500	0.187	-	
		SNGN 436	SNGN120424		●		0.094	0.500	0.187	-	
	SNGN 452	SNGN120708	●	●		0.031	0.500	0.313	-		
	SNGN 453	SNGN120712	●	●		0.047	0.500	0.313	-		
	SNGN 454	SNGN120716	●	●		0.063	0.500	0.313	-		

TN

**Triangular, 60°
with hole**

P	Steel																		
M	Stainless																		
K	Cast iron	●	●	●	●														
N	Non-ferrous																		
S	Superalloy																		
H	Hard material	●																	



Application	Chipbreaker	Designation		Ceramic			Dimension (inch)				
		Inch	Metric	TZ120	LX21	FX105	RE	IC	S	D1	
Finishing to medium cutting		-	TNMA 332	TNMA160408		●		0.031	0.375	0.187	0.150
			TNMA 333	TNMA160412		●		0.047	0.375	0.187	0.150
	-	TNGA 331	TNGA160404		●		0.016	0.375	0.187	0.150	
		TNGA 332	TNGA160408	●	●		0.031	0.375	0.187	0.150	
		TNGA 333	TNGA160412	●	●		0.047	0.375	0.187	0.150	
	TNGA 334	TNGA160416	●	●		0.063	0.375	0.187	0.150		

● : Line up
 ● : New

Insert NEGATIVE TYPE

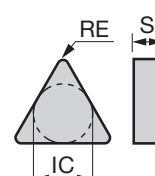
- : Continuous cutting
- : Light interrupted cutting
- ✳ : Heavy interrupted cutting


TN



Triangular, 60° without hole

P Steel																				
M Stainless																				
K Cast iron	●	●	●	●	●															
N Non-ferrous																				
S Superalloy																				
H Hard material	●																			



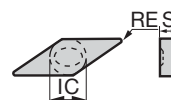
Application	Chipbreaker		Designation		Ceramic			Dimension (inch)				
			Inch	Metric	TZ120	LX21	FX105	RE	IC	S	D1	
Finishing to medium cutting		-	TNGN 331	TNGN160404			●	0.016	0.375	0.187	-	
			TNGN 332	TNGN160408			●	0.031	0.375	0.187	-	
			TNGN 333	TNGN160412	●	●	●		0.047	0.375	0.187	-
			TNGN 334	TNGN160416		●			0.063	0.375	0.187	-
			TNGN 335	TNGN160420		●			0.078	0.375	0.187	-


VN



Rhombic, 35° without hole

P Steel																				
M Stainless																				
K Cast iron	●	●	●	●	●															
N Non-ferrous																				
S Superalloy																				
H Hard material	●																			



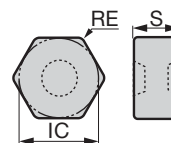
Application	Chipbreaker		Designation		Ceramic			Dimension (inch)			
			Inch	Metric	TZ120	LX21	FX105	RE	IC	S	D1
Finishing to medium cutting		-	VNGD 353	VNGD160712			●	0.047	0.375	0.313	-
			* with dimple	* with dimple							


HN



Hexagonal, 120° without hole

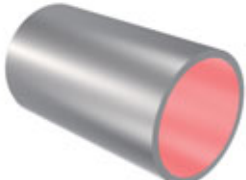

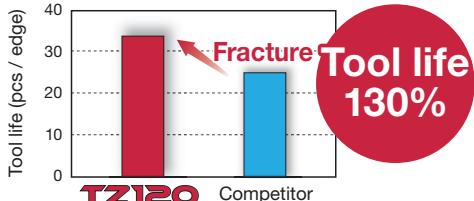
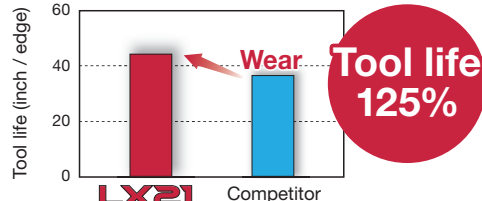
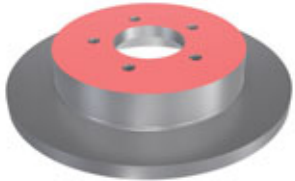
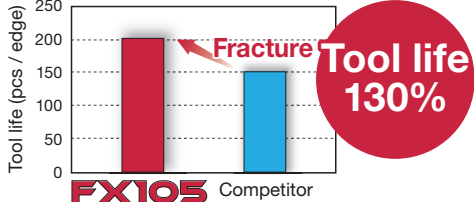
P Steel																				
M Stainless																				
K Cast iron	●	●	●	●	●															
N Non-ferrous																				
S Superalloy																				
H Hard material	●																			



Application	Chipbreaker		Designation		Ceramic			Dimension (inch)			
			Inch	Metric	TZ120	LX21	FX105	RE	IC	S	D1
Finishing to medium cutting		-	HNGD 453	HNGD050712			●	0.047	0.500	0.313	-
			HNGD 454	HNGD050716			●	0.063	0.500	0.313	-
			* with dimple	* with dimple							

- : Line up
- : New

PRACTICAL EXAMPLES

Workpiece type		Cylinder liner	Roll
Toolholder		Special boring tool	ACLNL164-A
Insert		SNGN 454	CNGA 432
Grade		TZ120	LX21
Workpiece material		Centrifugal cast iron 	Chilled cast iron (40HRC) 
Cutting conditions	Cutting speed : V_c (sfm)	656	262
	Feed : f (ipr)	0.0078	0.0078
	Depth of cut : a_p (inch)	0.079	0.039
	Machining	Boring	External
	Coolant	No	No
Results		 <p>TZ120 Competitor</p> <p>TZ120 is superior in wear resistance for centrifugal cast iron (such as cylinder liner) and extended tool life by 1.3x.</p>	 <p>LX21 Competitor</p> <p>LX21 is superior in wear resistance for hardened cast iron roll turning providing improved tool life by 1.25x over conventional ceramic grade.</p>
Workpiece type		Disc brake rotor	
Toolholder		Special toolholder	
Insert		SNMX 454	
Grade		FX105	
Workpiece material		Gray cast iron 	
Cutting conditions	Cutting speed : V_c (sfm)	1476	
	Feed : f (ipr)	0.020	
	Depth of cut : a_p (inch)	0.060	
	Machining	Face turning	
	Coolant	Wet	
Results		 <p>FX105 Competitor</p> <p>FX105 decreases the occurrence of sudden breakage providing stable machining.</p>	

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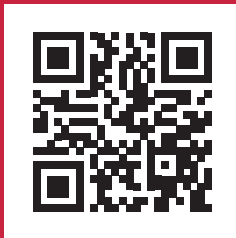
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