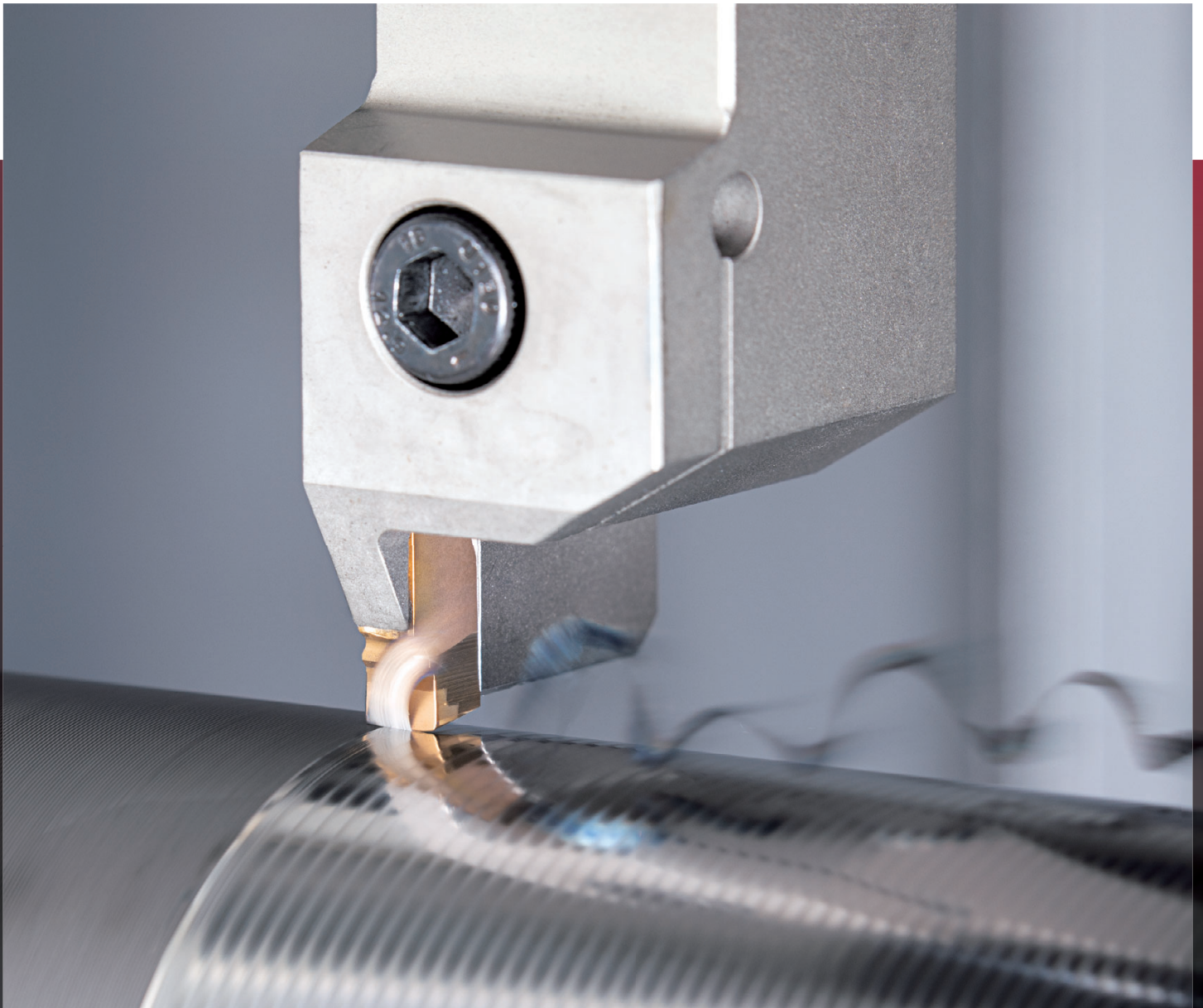


CBN inserts

TUNGCUT

Tungaloy Report No. 391S7-G

Innovative CBN inserts for accelerated machining of hard part turning





Unique brazing geometry of CBN-tipped TungCut inserts for high feed continuous turning of hardened steel

Innovative insert design for turning

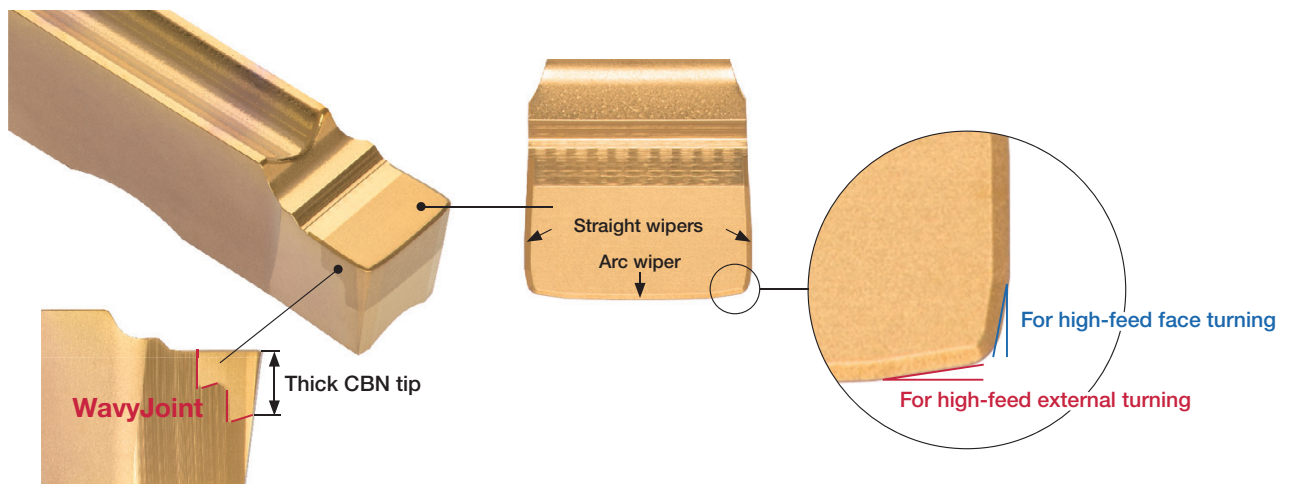
1 Optimized cutting edge geometry for high feed turning

- Turning insert in the shape of grooving insert—This innovative design allows the cutting edge to have longer wipers than traditional ISO wiper insert, providing superior surface finishing in high feed machining.
- Front and side cutting edges form small entry angles that generate chip thinning effect during machining at a high feed rate.

Note: When used for grooving, the insert will not provide the groove bottom with square corners due to the cutting edge profile with an arc wiper.

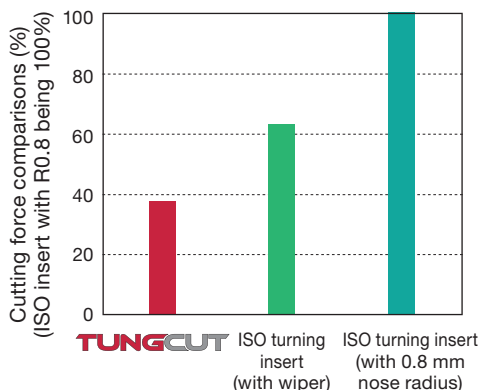
2 WavyJoint technology for enhanced brazing

- WavyJoint technology provides enhanced CBN tip and carbide insert bonding. A thick CBN tip dissipates the heat accumulated on the cutting edge during high feed machining, preventing the CBN tip from de-brazing.



Low cutting force

Optimized for high feed machining, the cutting edge creates thin chips, generating lower cutting forces than ISO inserts.



Insert	: STH500-SR BXA10 : 2QP-CNGA120408WL BXA10 : 2QP-CNGA120408 BXA10
Holder	: CTEL2525-5T12 : ACLNL2525M12-A
Workpiece material	: SCM415 (60HRC)
Cutting speed	: $V_c = 150$ m/min
Feed	: $f = 0.9$ mm/rev
Depth of cut	: $a_p = 0.1$ mm
Application	: External turning, continuous cut
Coolant	: Wet

High productive machining (for external turning)

An arc wiper on the front cutting edge provides superior surface finish when external turning at high feed rates.

	Feed: f (mm/rev)					
	0.1	0.3	0.6	0.9	1.2	1.5
TUNG CUT	✓	✓	✓	✓	✓	✓
ISO turning insert (with wiper)	✓	✓	✗	✗	✗	✗
ISO turning insert (with 0.8 mm nose radius)	✓	✗	✗	✗	✗	✗

✓ Rz = less than 3.2 μm
✗ Rz = 3.2 μm or greater

H	Insert	: STH500-SR BXA10 : 2QP-CNGA120408WL BXA10 : 2QP-CNGA120408 BXA10
	Holder	: CTEL2525-5T12 : ACLNL2525M12-A
	Workpiece material	: SCM415 (60HRC)
	Cutting speed	: $V_c = 150$ m/min
	Feed	: $f = 0.1 - 1.5$ mm/rev
	Depth of cut	: $a_p = 0.1$ mm
	Application	: External turning, continuous cut
	Coolant	: Wet

High productive machining (for face turning)

Straight wipers on the side cutting edges provides superior surface finish when face turning at high feed rates.

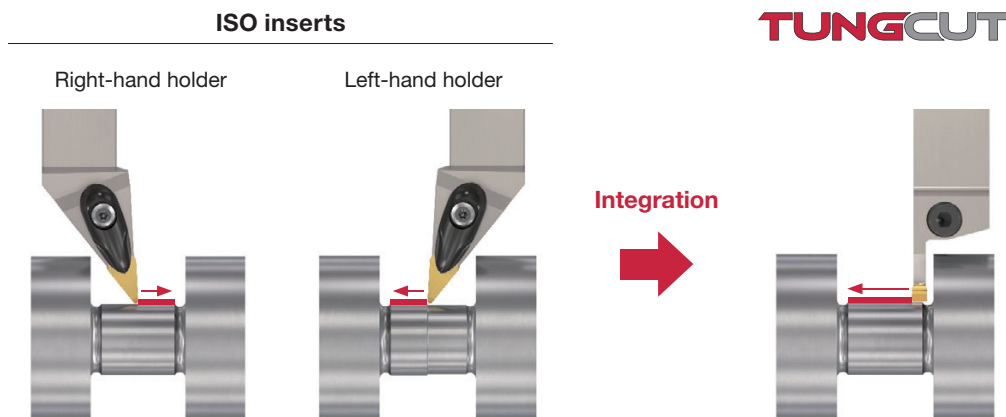
	Feed: f (mm/rev)					
	0.1	0.3	0.6	0.9	1.2	1.5
TUNG CUT	✓	✓	✓	✗	✗	✗
ISO turning insert (with wiper)	✓	✓	✗	✗	✗	✗
ISO turning insert (with 0.8 mm nose radius)	✓	✗	✗	✗	✗	✗

✓ Rz = less than 3.2 μm
✗ Rz = 3.2 μm or greater

H	Insert	: STH500-SR BXA10 : 2QP-CNGA120408WL BXA10 : 2QP-CNGA120408 BXA10
	Holder	: CTEL2525-5T12 : ACLNL2525M12-A
	Workpiece material	: SCM415 (60HRC)
	Cutting speed	: $V_c = 120$ m/min
	Feed	: $f = 0.1 - 1.5$ mm/rev
	Depth of cut	: $a_p = 0.1$ mm
	Application	: Face turning, continuous cut
	Coolant	: Wet

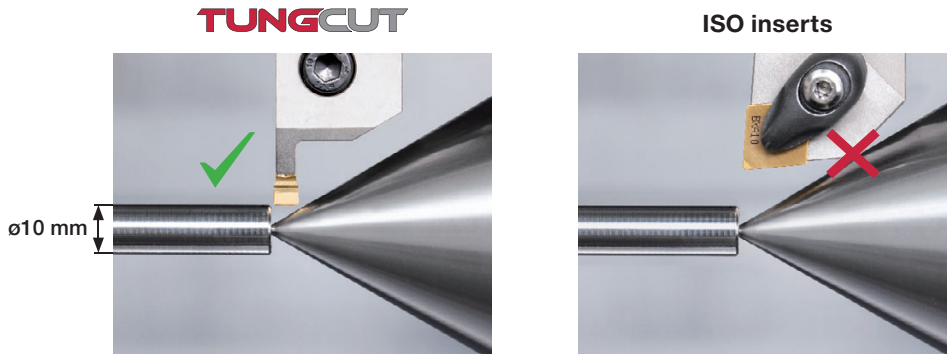
Integration of machining processes

To avoid tool interference, conventional turning method with ISO inserts requires two passes with two different turning holders. Using TungCut CBN insert with a grooving toolholder enables the machining processes to be integrated in a single machining pass.



Minimum tool interference

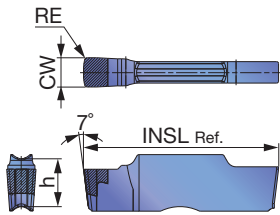
TungCut insert is positioned perpendicular to the workpiece center axis. This minimizes tool interference when entering the cut from the tail stock side, making it easy to machine small-diameter shafts.



INSERT

STH

External and face turning of hardened steel parts



Designation	Seat size	CW ± 0.025	RE	CBN								INSL	h	Edge prep.
				BXA10										SR (S01325)
STH300-SR	3	3	0.3	●								20	5	○
STH500-SR	5	5	0.3	●								25	5.5	○

★ : First choice

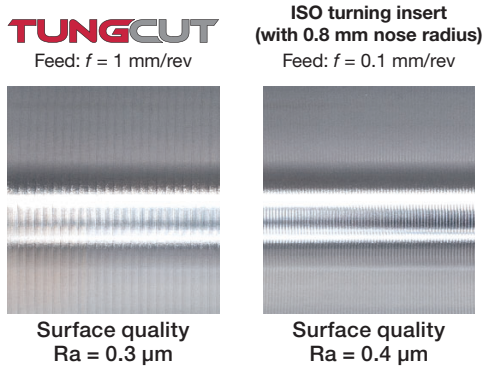
● : New product

STANDARD CUTTING CONDITIONS

ISO	CW	Application	Cutting speed Vc (m/min)	Depth of cut ap (mm)	Feed f (mm/rev)
H	3	External	100 - 230	0.08 - 0.12	0.4 - 1
		Face	100 - 230	0.08 - 0.12	0.4 - 0.8
	5	External	100 - 230	0.08 - 0.12	0.5 - 1.5
		Face	100 - 230	0.08 - 0.12	0.5 - 0.8

■ Cautions when turning with TungCut

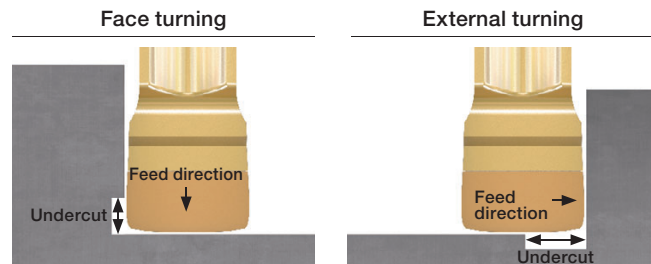
⚠ Since the wiper geometry consists of a long arc, TungCut CBN insert provides wavy surface finishing, despite the results with excellent Ra values.





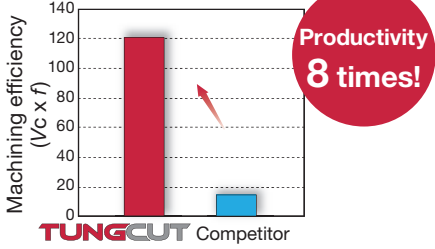
H	Insert	: STH500-SR BXA10
		: 2QP-CNGA120408 BXA10
	Holder	: CTEL2525-5T12
		: ACLNL2525M12-A
	Workpiece material	: SCM415 (60HRC)
	Cutting speed	: $V_c = 150$ m/min
	Feed	: $f = 0.1, 1$ mm/rev
Depth of cut	: $a_p = 0.1$ mm	
Application	: External turning, continuous cut	
Coolant	: Wet	

⚠ Due to the wiper geometry, ensure machine is programmed so that the wiper section of the cutting edge completely passes over the workpiece edge when external turning or face turning, otherwise, material will be left uncut on the workpiece. When cutting towards the wall or bottom, provide proper undercutting, as listed below, at the wall or bottom to eliminate uncut material.

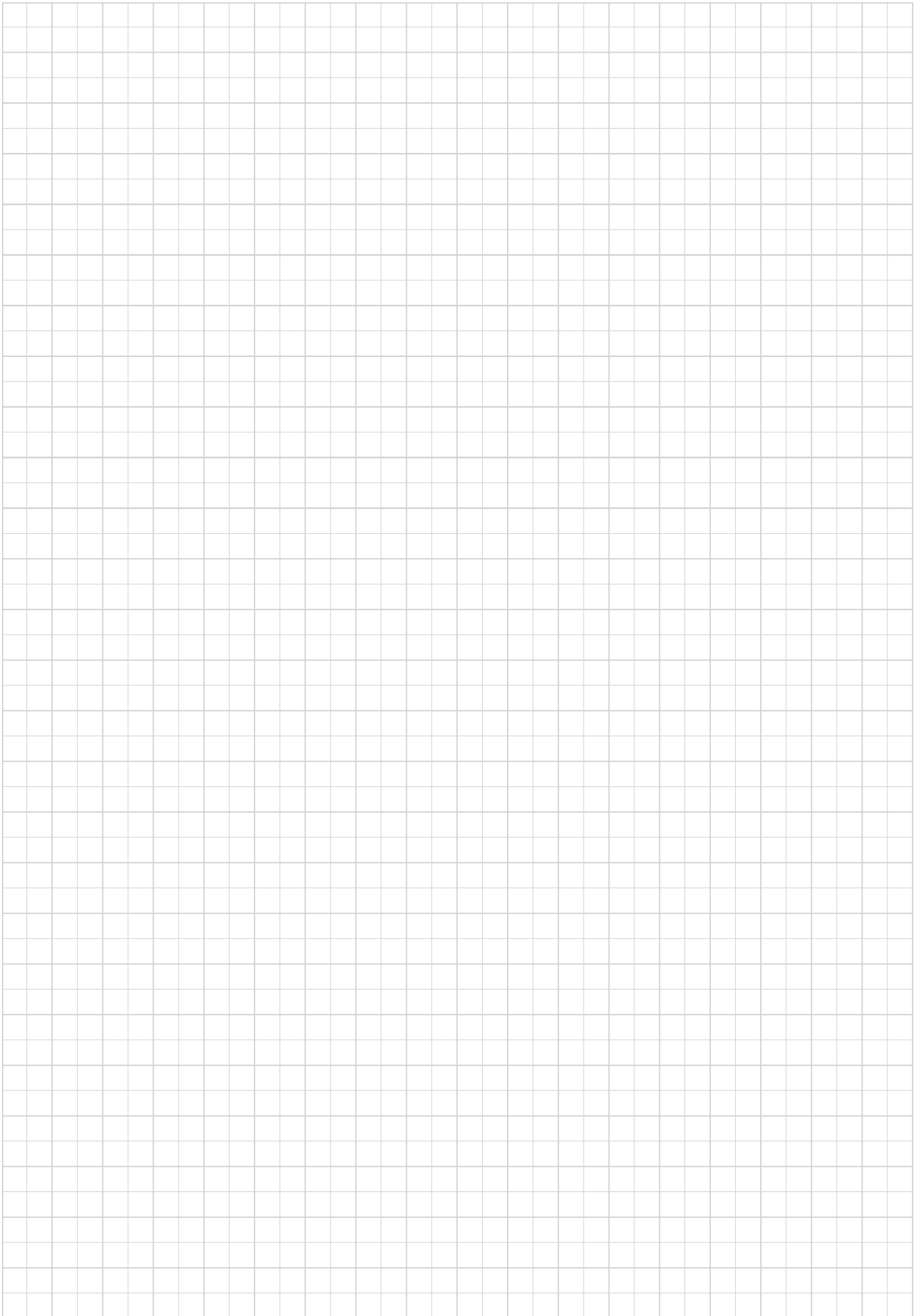
Designation	CW \pm 0.025	Application	Minimum undercutting required (mm)
STH300-SR	3	External	1.5
		Face	0.4
STH500-SR	5	External	2.5
		Face	0.7



■ PRACTICAL EXAMPLES

Workpiece type		Shaft	Shaft
Toolholder		CTER2525-3T25	CTER2525-3T09
Insert		STH300-SR	STH300-SR
Grade		BXA10	BXA10
Workpiece material		SUJ2 / B1 (60HRC)	SKD11 / X153CrMoV12 (60 - 64HRC)
		 H	 H
Cutting conditions	Cutting speed: V_c (m/min)	150	120
	Feed : f (mm/rev)	0.8	1
	Depth of cut : a_p (mm)	0.1 x 3 passes	0.055 x 91 passes
	Application	External turning	External turning
	Coolant	Wet	Wet
Results		 <p>Productivity 8 times!</p> <p>TUNG-CUT Competitor</p> <p>TungCut CBN enabled 8x higher feed rate than ISO insert.</p>	<p>5 mm stock had to be removed by external turning. TungCut CBN provided a high feed rate of 1 mm/rev., providing significantly reduced machining time.</p>

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