CAT.WDXT-M.7/22

SUMITOMO
CARBIDE - CBN - DIAMOND

High Stability Drilling in Stainless Steel

New WDXT-M-ACM300 Chipbreaker

M Chipbreaker
Troubleshooting Challenges in
Stainless Steel

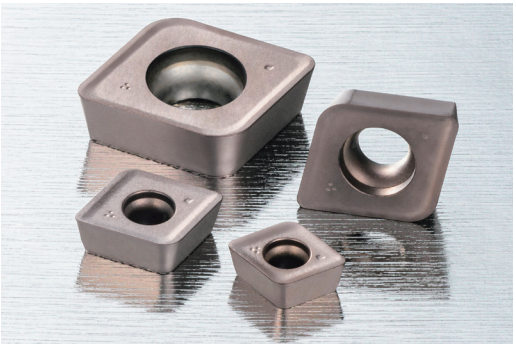
Ready to Create
New Standards

Chipbreaker for Stainless Steel

M

SUMITOMO ELECTRIC GROUP

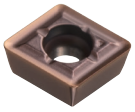
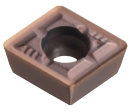
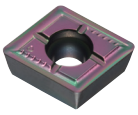
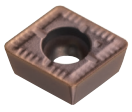
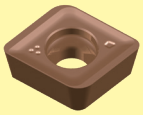
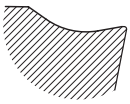
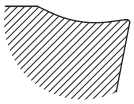
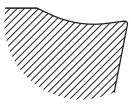
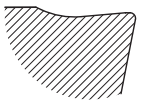
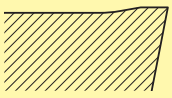
WDXT-M - Stainless Steel Chipbreaker



■ Features and Benefits

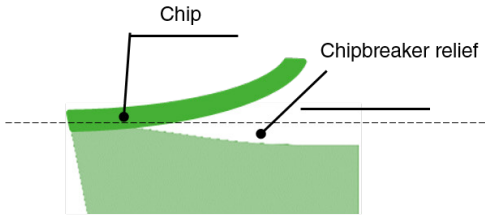
- The Newly developed M chipbreaker for stainless steel machining improves chip control and achieves stable hole quality.
- WDXT-M designed for smooth chip evacuation and machined surface
- M chipbreaker provides excellent hole quality with stable drilling and little vibration.
- WDXT-M, along with ACM300, a grade for stainless steel with a strong edge, establishes stable tool life and excellent wear resistance.

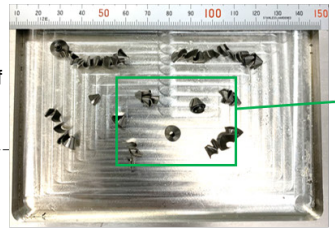
■ WDX Chipbreaker Selection Guide

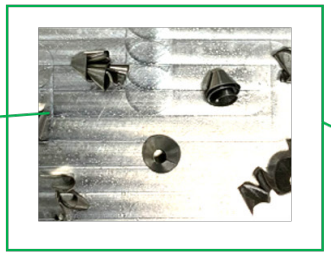
Type	L Chipbreaker	G Chipbreaker		H Chipbreaker	NEW M Chipbreaker
Features	For Low Feed with Chip Evacuation	General-Purpose	For Non-Ferrous Material	Strong Edged	For Stainless Steel Machining
Appearance					
Cross Section					

■ Troubleshoot Issues with Chip Control in Stainless Steel

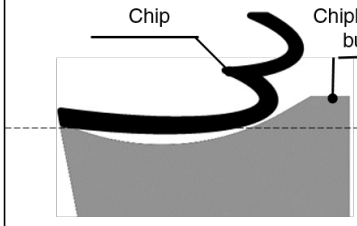
M-Type Chipbreaker

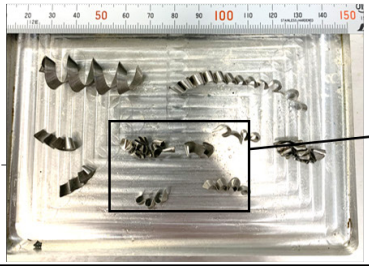


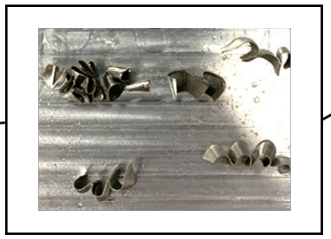




G - Chipbreaker





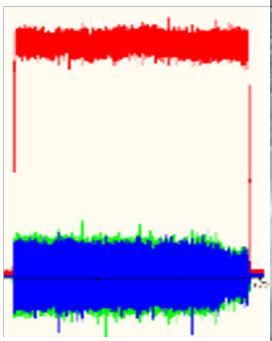


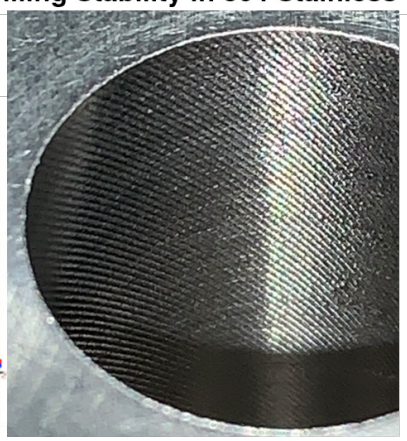
Parameters:
Material: 304 SS
Diameter: .750”
SFM: 492
IPR: .003”
RPM: 2,505
IPM: 7.5”

■ Increase Stability & Hole Quality in Stainless Steel

WDXT-M-ACM300 Drilling Stability in 304 Stainless

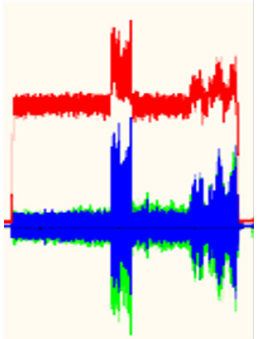
Thrust force (Nm):
Z-Axis: 619 Nm

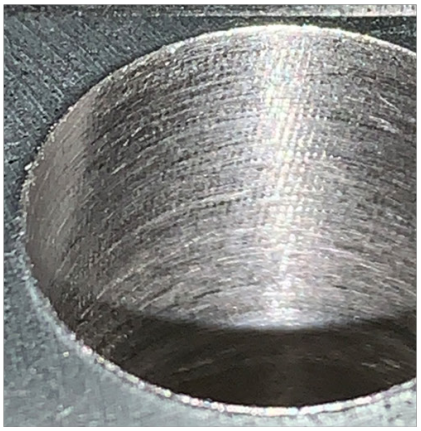




WDXT-G-ACP300 Drilling Stability in 304 Stainless

Thrust force (Nm):
Z-Axis: 436 Nm





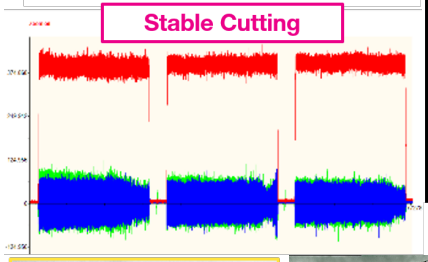
WDXT-M - Stainless Steel Chipbreaker

■ WDXT-M Hole Quality

WDXT-M-ACM300 Provides excellent hole quality via smooth chip evacuation.

WDXT-M-ACM300 Drilling Stability in 316 Stainless

Stable Cutting



Normal chips

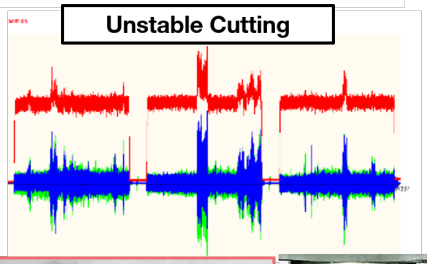
Type	New M Type	G Type
Features	Dedicated for Stainless Steel	General-purpose
Appearance		
Figure		

The Benefits of stable drilling:

- Reliable tool life.
- Reliable chip evacuation.
- Reliable process.

WDXT-G-ACP300 Drilling Stability in 316 Stainless

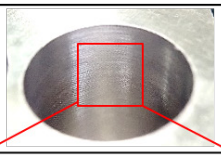
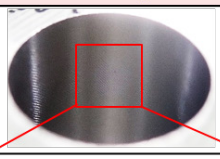
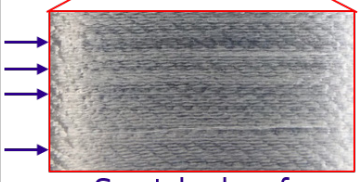
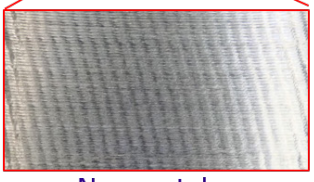
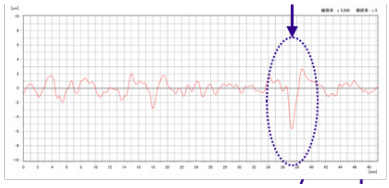
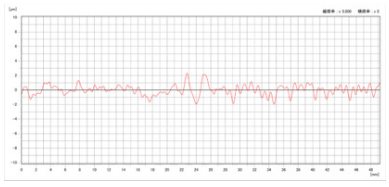
Unstable Cutting



Chip Packing

Rough surface

■ WDXT-M Machined Surface

	Competitor A	WDX M chipbreaker
Quality (Appearance)		
Machined Surface	 Scratched surface	 No scratches
Surface profile (axial direction)	 packing	 No scratches

■ WDXT-M Application Examples

303, 304 Stainless Steel Machine Component		Sumitomo	
Vertical Machining Center BT40 	Tool	WDX210D3S25	HSS Drill
	Grade	ACM300	-
	Chipbreaker	M	-
	Cutter Dia. (*mm*)	*21.0*	21.0
	v_c (SFM)	500	85
	f_z (IPR)	.003	.01
	a_p (inch)	.3543	-
	a_e (inch)	.0039	-
	Coolant	Wet	-
	Results	Achieve larger removal rate than HSS drill. Hole quality was sufficient to tap.	

WDX

Good chip control

Competitor's Product C **M**

Part Material : 304 Stainless Piping Component
Tool : WDX210D3S25 Insert: WDXT063006-M (ACM300)
Cutting Conditions: v_C = 350 SFM f = .0031 IPR H = 1.3386" Wet

· Enables improved chip evacuation and stable drilling.

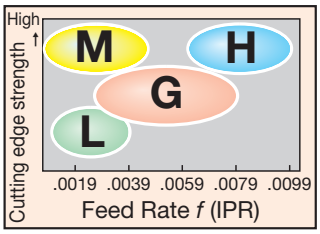
WDXT-M - Stainless Steel Chipbreaker

Insert Selection Guide - Wide Selection of Inserts for WDX Series

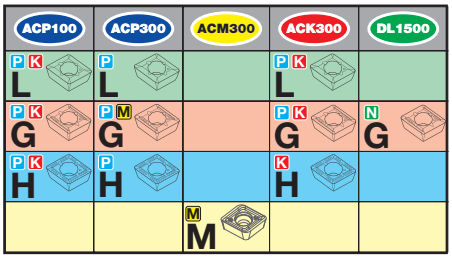
5 Grades

Part Material \ Grade	ACP100	ACP300	ACM300	ACK300	DL1500
P Steel (High-Speed Drilling)	○				
P Steel (General Drilling)		○			
M Stainless Steel		○	○		
K Cast Iron (High-Speed Drilling)	○				
K Cast Iron (General Drilling)				○	
N Non-Ferrous Metals					○

4 Types of Chipbreakers



11 Combinations are possible!



2nd Recommendation (P)

P Steel — For Low Feed with Chip Evacuation

L ACP300

- For drilling various types of Steel
- High speed and low feed is recommended if there are issues with chip control
- Decrease the feed if vibration occurs due to burnt chips

P Steel — General-Purpose

G ACP100

- For drilling of general steel and alloy steel, when prone to significantly large flank wear

P Steel — For Low Feed with Chip Evacuation

L ACP100

- For low-feed conditions

P Steel — Strong Edged

H ACP300

- For drilling with interruptions (entry/through) due to slanted entry, reduce the feed rate in the interrupted area (around f = 0.0019 IPR)
- For insufficient cutting edge strength due to drilling of hardened steel (heat treated)

P Steel: Improved chip control (low carbon steel, etc.)

P Steel: Insufficient wear resistance

P Steel: Initial chipping measures (interruption, high hardness, etc.)

1st Recommendation (P M K N)

General-Purpose

G

- P Steel: For general steel & alloy steel drilling — **ACP300**
- K Cast Iron: For cast iron drilling — **ACK300**
- N Non-Ferrous: For non-ferrous metal drilling — **DL1500**

M Stainless Steel — For stainless steel drilling — ACM300

Stainless Steel

M New

K Cast Iron: Insufficient wear resistance (high-speed drilling)

K Cast Iron: Initial chipping measures (interruption, high feed, etc.)

M: Lack of chip evacuation (extension)

2nd Recommendation (M K)

K Cast Iron — General-purpose

G ACP100

- When heavy flank wear occurs in cast iron drilling
- To limit wear in high-speed, low to medium feed conditions

K Cast Iron — Strong Edged

H ACK300

- When interrupted drilling is performed due to slanted entry, etc. as with steel drilling
- For insufficient cutting edge strength due to high-feed drilling

M — General-Purpose

G ACP300

- When chips extend and clog

*ACP100 is the first recommendation for steel with a hardness of 200HB or greater, or for high-speed drilling of steel.

WDXT-M - Stainless Steel Chipbreaker

■ Insert Availability

Dimensions (inch/ *mm*)

Cat. No.	ACP100	ACP300	ACM300	ACK300	DL1500	Width W1	Thickness S	Nose Radius RE1	Nose Radius RE2	Applicable Holder (Inch / *Metric*)	Fig
WDXT042004-L	•	•		•		.1654 *(4.2)*	.0788 *(2.0)*	.0157 *(0.4)*	.0157 *(0.4)*	WDX0562D□S075 to WDX0594D□S075 *WDX130D□S20 to WDX150D□S20*	1
WDXT042004-G	•	•		•	•						2
WDXT042004-H	•	•		•							3
WDXT042004-M			•						.0314 *(.8)*		4
WDXT052504-L	•	•		•		.1969 *(5.0)*	.0984 *(2.5)*	.0157 *(0.4)*	.0157 *(0.4)*	WDX0625D□S100 to WDX0687D□S100 *WDX155D□S20 to WDX180D□S25*	1
WDXT052504-G	•	•		•	•						2
WDXT052504-H	•	•		•							3
WDXT052504-M			•						.0394 *(1.0)*		4
WDXT063006-L	•	•		•		.2362 *(6.0)*	.1181 *(3.0)*	.0236 *(0.6)*	.0236 *(0.6)*	WDX0750D□S100 to WDX0875D□S100 *WDX185D□S25 to WDX225D□S25*	1
WDXT063006-G	•	•		•	•						2
WDXT063006-H	•	•		•							3
WDXT063006-M			•						.0551 *(1.4)*		4
WDXT073506-L	•	•		•		.2953 *(7.5)*	.1378 *(3.5)*	.0236 *(0.6)*	.0236 *(0.6)*	WDX0937D□S125 to WDX1125D□S125 *WDX230D□S25 to WDX285D□S32*	1
WDXT073506-G	•	•		•	•						2
WDXT073506-H	•	•		•							3
WDXT073506-M			•						.0629 *(1.6)*		4
WDXT094008-L	•	•		•		.3780 *(9.6)*	.1575 *(4.0)*	.0315 *(0.8)*	.0315 *(0.8)*	WDX1187D□S125 to WDX1437D□S150 *WDX290D□S32 to WDX360D□S40*	1
WDXT094008-G	•	•		•	•						2
WDXT094008-H	•	•		•							3
WDXT094008-M			•						.0944 *(2.4)*		4
WDXT125012-L	•	•		•		.4882 *(12.4)*	.1969 *(5.0)*	.0472 *(1.2)*	.0472 *(1.2)*	WDX1500D□S150 to WDX1750D2S150 *WDX370D□S40 to WDX450D2S40*	1
WDXT125012-G	•	•		•	•						2
WDXT125012-H	•	•		•							3
WDXT125012-M			•						.1259 *(3.2)*		4
WDXT156012-L	•	•		•		.5984 *(15.2)*	.2362 *(6.0)*	.0472 *(1.2)*	.0472 *(1.2)*	WDX1812D□S150 to WDX2125D□S150 *WDX460D□S40 to WDX550D2□40*	1
WDXT156012-G	•	•		•	•						2
WDXT156012-H	•	•		•							3
WDXT186012-L	•	•		•		.7087 *(18.0)*	.2362 *(6.0)*	.0472 *(1.2)*	.0472 *(1.2)*	WDX2250D□S150 to WDX2625D□S150 *WDX560D□S40 to WDX680D□S40*	1
WDXT186012-G	•	•		•							2
WDXT186012-H	•	•		•							3

Fig 1 For low feed with chip evacuation

L

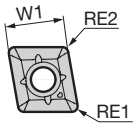


Fig 2 General-purpose

G

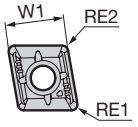


Fig 3 Strong Edged

H

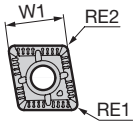
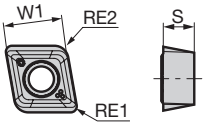


Fig 4 For stainless steel machining

M



• USA stocked item

■ WDXT Identification Code

WDXT 06 30 06 -G

- WDXT: Width Across Flats *(6.0)*
- 06: Thickness x 10 *(3.0)*
- 30: Nose Radius x 10 *(0.6)*
- 06: Chipbreaker
- -G

■ Recommended Cutting Conditions

	Part Material		Workpiece Hardness HB	Recommended Chipbreaker	Recommended Insert Grade	v_c (Cutting Speed) (SFM)	*f* (feed rate) (IPR) (Min. - **Optimum** - Max.) ø0.562 - ø1.00	ø1.062 - ø1.50	ø1.56 - ø2.125	ø2.25 - ø2.625
P	Steel, Carbon Steel	A529	<190	G	ACP300	450 - 780	.002 - .006	.003 - .008	.005 - .010	.006 - .012
		1015 Steel		L	ACP300	450 - 750	.002 - .004	.002 - .005	.003 - .006	N/A
		1045 Steel	190 ~ 250	G	ACP300	400 - 700	.003 - .009	.004 - .010	.005 - .010	.006 - .012
		1045 Steel Hardened		G	ACP100	400 - 700	.002 - .004	.002 - .005	.003 - .006	N/A
		1075 Steel	250 ~ 350	G	ACP100	350 - 550	.003 - .007	.003 - .008	.004 - .009	.004 - .010
		1075 Steel Hardened		G	ACP100	350 - 525	.002 - .004	.002 - .004	.003 - .005	N/A
	Low-alloy Steel	4140,4340	180 ~ 275	L	ACP300	350 - 700	.002 - .007	.003 - .008	.005 - .010	.006 - .010
		4140,4340 Hardened		G	ACP100	350 - 650	.002 - .004	.002 - .005	.003 - .006	N/A
		4140,4340 Hardened	275 ~ 350	G	ACP100	300 - 500	.002 - .006	.003 - .007	.004 - .008	.006 - .009
		4140,4340 Hardened		G	ACP100	300 - 500	.002 - .003	.002 - .004	.003 - .005	N/A
	High-alloy Steel	D2,L6,M2	200 ~ 325	G	ACP100	350 - 650	.003 - .006	.003 - .008	.006 - .010	.006 - .012
		D2,L6,M2 (Sintered)		G	ACP100	300 - 450	.002 - .004	.003 - .005	.003- .006	N/A
M	Stainless Steel	304, 316 (Austenitic)	160	M	ACM300	450 - 700	.003 - .007	.003 - .008	.005 - .010	.006 - .012
		304, 316 (Austenitic)	280	M	ACM300	400 - 550	.002 - .006	.003 - .006	.004 - .008	.006 - .010
		403/Others (Martensitic/Ferritic)	160	M	ACM300	450 - 700	.003 - .007	.003 - .008	.004 - .010	.006 - .012
		403 / Others (Martensitic (hardened))	240	M	ACM300	400 - 600	.002 - .006	.003 - .006	.004 - .008	.006 - .010
K	Cast Iron			H	ACK300	400 - 650	.004 - .008	.004 - .012	.006 - .014	.006 - .017
	Ductile Cast Iron			H	ACK300	300 - 500	.004 - .008	.004 - .012	.006 - .014	.006 - .017
S	Exotic Alloy (Heat-Resistant Alloy, Super Alloy, Titanium Alloy, etc.)		200 ~ 375	G	ACP300	80 - 250	.002 - .005	.003 - .007	.003 - .008	.003 - .010
N	Aluminum Alloy			G	DL1500	650 - 1200	.003 - .006	.003 - .007	.004 - .008	.005 - .010
	Copper Alloy			G	DL1500	600 - 900	.003 - .006	.003 - .007	.004 - .008	.005 - .010

For the P and K grades for which ACP300 and ACK300 inserts are the first recommendation, ACP100 inserts are the second recommendation.
In this case, it is recommended to set the cutting speed (V_c) to 130% and the feed rate (*f*) to 75% of the figures in the table above.