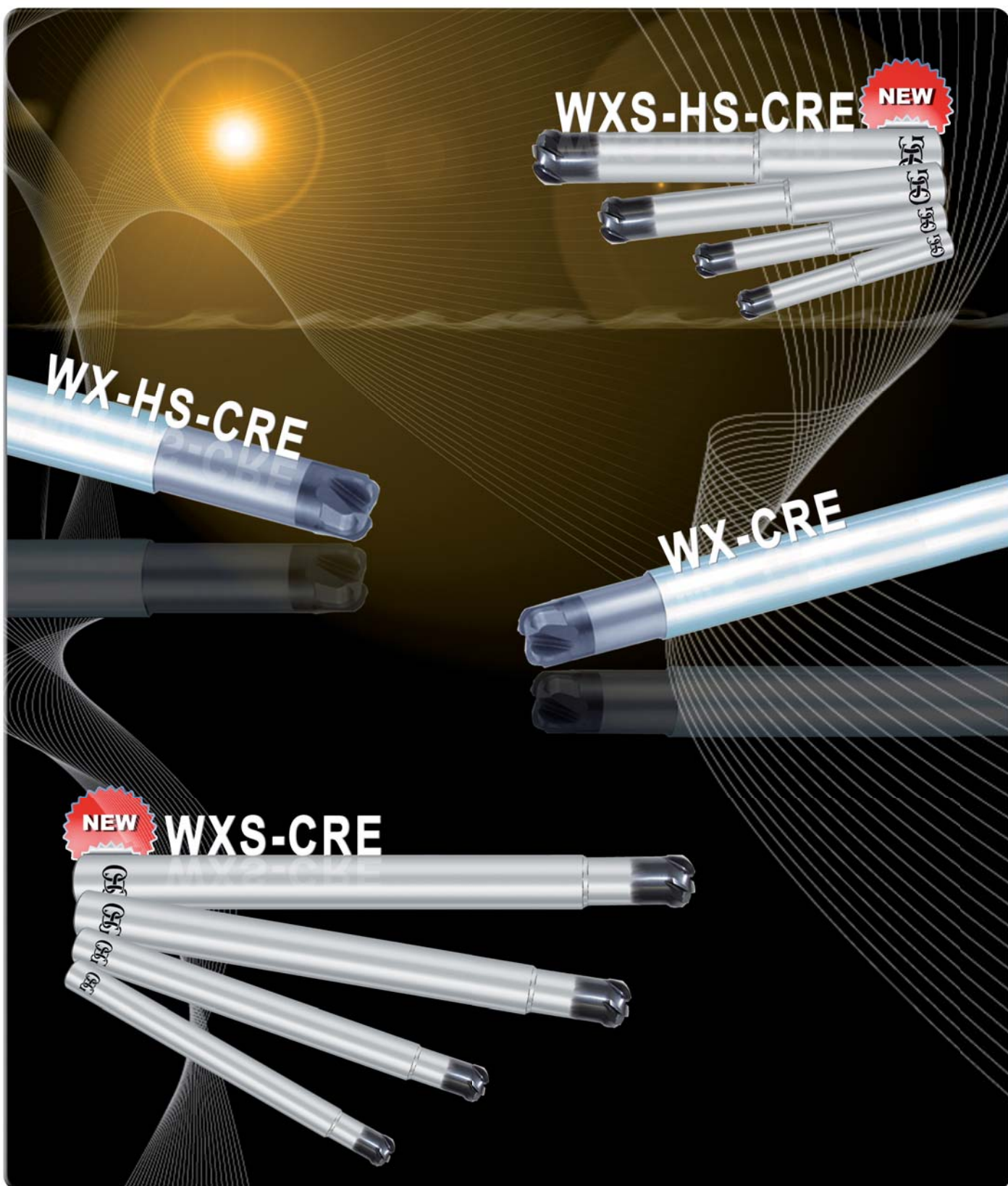




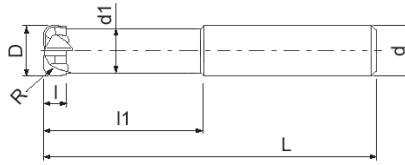
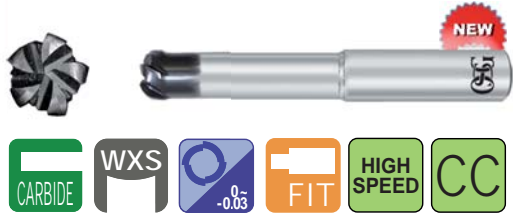
**Corner Radius End Mills for Hardened Materials
up to and over 65 HRC, with super high table speed**



WXS-CRE WXS-HS-CRE



Super Radius End Mills for materials up to and over 65 HRC

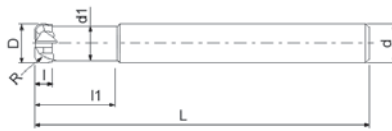


WXS-HS-CRE



EDP	D	R	L	l1	l	d1	d	Z	€
NEW 48107467	6	1,5	50	24	2,5	5,4	6	5	
NEW 48107489	8	2	60	32	3,5	7,2	8	5	
NEW 48107509	10	2	70	40	4	9	10	5	
NEW 48107533	12	3	80	48	5	11	12	5	

Super Radius End Mills for materials up to and over 65 HRC

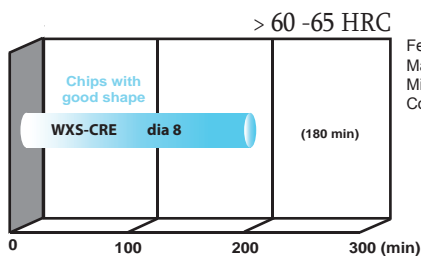


WXS-CRE

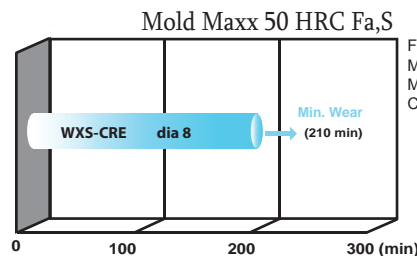
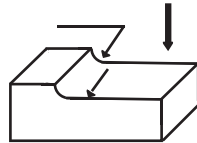


EDP	D	R	L	l1	l	d1	d	Z	€
NEW 48106467	6	1,5	90	12	2,5	5,4	6	5	
NEW 48106489	8	2	100	16	3,5	7,2	8	5	
NEW 48106509	10	2	100	20	4	9	10	5	
NEW 48106533	12	3	110	24	5	11	12	5	

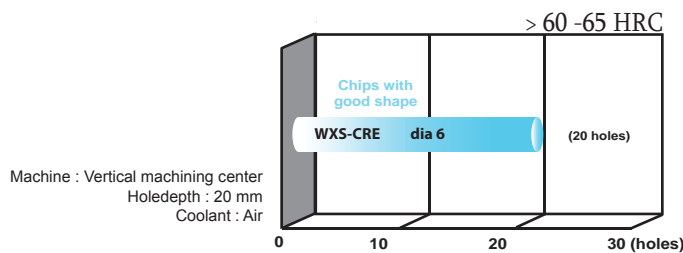
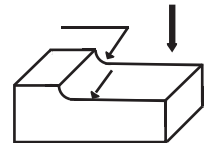
Processing Examples



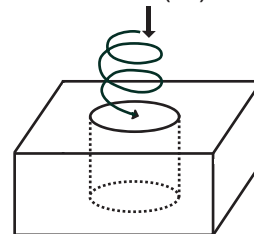
Feed: 63m/min (3 500 mm/min)
Machine : Vertical machining center
Milling depth : ap = 3 mm - ae = 0,1 mm
Coolant : Air



Feed: 130m/min (10 000 mm/min)
Machine : Vertical machining center
Milling depth : ap = 3 - 4 mm - ae = 0,1 mm
Coolant : Air



Machine : Vertical machining center
Holedepth : 20 mm
Coolant : Air

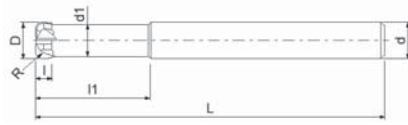


Applications													
WXS-HS-CRE	~40 HRC	~45 HRC	~55 HRC	~60 HRC	~65 HRC	SUS ~35 HRC	GG-GGG ~350 HB	Cu	Al	Graphite	Ti	HRS	Plast.
WXS-CRE	~40 HRC	~45 HRC	~55 HRC	~60 HRC	~65 HRC	SUS ~35 HRC	GG-GGG ~350 HB	Cu	Al	Graphite	Ti	HRS	Plast.

WX-CRE WX-HS-CRE



Super Radius End Mills



WX-HS-CRE



EDP	D	R	L	l1	l	d1	d	Z	€
3019867	6	1,5	50	24	2,5	5,4	6	4	
3019889	8	2	60	32	3,5	7,2	8	4	
3019909	10	2	70	40	4	9	10	4	
3019933	12	3	80	48	5	11	12	4	

Super Radius End Mills



WX-CRE



EDP	D	R	L	l1	l	d1	d	Z	€
8549421	2	0,50	60	5	0,8	1,8	6	4	
8549433	3	0,75	60	7,5	1,2	2,7	6	4	
8549445	4	1	70	10	1,6	3,6	6	4	
8549457	5	1,2	80	12,5	2	4,5	6	4	
8549467	6	1,5	90	12	2,5	5,4	6	4	
8549477	7	1,5	90	-	3	-	6	4	
8549489	8	2	100	16	3,5	7,2	8	4	
8549499	9	2	100	-	4	-	8	4	
8549509	10	2	100	20	4	9	10	4	
8549519	11	2	100	-	4,5	-	10	4	
8549533	12	3	110	24	5	11	12	4	
8549543	13	3	110	-	5,5	-	12	4	

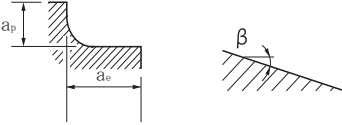
Applications

	~40 HRC	~45 HRC	~55 HRC	~60 HRC	~65 HRC	SUS ~35 HRC	GG-GGG ~350 HB	Cu	Al	Graphite	Ti	HRS	Plast.
WX-HS-CRE	●	●	●	●	○		●						
WX-CRE	●	●	●	●	○		●						

Conditions

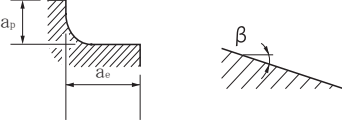
(Low speed, high feed milling)

Regular Milling

Work material	GG		30~38 HRC SKT-SKD-NAK55-HPM1 30~38 HRC		38~45 HRC - SUS SUS304-SKD-NAK80-HPM50 38~45 HRC		45~55 HRC 45~55 HRC		55~60 HRC 55~60 HRC																	
	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)																
Ø																										
6 X R1,5	5.300	7.000	4.250	5.100	3.700	4.450	2.650	2.850	1.600	1.150																
8 X R2	4.000	7.000	3.200	5.100	2.800	4.450	2.000	2.850	1.200	1.150																
10 X R2	3.200	7.000	2.550	5.100	2.250	4.450	1.600	2.850	955	1.150																
12 X R3	2.650	7.000	2.100	5.100	1.850	4.450	1.350	2.850	795	1.150																
Max. cutting depth					<table border="1"> <tr><td>aa</td><td>ar</td></tr> <tr><td>0, 1xR</td><td>0, 3D</td></tr> </table>		aa	ar	0, 1xR	0, 3D	<table border="1"> <tr><td>ae</td><td>ar</td></tr> <tr><td>R ≤ 2</td><td>0, 1 x R 0, 3D</td></tr> <tr><td>2 < R</td><td>0, 2 mm 0, 3D</td></tr> </table>		ae	ar	R ≤ 2	0, 1 x R 0, 3D	2 < R	0, 2 mm 0, 3D	<table border="1"> <tr><td>ae</td><td>ar</td></tr> <tr><td>R ≤ 2</td><td>0, 05 x R 0, 3D</td></tr> <tr><td>2 < R</td><td>0, 1 mm 0, 3D</td></tr> </table>		ae	ar	R ≤ 2	0, 05 x R 0, 3D	2 < R	0, 1 mm 0, 3D
aa	ar																									
0, 1xR	0, 3D																									
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2 < R	0, 2 mm 0, 3D																									
ae	ar																									
R ≤ 2	0, 05 x R 0, 3D																									
2 < R	0, 1 mm 0, 3D																									

(High speed, high feed milling)

High speed milling

Work material	GG		30~38 HRC SKT-SKD-NAK55-HPM1 30~38 HRC		38~45 HRC - SUS SUS304-SKD-NAK80-HPM50 38~45 HRC		45~55 HRC 45~55 HRC		55~60 HRC 55~60 HRC																	
	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)	S (min. ⁻¹)	F (mm/min)																
Ø																										
6 X R1,5	10.600	14.000	10.600	12.700	7.950	9.550	7.950	8.600	5.300	3.800																
8 X R2	7.950	14.000	7.950	12.700	5.950	9.550	5.950	8.600	4.000	3.800																
10 X R2	6.350	14.000	6.350	12.700	4.750	9.550	4.750	8.600	3.200	3.800																
12 X R3	5.300	14.000	5.300	12.700	4.000	9.550	4.000	8.600	2.650	3.800																
Max. cutting depth					<table border="1"> <tr><td>aa</td><td>ar</td></tr> <tr><td>0, 1xR</td><td>0, 3D</td></tr> </table>		aa	ar	0, 1xR	0, 3D	<table border="1"> <tr><td>ae</td><td>ar</td></tr> <tr><td>R ≤ 2</td><td>0, 1 x R 0, 3D</td></tr> <tr><td>2 < R</td><td>0, 2 mm 0, 3D</td></tr> </table>		ae	ar	R ≤ 2	0, 1 x R 0, 3D	2 < R	0, 2 mm 0, 3D	<table border="1"> <tr><td>ae</td><td>ar</td></tr> <tr><td>R ≤ 2</td><td>0, 05 x R 0, 3D</td></tr> <tr><td>2 < R</td><td>0, 1 mm 0, 3D</td></tr> </table>		ae	ar	R ≤ 2	0, 05 x R 0, 3D	2 < R	0, 1 mm 0, 3D
aa	ar																									
0, 1xR	0, 3D																									
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2 < R	0, 2 mm 0, 3D																									
ae	ar																									
R ≤ 2	0, 05 x R 0, 3D																									
2 < R	0, 1 mm 0, 3D																									

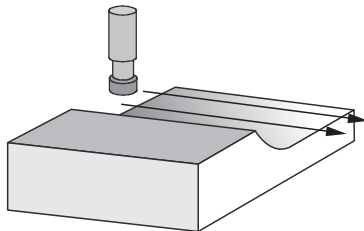
1. Use a rigid and precise machine and holder.
2. These milling conditions are based on milling with circular interpolation at corners. For milling without circular interpolation such as right angle corners, reduce the speed to 50-70% and the cutting depth to 50-80% of the above conditions.
3. We suggest using air blow or MQL (mist).

4. Please adjust the speed, feed and cutting depth according to actual cutting conditions.
5. When WX(S)-CRE enters in Z axis, reduce the feed speed to 30-60% of the above conditions with machining incline angle $\beta \leq 2^\circ$
6. These milling conditions are for a tool extension length: less than 4 x D. For a longer tool extension, reduce the speed, feed rate, and the cutting depth in accordance with the respective coefficients, to prevent chattering.

(%) Tool extension coefficients

Overhang Length	Cutting Speed	aa	Feed
L/D < 4	100	100	100
L/D = 5	60~80	60~80	70~90
L/D = 6	40~60	40~60	60~80

Ultra-high speed conditions



- When milling flat areas with a stable load, the speed and the feed rate of the high-speed conditions can be further increased to 150 - 200 %
- The ultra-high speed conditions are for a tool extension length : less than 4 x D. If the tool extension length is over 4 x D, do not refer to it.

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TOOL COMMUNICATION
OSG CORPORATION

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