

ASR | Pico – Turbo Metric Series – Modular/Bore Type

INSERTS ASRM/ASRB | Pico – Turbo Metric Series – Modular/Bore Type

Inserts		GX Coated	JP Coated	JM Coated	TB Coated			JS Coated	Insert Shape	
ID Code	Item Code	GX2140	JP4005	JP4020	JM4060	TB6005	TB6020	TB6045	JS4060	R
WF235	EPNW0603TN-8	GX2140			JM4060					Fig.1
WF236	EPNW0603TN-8								Fig.2	
WF237	EPNW0603TN-8		JP4005							
WF641	EPNW0603TN-8					TB6005				Fig.3
WF642	EPNW0603TN-8						TB6020			
WF643	EPNW0603TN-8							TB6045		
WF208	EPNW0603TN-8			JP4020					JS4060	
WF209	EPNW0603TN-8									
WF206	EPMT0603TN-8		JP4020							
WF207	EPMT0603TN-8								JS4060	
WF232	EPMT0603TN-8	GX2140								
WF233	EPMT0603TN-8				JM4060					
WF234	EPMT0603TN-8		JP4005						JS4060	
WF231	EPMT0603EN-8LF*				JM4060					

\* LF = Low Force

CAM Radius

ASR | Pico – Recommended Cutting Conditions

Work piece material	Recommend grade & Target hardness (HRC)		Emulsion	Mist	Air	Parameter	D 16 (Z2)					D 20 (Z3)					D 25 (Z4)					
	30	40					50	< 3D		3D-5D	5D-7D	> 7D	< 3D		3D-5D	5D-7D	> 7D	< 3D		3D-5D	5D-7D	> 7D
	General	High Speed					General	High Speed	General	High Speed	General	High Speed	General	High Speed	General	High Speed	General	High Speed	General	High Speed	General	High Speed
I Carbon-Steel II Alloy-Steel <30HRC	GX2140					V <sub>c</sub> (m/min)	90	180	130	130	90	90	180	130	130	90	90	180	130	130	90	
	JS4060					n (min <sup>-1</sup> )	1790	3580	2590	2590	1790	1430	2860	2070	2070	1430	1150	2290	1660	1660	1150	
	TB6045					f <sub>z</sub> feed/tooth	0.8	1.4	0.8	0.8	0.8	1	1.6	1	1	1	1	1.6	1	1	1	
						V <sub>f</sub> (mm/min)	2860	10030	4140	4140	2860	4300	13750	6210	6210	4300	4580	14670	6620	6620	4580	
						a <sub>p</sub> (mm)	0.8	0.6	0.6	0.5	0.4	1	0.5	0.8	0.6	0.4	1	0.5	0.8	0.6	0.4	
						Q (cm <sup>3</sup> /min)	12	12	12	12	12	15	15	15	15	15	20	20	20	20	20	
III Alloy-Steel Tool-Steel 30-40HRC	GX2140					V <sub>c</sub> (m/min)	90	180	130	130	90	90	180	130	130	90	90	180	130	130	90	
	JS4060					n (min <sup>-1</sup> )	1790	3580	2590	2590	1790	1430	2860	2070	2070	1430	1150	2290	1660	1660	1150	
	TB6045					f <sub>z</sub> feed/tooth	0.8	1.4	0.8	0.8	0.8	1	1.6	1	1	1	1	1.6	1	1	1	
						V <sub>f</sub> (mm/min)	2860	10030	4140	4140	2860	4300	13750	6210	6210	4300	4580	14670	6620	6620	4580	
						a <sub>p</sub> (mm)	0.6	0.4	0.5	0.4	0.3	0.8	0.4	0.6	0.5	0.35	0.8	0.4	0.6	0.5	0.35	
						Q (cm <sup>3</sup> /min)	12	12	12	12	12	15	15	15	15	15	20	20	20	20	20	
IV Pre-Hardened Steel Tool-Steel 40-50HRC			TB6020			V <sub>c</sub> (m/min)	90	130	90	90	90	130	90	90	90	90	130	90	90	90		
			JP4020			n (min <sup>-1</sup> )	1790	2590	1790	1790	1790	1430	2070	1430	1430	1430	1150	1660	1150	1150		
			TB6045			f <sub>z</sub> feed/tooth	0.6	1.2	0.8	0.8	0.8	0.8	1.4	0.8	0.8	0.8	0.8	1.4	0.8	0.8		
						V <sub>f</sub> (mm/min)	2150	6210	2860	2860	2860	3440	8690	3440	3440	3440	3670	9270	3670	3670		
						a <sub>p</sub> (mm)	0.5	0.35	0.4	0.3	0.2	0.6	0.35	0.5	0.4	0.25	0.6	0.35	0.5	0.4		
						Q (cm <sup>3</sup> /min)	13	26	14	10	7	31	46	26	21	13	44	65	37	29		
V Pre-Hardened Steel Tool-Steel 50-55HRC			TB6020			V <sub>c</sub> (m/min)	80	120	80	80	80	120	80	80	80	80	120	80	80			
			JP4020			n (min <sup>-1</sup> )	1590	2390	1590	1590	1590	1270	1910	1270	1270	1020	1530	1020	1020			
			TB6045			f <sub>z</sub> feed/tooth	0.5	1	0.6	0.6	0.6	0.6	1	0.6	0.6	0.6	1	0.6	0.6			
						V <sub>f</sub> (mm/min)	1590	4770	1910	1910	1910	2290	5730	2290	2290	2290	2440	6110	2440	2440		
						a <sub>p</sub> (mm)	0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.35			
						Q (cm <sup>3</sup> /min)	8	14	8	6	3	14	21	12	9	5	20	31	17			
VI Pre-Hardened Steel Tool-Steel >55HRC			JP4005			V <sub>c</sub> (m/min)	65	90	65	65	65	65	90	65	65	65	65	90	65			
			TB6005			n (min <sup>-1</sup> )	1290	1790	1290	1290	1290	1030	1430	1030	1030	1030	830	1150	830			
						f <sub>z</sub> feed/tooth	0.5	0.8	0.5	0.5	0.5	0.5	0.8	0.5	0.5	0.5	0.8	0.5				
						V <sub>f</sub> (mm/min)	1290	2860	1290	1290	1290	1550	3440	1550	1550	1550	1660	3670	1660			
						a <sub>p</sub> (mm)	0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.35	0.25	0.15	0.4	0.25				
						Q (cm <sup>3</sup> /min)	6	9	5	4	2	9	13	8	6	3	13	18				
VII Stainless steel			JM4060			V <sub>c</sub> (m/min)	90	160	120	100	90	90	160	120	100	90	90	160				
			JP4020			n (min <sup>-1</sup> )	1790	3180	2390	1990	1790	1430	2550	1910	1590	1430	1150	2040				
						f <sub>z</sub> feed/tooth	0.6	1	0.6	0.6	0.6	0.6	1	0.6	0.6	0.6	1	0.6				
						V <sub>f</sub> (mm/min)	2150	6370	2860	2390	2150	2580	7640	3440	2860	2580	2750	8150	3670			
						a <sub>p</sub> (mm)	0.8	0.5	0.6	0.5	0.4	0.8	0.5	0.6	0.5	0.4	0.8	0.5				
						Q (cm <sup>3</sup> /min)	21	38	21	14	10	31	57	31	21	15	44	82				
VIII Cast-Iron GG GGG			TB6020			V <sub>c</sub> (m/min)	90	180	130	130	90	90	180	130	130	90	90	180				
			JP4020			n (min <sup>-1</sup> )	1790	3580	2590	2590	1790	1430	2860	2070	2070	1430	1150	2290				
			TB6045			f <sub>z</sub> feed/tooth	1.2	1.6	1.2	1.2	1.2	1.4	1.8	1.4	1.4	1.4	1.4	1.8				
						V <sub>f</sub> (mm/min)	4300	11460	6210	6210	4300	6020	15470	8690	8690	6020	6420	16500				
			GX2140			a <sub>p</sub> (mm)	1	0.8	0.8	0.6	0.5	1.25	1	0.8	0.6	0.4	1.25	1				
						Q (cm <sup>3</sup> /min)	12	12	12	12	12	15	15	15	15	15	20	20				

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**Item Info: Grades & Insert Shape**

**GX2140: CVD coating for heavy roughing of mild steel ( $\leq 35\text{HRC}$ )**

- Smooth surface of coating: Better adhesion resistance
- Thicker Al<sub>2</sub>O<sub>3</sub> layer: Better heat resistance
- Nano-Ti(C.N): Better wear resistance
- Tougher substrate: Better crack resistance

**JP4005: For high-hardened material ( $\geq 50\text{HRC}$ )**  
Ultra micro grain & higher-adhesive coating

**PICO LF Type (Fig. 3) Low Force**

- sharper than standard chip breaker
- better for sticky material

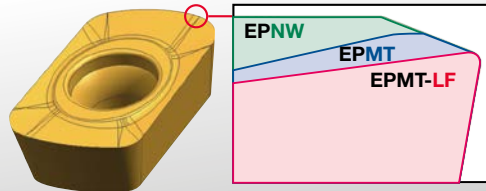
**JM4060: For stainless steel**

Advanced PVD technology makes higher adherence

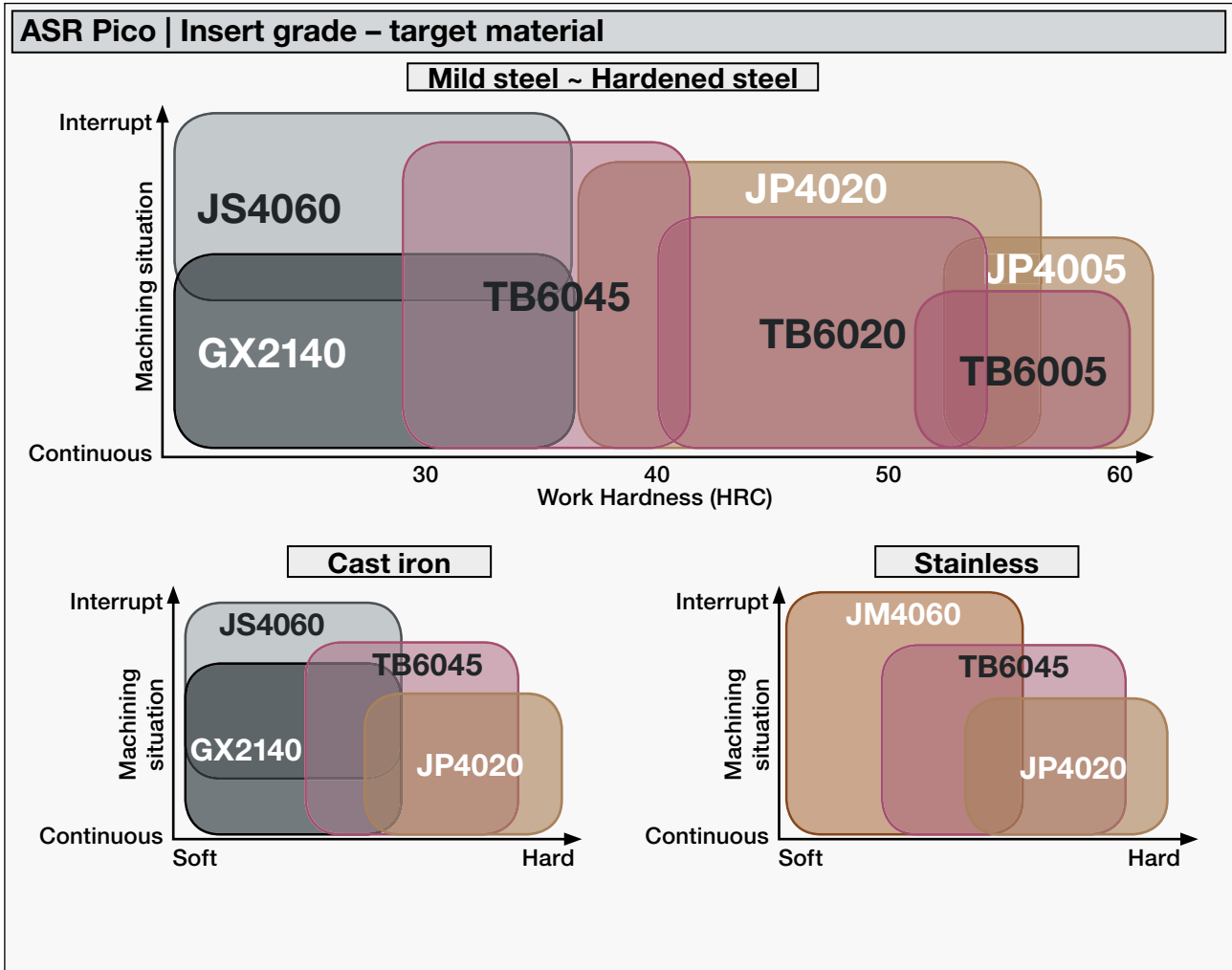
- best form for stainless steel
- better wear & chipping resistance

Combination with tougher substrate makes

- higher heat resistance
- better chipping resistance



D 32 (Z5)					D 40 (Z6)					D 42 (Z6)					D 52 (Z7)		D 66 (Z8)	
< 3D		3D-5D	5D-7D	> 7D	< 3D		3D-5D	5D-7D	> 7D	< 3D		3D-5D	5D-7D	> 7D	< 3D		< 3D	
General	High Speed				General	High Speed				General	High Speed				General	High Speed	General	High Speed
90	180	130	130	90	90	180	130	130	90	90	180	130	130	90	90	180	90	180
900	1790	1290	1290	900	720	1430	1030	1030	720	680	1360	990	990	680	550	1100	430	870
1	1.6	1	1	1	1	1.6	1	1	1	1	1.6	1	1	1	1	1.6	1	1.6
4480	14320	6470	6470	4480	4300	13750	6210	6210	4300	4090	13100	5910	5910	4090	3860	12340	3470	11110
1	0.5	0.8	0.6	0.4	1	0.5	0.8	0.6	0.4	1	0.5	0.8	0.6	0.4	1	0.5	1	0.5
24	24	24	24	24	30	30	30	30	30	32	32	32	32	32	40	40	50	50
108	172	124	93	43	129	206	149	112	52	131	210	151	113	52	154	247	174	278
90	180	130	130	90	90	180	130	130	90	90	180	130	130	90	90	180	90	180
900	1790	1290	1290	900	720	1430	1030	1030	720	680	1360	990	990	680	550	1100	430	870
1	1.6	1	1	1	1	1.6	1	1	1	1	1.6	1	1	1	1	1.6	1	1.6
4480	14320	6470	6470	4480	4300	13750	6210	6210	4300	4090	13100	5910	5910	4090	3860	12340	3470	11110
0.8	0.4	0.6	0.5	0.35	0.8	0.4	0.6	0.5	0.35	0.8	0.4	0.6	0.5	0.35	0.8	0.4	0.8	0.4
24	24	24	24	24	30	30	30	30	30	32	32	32	32	32	40	40	50	50
86	137	93	78	38	103	165	112	93	45	105	168	113	95	46	124	197	139	222
90	130	90	90	90	90	130	90	90	90	90	130	90	90	90	90	130	90	130
900	1290	900	900	900	720	1030	720	720	720	680	990	680	680	680	0.8	800	430	630
0.8	1.4	0.8	0.8	0.8	0.8	1.4	0.8	0.8	0.8	0.8	1.4	0.8	0.8	0.8	0.8	1.4	0.8	1.4
3580	9050	3580	3580	3580	3440	8690	3440	3440	3440	3270	8280	3270	3270	3270	3090	7800	2780	7020
0.6	0.35	0.5	0.4	0.25	0.6	0.35	0.5	0.4	0.25	0.6	0.35	0.5	0.4	0.25	0.6	0.35	0.6	0.35
24	24	24	24	24	30	30	30	30	30	32	32	32	32	32	40	40	50	50
52	76	43	34	21	62	91	52	41	26	63	93	52	42	26	74	109	83	123
80	120	80	80	80	80	120	80	80	80	80	120	80	80	80	80	120	80	120
800	1190	800	800	800	640	950	640	640	640	610	910	610	610	610	490	730	390	580
0.6	1	0.6	0.6	0.6	0.6	1	0.6	0.6	0.6	0.6	1	0.6	0.6	0.6	0.6	1	0.6	1
2390	5970	2390	2390	2390	2290	5730	2290	2290	2290	2180	5460	2180	2180	2180	2060	5140	1850	4630
0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.4	0.25
24	24	24	24	24	30	30	30	30	30	32	32	32	32	32	40	40	50	50
23	36	20	14	9	27	43	24	17	10	28	44	24	17	10	33	51	37	58
65	90	65	65	65	65	90	65	65	65	65	90	65	65	65	65	90	65	90
650	900	650	650	650	520	720	520	520	520	490	680	490	490	490	400	550	310	430
0.5	0.8	0.5	0.5	0.5	0.5	0.8	0.5	0.5	0.5	0.5	0.8	0.5	0.5	0.5	0.5	0.8	0.5	0.8
1620	3580	1620	1620	1620	1550	3440	1550	1550	1550	1480	3270	1480	1480	1480	1390	3090	1250	2780
0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.35	0.25	0.15	0.4	0.25	0.4	0.25
24	24	24	24	24	30	30	30	30	30	32	32	32	32	32	40	40	50	50
16	21	14	10	6	19	26	16	12	7	19	26	17	12	7	22	31	25	35
90	160	120	100	90	90	160	120	100	90	90	160	120	100	90	90	160	90	160
900	1590	1190	990	900	720	1270	950	800	720	680	1210	910	760	680	550	980	430	770
0.6	1	0.6	0.6	0.6	0.6	1	0.6	0.6	0.6	0.6	1	0.6	0.6	0.6	0.6	1	0.6	1
2690	7960	3580	2980	2690	2580	7640	3440	2860	2580	2460	7280	3270	2730	2460	2310	6860	2080	6170
0.8	0.5	0.6	0.5	0.4	0.8	0.5	0.6	0.5	0.4	0.8	0.5	0.6	0.5	0.4	0.8	0.5	0.8	0.5
24	24	24	24	24	30	30	30	30	30	32	32	32	32	32	40	40	50	50
52	96	52	36	26	62	115	62	43	31	63	116	63	44	31	74	137	83	154
90	180	130	130	90	90	180	130	130	90	90	180	130	130	90	90	180	90	180
900	1790	1290	1290	900	720	1430	1030	1030	720	680	1360	990	990	680	550	1100	430	870
1.4	1.8	1.4	1.4	1.4	1.4	1.8	1.4	1.4	1.4	1.4	1.8	1.4	1.4	1.4	1.4	1.8	1.4	1.8
6270	16110	9050	9050	6270	6020	15470	8690	8690	6020	5730	14730	8280	8280	5730	5400	13880	4860	12500
1.25	1	0.8	0.6	0.4	1.25	1	0.8	0.6	0.4	1.25	1	0.8	0.6	0.4	1.25	1	1.25	1
24	24	24	24	24	30	30	30	30	30	32	32	32	32	32	40	40	50	50
188	387	174	130	60	226	464	209	156	72	229	471	212	159	73	270	555	304	625



**Product Range**

Solid Carbide End Mills



Indexable Milling Tools



WHNSB Drills



Milling Chucks



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