

Tungaloy

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Tungaloy Report No. 429-US

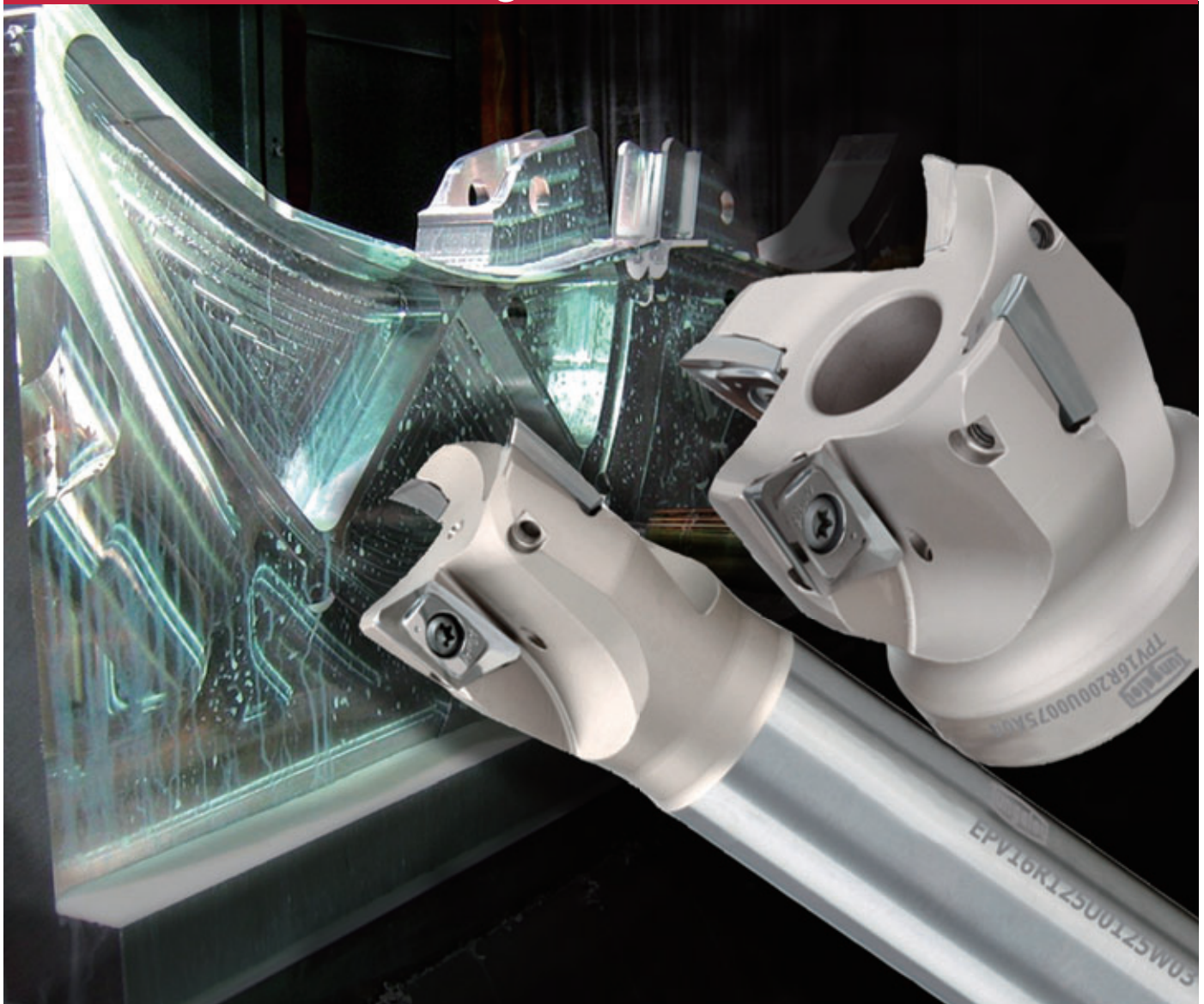
MILLLINE High Speed Milling Cutter

TUNG-ALUMILL

NEW

**NEW
CHIPBREAKER**

**Exceptional productivity for aluminum and
non-ferrous machining**



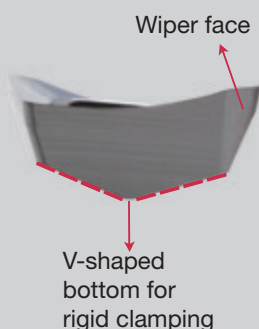
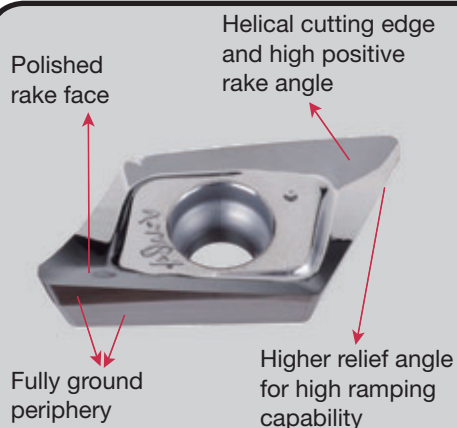
Outstanding productivity in demanding applications high helical ramping, straight ramping

Features

- 1 Exceptional productivity for aluminum and non-ferrous material machining
- 2 Can be applied to rough and finish machining
- 3 Available in various corner radii (.015" - .196")
- 4 Secure, stable and unique "V" bottom insert design
- 5 No movement during high ramp machining

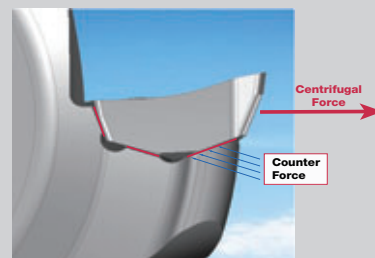
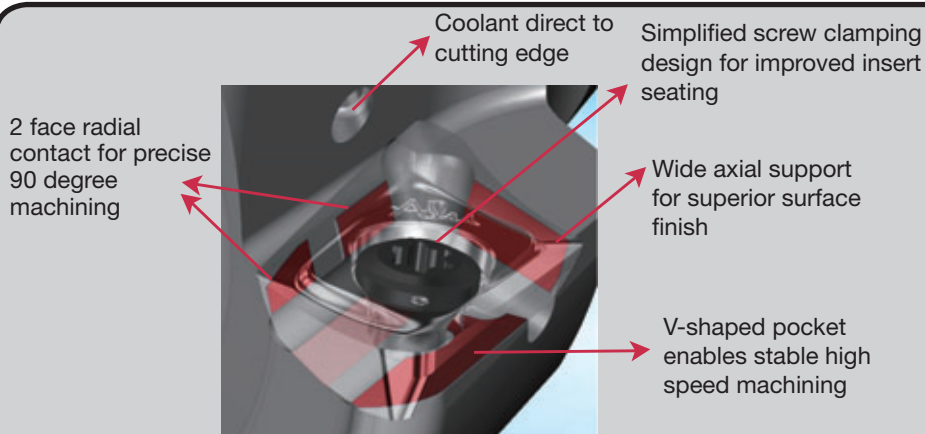


Inserts



Various Corner Radii

Body



ending applications such as ramping and step milling!

FE Model Analysis

Tool: EPV16R125U0125W02

Insert: XVCT 160508R-AJ

Cutting Condition

- Feed .006 IPT/tooth, RPM 20,000, Depth of cut .197, Width of cut .394, Ramping



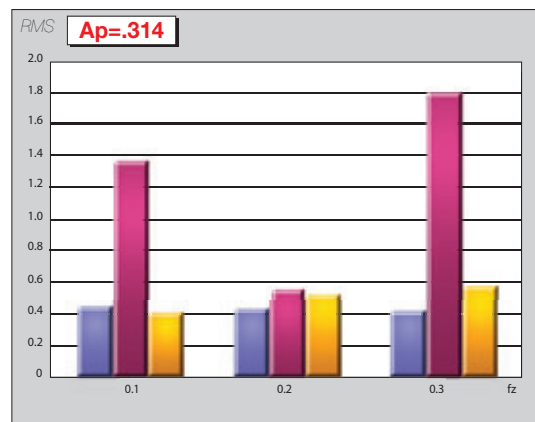
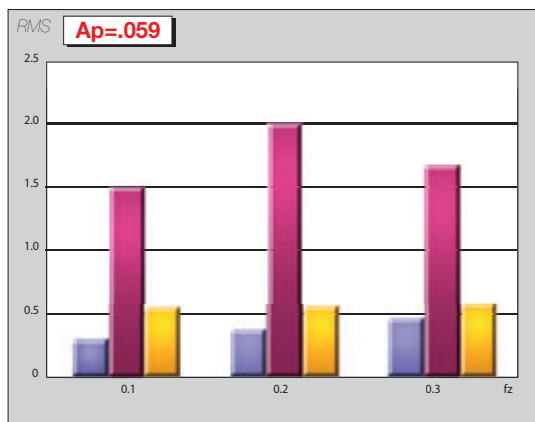
	TUNG-ALUMILL -V Shaped Design	General Type
Insert Movement (ramping down cutting)	3.0 μm	10.5 μm
Stress of Screw	100%	120%

Surface Roughness Test (Average roughness, Ra)

Tool: EPV16R125U0125W02

Insert: XVCT 160508R-AJ

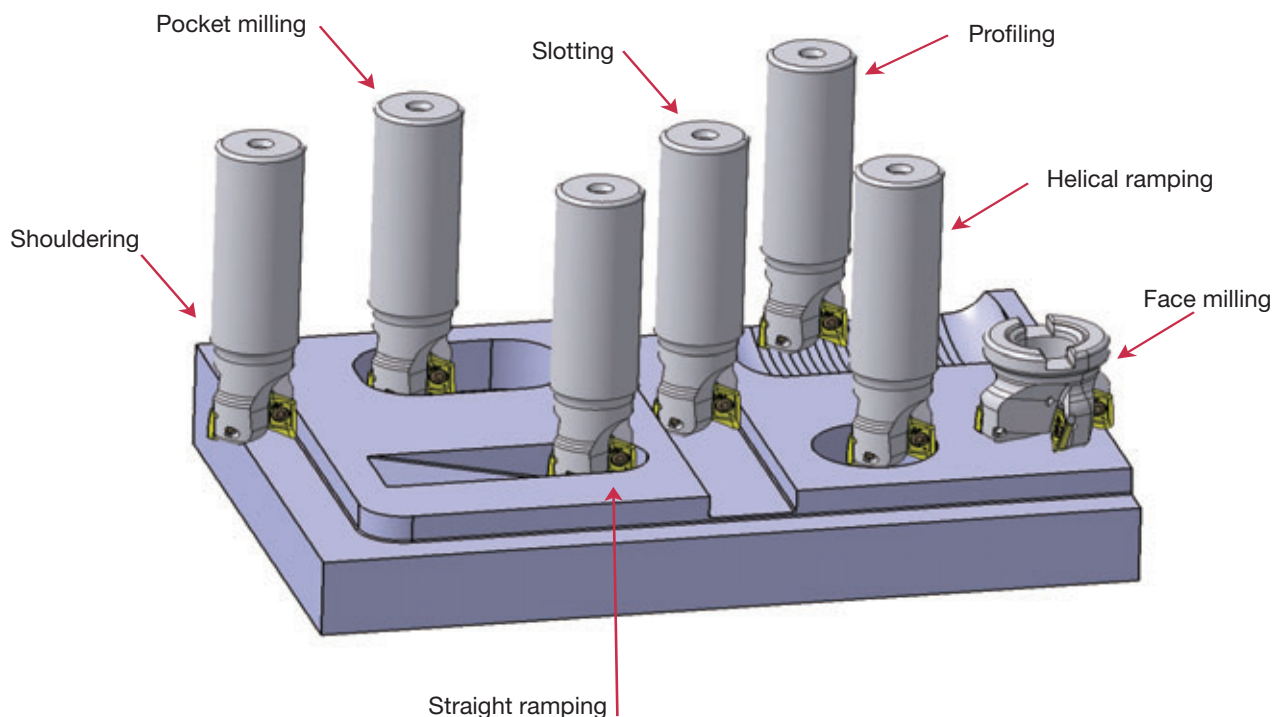
- Material: Aluminum alloy, RPM 6,000, Rd=1.0", Dry, All inserts clamped



■ XVCT 160508R-AJ
■ Competitor A
■ Competitor B

Target

- General application - Multi purpose milling

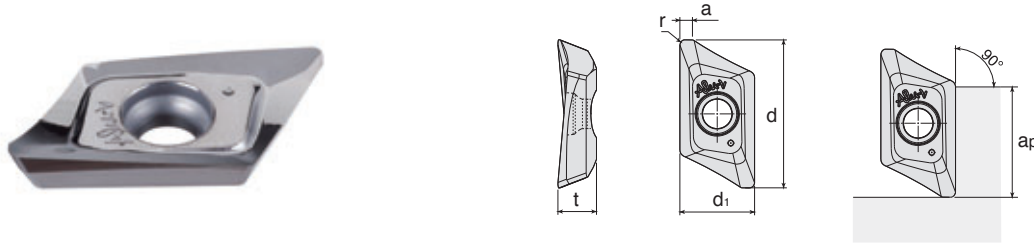


- Where productivity needs to be increased while maintaining accurate machining and high surface quality.
- Roughing and finishing with one tool.
- Reducing tool numbers in the machine magazine by replacing solid carbide end mills for finishing operation.
- Components that require high precision such as aerospace frame part.

Safety guidelines

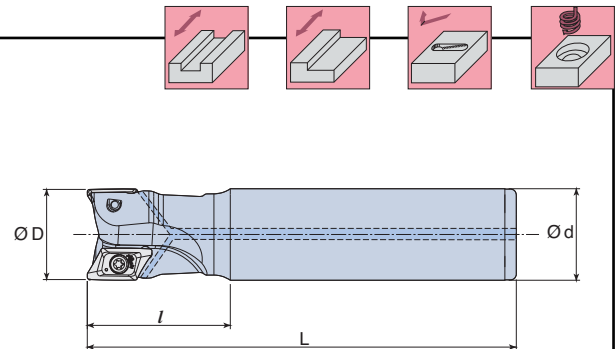
1. Use only original inserts and cutters including components.
2. Insert pocket must be cleaned before clamping insert.
3. Clamp torque of screw: 4.5Nm (46 kgf.cm, 40 in.lbs.)
4. For safety reasons, it is recommended to use a new screw after every insert change.
5. Since maximum RPM values were determined based on the burst test, using RPM beyond maximum values may cause insert breakage, machine damage and personal injury.
6. Because XVCT insert has sharp cutting edge, always wear gloves for protection from injury when handling.

Insert



Cat. No.	Stock	Dimensions (inch)						Grade
		d	d ₁	t	a	r	ap	
XVCT160504R-AJ	●	.875	.442	.232	.051	.016	.630	TH10
XVCT160508R-AJ	●	.875	.442	.232	.039	.031	.630	TH10
XVCT160512R-AJ	●	.855	.442	.228	.039	.047	.610	TH10
XVCT160516R-AJ	●	.835	.442	.226	.039	.063	.590	TH10
XVCT160520R-AJ	●	.818	.442	.226	.039	.079	.570	TH10
XVCT160524R-AJ	●	.800	.442	.224	.039	.094	.551	TH10
XVCT160530R-AJ	●	.766	.442	.220	.039	.118	.551	TH10
XVCT160532R-AJ	●	.757	.442	.220	.039	.126	.551	TH10
XVCT160540R-AJ	●	.724	.442	.216	.047	.157	.511	TH10
XVCT160550R-AJ	●	.722	.442	.212	.015	.197	.511	TH10

End Mill Type



Cat. No.	Stock	No. of Teeth	Dimensions(inch)				Coolant	Insert	Max. RPM
			D	d	L	l			
EPV16R100U0100W02	●	2	1.000	1.000	5.000	2.000	with	XVCT1605□□R-AJ	38,000
EPV16R100U0100W02L	●	2	1.000	1.000	7.000	3.000	with		38,000
EPV16R125U0125W02	●	2	1.250	1.250	6.000	2.000	with		34,000
EPV16R125U0125W02L	●	2	1.250	1.250	8.000	3.000	with		34,000
EPV16R125U0125W03	●	3	1.250	1.250	6.000	2.000	with		34,000
EPV16R125U0125W03L	●	3	1.250	1.250	8.000	3.000	with		34,000
EPV16R150U0125W03	●	3	1.500	1.250	7.000	2.000	with		30,000
EPV16R150U0125W03L	●	3	1.500	1.250	10.000	2.000	with		30,000

• Coolant through type

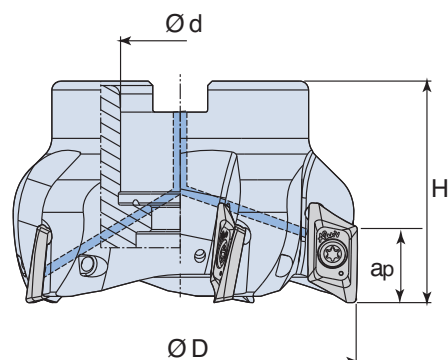
• Cutter body for XVCT 16 insert with corner radius more than .125" should be modified based on the following: Body radius = insert radius - .012"

● : Stocked items

Face Mill Type

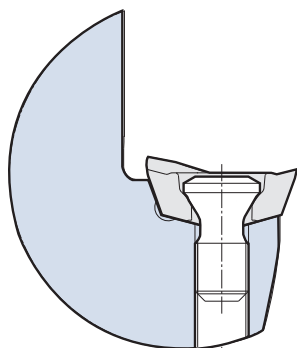


• K=90°



Cat. No.	Stock	Insert	Teeth	Dimensions(inch)			Max RPM	Coolant	Mounting Bolt
				D	d	H			
TPV16R150U0075A03	●	XVCT 1605□□R-AJ	3	1.500	.750	2.000	30,000	with	TCS 9.525-35-I
TPV16R200U0075A04	●		4	2.000	.750	2.000	27,000	with	SD06-46
TPV16R250U0100A05	●		5	2.500	1.000	2.000	24,000	with	SD08-47
TPV16R300U0100A05	●		5	3.000	1.000	2.000	21,000	with	SD08-47
TPV16R400U0150A06	●		6	4.000	1.500	2.500	19,000	with	SD12-82
TPV16R500U0150A07	●		7	5.000	1.500	2.500	17,000	with	SD12-82

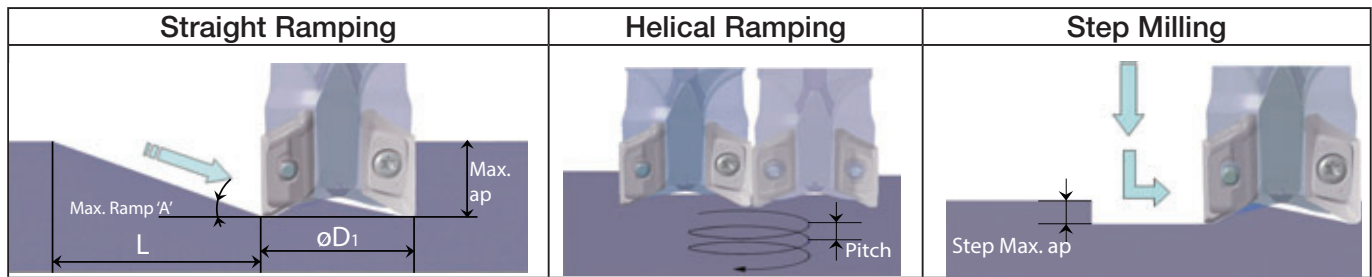
Components



Screw		Wrench	
TS 40085I/HG (Dia. 1.0)		Torx Bit	BT15S
TS 40093I/HG (Dia. 1.25>)		Grip	H-TB

● : Stocked items

Ramping Data



●XVCT 16 (.016" - .047" Radius)

Cutter Dia.(D ₁)	Straight Ramp Down			Helical Ramp Down			Step Down
	Max. Ramp (A°)	Max. ap (in)	Min. Length (L)	Min. Dia.	Max. Dia	Max. Pitch/Rev	Max. ap
1.0	22°	.630	1.57	1.150		.173	.166
					1.970	1.06	.166
1.25	16.5°	.630	2.13	1.690		.346	.158
					2.520	.996	.158
1.50	11.5°	.630	3.11	2.330		.409	.158
					3.150	.854	.158
2.0	9.5°	.630	3.78	3.110		.512	.158
					3.940	.879	.158
2.5	7°	.630	5.12	4.130		.543	.158
					4.960	.811	.158
3.0	5°	.630	7.2	5.470		.543	.158
					6.300	.736	.158
4.0	3.5°	.630	10.31	7.040		.508	.158
					7.870	.642	.158
5.0	2.5°	.630	14.45	9.020		.476	.158
					9.840	.575	.158

●XVCT 16 (.062" - .078" Radius)

Cutter Dia.(D ₁)	Straight Ramp Down			Helical Ramp Down			Step Down
	Max. Ramp (A°)	Max. ap (in)	Min. Length (L)	Min. Dia.	Max. Dia	Max. Pitch/Rev	Max. ap
1.0	22°	.610	1.5	1.150		.173	.146
					1.970	1.06	.146
1.25	16°	.610	2.13	1.690		.335	.138
					2.520	.965	.138
1.50	11°	.610	3.15	2.330		.389	.138
					3.150	.815	.138
2.0	9°	.610	3.86	3.110		.484	.138
					3.940	.831	.138
2.5	6.5°	.610	5.35	4.130		.504	.138
					4.960	.752	.138
3.0	4.5°	.610	7.76	5.470		.488	.138
					6.300	.661	.138
4.0	3°	.610	11.65	7.040		.437	.138
					7.870	.551	.138
5.0	2°	.610	17.48	9.020		.382	.138
					9.840	.457	.138

● XVCT 16 (.118" - .125" Radius)

Cutter Dia.(D1)	Straight Ramp Down			Helical Ramp Down			Step Down
	Max. Ramp (A°)	Max. ap (in)	Min. Length (L)	Min. Dia.	Max. Dia	Max. Pitch/Rev	Max. ap
1.0	21°	.571	1.5	1.15		.167	.098
					1.97	1.01	.098
1.25	15°	.571	2.13	1.70		.311	.118
					2.52	.902	.118
1.50	10°	.571	3.23	2.33		.354	.118
					3.15	.740	.118
2.0	8°	.571	4.06	3.11		.429	.118
					3.94	.748	.118
2.5	6°	.571	5.43	4.14		.465	.118
					4.96	.697	.118
3.0	4°	.571	8.15	5.48		.433	.118
					6.30	.587	.118
4.0	2.5°	.571	13.07	7.05		.362	.118
					7.87	.457	.118
5.0	1.5°	.571	21.87	9.02		.287	.118
					9.84	.343	.118

● XVCT 16 (.157" - .196" Radius)

Cutter Dia.(D1)	Straight Ramp Down			Helical Ramp Down			Step Down
	Max. Ramp (A°)	Max. ap (in)	Min. Length (L)	Min. Dia.	Max. Dia	Max. Pitch/Rev	Max. ap
1.0	18.5°	.531	1.57	1.15		.147	.090
					1.97	.879	.090
1.25	13.5°	.531	2.20	1.70		.280	.098
					2.52	.807	.098
1.50	8.5°	.531	3.54	2.33		.299	.098
					3.15	.626	.098
2.0	7°	.531	4.33	3.11		.374	.098
					3.94	.646	.098
2.5	5.5°	.531	5.51	4.14		.425	.098
					4.96	.638	.098
3.0	3.5°	.531	8.70	5.48		.378	.098
					6.30	.516	.098
4.0	2.5°	.531	12.17	7.05		.362	.098
					7.87	.457	.098
5.0	1.5°	.531	20.31	9.02		.287	.098
					9.84	.343	.098

● Recommended Cutting Conditions

Material			HB	SFM	Best grade	Feed(IPT)
Aluminum wrought alloy		Not cureable	60	900-1600	TH10	.006 -.015
		Cured	100	650-6600	TH10	.004 -.010
Aluminum-cast, alloyed	<=12% Si	Not cureable	75	650-6600	TH10	.006 -.012
		Cured	90	650-5000	TH10	.004 -.010
	>12% Si	High temp.	130	650-3200	TH10	.003 -.006
Copper alloys	>1% Pb	Free cutting	110	650-2600	TH10	.003 -.006
		Brass	90	900-3200	TH10	.004 -.006
		Electrolytic copper	100	900-2600	TH10	.004 -.006
Non-metallic		Duroplastics, fiber plastics	-	300-1600	TH10	.004 -.006
		Hard rubber	-	300-900	TH10	.004 -.006

● Case Study 1

Cutting conditions	TUNG-ALUMILL	Competitor
Cutter	TPV16R200U0075A04	D50 face mill
Diameter (inch)	2.0	2.0
Insert	XVCT 160404R-AJ TH10	12mm carbide insert
No. of teeth	4	4
Cutting Speed	(RPM 14,000)	(RPM 14,000)
fz (in/tooth)	.007	.007
Table Feed (IPM)	394	394
Depth of Cut (in)	.205	.157
Width of Cut (in)	1.40	1.40
Coolant	Wet	Wet
Tool Life (hrs)	4hrs/corner	3hrs/corner
Cutting time (min)	28	45

- Reduced cutting load enables higher DOC. Improved productivity with better tool life.

● Case Study 2

Cutting conditions	TUNG-ALUMILL	Competitor
Cutter	EPV16R125U0125W03	1.250 endmill
Diameter (inch)	1.25	1.25
Insert	XVCT 160430R-AJ TH10	5/8 carbide insert
No. of teeth	3	3
Cutting Speed(RPM)	(RPM 9,000)	(RPM 9,000)
fz (IPT)	.012	.010
Table Feed (IPM)	320	295
Depth of Cut(inch)	Rough .120, Finish .010	Rough .120, Finish .010
Width of Cut(inch)	Varies	Varies
Coolant	Wet	Wet
Tool Life (pcs)	3pcs/corner	3pcs/corner

- Reduced cutting load enables improved productivity via a higher feed rate.

● Case Study 3

Cutting conditions	TUNG-ALUMILL	Competitor
Cutter	EPV16R100U0100W02	Solid carbide endmill
Diameter (inch)	1.00	5/8
Insert	XVCT 160404R-AJ TH10	-
No. of teeth	2	3
Cutting Speed(RPM)	(RPM 10,000)	(RPM 10,000)
fz (IPT)	.006	.003
Table Feed (IPM)	118	95
Depth of Cut (inch)	.390	.390
Width of Cut (inch)	Varies	Varies
Coolant	Wet	Wet

- Cost reduction due to higher feed rate.
- Good surface quality due to unique insert geometry.



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