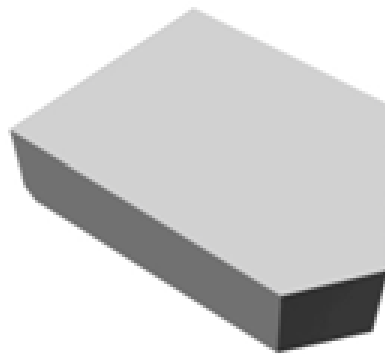




# Cemented Carbide

## Mining Roof Bits

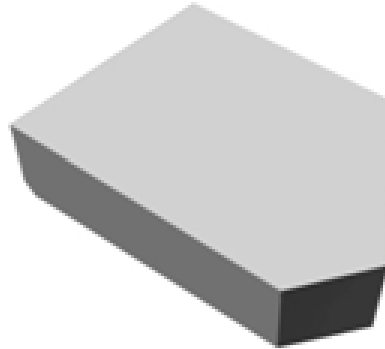
M10



	t	H	S	a	ψ	ψ <sub>1</sub>	α <sub>1</sub>	α <sub>2</sub>	α <sub>3</sub>	α <sub>4</sub>	β	e		
M1011L	11.0	13.5	3.0	4.5	24°46'	35°	15°	3°	15°	15°	3.0	e	G87047	
M1012R	12.0	14.0	3.5	8.0	30°	30°		15°				15°	15°	1.0
M1013R	13.5	13.5	3.0	7.5	21°48'	26°34'	3°							/
M10-93001	15.0	15.0		5.0	35°	30°	10°	/	/	/		/	1.0	
M10-93002				10.0	30°	35°		/						G97493
M10-97003		19.0		5.0	35°	30		/	G97494					
M10-97004				10.0	30°	35°	/	S122						
M1015L		22.0		/	5.0	30°	35°	10°	10°	/		S122		
M1015R					10.0	30°	35°	10°	/					



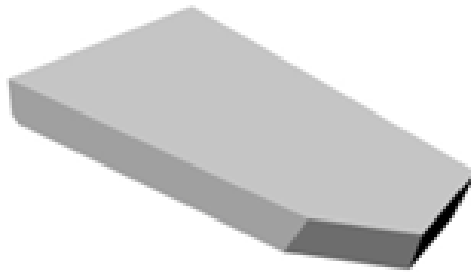
# M10



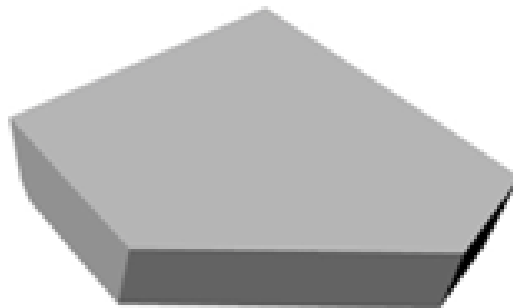
	t	H	S	a	ψ	ψ <sub>1</sub>	α <sub>1</sub>	α <sub>2</sub>	α <sub>3</sub>	α <sub>4</sub>	β	e		
M1011L	11.0	13.5	3.0	4.5	24°46'	35°	15°	3°	15°	15°	3.0	e	G87047	
M1012R	12.0	14.0	3.5	8.0	30°	30°		15°				1.0	G87048	
M1013R	13.5	13.5	3.0	7.5	21°48'	26°34'	3°	/						/
M10-93001	15.0	15.0		5.0	35°	30°	/	10°	/	20°		20°	1.0	
M10-93002				10.0	30°	35°	/		G97493					
M10-97003		19.0		5.0	35°	30	/							S122
M10-97004				10.0	30°	35°	/	S122						
M1015L		22.0		5.0	30°	35°	/		10°	/				
M1015R				10.0	30°	35°	10°							



# M11



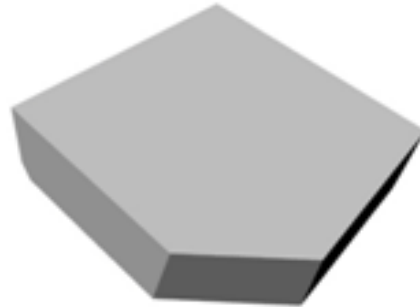
	<b>t</b>	<b>H</b>	<b>h</b>	<b>S</b>	
M1113	13.4	26.0	23.8	3.0	S226



	<b>H</b>	<b>B</b>	<b>C</b>	<b>α</b>	<b>β</b>	<b>γ</b>	<b>δ</b>	<b>a</b>	
M11-94001	21.0	15.0	3.0	35°	30°	3°	20°	5.0	G94752

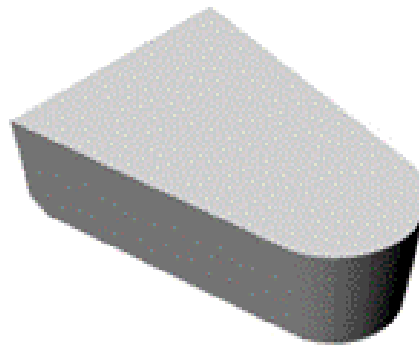


### M11 (cont'd)



	H	B	C	$\alpha$	$\beta$	$\gamma$	$\delta$	a	
M11-94002	21.0	15.0	3.0	30°	35°	3°	20°	16.0	G94753

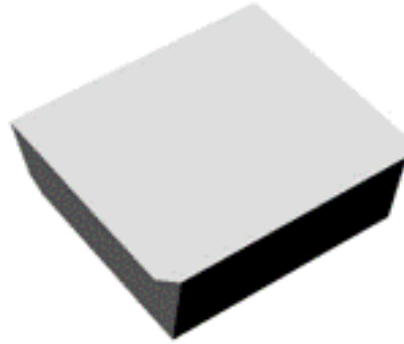
### M12



	t	H	S	R	$\alpha$	$\alpha 1$	e	
M1215	15.5	22.0	7.0	5.0	15o	4o	1.5	G83556
M1222	22.0	22.5	7.5	9.5	11o	/		G81034
M1230	30.0	35.0	12.0	8.0	8o	8o	1.0	X7406



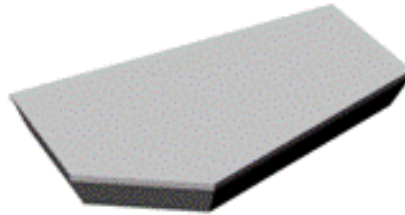
# M13



	<b>L</b>	<b>t</b>	<b>S</b>	<b><math>\alpha</math></b>	<b><math>\beta</math></b>	<b>e</b>	<b><math>e_1</math></b>	
M1314	14.0	16.0	6.0	15°	/	/	1.0	G90109
M13-98001	15.0	10.0	3.0		15°	/	/	MP-98001
M1317	17.5	15.5	6.0	10°	10°	1.0	1.0	G81168
M1319	19.0	16.0		8°		1.0		G81169



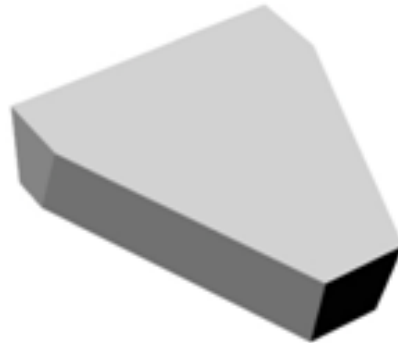
# M14



	L	t	S	a	t <sub>1</sub>	t <sub>2</sub>	α	α <sub>1</sub>	α <sub>2</sub>	β	b	e	
M1425	25.0	15.0	3.0	12.5	10.0	10.0	15°	15°	15°	/	/	/	MP-9804
M1427L	27.5	22.0	4.5	12.0	11.0	15.0	10°	5°	/	2°	/	/	G84246
M1428R	28.0	18.0	8.0	19.0	14.0	16.0	14°	14°	/	/	/	/	G88117
M1443L	43.0	21.0		18.0	12.0	10.0	8°	/	/	/	/	1.0	G83305
M14-77001		23.0			18.2	14.9	12°	12°	/	/	/	/	G7264
M1445L	45.0	27.0	9.0	15.0	18.0	18.0	10°	10°	/	/	/	1.0	X7402
M1445LA				22.5					/	/	/		X7403
M1445R				30.0					/	/	/		X7401

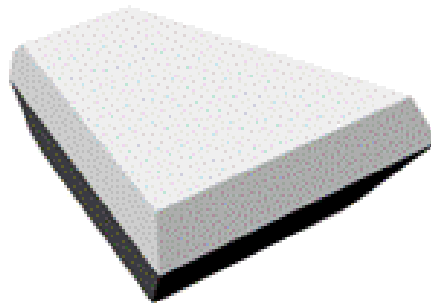


### M15



	H	t	S	a	$\beta$	a	b	
M1521	26.0	21.0	7.0	6°	6°	6.0	6.0	G85261

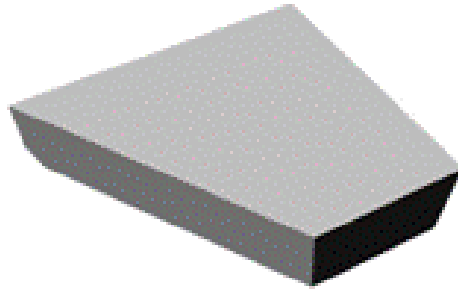
### M16



	H	t	S	a	$\alpha$	$\alpha_1$	$\beta$	e	
M1612	12.0	7.0	4.0	1.0	30°	15°	2°30'	0.5	G89358
M1616	16.0	15.0	6.0	2.0	37°	19°	15°	1.0	G08775
M1620	20.0	16.0	8.0	3.0	63°	52°	/		G85169



# M17



	H	t	S	$\alpha$	$\alpha_1$	$\alpha_2$	$\beta$	$\gamma$	e	
M1715	15.0	15.0	3.0	16°	10°	10°	76°	83°	1.0	LS88-012

# M18

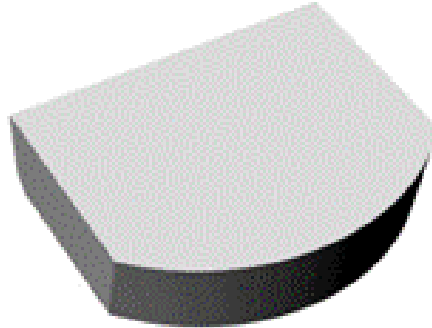


	L	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	t	t <sub>1</sub>	S	S <sub>1</sub>	R	h	$\alpha$	$\beta$	e	
M1820	22.0	22.0	13.0	12.5	22.0	20.0	16.7	9.0	25.0	14.0	128°	110°	1.0	G81033





# M19



	L	t	S	R	$\alpha$	$\beta$	e	
M1922	22.0	19.0	6.0	65.0	15°	5°	1.0	G9010 8
M1928	28.0			22.0	10°	10°		G8117 0

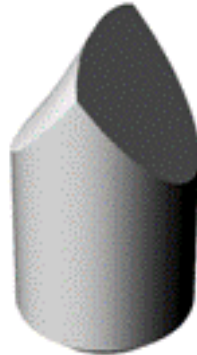
# M20



	D	H	h	h <sub>1</sub>	r	$\alpha$	$\alpha_1$	$\beta$	e	
M20-97001	14.8	20.5	12.5	4.0	2.0	90°	35°	45°	1.5	G97580
M2018	18.0	30.0	20.0	6.0	1.5	80°	30°		1.0	X7404
M20-98002		35.0	28.0	4.0	2.5	110°	45°	62°30'	3.5	G98140



## M21



	D	H	R	$\alpha$	$\beta$	r	a	e	
M2110	10.0	18.0	8.0	53°	30°	53°	/	1.0	G87039
M2110A		20.0	5.5	50°	45°	52°	/		S410

## M22



	D	H	R	$R_1$	h	a	$\alpha_1$	$\alpha_2$	$\alpha_3$	$\beta$	e	
M2212	12.0	22.0	9.0	1.0	9.5	2.0	50°	50°	125°	30°	1.0	G87036
M2212A	12.5	25.0			15.5	2.3	45°	55°				G08675



# M23



	<b>D</b>	<b>H</b>	<b>R</b>	<b>α</b>	<b>β</b>	<b>r</b>	<b>a</b>	<b>e</b>		
M23-92001	11.0	21.0	56°	30°	48°	120°	130°	2.0	G92081	
M2312	12.0	22.0							58°	47°
M2312A		25.0	45°	48°	G85260					
M2312B	12.5				56°				48°	G81607
M23-92002	14.0	20.0	45°	48°						G92241
M2314		22.0								G87040
M2314A		25.0			G81608					



# M24



	<b>D</b>	<b>H</b>	<b>R</b>	<b>γ</b>	<b>h</b>	<b>β</b>	<b>e</b>	<b>D</b>	
M2417	17.0	16.5	26.0	/	15.9	60°	3.9	G87042	G92081
M2417A		29.5		1.8	18.9			G08674	G87037



# M25



	D	H	R	R <sub>1</sub>	h <sub>0</sub>	α	α <sub>1</sub>	α <sub>2</sub>	α <sub>3</sub>	β	a	e	
M25-86002	12.5	25.0	1.5	3.0	1.0	80°	35°	110°	120°	45°	1.0	1.0	G86278
M2513	13.0	24.0			/		55°						G85034
M2513A			1.0	60°	100°		90°	60°	0.5	G86277			
M2513B			1.1	55°				62°30'	/	6.0	G90055		
M2514	14.0			1.0	60°		60°	0.5	G85035				



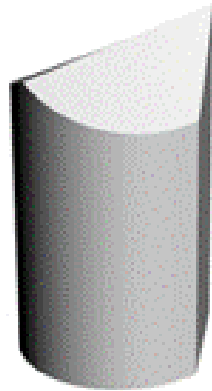
# M27



	D	H	R	$\alpha$	$\beta$	$\gamma$	r	a	e	
M27-81001	11.5	25.0	6.0	58°	45°	50°	/	/	1.0	G81201
M2712	12.5		9.0	48°		32°	/	2.3		G82681
M2712A			10.0		47°	23°	45°	/	1.3	2.0
M2713	13.0	24.0			53°	45°	50°	1.0	1.0	1.0
M2715	15.0	22.0	11.0	45°	30°	45°	/	/	2.6	G6597
M2715A		22.6	10.0	41°30'	39°	51°	1.0	-1.1	2.4	G5465
M2717	17.8	20.0	14.4	37°30'	45°	67°30'	/	/	1.5	G8154



# M28



	<b>t</b>	<b>t<sub>1</sub></b>	<b>H</b>	<b>R</b>	<b>α</b>	<b>β</b>	<b>γ</b>	
M2812	12.5	12.0	20.0	6.0	7°	100°	90°	G83645

# M29



	<b>D</b>	<b>H</b>	<b>a</b>	<b>α</b>	<b>β</b>	<b>γ</b>	
M2910	10.0	20.0	1.5	75°	60°	1.0	G83150
M29-77001				65°	/	/	G7310