

# Drilling Family



***MZE***

***MZS***

**TAFM NPX BRS**

**MZE MZS**

**Micro  
MZE/MZS**

# Drilling Family



## TAFM

- New 3:1 length diameter ratio • High helix and large flute capacity • 4 cutting edges per insert • Wide range of chipbreakers • Excellent grade profile • Coolant thru. nickel plated drill body is designed to resist heat and chip wash • Stock diameters: Inch (.468 thru 2-1/4") • Metric Diameters: (12 thru 56mm)
- Ideal for both non-rotating and rotating applications

## TAFL

- New 4:1 length to diameter design • High helix and large flute capacity • 4 cutting edges per insert • 3 available chipbreakers • Wide grade profile • Coolant thru nickel plated drill body is designed to resist heat and chip wash • Stock diameters: Inch (.625 thru 1-1/4") • Metric diameters are stock in Japan • Ideal for both non-rotating and rotating applications

## TAFS

- New 2:1 length to diameter ratio design • High helix and large flute capacity • 4 cutting edges per insert • 3 available chipbreakers • Wide grade profile • Coolant thru nickel plated drill body is designed to resist heat and chip wash • Stock diameters: Inch (.625 thru 1-1/4")
- Metric diameters are stock in Japan • Ideal for both non-rotating and rotating applications

## NPXL

- Two effective insert drill with screw down inserts • Higher penetration when compared to conventional insert drills • Screw down insert can be indexed on the machine • Total inserts cost comparable to the cost of a re-conditioned drill • Low cost close tolerance insert is ideal for most drilling application • Coolant thru nickel plated drill body is designed to resist heat and chip wash • Drill body design accepts a range of both inch and metric inserts • Stock diameters: Inch (.750 thru 1-5/32") Metric (20 thru 30mm) • 140 degree point angle • 120 degree helix angle • Length to diameter ratio 3-4:1 • PVD grades GP20M (TiCN/Tin on C5 substrate) • Close tolerance drill • Ideal for both non-rotating and rotating applications • Not recommended for low carbon or gummy materials

## BRS

- Brazed carbide tip drill with coolant holes • Steel body • Re grindable-center point design • Stock diameters: Inch (.500 thru 1.188") Metric (14 thru 20mm)
- 150 degree point angle • 30 degree helix angle • Length to diameter ratio: 3-4:1 • PVD grades: GP20M (TiCN/Tin on C5 substrate) • Close tolerances • Ideal for both non-rotating and rotating applications • Recommended for low carbon or gummy materials

## MZE

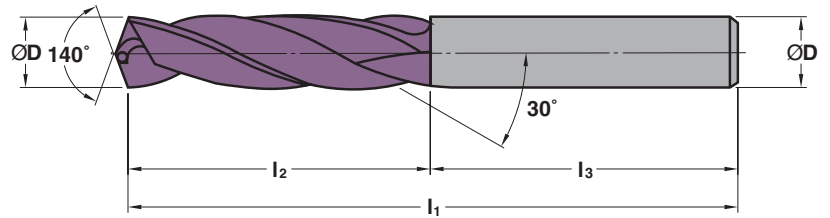
- Solid carbide drill (No coolant holes) • Stock diameters: Inch (.125 thru .633") Metric (2.9 thru 17mm) • 140 degree point angle • 30 degree high helix angle • Length to diameter ratio: 2-3:1 • PVD grades: VP15TF (AlTi)N coating on micro grain substrate
- Recommended for rotating tool applications

## MZS

- Solid carbide drill with coolant holes • Stock diameters: Inch (.125 thru .7812") Metric (3.3 thru 17mm) • 140 degree point angle • 30 degree high helix angle • Length to diameter ratio: 3-5:1 • PVD grades: VP15TF (AlTi)N coating on micro grain substrate • Close tolerances • High penetration rates
- Recommended for rotating tool applications

## Micro

- Worlds smallest carbide drill with coolant holes • Stock diameters: Inch (.039 thru .120") Metric (1 thru 3mm) • 140 degree point angle • 30 degree high helix angle • MZS length to diameter ratio: 10:1 • MZE (pilot drill) available for each Micro MZS size • PVD grade: VP15TF (AlTi)N coating on micro grain substrate • Close tolerances • High penetration rates • Recommended for rotating tool applications



**VP15TF**

External coolant drill (Inch/Metric standard)

Drill Diameter (Inch)	D ≤ .118 (3MM)	(3M) .118 < D ≤ .236 (6MM)	(6MM) .236 ≤ D ≤ .394 (10MM)	(10MM) .394 < D ≤ .669 (18MM)
Tolerance	+ 0 - .00055	+ 0 - .00071	+ 0 - .00087	+ 0 - .0013

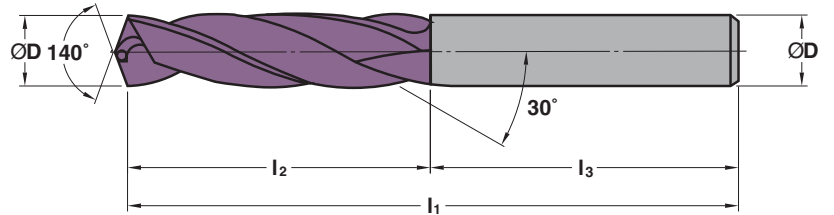
## MZE Drill Standard

Standard type (For 2-3xD)  
Shank is Shrink-Fit Ready

Order Number	Stock	* Drill Diameter (ØD) Drill Shank			* Dimensions			Drill Depth
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	
MZE0290SA	+		2.90	.1142	55	16	39	2xD
MZE00300SA	+	1/8	3.00	.1181	55	16	39	
MZE01250SA	+	1/8		.1250	1.922	.703	1.219	
MZE0330SA	+		3.30	.1299	55	18	37	
MZE0340SA	+		3.40	.1339	55	20	35	
MZE01406SA	+	9/64		.1406	2.047	.781	1.250	
MZE0380SA	+		3.80	.1496	55	22	33	
MZE0390SA	+		3.90	.1535				
MZE01562SA	+	5/32		.1562	2.187	.875	1.312	
MZE0420SA	+		4.20	.1654	55	22	33	
MZE01719SA	+	11/64		.1719	2.281	.937	1.343	
MZE0440SA	+		4.40	.1732	58	24	34	
MZE0450SA	+		4.50	.1772				
MZE01875SA	+	3/16		.1875	2.437	1.00	1.437	
MZE0490SA	+		4.90	.1929	62	26	36	
MZE0500SA	+		5.00	.1968				
MZE02010SA	+	#7		.2010	2.437	1.00	1.437	
MZE02031SA	+	13/64		.2031	2.437	1.00	1.437	
MZE0550SA	+		5.50	.2165	66	28	38	
MZE02188SA	+	7/32		.2188	2.625	1.125	1.500	
MZE02344SA	+	15/64		.2344				
MZE0600MA	+		6.00	.2362	81	41	40	
MZE02500MA	+	1/4		.2500	3.187	1.625	1.562	
MZE02570MA	+	F		.2570	3.265	1.687	1.575	
MZE02656MA	+	17/64		.2656	3.265		1.562	
MZE0680MA	+		6.80	.2677	83	43	40	
MZE02720MA	+	1		.2720	3.265	1.687	1.575	
MZE0700MA	+		7.00	.2756	83	43	40	
MZE02812MA	+	9/32		.2812	3.437	1.750	1.687	
MZE0750MA	+		7.50	.2953	87	45	42	
MZE02969MA	+	19/64		.2969	3.562	1.875	1.687	
MZE03125MA	+	5/16		.3125				
MZE0800MA	+		8.00	.3150	90	48	42	
MZE03281MA	+	21/64		.3281	3.750	2.063	1.688	
MZE03320MA	+	Q		.3320	3.780	2.087		

\* Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

+: Stock, □: Non Stock, □: Not Produced



## MZE Drill Standard

Standard type (For 3xD)  
Shank is Shrink-Fit Ready

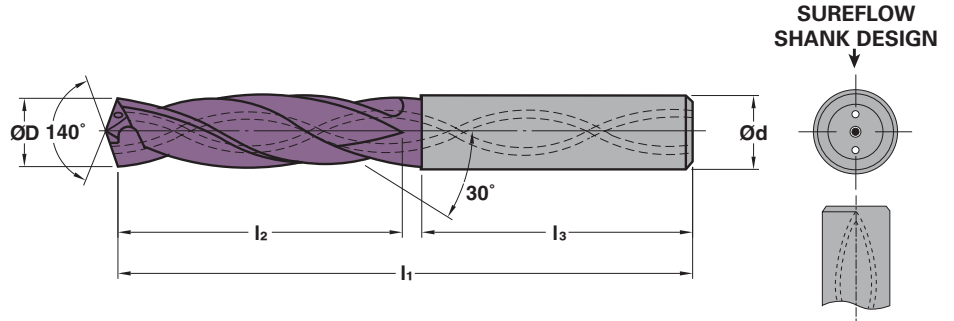
Order Number	Stock	* Drill Diameter (ØD) Drill Shank			* Dimensions			Drill Depth	
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>		
MZE0850MA	+		8.50	.3346	96	53	43	3xD	
MZE03438MA	+	11/32		.3438	3.875	2.187	1.687		
MZE0900MA	+		9.00	.3543	98	55	43		
MZE03594MA	+	23/64		.3594	4.000	2.281	1.718		
MZE03680MA	+	U		.3680	4.016	2.283	1.732		
MZE03750MA	+	3/8		.3750	4.125	2.375	1.750		
MZE0970MA	+		9.7	.3810	105	60	45		
MZE03906MA	+	25/64		.3906	4.125	2.375	1.750		
MZE1000MA	+		10.00	.3937	105	60	45		
MZE04062MA	+	13/32		.4062	4.406	2.625	1.781		
MZE1050MA	+		10.50	.4134	112	66	46		
MZE04219MA	+	27/64		.4219	4.500	2.688	1.813		
MZE1100MA	+		11.00	.4331	114	68	46		
MZE04375MA	+	7/16		.4375	4.625	2.813	1.813		
MZE04531MA	+	29/64		.4531	4.750	2.875	1.875		
MZE04688MA	+	15/32		.4688					
MZE1200MA	+		12.00	.4724	121	73	48		
MZE04844MA	+	31/64		.4844	5.313	3.000	2.313		
MZE1250MA	+		12.50	.4921	135	76	59		
MZE05000MA	+	1/2		.5000	5.375	3.063	2.313		
MZE05050MA	+	TUBE SHEET			.5050	5.394	3.071		2.323
MZE05118MA	+		13.00	.5118	5.394	3.071	2.323		
MZE05156MA	+	33/64		.5156	5.688	3.344	2.343		
MZE05312MA	+	17/32		.5312					
MZE1400MA	+		14.00	.5512	147	86	61		
MZE05625MA	+	9/16		.5625	5.938	3.500	2.437		
MZE1450MA	+		14.50	.5709	151	89	62		
MZE05781MA	+	37/64		.5781	6.020	3.582	2.437		
MZE1500MA	+		15.00	.5906	153	91	62		
MZE1550MA	+		15.50	.6102	157	94	63		
MZE06250MA	+	5/8		.6250	6.299	3.780	2.519		
MZE1600MA	+		16.00	.6299	160	96	64		
MZE06330MA	+	TUBE SHEET			.6330	6.575	4.016	2.559	
MZE1700MA	+		17mm	.669	167	102	65		

\* Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

+: Stock, □: Non Stock, ◻: Not Produced



**VP15TF**



Internal coolant drill (Inch standard)

Drill Diameter (Inch)	D ≤ .118 (3MM)	(3M) .118 < D ≤ .236 (6MM)	(6MM) .236 ≤ D ≤ .394 (10MM)	(10MM) .394 < D ≤ .781 (17MM)
Tolerance	+0 -.00055	+0 -.00071	+0 -.00087	+0 -.00106

## MZS Drill Standard

Standard type (For 3xD)  
Shank is Shrink-Fit Ready

Order Number	Stock	* Drill Diameter (ØD)			* Dimensions				Drill Depth
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZS01250MB	+	1/8		.1250	2.992	1.102	1.890	.1575	3xD
MZS0310MB			3.1	.1220	76	28	48	4	
MZS0320MB			3.2	.1260	76	28	48	4	
MZS0330MB	+		3.3	.1299	76	28	48	4	
MZS0340MB			3.4	.1340	76	28	48	4	
MZS0350MB			3.5	.1380	76	28	48	4	
MZS01405MB	+	#28		.1405	3.150	1.260	1.890	.1575	
MZS0370MB	+		3.7	.1457	80	32	48	4	
MZS01495MB	+	#25		.1495	3.150	1.260	1.890	.1575	
MZS0400MB	+		4.0	.1575	80	32	48	4	
MZS01590MB	+	#21		.1590	3.386	1.417	1.969	.1969	
MZS0420MB	+		4.2	.1654	86	36	50	5	
MZS01719MB	+	11/64		.1719	3.386	1.417	1.969	.1969	
MZS01875MB	+	3/16		.1875	3.543	1.575	2.047	.2344	
MZS0500MB	+		5.0	.1968	82	27.5	52	6	
MZS02031MB	+	13/64		.2031	3.228	1.083	2.047	.2344	
MZS02165MB	+		5.5	.2165	82	27.5	52	6	
MZS0550MB	+		5.5	.2165	82	27.5	52	6	
MZS02188MB	+	7/32		.2188	3.228	1.181	2.047	.2344	
MZS02344MB	+	15/64		.2344	82	30.0	52	6	
MZS0600MB	+		6.0	.2362	82	30.0	52	6	
MZS02500MB	+	1/4		.2500	3.465	1.280	2.087	.2656	
MZS0650MB	+		6.5	.2559	88	32.5	53	7	
MZS02570MB	+	F		.2570	3.465	1.280	2.087	.2656	
MZS02656MB	+	17/64		.2656	88	35	53	7	
MZS0680MB	+		6.8	.2677	88	35	53	7	
MZS02720MB	+	I		.2720	3.465	1.378	2.087	.2720	
MZS0700MB	+		7.0	.2756	88	35.0	53	7	
MZS02812MB	+	9/32		.2812	3.701	1.476	2.126	.3125	
MZS0750MB	+		7.5	.2953	94	37.5	54	8	
MZS02969MB	+	19/64		.2969	3.701	1.575	2.126	.3125	
MZS03125MB	+	5/16		.3125	94	40.0	54	8	
MZS0800MB	+		8.0	.3150	94	40.0	54	8	
MZS03281MB	+	21/64		.3281	3.937	1.673	2.165	.3438	
MZS03320MB	+	Q		.3320	3.937	1.673	2.165	.3438	
MZS0850MB	+		8.5	.3346	100	42.5	55	9	
MZS03438MB	+	11/32		.3438	3.937	1.772	2.165	.3438	

\* Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

⊕: Stock, □: Non Stock, ◻: Not Produced

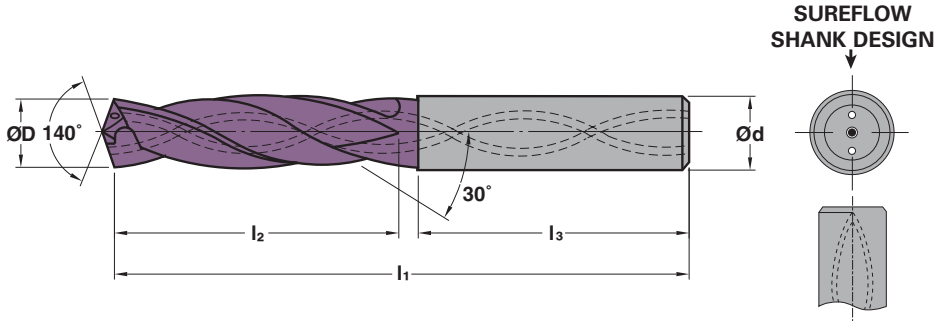
## MZS Drill Standard

Standard type (For 3xD)

Order Number	Stock	* Drill Diameter (ØD)			* Dimensions				Drill Depth			
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d				
MZS0900MB	+		9.0	.3543	100	45	55	9	3xD			
MZS03594MB	+	23/64		.3594	4.173	1.870	2.205	.3906				
MZS03680MB	+	U		.3680								
MZS0950MB	+		9.5	.3740	106	47.5	56	10				
MZS03750MB	+	3/8		.3750	4.174	1.969	2.205	.3906				
MZS0970MB	+		9.7	.3810	106	50	56	10				
MZS03906MB	+	25/64		.3906	4.174	1.969	2.205	.3906				
MZS1000MB	+		10.0	.3937	106	50.0	56	10				
MZS04062MB	+	13/32		.4062	4.567	2.067	2.402	.4218				
MZS1040MB	+		10.4	.4094	116	52.5	61	11				
MZS1050MB	+		10.5	.4134	116	52.5	61	11				
MZS04219MB	+	27/64		.4219	4.567	2.165	2.402	.4218				
MZS1100MB	+		11.0	.4331	116	55.0	61	11				
MZS04375MB	+	7/16		.4375	4.803	2.264	2.441	.4687				
MZS1150MB	+		11.5	.4528	122	57.5	62	12				
MZS04531MB	+	29/64		.4531	4.803	2.362	2.441	.4688				
MZS04688MB	+	15/32		.4688								
MZS1200MB	+		12.0	.4724	122	60.0	62	12				
MZS04844MB	+	31/64		.4844	5.039	2.461	2.480	.500				
MZS1250MB	+		12.5	.4921	128	62.5	63	13				
MZS05000MB	+	1/2		.5000	5.039	2.559	2.480	.5000				
MZS05050MB	+	TUBE SHEET		.5050							.5118	
MZS05118MB	+		13mm	.5118		2.657	2.520	.5469				
MZS1300MB	+		13.0	.5118	128	65.0	63	13				
MZS05156MB	+	33/64		.5156	5.276	2.657	2.520	.5469				
MZS05312MB	+	17/32		.5312								
MZS1350MB	+		13.5	.5315	134	67.5	64	14				
MZS05469MB	+	35/64		.5469	5.276	2.756	2.520	.5469				
MZS1400MB	+		14.0	.5512	134	70.0	64	14				
MZS05625MB	+	9/16		.5625	5.512	2.854	2.559	.5781				
MZS1450MB	+		14.5	.5709	140	72.5	65	15				
MZS05781MB	+	37/64		.5781	5.512	2.953	2.559	.5781				
MZS1500MB	+		15.0	.5906	140	75.0	65	15				
MZS05937MB	+	19/32		.5937	5.709	3.051	2.559	.625				
MZS06094MB	+	39/64		.6094								
MZS1550MB	+		15.5	.6102	145	77.5	65	16				
MZS06250MB	+	5/8		.6250	5.709	3.150	2.559	.625				
MZS1600MB	+		16.0	.6299	145	80	66	16				
MZS06330MB	+	TUBE SHEET		.6330	5.906	3.248	2.559	.6363				
MZS06406MB	+	41/64		.6406							.6563	
MZS06563MB	+	21/32		.6563		3.346						
MZS1700MB	+		17.0	.6690	150	85	65	17				
MZS06718MB	+	43/64		.6718	6.102	3.445	2.559	.7031				
MZS06875MB	+	11/16		.6875								
MZS07031MB	+	45/64		.7031		3.543						
MZS07188MB	+	23/32		.7188	6.299	3.642	2.559	.7343				
MZS07344MB	+	47/64		.7344						3.740		
MZS07500MB	+	3/4		.7500	6.496	3.839	2.559	.7812				
MZS07580MB	+	TUBE SHEET		.7580								
MZS07656MB	+	49/64		.7656								
MZS07812MB	+	25/32		.7812		3.937						

\* Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

⊕: Stock, □: Non Stock, ○: Not Produced



Internal coolant drill (Inch standard)

Drill Diameter (Inch)	D ≤ .118 (3MM)	(3M) .118 < D ≤ .236 (6MM)	(6MM) .236 ≤ D ≤ .394 (10MM)	(10MM) .394 < D ≤ .781 (17MM)
Tolerance	+0 -.00055	+0 -.00071	+0 -.00087	+0 -.0013

## MZS Drill Standard

Long type (For 5xD)  
Shank is Shrink-Fit Ready

Order Number	Stock	* Drill Diameter (ØD)			* Dimensions				Drill Depth
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZS01250LB	+	1/8		.1250	3.425	1.535	1.890	.1575	5xD
MZS01405LB	+	9/64		.1405	3.622	1.732			
MZS0370LB	+		3.7	.1457	92	44	48	4	
MZS01495LB	+	#25		.1495	3.622	1.732	1.890	.1575	
MZS01562LB	+	5/32		.1562	3.622	1.732	1.890	.1575	
MZS0400LB	+		4.0	.1575	92	44	48	4	
MZS01590LB	+	#21		.1590	3.937	1.969	1.969	.1969	
MZS0420LB	+		4.2	.1654	100	50	50	5	
MZS01719LB	+	11/64		.1719	3.937	1.969	1.969	.1969	
MZS01875LB	+	3/16		.1875	4.134	2.165			
MZS0500LB	+		5.0	.1969	100	44	52	6	
MZS0510LB	+		5.1	.2008					
MZS02031LB	+	13/64		.2031	3.937	1.732	2.047	.2343	
MZS0550LB	+		5.5	.2165	100	44	52	6	
MZS02188LB	+	7/32		.2188	3.937	1.890	2.047	.2343	
MZS02344LB	+	15/64		.2344					
MZS0600LB	+		6.0	.2362	100	48	52	6	
MZS02500LB	+	1/4		.2500	4.292	2.047	2.087	.2656	
MZS0650LB	+		6.5	.2559	109	52	53	7	
MZS02570LB	+	F		.2570	4.292	2.205	2.087	.2656	
MZS0670LB	+		6.7	.2638	109	56	53	7	
MZS02656LB	+	17/64		.2656	4.292	2.205	2.087	.2656	
MZS0680LB	+		6.8	.2677	109	56	53	7	
MZS02720LB	+	I		.2720	4.292	2.205	2.087	.2656	
MZS0700LB	+		7.0	.2756	109	56	53	7	
MZS02812LB	+	9/32		.2812	4.646	2.362	2.125	.3125	
MZS0750LB	+		7.5	.2953	118	60	54	8	
MZS02969LB	+	19/64		.2969	4.646	2.520	2.125	.3125	
MZS03125LB	+	5/16		.3125					
MZS0800LB	+		8.0	.3150	118	64	54	8	
MZS03281LB	+	21/64		.3281	5.000	2.677	2.165	.3438	
MZS03320LB	+	Q		.3320					
MZS0850LB	+		8.5	.3346	127	68	55	9	

\* Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

⊕: Stock, □: Non Stock, ☐: Not Produced

## MZS Drill Standard

Long type (For 5xD)  
Shank is Shrink-Fit Ready

Order Number	Stock	* Drill Diameter (ØD)			* Dimensions				Drill Depth
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZS0860LB	+		8.6	.3386	127	72	55	9	5xD
MZS03438LB	+	11/32		.3438	5.000	2.835	2.165	.3438	
MZS0900LB	+		9.00	.3543	127	72	55	9	
MZS03594LB	+	23/64		.3594	5.355	2.992	2.203	.3906	
MZS03680LB	+	U		.3680					
MZS0950LB	+		9.5	.3740	136	76	56	10	
MZS03750LB	+	3/8		.3750	5.355	3.150	2.203	.3906	
MZS0970LB	+		9.7	.3810	136	80	56	10	
MZS03906LB	+	25/64		.3906	5.355	3.150	2.203	.3906	
MZS1000LB	+		10.0	.3937	136	80	56	10	
MZS1030LB	+		10.3	.4055	149	84	61	11	
MZS04062LB	+	13/32		.4062	5.866	3.307	2.406	.4218	
MZS1040LB	+		10.4	.4094	149	84	61	11	
MZS1050LB	+		10.5	.4134					
MZS04219LB	+	27/64		.4219	5.866	3.465	2.401	.4219	
MZS1100LB	+		11.0	.4331	149	88	61	11	
MZS04375LB	+	7/16		.4375	6.221	3.622	2.441	.4688	
MZS1150LB	+		11.5	.4528	158	92	62	12	
MZS04531LB	+	29/64		.4531	6.221	3.780	2.441	.4688	
MZS04688LB	+	15/32		.4688					
MZS1200LB	+		12.0	.4724	158	96	62	12	
MZS04844LB	+	31/64		.4844	6.575	3.937	2.481	.500	
MZS1250LB	+		12.5	.4921	167	100	63	13	
MZS05000LB	+	1/2		.5000	6.575	4.094	2.481	.500	
MZS05050LB	+	TUBE SHEET		.5050	6.575	4.094	2.481	.5118	
MZS05118LB	+		13mm	.5118	6.575	4.094	2.481	.5118	
MZS1300LB	+		13.0		167	104	63	13	
MZS05156LB	+	33/64		.5156	6.922	4.250	2.516	.5469	
MZS05312LB	+	17/32		.5312					
MZS1350LB	+		13.5	.5315	176	108	64	14	
MZS05469LB	+	35/64		.5469	6.921	4.406	2.516	.5469	
MZS1400LB	+		14.0	.5512	176	112	64	14	
MZS05625LB	+	9/16		.5625	7.281	4.562	2.562	.5781	
MZS1450LB	+		14.5	.5709	185	116	65	15	
MZS05781LB	+	37/64		.5781	7.281	4.718	2.562	.5781	
MZS1500LB	+		15.0	.5906	185	120	65	15	
MZS05937LB	+	19/32		.5937	7.593	4.875	2.562	.6250	
MZS06094LB	+	39/64		.6094					
MZS1550LB	+		15.5	.6102	193	124	65	16	
MZS06250LB	+	5/8		.6250	7.593	5.031	2.562	.6250	
MZS1600LB	+		16.0	.6299	193	128	65	16	
MZS06330LB	+	TUBE SHEET		.6330	7.913	5.197	2.559	.6563	
MZS06406LB	+	41/64		.6406		5.197			
MZS06563LB	+	21/32		.6563		5.354			
MZS1700LB	+		17.0	.6690	201	136	65	17	
MZS06718LB	+	43/64		.6718	8.228	5.512	2.559	.7031	
MZS06875LB	+	11/16		.6875					
MZS07031LB	+	45/64		.7031					
MZS07188LB	+	23/32		.7188	8.543	5.827	2.559	.7344	
MZS07344LB	+	47/64		.7344					
MZS07500LB	+	3/4		.7500	8.858	6.142			2.559
MZS07580LB	+	TUBE SHEET		.7580					
MZS07656LB	+	49/64		.7656					
MZS07812LB	+	25/32		.7812		6.299			

\* Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

⊕ : Stock, □ : Non Stock, □ : Not Produced

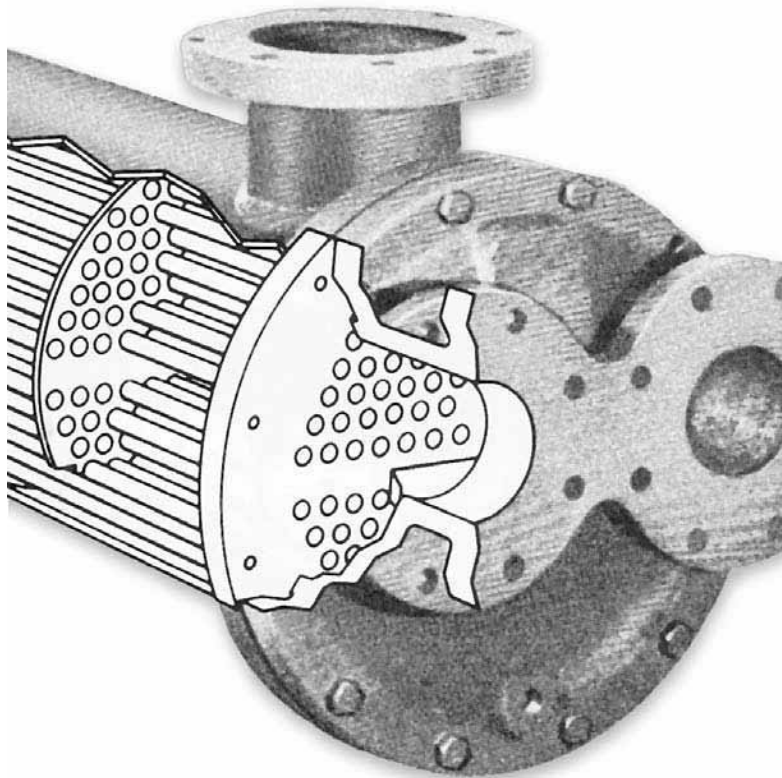
**MZS AND MZE DRILL FOR TUBE SHEET DRILING**

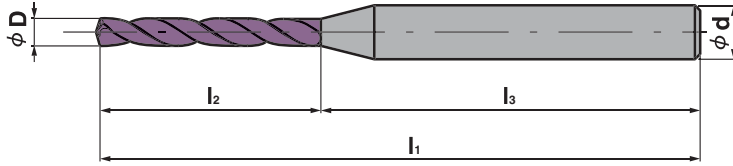
Reference MZS and MZE sections for additional dimensions

Drill type	Order Number	VP15TF	Drill diameter	Flute length	Shank diameter
<b>MZS drill For 3 x D (Internal coolant)</b>	MZS0970MB	+	.3810"	50	10
	MZS05050MB	+	.5050"	2.559"	.5118"
	MZS06330MB	+	.6330"	3.248"	.656"
	MZS1700MB	+	.6690"	85	17
	MZS07580MB	+	.7580"	3.839"	.7812"
<b>MZS drill For 5 x D (Internal coolant)</b>	MZS0970LB	+	.3810"	80	10
	MZS05050LB	+	.5050"	4.094"	.5118"
	MZS06330LB	+	.6330"	5.197"	.656"
	MZS1700LB	+	.6690"	136	17
	MZS07580LB	+	.7580"	6.142"	.7812"
<b>MZE drill For 3 x D</b>	MZE0970MA	+	.3810"	60	9.7
	MZE05050MA	+	.5050"	3.071"	.5050"
	MZE06330MA	+	.6330"	4.016"	.6330"
	MZE1700MA	+	.6690"	102	17

\*Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

⊕: Stock, □: Non Stock, □: Not Produced





Drill Diameter (Inch)	D ≤ .120 (3MM)
Tolerance	+ 0 - .00055

## Micro MZE Pilot Drills

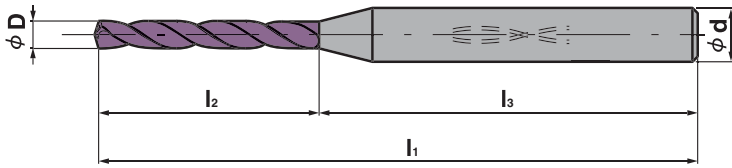
Drill depth for pilot drill is 1 to 2 times the diameter.

Order Number	Stock	Drill Diameter (ØD)			Dimensions				Tap Size
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZE00394SB	+		1.00	.0394	2.165	.2360	1.929	.1250	2-64
MZE00400SB	+	#60		.0400		.2760	1.889		
MZE00410SB	+	#59		.0410					
MZE00420SB	+	#58		.0420					
MZE00430SB	+	#57		.0430					
MZE00465SB	+	#56		.0465		.3150	1.850		
MZE00520SB	+	#55		.0520		.3540	1.811		
MZE00550SB	+	#54		.0550					
MZE00591SB	+		1.50	.0591					
MZE00625SB	+	1/16"		.0625		.3940	1.771		
MZE00635SB	+	#52		.0635					
MZE00670SB	+	#51		.0670		.4330	1.732		
MZE00700SB	+	#50		.0700					
MZE00730SB	+	#49		.0730					
MZE00760SB	+	#48		.0760					
MZE00785SB	+	#47 (5/64)		.0785		.6300	1.535		
MZE00810SB	+	#46		.0810					
MZE00860SB	+	#44		.0860					
MZE00890SB	+	#43		.0890					
MZE00938SB	+	(#42) 3/32		.0938		55	16		
MZE0240SA	+		2.40	.0945					
MZE00960SB	+	#41		.0960	2.165	.6300	1.535	.1250	
MZE0250SA	+	#40	2.50	.0984	55	16	39	2.5	
MZE01010SB	+	#38		.1010	2.165	.6300	1.535	.1250	
MZE01040SB	+	#37		.1040					
MZE01060SB	+	#36		.1060					
MZE01094SB	+	7/64		.1094					
MZE0280SA	+		2.80	.1102	55	16	39	2.80	
MZE0290SA	+		2.90	.1142				2.90	
MZE0300SA	+		3.00	.1181				3.0	
MZE01200SB	+	#31		.1200	2.165	.709	1.457	.1250	

⊕: Stock, □: Non Stock, □: Not Produced

\*Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills.

# Micro MZS<sub>TYPE</sub>



## Micro MZS Kit Chart

\*Add suffix when ordering. Example shown: 2.8mm Drill

Kit - K2	MZS0280LB-K2
Kit - K4	MZS0280LB-K4
Individual	MZS0280LB

-K2 = 2 drills (1-pilot drill) -K4 = 4 drills (1-pilot drill)

## Micro MZS Drills

For drill diameters tolerance reference Micro MZE p.202

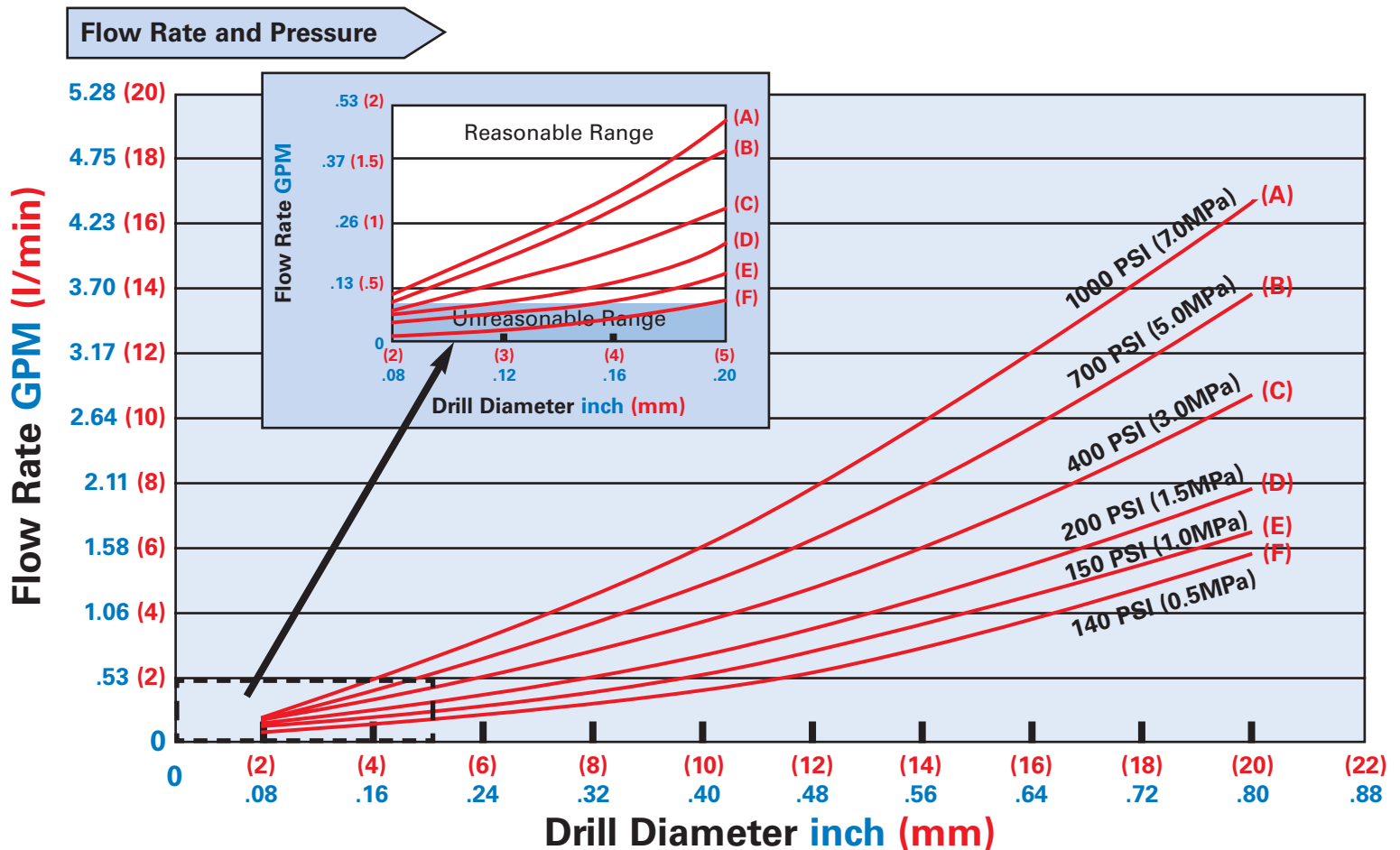
LB L/D = 10 X D

Order Number	Stock	Drill Diameter (ØD)			Dimensions				Tap Size
	VP15TF	Fractional (inch)	Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZS00394LB	+		1.00	.0394	2.165	.4330	1.732	.1250	
MZS00400LB	+	#60		.0400		.6690	1.496		
MZS00410LB	+	#59		.0410					
MZS00420LB	+	#58		.0420					
MZS00430LB	+	#57		.0430					
MZS00465LB	+	#56		.0465					
MZS00520LB	+	#55		.0520					
MZS00550LB	+	#54		.0550					
MZS00591LB	+	#53	1.50	.0591					
MZS00625LB	+	1/16"		.0625	2.677			.8660	1.811
MZS00635LB	+	#52		.0635					
MZS00670LB	+	#51		.0670					
MZS00700LB	+	#50		.0700					
MZS00730LB	+	#49		.0730					
MZS00760LB	+	#48		.0760					
MZS00785LB	+	#47 (5/64)		.0785					
MZS00810LB	+	#46		.0810					
MZS00860LB	+	#44		.0860					
MZS00890LB	+	#43		.0890	2.913	1.102	.1250		
MZS00938LB	+	(#42) 3/32		.0938					
MZS0240LB	+		2.40	.0945				74	28
MZS00960LB	+	#41		.0960	2.913	1.102	1.811	.1250	
MZS0250LB	+	#40	2.50	.0984	74	28	46	3	
MZS01010LB	+	#38		.1010	3.189	1.299	1.890	.1250	
MZS01040LB	+	#37		.1040					
MZS01060LB	+	#36		.1060					
MZS01094LB	+	7/64		.1094					
MZS0280LB	+		2.80	.1102	81	33	48	3	
MZS0290LB	+		2.90	.1142					
MZS0300LB	+		3.00	.1181					
MZS01200LB	+	#31		.1200	3.425	1.535	1.890	.1250	

\*Drill diameter and dimensions appear as fractional values for inch drills and in millimeters for metric drills. Please refer to page 206 for technical information.

+: Stock, -: Non Stock, □: Not Produced

## Reasonable Coolant Flow and Pressure For MZS Drills



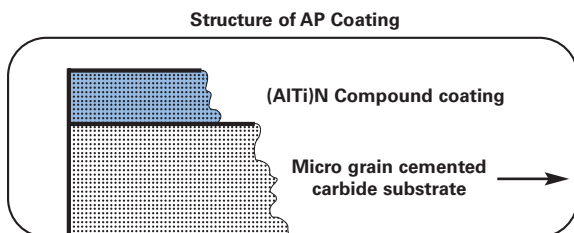
### Performance Requirements

In order for micro MZS Drills to perform properly you must satisfy the following requirements.

1.  High pressure pump system (800 psi or greater)
2.  Filter to 5 microns
3.  Runout <.0003 max.
4.  Coolant with E.P. additives
5.  Use MZE pilot drill
6.  Recommended for rotating drill applications

### 1. VP Coating

Using (AlTi)N compound coating  
AP coating excels in heat-resistance (heat fatigue)  
and bonding strength.

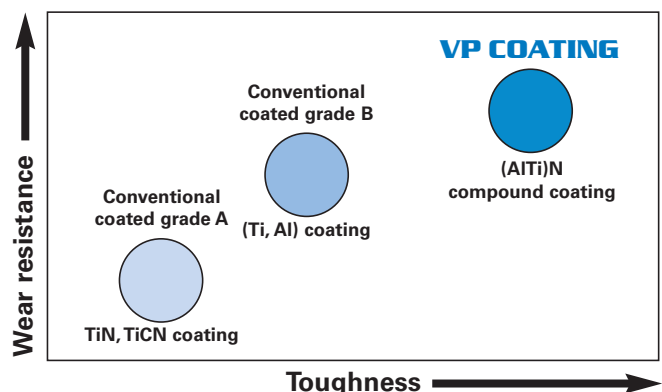


### 2. High Performance Machining

The solid and indexable Endmills are acknowledged as having the fastest cutting speeds.

### 3. VP Coating Features

The substrate of VP coating is harder and tougher than conventional coated grades A and B. Therefore, VP coating suits high speed and feed cutting



## REGRINDING PROCEDURES

### Check the cutting edge

- 1) Check the worn and/or damaged condition of the cutting edge.
- 2) If the cutting edge is chipped, remove the damaged part using a green wheel.

### Regrinding the front face

- 1) The face can be ground by a three rake system. With the use of a twist drill grinder or a universal tool and cutter grinder, set the drill to 20° for a 140° point angle as shown in Figure 1.
- 2) Grind the flank so that the first angle of 10°~12° is obtained as shown in Figure 2. Index and grind the other cutting edge. Spark out and maintain lip heights within .0008".
- 3) Next, tilt the drill an additional 10° and grind the flank so that a second angle of 20°~22° as shown in Figure 3. Grind the second angle so the edge line between the first and second angle aligns with the center of the drill. A conical grind is also acceptable.

- Grinding wheel; Diamond cup type  
230 grit to 400 grit Ø4 inch to Ø6 inch

### Web thinning

- 1) Thin along the edge of the chisel at 90° as shown in Figure 4, leave .002"~.004" behind center.
- 2) Next, turn the drill 10°~15° to create a pocket of 100°~105°. This forms the third facet angle.
  - Grinding wheel; Diamond flat type  
230 grit to 400 grit

### Honing

- 1) Hone the chisel edge per chart below
  - Diamond file: T-1-140, T-0-400, T-0-1500
- 2) Hone uniformly over the entire cutting edge.
  - Diamond files: T-1-140, T-0-400, T-0-1500
- 3) Hone width

Drill Diameter	Hone Width
3/16" less	.002x30"
3/16" over 25/64" less	.002~.004x30°
25/64" over	.004~.006x30°

### The regrinding work is now complete.

#### Check the following before using the drill:

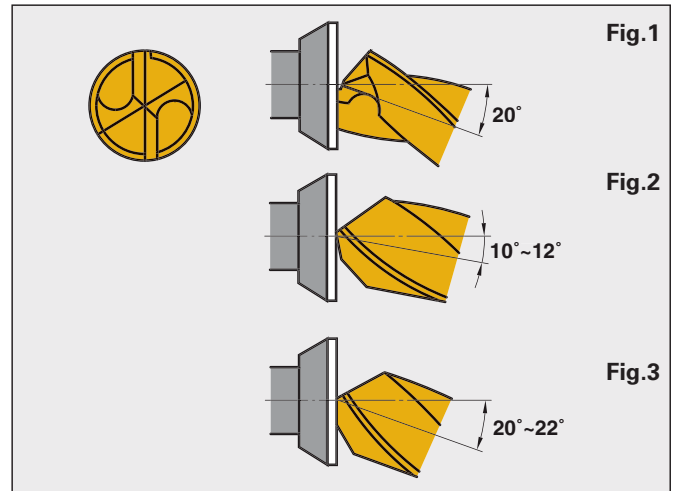
- Check if the lip height difference is within .0008".
- Check if there was a failure to regrind a damaged part of the cutting edge.
- Check if the honing is properly done.
- Check if there are any grinding burrs.

### Caution

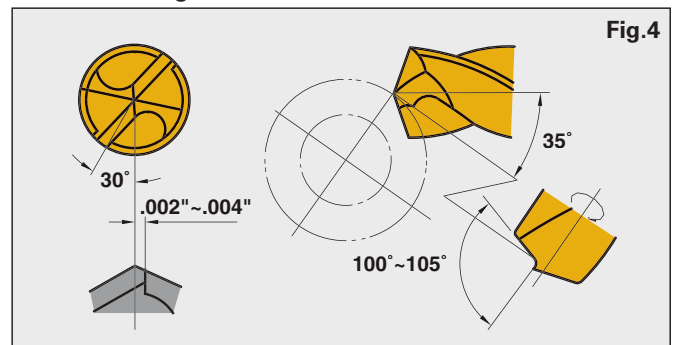
As a result of regrinding, the coating has been ground off the front flank. Therefore, there will be a reduction in tool life compared with a new product.

**Contact your local Mitsubishi Carbide Representative or distributor for authorized regrinding facilities.**

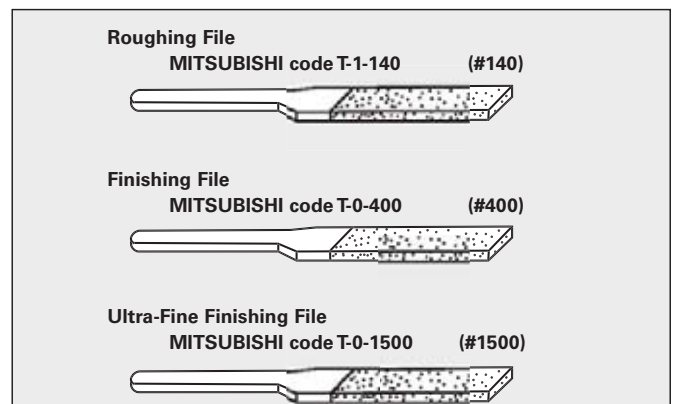
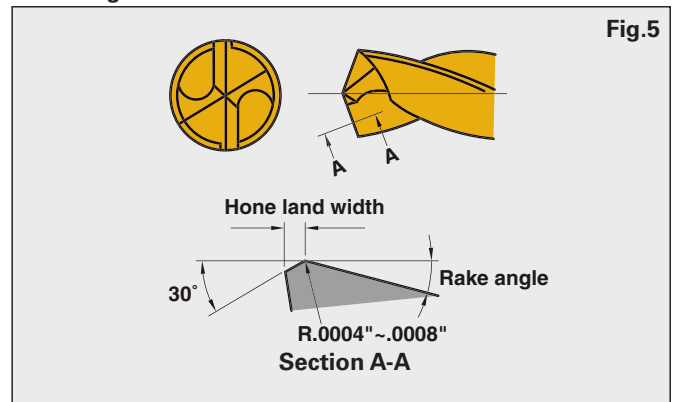
### Regrinding the front face



### Web thinning



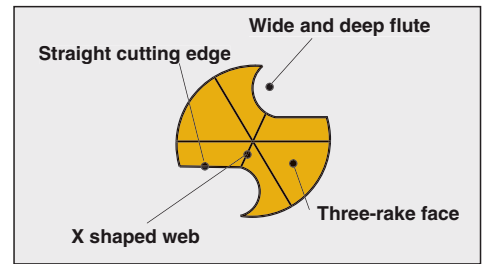
### Honing



# MZE/MZS/Micro CUTTING CONDITIONS

## ■ USE AND CHARACTERISTICS OF THE SOLID CARBIDE DRILL

- Ideal drill for all materials - the Solid Carbide Drill offers a combination of wide flute and quality proven coating technology.
- Linear cutting edge permits easier regrinding and simple cutting edge honing.
- Easy discharge of chips because of wide and deep flute.
- Much higher drilling accuracy than HSS drill.
- 5 times higher efficiency and 10 times longer tool life than HSS drill.

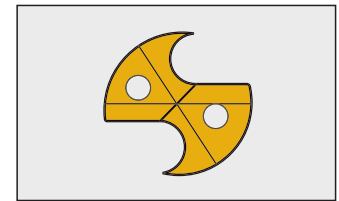


## ■ RECOMMENDED CUTTING CONDITIONS - MZE DRILL

Workpiece	Hardness	Drill diameter $\varnothing$ .114 ~ $\varnothing$ .236		Drill diameter $\varnothing$ .236 ~ $\varnothing$ .394		Drill diameter $\varnothing$ .394 ~ $\varnothing$ .551		Drill diameter $\varnothing$ .551 ~ $\varnothing$ .630	
		Cutting speed (SFM)	Feed (IPR)	Cutting speed (SFM)	Feed (IPR)	Cutting speed (SFM)	Feed (IPR)	Cutting speed (SFM)	Feed (IPR)
Mild steel	$\leq 180\text{HB}$	150	.008	180	.010	215	.012	230	.014
Carbon steel	180 ~ 280HB	130	.008	165	.010	195	.012	215	.014
Alloy steel	280 ~ 350HB	115	.006	150	.008	180	.010	195	.012
Stainless steel	$\leq 200\text{HB}$	65	.004	80	.0048	80	.006	80	.008
High hardened steel	40 ~ 60HRC	65	.004	80	.0048	80	.006	100	.008
Gray cast iron	180 ~ 220HB	165	.010	195	.012	230	.014	230	.016
Ductile cast iron	230 ~ 300HB	150	.008	180	.010	215	.012	230	.014
Heat Resistant Materials	-	65	.004	80	.005	80	.006	98	.008

## ■ USE AND CHARACTERISTICS OF THE MZS INTERNAL COOLANT DRILL

- High efficiency and high precision drilling.
- High stability when drilling steel, cast iron, stainless steel and other gummy materials.
- No peck required when drilling holes up to 5XD ratio.



## ■ RECOMMENDED CUTTING CONDITIONS - MZS DRILL

Workpiece	Hardness	Drill diameter $\varnothing$ .078 ~ $\varnothing$ .236		Drill diameter $\varnothing$ .236 ~ $\varnothing$ .394		Drill diameter $\varnothing$ .394 ~ $\varnothing$ .472		Drill diameter $\varnothing$ .472 ~ $\varnothing$ .781	
		Cutting speed (SFM)	Feed (IPR)	Cutting speed (SFM)	Feed (IPR)	Cutting speed (SFM)	Feed (IPR)	Cutting speed (SFM)	Feed (IPR)
Mild steel	$\leq 180\text{HB}$	260	.008	425	.010	460	.012	490	.014
Carbon steel	180 ~ 280HB	230	.008	360	.008	395	.010	425	.012
Alloy steel	280 ~ 350HB	195	.006	230	.008	260	.010	295	.012
Stainless steel	$\leq 200\text{HB}$	130	.004	230	.008	260	.010	295	.010
Gray cast iron	180 ~ 220HB	330	.010	425	.012	460	.014	490	.014
Ductile cast iron	230 ~ 300HB	195	.008	230	.008	260	.010	295	.012
Aluminum	-	390	.008	490	.012	525	.016	555	.019
Heat Resistant Materials	-	65	.004	80	.005	85	.006	98	.008

## ■ RECOMMENDED CUTTING CONDITIONS - MICRO MZE DRILL

Workpiece	Hardness	Drill diameter $\varnothing$ .039 ~ $\varnothing$ .120	
		Cutting speed (SFM)	Feed (IPR)
Mild steel	$\leq 180\text{HB}$	75-150	.0035
Carbon steel	180 ~ 280HB	65-130	.003
Alloy steel	280 ~ 350HB	55-110	.0025
Stainless steel	$\leq 200\text{HB}$	50-100	.0015
High hardened steel	40 ~ 60HRC	32-80	.002
Gray cast iron	180 ~ 220HB	80-160	.003
Ductile cast iron	230 ~ 300HB	70-140	.003
Heat Resistant Materials	-	32-80	.002

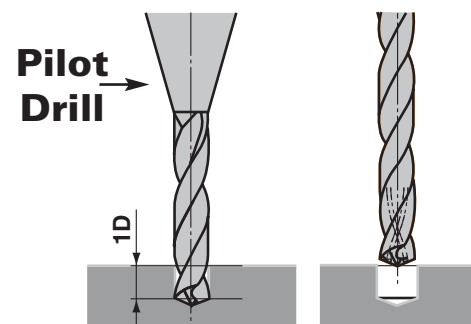
## ■ Special Application Notes:

• For safety and success, always pre-drill the hole with a pilot drill. This is especially true for drilling small sizes less than **2mm [0.078"]**.

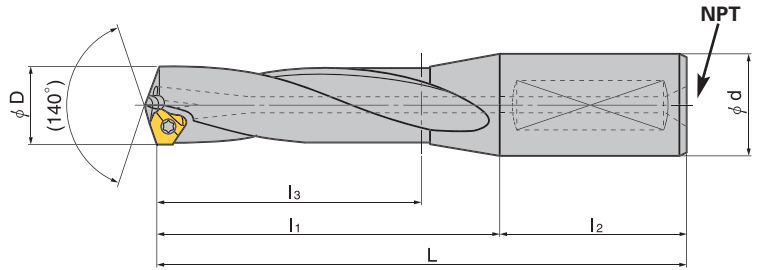
- Minimum coolant pressure = **800psi** (5.5 MPa).
- Coolant must have Extreme pressure (**EP**) Additives.
- Positive displacement type coolant pump is required.
- Coolant filter must be less than 5 microns. Fine filtration is necessary to prevent blockage of the Oil Holes.

## ■ RECOMMENDED CUTTING CONDITIONS - MICRO MZS DRILL

Workpiece	Hardness	Drill diameter $\varnothing$ .039 ~ $\varnothing$ .120	
		Cutting speed (SFM)	Feed (IPR)
Mild steel	$\leq 180\text{HB}$	150-300	.002/.0035
Carbon steel	180 ~ 280HB	150-300	.002/.0035
Alloy steel	280 ~ 350HB	100-200	.002/.0035
Stainless steel	$\leq 200\text{HB}$	80-175	.0015/.003
Gray cast iron	180 ~ 220HB	150-250	.002/.0035
Ductile cast iron	230 ~ 300HB	100-200	.002/.0035
Aluminum	-	200-500	.002/.0035
Heat Resistant Materials	-	65-125	.001/.002





# NPXL TYPE - The Insertable New Point Drill



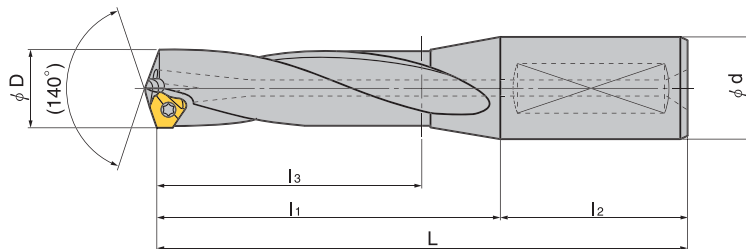
**L/D=4**

**(Inch Standard)**

Body Order Number	Stock	Insert Order Number	GP20M	Drill Diameter (D)			Dimensions (Inch)						Spare Parts	
				Fraction	Metric	Decimal	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	NPT	Insert Screw	Wrench
														
NPXL0048	+	NPT0048T	+	3/4	-	.750	6.203	3.953	2.250	3.203	1.000	1/8-27	TS3	TKY08F
		NPT0049T	+	49/64	-	.766								
		NPT0050T	+	25/32	-	.781								
		NPT2000T	-	20.00	.787									
NPXL0052	+	NPT0051T	+	51/64	-	.797	6.609	4.359	2.250	3.351	1.000	1/8-27	TS3	TKY08F
		NPT2050T	-	20.50	.807									
		NPT0052T	+	13/16	-	.813								
		NPT2100T	-	21.00	.827									
NPXL0056	+	NPT0053T	+	53/64	-	.828	6.797	4.547	2.250	3.688	1.000	1/8-27	TS35	TKY10F
		NPT0054T	+	27/32	-	.844								
		NPT2150T	-	21.50	.846									
		NPT0055T	+	55/64	-	.859								
		NPT2200T	-	22.00	.866									
NPXL0058	+	NPT0056T	+	7/8	-	.875	7.016	4.766	2.250	3.859	1.000	1/8-27	TS35	TKY10F
		NPT2250T	-	22.50	.886									
		NPT0057T	+	57/64	-	.891								
		NPT0058T	+	29/32	-	.906								
		NPT2300T	-	23.00	.906									
NPXL0061	+	NPT0059T	+	59/64	-	.922	7.547	5.172	2.250	4.188	1.000	1/4-18	TS35	TKY10F
		NPT2350T	-	23.50	.925									
		NPT0060T	+	15/16	-	.938								
		NPT2400T	-	24.00	.945									
		NPT0061T	+	61/64	-	.953								
NPXL0100	+	NPT2450T	-	24.50	.965	7.734	5.359	2.250	4.434	1.000	1/4-18	TS35	TKY10F	
		NPT0062T	+	31/32	-									.969
		NPT0063T	+	63/64	-									.984
		NPT2500T	-	25.00	.984									
		NPT0100T	+	1	-									1.000
		NPT2550T	-	25.50	1.004									
NPXL0103	+	NPT0101T	+	1-1/64	-	1.016	7.953	5.578	2.250	4.516	1.250	1/4-18	TS4	TKY15F
		NPT2600T	-	26.00	1.024									
		NPT0102T	+	1-1/32	-	1.031								
		NPT2650T	-	26.50	1.043									
NPXL0106	+	NPT0103T	+	1-3/64	-	1.047	8.141	5.766	2.250	4.672	1.250	1/4-18	TS4	TKY15F
		NPT0104T	+	1-1/16	-	1.063								
		NPT2700T	-	27.00	1.063									
		NPT0105T	+	1-5/64	-	1.078								
NPXL0108	+	NPT2750T	-	27.50	1.083	8.359	5.984	2.250	4.844	1.250	1/4-18	TS4	TKY15F	
		NPT0106T	+	1-3/32	-									1.094
		NPT2800T	-	28.00	1.102									
		NPT0107T	+	1-7/64	-									1.109
		NPT2850T	-	28.50	1.122									
		NPT0108T	+	1-1/8	-									1.125
NPXL0108	+	NPT0109T	+	1-9/64	-	1.141	8.359	5.984	2.250	4.844	1.250	1/4-18	TS4	TKY15F
		NPT2900T	-	29.00	1.142									
		NPT0110T	+	1-5/32	-	1.156								
		NPT2950T	-	29.50	1.161									
NPXL0108	+	NPT3000T	-	30.00	1.181	8.359	5.984	2.250	4.844	1.250	1/4-18	TS4	TKY15F	
		NPT3000T	-	30.00	1.181									

⊕ ⊕ : Stock, ⊖ ⊖ : Non Stock, □ : Not Produced

# NPXM TYPE - The Insertable New Point Drill



**L/D=3**

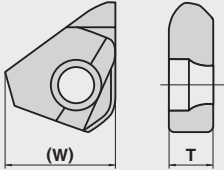
**(Metric Standard)**

Body Order Number	Stock	Insert Order Number	GP20M	Drill Diameter (D)			Dimensions (mm)					Spare Parts						
				Metric	Fraction	Decimal	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	Insert Screw	Wrench					
NPXM2000S25		NPT0049T	+	-	49/64	.766	156	100	80	25	TS3	TKY08F						
		NPT0050T	+	-	25/32	.781												
		NPT2000T	-	20.00	-	.787												
		NPT0051T	+	-	51/64	.797												
		NPT2050T	-	20.50	-	.807												
NPXM2100S25		NPT0052T	+	-	13/16	.813							161	105	56	83	TS35	TKY10F
		NPT2100T	-	21.00	-	.827												
		NPT0053T	+	-	53/64	.828												
		NPT0054T	+	-	27/32	.844												
		NPT2150T	-	21.50	-	.846												
NPXM2200S25		NPT0055T	+	-	55/64	.859	170	110	60	86	TS4	TKY15F						
		NPT2200T	-	22.00	-	.866												
		NPT0056T	+	-	7/8	.875												
		NPT2250T	-	22.50	-	.886												
		NPT0057T	+	-	57/64	.891												
NPXM2300S25		NPT2300T	-	23.00	-	.906							175	115	60	88	TS4	TKY15F
		NPT0058T	+	-	29/32	.906												
		NPT0059T	+	-	59/64	.922												
		NPT2350T	-	23.50	-	.925												
		NPT0060T	+	-	15/16	.938												
NPXM2400S32		NPT2400T	-	24.00	-	.945	180	120	92	96	TS4	TKY15F						
		NPT0061T	+	-	61/64	.953												
		NPT2450T	-	24.50	-	.965												
		NPT0062T	+	-	31/32	.969												
		NPT2500T	-	25.00	-	.984												
NPXM2500S32		NPT0063T	+	-	63/64	.984							185	125	96	96	TS4	TKY15F
		NPT2550T	-	25.50	-	1.004												
		NPT0100T	+	-	1.0	1.000												
		NPT0101T	+	-	1-1/64	1.016												
		NPT2600T	-	26.00	-	1.024												
NPXM2600S32		NPT0102T	+	-	1-1/32	1.031	185	125	96	96	TS4	TKY15F						
		NPT2650T	-	26.50	-	1.043												
		NPT0103T	+	-	1-3/64	1.047												
		NPT2700T	-	27.00	-	1.063												
		NPT0104T	+	-	1-1/16	1.063												
NPXM2700S32		NPT0105T	+	-	1-5/64	1.078							185	125	96	96	TS4	TKY15F
		NPT2750T	-	27.50	-	1.083												
		NPT0106T	+	-	1-3/32	1.094												
		NPT2800T	-	28.00	-	1.102												
		NPT0107T	+	-	1-7/64	1.109												
NPXM2800S32		NPT2850T	-	28.50	-	1.122	185	125	96	96	TS4	TKY15F						
		NPT0108T	+	-	1-1/8	1.125												
		NPT0109T	+	-	1-9/64	1.141												
		NPT2900T	-	29.00	-	1.142												
		NPT2950T	-	29.50	-	1.161												
NPXM3000S32		NPT3000T	-	30.00	-	1.181												

+ + : Stock, 
 + : Non Stock, 
 - : Not Produced

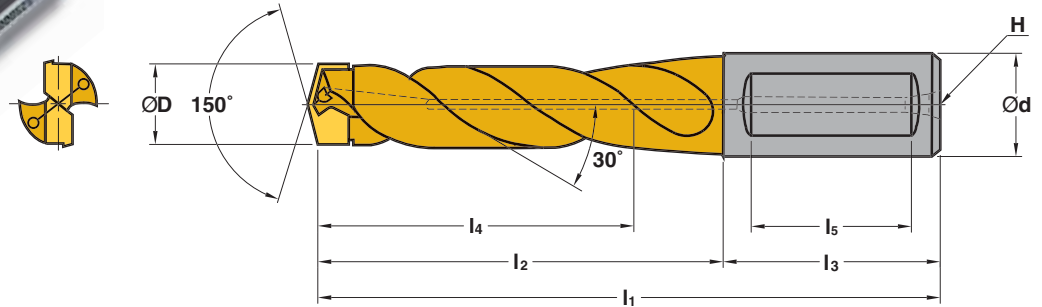
# NPXL/M TYPE - The Insertable New Point Drill

## NPT (For NPX Series Drill)

Shape	Class	Order Number	Coated		Diameter			Dimensions (mm)	
			GP20M		Fraction	mm	Decimal	W	T
	M	NPT0048T	+		3/4		.750	.3268	.1645 (4.18mm)
		NPT0049T	+		49/64		.766	.3307	
		NPT0050T	+		25/32		.781	.3386	
		NPT2000T				20.0	.787	8.7mm	
		NPT0051T	+		51/64		.797	.3465	
		NPT2050T				20.5	.807	8.9mm	
		NPT0052T	+		13/16		.813	.3543	
		NPT2100T				21.0	.827	9.1mm	
		NPT0053T	+		53/64		.828	.3583	
		NPT0054T	+		27/32		.844	.3661	
		NPT2150T				21.5	.846	9.3mm	
		NPT0055T	+		55/64		.859	.3740	
		NPT2200T				22.0	.866	9.5mm	
		NPT0056T	+		7/8		.875	.3819	
		NPT2250T				22.5	.886	9.8mm	
		NPT0057T	+		57/64		.891	.3858	
		NPT2300T				23.0	.906	10.0mm	
		NPT0058T	+		29/32		.906	.3937	
		NPT0059T	+		59/64		.922	.4016	
		NPT2350T				23.5	.925	10.2mm	
		NPT0060T	+		15/16		.938	.4094	
		NPT2400T				24.0	.945	10.4mm	
		NPT0061T	+		61/64		.953	.4134	
		NPT2450T				24.5	.965	10.6mm	
		NPT0062T	+		31/32		.969	.4213	
		NPT2500T				25.0	.984	10.9mm	
		NPT0063T			63/64		.984	.4291	
		NPT0100T	+		1.0		1.000	.4331	
		NPT2550T				25.5	1.004	11.1mm	
		NPT0101T	+		1-1/64		1.016	.4409	
		NPT2600T				26.0	1.024	11.3mm	
		NPT0102T	+		1-1/32		1.031	.4488	
		NPT2650T				26.5	1.043	11.5mm	
		NPT0103T	+		1-3/64		1.047	.4567	
		NPT0104T	+		1-1/16		1.063	.4606	
NPT2700T				27.0	1.063	11.7mm			
NPT0105T	+		1-5/64		1.078	.4685			
NPT2750T				27.5	1.083	11.9mm			
NPT0106T	+		1-3/32		1.094	.4764			
NPT2800T				28.0	1.102	12.2mm			
NPT0107T	+		1-7/64		1.109	.4803			
NPT2850T				28.5	1.122	12.4mm			
NPT0108T	+		1-1/8		1.125	.4882			
NPT0109T	+		1-9/64		1.141	.4961			
NPT2900T				29.0	1.142	12.6mm			
NPT0110T	+		1-5/32		1.156	.5039			
NPT2950T				29.5	1.161	12.8mm			
NPT3000T				30.0	1.181	13.0mm			
							.2141 (5.44mm)		

Metric inserts take 2-4 weeks for delivery

+ : Stock, 
  : Non Stock, 
  : Not Produced

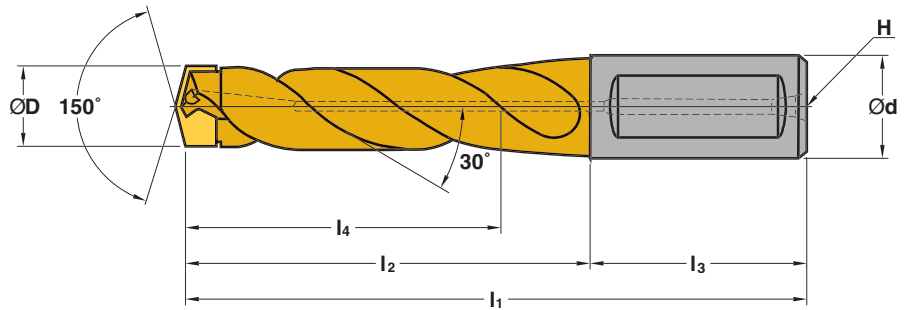


**(Inch Standard)**

Order Number	Stock	Drill Diameter (D)		Dimensions (inch)						
		Fractional Dia.	Decimal Dia.	d	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	H
BRS0032	+	1/2	.500	5/8	4.609	2.734	1.875	2.140	1.375	1/8 NPT
BRS0033	+	33/64	.5156							
BRS0034	+	17/32	.5313							
BRS0035	+	35/64	.5469		4.812	2.937	1.875	2.297		
BRS0036	+	9/16	.5625							
BRS0037	+	37/64	.5781							
BRS0038	+	19/32	.5938	3/4	5.140	3.140	2.453	1.500		
BRS0039	+	39/64	.6094							
BRS0040	+	5/8	.6250							
BRS0041	+	41/64	.6406		5.328	3.328	2	2.609		
BRS0042	+	21/32	.6563							
BRS0043	+	43/64	.6719							
BRS0044	+	11/16	.6875	1	5.546	3.546	2.765	1.750		
BRS0045	+	45/64	.7031							
BRS0046	+	23/32	.7188							
BRS0047	+	47/64	.7344		5.984	3.734	2.250	2.921		
BRS0048	+	3/4	.7500							
BRS0049	+	49/64	.7656							
BRS0050	+	25/32	.7813	1-1/4	6.309	4.140	3.265	1.875		
BRS0051	+	51/64	.7969							
BRS0052	+	13/16	.8125							
BRS0053	+	53/64	.8281		6.609	4.359	2.375	3.421		
BRS0054	+	27/32	.8438							
BRS0055	+	55/64	.8594							
BRS0056	+	7/8	.8750	1-1/4	6.796	4.546	3.578	1/4 NPT		
BRS0057	+	57/64	.8906							
BRS0058	+	29/32	.9063							
BRS0059	+	59/64	.9219		7.015	4.765	2.375		3.734	
BRS0060	+	15/16	.9375							
BRS0061	+	61/64	.9531							
BRS0062	+	31/32	.9688	1-1/4	7.546	5.171	4.046	1/4 NPT		
BRS0063	+	63/64	.9844							
BRS0100	+	1	1.000						7.734	5.359
BRS0101	+	1-1/64	1.0156							
BRS0102	+	1-1/31	1.0313							
BRS0103	+	1-3/64	1.0469		1-1/4	7.953	5.578		4.359	1/4 NPT
BRS0104	+	1-1/16	1.0625							
BRS0105	+	1-5/64	1.0781							
BRS0106	+	1-3/32	1.0938	8.140		5.765	2.375	4.515		
BRS0107	+	1-7/64	1.1094							
BRS0108	+	1-1/8	1.1250							
BRS0109	+	1-9/64	1.1406	8.359	5.984	2.375	4.671			
BRS0110	+	1-5/32	1.1563							
BRS0111	+	1-11/64	1.1719							
BRS0112	+	1-3/16	1.1875	8.546	6.172	2.375	4.828			

+: Stock, □: Non Stock, □: Not Produced

# BRS, NPXL/M TYPE



(Metric Standard)

Order Number	Stock	Drill Diameter (D)		Dimensions (Metric)				
		D	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	Ød	H
BRS1400S16		14.00	.5511	66	48	52	16	1/8 NPT
BRS1450S16		14.50	.5708					
BRS1500S20		15.00	.5905	76	50	61	20	
BRS1550S20		15.50	.6102					
BRS1600S20		16.00	.6299	81	65	20		
BRS1650S20		16.50	.6496					
BRS1700S20		17.00	.6693	86	69	20		
BRS1750S20		17.50	.6889					
BRS1800S20		18.00	.7086	91	73	20		
BRS1850S20		18.50	.7283					
BRS1900S25		19.00	.7480	101	56	77	25	
BRS1950S25		19.50	.7677					
BRS2000S25		20.00	.7874					

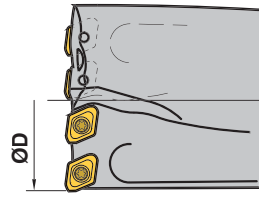
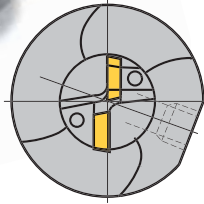
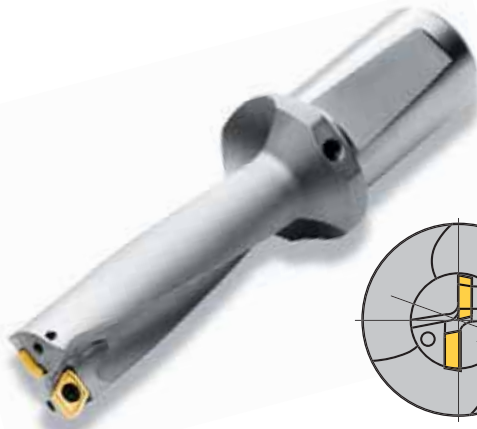
⊕: Stock, □: Non Stock, ○: Not Produced

Stock in Japan. Delivery 2-4 Weeks.

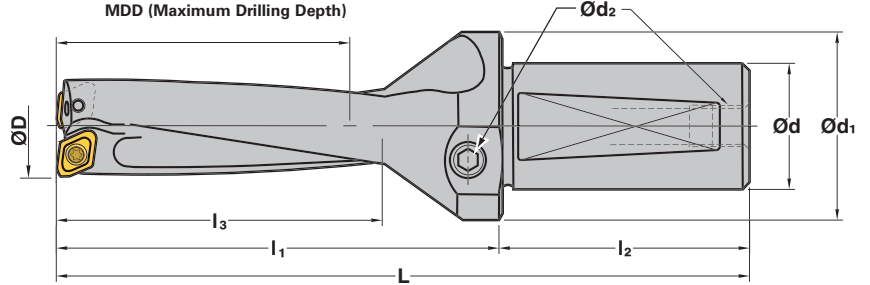
## RECOMMENDED CUTTING CONDITIONS

Workpiece (Hardness)	Drill	Drill Diameter (inch)					
		< 33/64		17/32 ~ 45/64		> 23/32	
		Cutting Speed	Feed	Cutting Speed	Feed	Cutting Speed	Feed
		(feet/min.)	(inch/rev.)	(feet/min.)	(inch/rev.)	(feet/min.)	(inch/rev.)
Mild steel (H <sub>s</sub> 160 Under)	BRS	250	.010	250	.012	300	.014
Carbon steel, Alloy steel (HRC25 Under)	BRS NPX	250	.010	250	.012	300	.012
Carbon steel, Alloy steel (HRC30 Under)	BRS NPX	180	.010	200	.010	200	.011
Stainless steel	BRS	150	.010	230	.011	260	.012
Heat-resisting alloy	BRS	80	.004	90	.006	90	.006
Titanium alloy	BRS	80	.006	100	.008	110	.010
Gray Cast iron	NPX	300	.012	300	.014	300	.016
Ductile Cast iron	NPX	300	.011	300	.012	300	.012

( INDEXABLE ) **TAFM** TYPE  
 ( INCH-STANDARD )



Drills from 1-15/16" have 4 inserts.



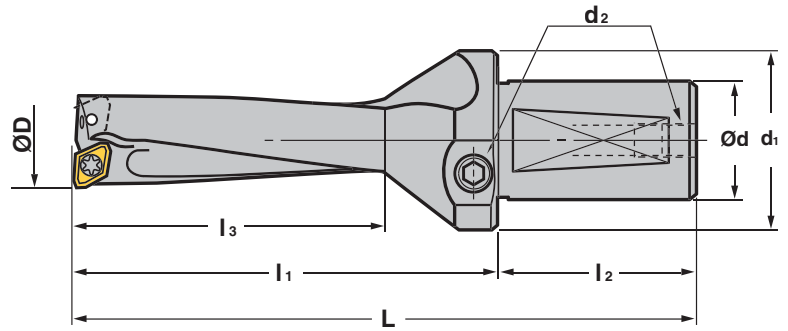
**L/D=3**

Order Number	Stock	Dimensions (Inch)									No. of inserts	Insert No.	Spare Parts	
		D	MDD	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	d <sub>1</sub>	d <sub>2</sub>			Insert Screw	Wrench
TAFM0468	+	15/32	1.40	4.22	2.47	1.75	1.60	3/4	1.02	1/8	2	GCMT040204-U1 GCMT040204-U2	TS2	① TKY06F
TAFM0500	+	1/2	1.50	4.31	2.56		1.70							
TAFM0531	+	17/32	1.59	4.41	2.66		1.79							
TAFM0562	+	9/16	1.69	4.50	2.75		1.89							
TAFM0593	+	19/32	1.72	4.59	2.84		1.98							
TAFM0625	+	5/8	1.88	6.31	3.31	3.00	2.13	1	1.73	2	GPMT060204-U1 GPMT060204-U2 GPMT060204-U3	TS25	① TKY08F	
TAFM0687	+	11/16	2.06	6.49	3.49		2.34							
TAFM0750	+	3/4	2.25	6.68	3.68		2.55							
TAFM0812	+	13/16	2.44	6.87	3.87		2.76							
TAFM0875	+	7/8	2.63	7.06	4.06		2.98							
TAFM0937	+	15/16	2.81	7.24	4.24	3.00	3.19	1-1/4	1.89	2	GPMT090304-U1 GPMT090304-U2 GPMT090304-U3	TS3	① TKY08F	
TAFM1000	+	1	3.00	7.43	4.43		3.40							
TAFM1062	+	1-1/16	3.19	7.62	4.62		3.61							
TAFM1125	+	1-1/8	3.38	7.77	4.77		3.83							
TAFM1187	+	1-3/16	3.56	8.14	5.14		4.04							
TAFM1250	+	1-1/4	3.75	8.33	5.33	3.00	4.25	1-1/2	2.09	2	GPMT11T308-U1 GPMT11T308-U2 GPMT11T308-U3	TS4	② TKY15D	
TAFM1312	+	1-5/16	3.94	8.52	5.52		4.46							
TAFM1375	+	1-3/8	4.13	8.71	5.71		4.68							
TAFM1437	+	1-7/16	4.31	8.89	5.89		4.89							
TAFM1500	+	1-1/2	4.50	9.08	6.08		5.10							
TAFM1562	+	1-9/16	4.69	9.27	6.27	3.00	5.31	1-1/2	2.28	2	GPMT140408-U1 GPMT140408-U2 GPMT140408-U3	TS5	② TKY25D	
TAFM1625	+	1-5/8	4.88	9.46	6.46		5.53							
TAFM1687	+	1-11/16	5.06	9.65	6.65		5.74							
TAFM1750	+	1-3/4	5.25	9.83	6.83		5.95							
TAFM1812	+	1-13/16	5.44	10.02	7.02		6.16							
TAFM1875	+	1-7/8	5.63	10.21	7.21	3.00	6.37	1-1/2	2.48	2	GPMT090304-U1 GPMT090304-U2 GPMT090304-U3	TS3	① TKY08F	
TAFM1937	+	1-15/16	5.81	10.43	7.43		6.59							
TAFM2000	+	2	6.00	10.61	7.61		6.80							
TAFM2062	+	2-1/16	6.19	10.81	7.81		7.01							
TAFM2125	+	2-1/8	6.38	10.99	7.99		7.22							
TAFM2187	+	2-3/16	6.56	11.19	8.19	3.00	7.44	1-1/2	2.48	2	GPMT11T308-U1 GPMT11T308-U2 GPMT11T308-U3	TS4	② TKY15D	
TAFM2250	+	2-1/4	6.75	11.39	8.39		7.65							

⊕ : Stock, □ : Non Stock, ○ : Not Produced

# TAFS/TAFL TYPE (INDEXABLE INCH-STANDARD)

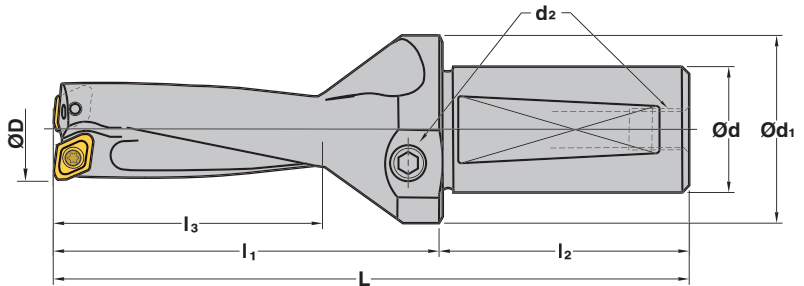
## TAFS



### L/D=2

Order Number	Stock	Dimensions (Inch)								# of Inserts	Insert No.	Spare Parts	
		D	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	d <sub>1</sub>	d <sub>2</sub>			Insert Screw	Wrench
TAFS0625	+	5/8	5.69	2.69	3.00	1.51	1.00	1.73	1/4 NPT	2	GPMT060204-U1/U2/U3	TS2	TKY06F
TAFS0750	+	3/4	5.93	2.93		1.80					GPMT070204-U1/U2/U3	TS25	TKY08F
TAFS0875	+	7/8	6.19	3.19		2.11					GPMT090304-U1/U2/U3	TS3	TKY08F
TAFS1000	+	1	6.43	3.43		2.40	1-1/4	1.89			GPMT11T308-U1/U2/U3	TS4	TKY15D
TAFS1125	+	1-1/8	6.65	3.65		2.71	1-1/2	2.09					
TAFS1250	+	1-1/4	7.08	4.08		3.00							

## TAFL



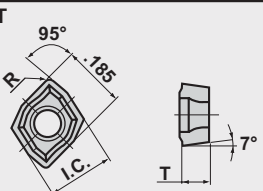
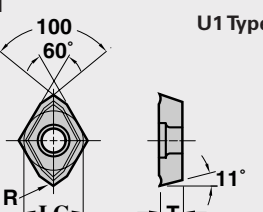
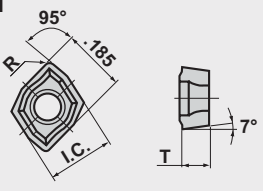
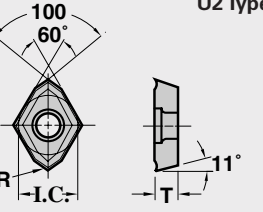
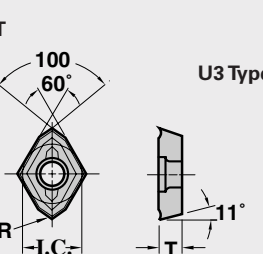
### L/D=4

Order Number	Stock	Dimensions (Inch)								# of Inserts	Insert No.	Spare Parts	
		D	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	d <sub>1</sub>	d <sub>2</sub>			Insert Screw	Wrench
TAFL0625	+	5/8	6.94	3.94	3.00	2.76	1.00	1.73	1/4 NPT	2	GPMT060204-U1/U2/U3	TS2	TKY06F
TAFL0750	+	3/4	7.43	4.43		3.30					GPMT070204-U1/U2/U3	TS25	TKY08F
TAFL0875	+	7/8	7.94	4.94		3.86					GPMT090304-U1/U2/U3	TS3	TKY08F
TAFL1000	+	1	8.43	5.43		4.40	1-1/4	1.89			GPMT11T308-U1/U2/U3	TS4	TKY15D
TAFL1125	+	1-1/8	8.90	5.90		4.96							
TAFL1250	+	1-1/4	9.58	6.58		5.50	1-1/2	2.09					

+ : Stock, 
 + : Non Stock, 
  : Not Produced

# TAFS/TAFM/TAFL TYPE

## ■ INSERT

Shape	Class	Drill diameter (inch)	Order Number	Coated					Dimensions (inch)			
				UE6020	U625	GP20M	UP20M	US735	I.C.	T	R	
<b>GCMT</b>  <b>GPMT</b>  U1 Type	M	15/32~9/16	GCMT040204-U1 GCMT1.51.51-U1				+		.196	3/32	1/64	
		19/32~11/16	GPMT060204-U1 GPMT1.81.51-U1	+			+		7/32			
		3/4~7/8	GPMT070204-U1 GPMT21.51-U1	+			+		1/4			
			15/16~1-1/16 *1-15/16~2-3/16	GPMT090304-U1 GPMT2.521-U1	+			+		5/16	1/8	1/32
			1-1/8~1-5/16 *2-1/4	GPMT11T308-U1 GPMT32.52-U1	+			+		3/8	5/32	
			1-3/8~1-7/8	GPMT140408-U1 GPMT432-U1	+			+		1/2	3/16	
<b>GCMT</b>  <b>GPMT</b>  U2 Type	M	15/32~9/16	GCMT040204-U2 GCMT1.51.51-U2			+	+	+	.196	3/32	1/64	
		19/32~11/16	GPMT060204-U2 GPMT1.81.51-U2	+			+	+	7/32			
		3/4~7/8	GPMT070204-U2 GPMT21.51-U2	+			+	+	1/4			
			15/16~1-1/16 *1-15/16~2-3/16	GPMT090304-U2 GPMT2.521-U2	+			+	+	5/16	1/8	1/32
			1-1/8~1-5/16 *2-1/4	GPMT11T308-U2 GPMT32.52-U2	+			+	+	3/8	5/32	
			1-3/8~1-7/8	GPMT140408-U2 GPMT432-U2	+			+	+	1/2	3/16	
<b>GPMT</b>  U3 Type	M	19/32~11/16	GPMT060204-U3 GPMT1.81.51-U3	+	+		+	+	7/32	3/32	1/64	
		3/4~7/8	GPMT070204-U3 GPMT21.51-U3	+	+		+	+	1/4			
			15/16~1-1/16 *1-15/16~2-3/16	GPMT090304-U3 GPMT2.521-U3	+	+		+	+	5/16	1/8	1/32
			1-1/8~1-5/16 *2-1/4	GPMT11T308-U3 GPMT32.52-U3	+	+		+	+	3/8	5/32	
			1-3/8~1-7/8	GPMT140408-U3 GPMT432-U3	+	+		+	+	1/2	3/16	

\*Drill has 4 inserts.

+ : Stock, 
   : Non Stock, 
   : Not Produced

# TAFS/TAFM/T AFL TYPE

## RECOMMENDED CUTTING CONDITIONS (TAF Series)

Mild steel	Hardness	Cutting Speed SFM (feet/min)			Chip Breaker	Feed IPR					
		2 & 3xD		4xD		Cutter Diameter					
		(15/32 to 19/32)	(5/8 to 2-1/4)	(5/8 to 1-1/4)		(15/32 to 19/32)	(5/8 to 7/8)	(15/16 to 1-5/16)	(1-3/8 to 1-13/16)	(1-15/16 to 2-1/4)	
P	Low Carbon (1010 & 1020)	150 HB	500 (328-650)	656 (500-1000)	500 (328-650)	U1	.002 (.0015 to .004)	.0028 (.0015 to .004)	.003 (.0015 to .004)	.004 (.002 to .005)	.003 (.0015 to .004)
						U2	.002 (.0015 to .004)	.003 (.0015 to .005)	.004 (.0015 to .005)	.005 (.002 to .005)	.004 (.0015 to .005)
						U3	-	.003 (.0015 to .005)	.004 (.0015 to .005)	.005 (.002 to .005)	.004 (.0015 to .005)
	Medium Carbon (1045 & 1049)	180-280 HB	393 (250-525)	500 (375-600)	325 (262-400)	U1	.002 (.0015 to .004)	.003 (.002 to .005)	.0045 (.003 to .006)	.005 (.003 to .007)	.0045 (.003 to .006)
						U2	.002 (.0015 to .004)	.004 (.002 to .006)	.005 (.003 to .007)	.006 (.003 to .008)	.005 (.003 to .007)
						U3	-	.004 (.002 to .006)	.005 (.003 to .007)	.006 (.003 to .008)	.005 (.003 to .007)
	Alloy Steel (4140 & 5120)	180-280 HB	393 (250-525)	500 (375-600)	325 (262-400)	U1	.002 (.0015 to .004)	.003 (.002 to .004)	.003 (.002 to .005)	.004 (.003 to .005)	.003 (.002 to .005)
						U2	.002 (.0015 to .004)	.004 (.002 to .005)	.004 (.003 to .006)	.005 (.003 to .007)	.004 (.003 to .006)
						U3	-	.004 (.002 to .005)	.004 (.003 to .006)	.005 (.003 to .007)	.004 (.003 to .006)
M	Stainless Steel (304 & 316)	200 HB	325 (250-400)	500 (375-650)	325 (262-400)	U1	.002 (.0015 to .004)	.0025 (.0015 to .004)	.003 (.0014 to .004)	.004 (.0016 to .005)	.003 (.0014 to .004)
						U2	.002 (.0015 to .004)	.0025 (.0015 to .005)	.004 (.0016 to .006)	.004 (.0016 to .006)	.004 (.0016 to .006)
						U3	-	.003 (.0015 to .005)	.004 (.0016 to .006)	.004 (.0016 to .006)	.004 (.0016 to .006)
K	Cast Iron (Class 20 & 35)	150 HB	400 (250-525)	500 (375-600)	460 (360-525)	U1	.0028 (.002 to .004)	.0028 (.002 to .004)	.004 (.0016 to .005)	.004 (.0016 to .005)	.004 (.0016 to .005)
						U2	.0028 (.0015 to .004)	.006 (.004 to .007)	.007 (.004 to .0010)	.007 (.004 to .0010)	.007 (.004 to .0010)
						U3	-	.006 (.004 to .007)	.007 (.004 to .0010)	.007 (.004 to .0010)	.007 (.004 to .0010)
K	Ductile Iron (60-40-18)	140 HB	325 (250-500)	500 (375-600)	325 (250-400)	U1	.0028 (.002 to .004)	.0028 (.002 to .004)	.004 (.0025 to .005)	.004 (.0025 to .005)	.004 (.0025 to .005)
						U2	.002 (.0015 to .004)	.004 (.003 to .005)	.006 (.003 to .008)	.007 (.003 to .008)	.006 (.003 to .008)
						U3	-	.004 (.003 to .005)	.006 (.003 to .008)	.007 (.003 to .008)	.006 (.003 to .008)

## CHIP BREAKER RECOMMENDATION

⊙:1st Choice ○:2nd Choice

Workpiece	P						M		K			
	Low Carbon		Medium Carbon		Alloy Steels		Stainless Steel		Cast Iron		Ductile Iron	
	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT
Breaker												
U1	⊙	⊙	○	○	○	○	○	○	○	○	○	○
U2	○	○	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
U3		○		○		○		○		○		○

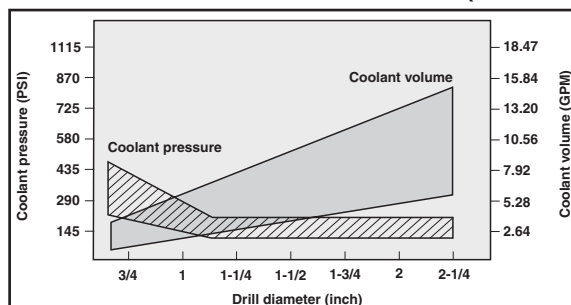
Note: U3 Breaker is recommended for rotating tool applications.

## GRADE RECOMMENDATION

⊙:1st Choice ○:2nd Choice

Workpiece	P						M		K			
	Low Carbon		Medium Carbon		Alloy Steels		Stainless Steel		Cast Iron		Ductile Iron	
	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT
Grade												
UP20M	⊙	⊙	○	⊙	○	○	○	○	○	⊙	○	⊙
GP20M	○		⊙		⊙		⊙		⊙		⊙	
UE6020/U625		○		○		⊙		○		○		○
US735		○		○		○		⊙		○		○

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