

*Solid carbide drill*

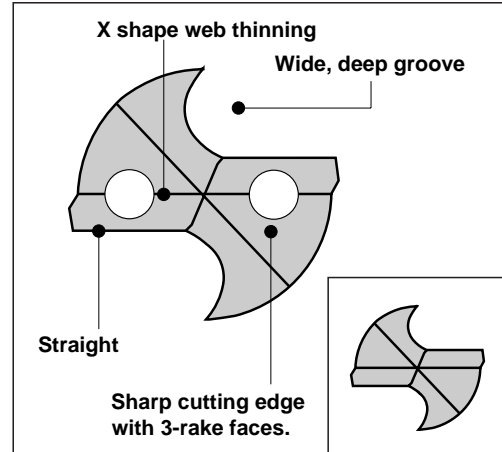
***MZ*** drill

- Large diameter sizes added.



# MZ drill, characteristics and application

- Wide groove shape gives excellent chip disposal.
- Simple straight cutting edge design makes regrinding easy.
- GP coating with high wear resistance prolongs tool life.
- Solid carbide gives higher hole accuracy than HSS.
- 5 - 10 times higher efficiency tool life than HSS drill.
- Abundant standard inventory maintained.  
( $\varnothing$  .078~  $\varnothing$ .781)
- Grade is GP20M (tough substrate + New PVD coating)



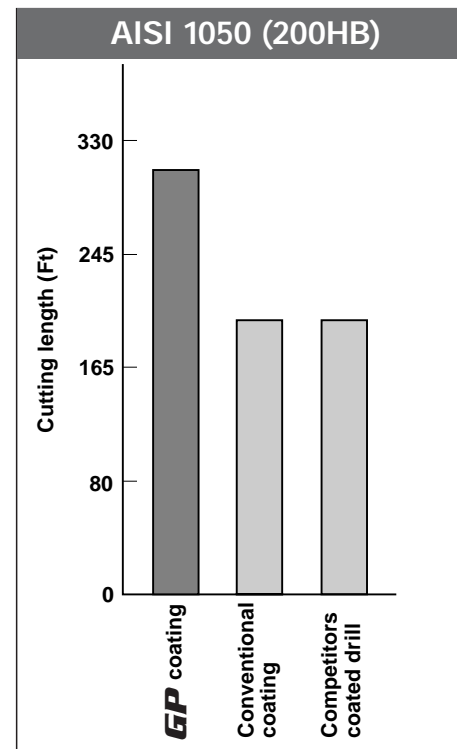
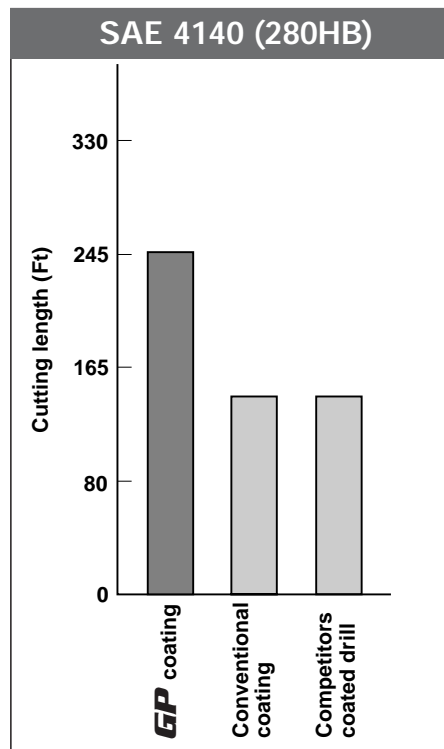
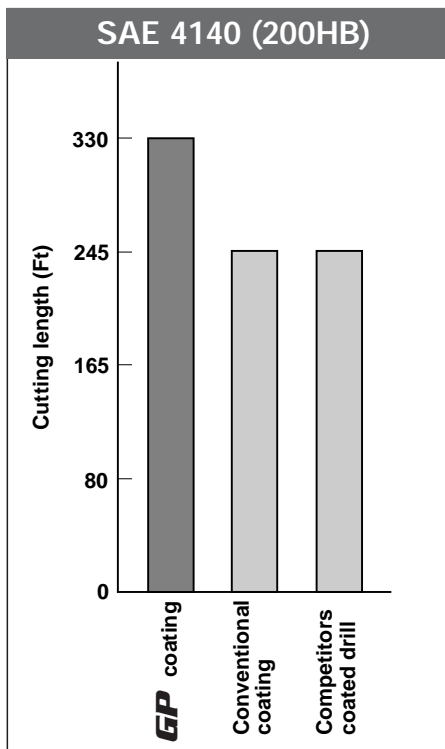
# MZ drill, cutting performance comparison data

Tool Diameter \ Cutting conditions	MZ drill		Coated HSS drill	HSS drill
	MZE	MZS		
Cutting speed (SFM)	195	395	100	50
Feed per revolution (IPR)	.012	.010	.010	.006
Feed (IPM)	18.78	31.34	7.83	2.36

(Cutting conditions)  
 Workpiece : SAE 4140 (230HB)  
 Tool diameter :  $\varnothing$  .47  
 Hole depth : 1.18 inch  
 Cutting fluid : Water soluble (10:1)

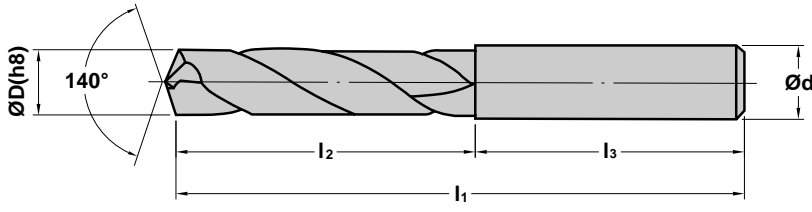
# GP coating, cutting performance

(Cutting speed : 195 SFM Feed : .010 IPR Hole depth : L/D=3)



# MZE drill Standard

## ■ MZE type (External coolant)



Ø D	Tolerance(hB)
≤ .118	<sup>0</sup> <sub>-.00056</sub>
.118-.236	<sup>0</sup> <sub>-.00072</sub>
.236-.394	<sup>0</sup> <sub>-.00088</sub>
.394-.709	<sup>0</sup> <sub>-.00108</sub>
.709-.787	<sup>0</sup> <sub>-.00132</sub>

### ● Standard type (Inch)

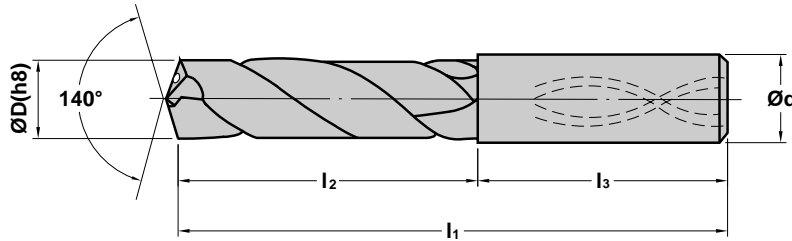
Order Number	Stock	Drill Diameter (ØD)		Dimensions (Inch)			Drill depth
		Fractional	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	
MZE01250SA	+	1/8	.1250	1-59/64	45/64	1-7/32	2xD
MZE01406SA	+	9/64	.1406	2-3/64	25/32	1-1/4	
MZE01562SA	+	5/32	.1562	2-3/16	7/8	1-5/16	
MZE01719SA	+	11/64	.1719	2-9/32	15/16	1-11/32	
MZE01875SA	+	3/16	.1875	2-7/16	1	1-7/16	
MZE02031SA	+	13/64	.2031				
MZE02188SA	+	7/32	.2188	2-5/8	1-1/8	1-1/2	
MZE02344SA	+	15/64	.2344				
MZE02500MA	+	1/4	.2500	3-3/16	1-5/8	1-9/16	3xD
MZE02570MA	+	F	.2570	3-17/64	1-11/16		
MZE02656MA	+	17/64	.2656				
MZE02720MA	+	I	.2720				
MZE02812MA	+	9/32	.2812	3-7/16	1-3/4	1-11/16	
MZE02969MA	+	19/64	.2969	3-9/16	1-7/8		
MZE03125MA	+	5/16	.3125				
MZE03281MA	+	21/64	.3281	3-3/4	2-1/16	1-11/16	
MZE03320MA	+	Q	.3320				
MZE03438MA	+	11/32	.3438	3-7/8	2-3/16	1-23/32	
MZE03594MA	+	23/64	.3594	4	2-9/32		
MZE03680MA	+	U	.3680				
MZE03750MA	+	3/8	.3750	4-1/8	2-3/8		1-3/4
MZE03906MA	+	25/64	.3906				
MZE04062MA	+	13/32	.4062	4-13/32	2-5/8	1-25/32	
MZE04219MA	+	27/64	.4219	4-1/2	2-11/16	1-13/16	
MZE04375MA	+	7/16	.4375	4-5/8	2-13/16		
MZE04531MA	+	29/64	.4531	4-3/4	2-7/8	1-7/8	
MZE04688MA	+	15/32	.4688				
MZE04844MA	+	31/64	.4844	5-5/16	3	2-5/16	
MZE05000MA	+	1/2	.5000	5-3/8	3-1/16		
MZE05118MA	+	13.0mm	.5118				
MZE05156MA	+	33/64	.5156	5-11/16	3-11/32	2-11/32	
MZE05312MA	+	17/32	.5312				
MZE05625MA	+	9/16	.5625	5-15/16	3-1/2	2-7/16	
MZE05781MA	+	37/64	.5781	6	3-37/64		
MZE06250MA	+	5/8	.6250	6-19/64	3-25/32	2-33/64	

### ● Standard type (Metric)

Order Number	Stock	Drill Diameter (ØD)		Dimensions (Metric)			Drill depth
		Decimal	Metric (mm)	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	
MZE0290SA	+	.1142	2.90	46	16	30	2xD
MZE0330SA	+	.1299	3.30	49	18	31	
MZE0340SA	+	.1339	3.40	52	20	32	
MZE0380SA	+	.1496	3.80	55	22	33	
MZE0390SA	+	.1535	3.90				
MZE0420SA	+	.1654	4.20				
MZE0440SA	+	.1732	4.40	58	24	34	
MZE0450SA	+	.1772	4.50				
MZE0490SA	+	.1929	4.90	62	26	36	
MZE0500SA	+	.1968	5.00				
MZE0550SA	+	.2165	5.50	66	28	38	
MZE0600MA	+	.2362	6.00	81	41	40	
MZE0680MA	+	.2677	6.80	83	43		
MZE0700MA	+	.2756	7.00				
MZE0750MA	+	.2953	7.50	87	45	42	
MZE0800MA	+	.3150	8.00	90	48		
MZE0850MA	+	.3346	8.50	96	53	43	
MZE0900MA	+	.3543	9.00	98	55		
MZE1000MA	+	.3937	10.00	105	60	45	
MZE1050MA	+	.4134	10.50	112	66	46	
MZE1100MA	+	.4331	11.00	114	68		
MZE1200MA	+	.4724	12.00	121	73	48	
MZE1250MA	+	.4921	12.50	135	76	59	
MZE1400MA	+	.5512	14.00	147	86	61	
MZE1450MA	+	.5709	14.50	151	89	62	
MZE1500MA	+	.5906	15.00	153	91		
MZE1550MA	+	.6102	15.50	157	94	63	
MZE1600MA	+	.6299	16.00	160	96	64	

# MZS drill Standard

## ■ MZS type (Internal coolant)



Drill diameter and tolerance

Ø D	Tolerance(hB)
≤ .118	<sup>0</sup> <sub>-.00056</sub>
.118~.236	<sup>0</sup> <sub>-.00072</sub>
.236~.394	<sup>0</sup> <sub>-.00088</sub>
.394~.709	<sup>0</sup> <sub>-.00108</sub>

## ● Long type (For 5xD) (Metric standard)

Order Number	Stocked	Drill Diameter (ØD)		Dimensions (Metric)				Drill depth
		Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZS0370LB	+	3.7	.1457	92	44	48	4	5xD
MZS0400LB	+	4.0	.1575					
MZS0420LB	+	4.2	.1654	100	50	50	5	
MZS0500LB	+	5.0	.1969					
MZS0510LB	+	5.1	.2008	100	44	52	6	
MZS0550LB	+	5.5	.2165					
MZS0600LB	+	6.0	.2362	109	48	53	7	
MZS0650LB	+	6.5	.2559					
MZS0670LB	+	6.7	.2638	109	56	53	7	
MZS0680LB	+	6.8	.2677					
MZS0700LB	+	7.0	.2756	118	60	54	8	
MZS0750LB	+	7.5	.2953					
MZS0800LB	+	8.0	.3150	127	68	55	9	
MZS0850LB	+	8.5	.3346					
MZS0860LB	+	8.6	.3386	127	72	55	9	
MZS0900LB	+	9.0	.3543					
MZS0950LB	+	9.5	.3740	136	76	56	10	
MZS1000LB	+	10.0	.3937					
MZS1030LB	+	10.3	.4055	149	84	61	11	
MZS1040LB	+	10.4	.4094					
MZS1050LB	+	10.5	.4134	149	88	61	11	
MZS1100LB	+	11.0	.4331					
MZS1150LB	+	11.5	.4528	158	92	62	12	
MZS1200LB	+	12.0	.4724					
MZS1250LB	+	12.5	.4921	167	100	63	13	
MZS1300LB	+	13.0	.5118					
MZS1350LB	+	13.5	.5315	176	108	64	14	
MZS1400LB	+	14.0	.5512					
MZS1450LB	+	14.5	.5709	185	116	65	15	
MZS1500LB	+	15.0	.5906					
MZS1550LB	+	15.5	.6102	193	120	65	16	
MZS1600LB	+	16.0	.6299					

## ● Standard type (For 3xD) (Metric standard)

Order Number	Stock	Drill Diameter (ØD)		Dimensions (Metric)				Drill depth
		Metric (mm)	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZS0200MA	+	2.0	.0787	62	16	46	2.0	3xD
MZS0240MA	+	2.4	.0945	66	20		2.4	
MZS0250MA	+	2.5	.0984				2.5	
MZS0280MA	+	2.8	.1102	72	24	48	2.8	
MZS0290MA	+	2.9	.1142				2.9	
MZS0300MB	+	3.0	.1181	76	28	48	3	
MZS0330MB	+	3.3	.1299				4	
MZS0370MB	+	3.7	.1457	80	32	50	5	
MZS0400MB	+	4.0	.1575					
MZS0420MB	+	4.2	.1654	86	36	50	5	
MZS0500MB	+	5.0	.1968	82	27.5	52	6	
MZS0550MB	+	5.5	.2165					
MZS0600MB	+	6.0	.2362	88	30.0	53	7	
MZS0650MB	+	6.5	.2559					
MZS0680MB	+	6.8	.2677	88	32.5	53	7	
MZS0700MB	+	7.0	.2756					
MZS0750MB	+	7.5	.2953	94	37.5	54	8	
MZS0800MB	+	8.0	.3150					
MZS0850MB	+	8.5	.3346	100	40.0	55	9	
MZS0900MB	+	9.0	.3543					
MZS0950MB	+	9.5	.3740	106	42.5	56	10	
MZS1000MB	+	10.0	.3937					
MZS1040MB	+	10.4	.4094	116	47.5	61	11	
MZS1050MB	+	10.5	.4134					
MZS1100MB	+	11.0	.4331	122	50.0	62	12	
MZS1150MB	+	11.5	.4528					
MZS1200MB	+	12.0	.4724	128	52.5	63	13	
MZS1250MB	+	12.5	.4921					
MZS1300MB	+	13.0	.5118	134	55.0	64	14	
MZS1350MB	+	13.5	.5315					
MZS1400MB	+	14.0	.5512	140	67.5	65	15	
MZS1450MB	+	14.5	.5709					
MZS1500MB	+	15.0	.5906	145	70.0	66	16	
MZS1550MB	+	15.5	.6102					
MZS1600MB	+	16.0	.6299					

# MZS drill Standard

## ● Long type (For 5xD) (Inch standard)

Order Number	Stocked	Drill Diameter (ØD)		Dimensions (Inch)				Drill depth
		Fractional	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			
MZS01495LB	+	#25	.1495					
MZS01562LB	+	5/32	.1562	3.937	1.969	1.969	.1969	
MZS01590LB	+	#21	.1590					
MZS01719LB	+	11/64	.1719					
MZS01875LB	+	3/16	.1875	4.134	2.165	1-3/4	15/64	
MZS02031LB	+	13/64	.2031					
MZS02188LB	+	7/32	.2188					
MZS02344LB	+	15/64	.2344	3-5/16	1-7/64	2-3/64	15/64	
MZS02500LB	+	1/4	.2500	4-9/64	2-3/64	2-3/32	17/64	
MZS02570LB	+	F	.2570					
MZS02656LB	+	17/64	.2656					
MZS02720LB	+	I	.2720					
MZS02812LB	+	9/32	.2812	4-1/64	2-3/64	2-1/8	5/16	
MZS02969LB	+	19/64	.2969					
MZS03125LB	+	5/16	.3125					
MZS03281LB	+	21/64	.3281	5	2-3/64	2-5/32	11/32	
MZS03320LB	+	Q	.3320					
MZS03438LB	+	11/32	.3438					
MZS03594LB	+	23/64	.3594	5-3/64	3	2-3/64	25/64	
MZS03680LB	+	U	.3680					
MZS03750LB	+	3/8	.3750					
MZS03906LB	+	25/64	.3906	5-7/8	3-5/16	2-3/32	27/64	
MZS04062LB	+	13/32	.4062					
MZS04219LB	+	27/64	.4219					
MZS04375LB	+	7/16	.4375	6-7/32	3-5/8	2-7/16	15/32	
MZS04531LB	+	29/64	.4531					
MZS04688LB	+	15/32	.4688					
MZS04844LB	+	31/64	.4844	6-7/64	3-5/16	2-1/64	1/2	
MZS05000LB	+	1/2	.5000					
MZS05118LB	+	13.0mm	.5118					
MZS05156LB	+	33/64	.5156	6-9/64	4-1/4	2-3/64	35/64	
MZS05312LB	+	17/32	.5312					
MZS05469LB	+	35/64	.5469					
MZS05625LB	+	9/16	.5625	7-9/32	4-9/16	2-9/16	37/64	
MZS05781LB	+	37/64	.5781					
MZS05937LB	+	19/32	.5937					
MZS06094LB	+	39/64	.6094	7-19/32	4-7/8	5/8		
MZS06250LB	+	5/8	.6250					
MZS06406LB	+	41/64	.6406					
MZS06563LB	+	21/32	.6563	7.913	5.197	21/32		
MZS06718LB	+	43/64	.6718					
MZS06875LB	+	11/16	.6875					
MZS07031LB	+	45/64	.7031	8.228	5.512	45/64		
MZS07188LB	+	23/32	.7188					
MZS07344LB	+	47/64	.7344					
MZS07500LB	+	3/4	.7500	8.543	5.669	47/64		
MZS07656LB	+	49/64	.7656					
MZS07812LB	+	25/32	.7812					
MZS07812LB	+	25/32	.7812	8.858	5.827	25/32		
MZS07344LB	+	47/64	.7344					
MZS07500LB	+	3/4	.7500					
MZS07656LB	+	49/64	.7656	8.858	5.984	25/32		
MZS07812LB	+	25/32	.7812					
MZS07812LB	+	25/32	.7812					

## ● Standard type (For 3xD) (Inch standard)

Order Number	Stock	Drill Diameter (ØD)		Dimensions (Inch)				Drill depth
		Fractional	Decimal	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d	
MZS00781MB	+	5/64	.0781	2.441	.630	1.811	.0781	3xD
MZS00938MB	+	3/32	.0938	2.598	.787			
MZS01094MB	+	7/64	.1094	2.835	.945			
MZS01250MB	+	1/8	.1250	2.992	1.102	1.890	.1575	
MZS01400MB	+	#28	.1405	3.150	1.260			
MZS01495MB	+	#25	.1495					
MZS01590MB	+	#21	.1590	3.386	1.417	1.969	.1969	
MZS01719MB	+	11/64	.1719					
MZS01875MB	+	3/16	.1875					
MZS02031MB	+	13/64	.2031	3.543	1.575	2.047	15/64	
MZS02165MB	+	5.5mm	.2165					
MZS02188MB	+	7/32	.2188					
MZS02344MB	+	15/64	.2344	3.228	1.082	2.087	17/64	
MZS02500MB	+	1/4	.2500					
MZS02570MB	+	F	.2570					
MZS02656MB	+	17/64	.2656	3.465	1.279	2.087	.2720	
MZS02720MB	+	I	.2720					
MZS02812MB	+	9/32	.2812					
MZS02969MB	+	19/64	.2969	3.701	1.476	2.126	5/16	
MZS03125MB	+	5/16	.3125					
MZS03281MB	+	21/64	.3281					
MZS03320MB	+	Q	.3320	3.937	1.673	2.165	11/32	
MZS03438MB	+	11/32	.3438					
MZS03594MB	+	23/64	.3594					
MZS03680MB	+	U	.3680	4.174	1.870	2.205	25/64	
MZS03750MB	+	3/8	.3750					
MZS03906MB	+	25/64	.3906					
MZS04062MB	+	13/32	.4062	4.567	2.067	2.402	27/64	
MZS04219MB	+	27/64	.4219					
MZS04375MB	+	7/16	.4375					
MZS04531MB	+	29/64	.4531	4.803	2.264	2.441	15/32	
MZS04688MB	+	15/32	.4688					
MZS04844MB	+	31/64	.4844					
MZS05000MB	+	1/2	.5000	5.039	2.461	2.480	1/2	
MZS05118MB	+	13.0mm	.5118					
MZS05156MB	+	33/64	.5156					
MZS05312MB	+	17/32	.5312	5.276	2.657	2.520	35/64	
MZS05469MB	+	35/64	.5469					
MZS05625MB	+	9/16	.5625					
MZS05781MB	+	37/64	.5781	5.512	2.854	2.559	37/64	
MZS05937MB	+	19/32	.5937					
MZS06094MB	+	39/64	.6094					
MZS06250MB	+	5/8	.6250	5.709	3.051	2.559	5/8	
MZS06406MB	+	41/64	.6406					
MZS06563MB	+	21/32	.6563					
MZS06718MB	+	43/64	.6718	6.102	3.445	2.559	45/64	
MZS06875MB	+	11/16	.6875					
MZS07031MB	+	45/64	.7031					
MZS07188MB	+	23/32	.7188	6.299	3.543	47/64		
MZS07344MB	+	47/64	.7344					
MZS07500MB	+	3/4	.7500					
MZS07656MB	+	49/64	.7656	6.496	3.642	25/32		
MZS07812MB	+	25/32	.7812					
MZS07812MB	+	25/32	.7812					



# MZ drill for tube sheet drilling

## ● Tube sheet drills

Drill type	Order number	Stock	Drill diameter	Flute length	Shank diameter
MZS drill For 3 x D (Internal coolant)	MZS06330MB	+	.633"	3.150"	.656"
	MZS0970MB	+	.381"	1.968"	10 mm
	MZS1700MB	+	.669"	3.543"	17 mm
	MZS07580MB	+	.758"	3.839"	.781"
	MZS05050MB	+	.505"	2.559"	.512"
MZS drill For 5 x D (Internal coolant)	MZS06330LB	+	.633"	5.031"	.656"
	MZS0970LB	+	.381"	3.150"	10 mm
	MZS1700LB	+	.669"	5.040"	17 mm
	MZS07580LB	+	.758"	6.142"	.781"
	MZS05050LB	+	.505"	4.093"	.512"
MZE drill For 3 x D (External coolant)	MZE06330MA	+	.633"	3.781"	.633"
	MZE0970MA	+	.381"	2.362"	9.7 mm
	MZE1700MA	+	.669"	3.543"	17 mm
	MZE05050MA	+	.505"	2.559"	.505"

## MZ drill, recommended cutting conditions

### ■ MZE type

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	$\leq$ 180HB	150 (115 ~ 180)	.008 (.004 ~ .010)	180 (150 ~ 215)	.010 (.006 ~ .012)	215 (180 ~ 245)	.012 (.008 ~ .014)	230 (195 ~ 260)	.014 (.008 ~ .016)
Carbon steel Alloy steel	180 ~ 280HB	130 (100 ~ 165)	.008 (.004 ~ .010)	165 (130 ~ 195)	.010 (.006 ~ .012)	195 (165 ~ 230)	.012 (.008 ~ .014)	215 (180 ~ 245)	.014 (.008 ~ .016)
	280 ~ 350HB	115 (80 ~ 150)	.006 (.004 ~ .008)	150 (115 ~ 180)	.008 (.004 ~ .010)	180 (150 ~ 215)	.010 (.006 ~ .012)	195 (164 ~ 230)	.012 (.008 ~ .014)
Stainless steel	$\leq$ 200HB	65 (50 ~ 100)	.004 (.002 ~ .006)	80 (50 ~ 100)	.0048 (.002 ~ .006)	80 (50 ~ 100)	.006 (.004 ~ .008)	80 (50 ~ 100)	.008 (.004 ~ .010)
High hardened steel	40 ~ 60HRC	65 (30 ~ 80)	.004 (.002 ~ .006)	80 (50 ~ 100)	.0048 (.002 ~ .006)	80 (50 ~ 100)	.006 (.004 ~ .008)	100 (80 ~ 115)	.008 (.004 ~ .010)
Grey cast iron	180 ~ 220HB	165 (130 ~ 195)	.010 (.006 ~ .012)	195 (165 ~ 230)	.012 (.008 ~ .014)	230 (195 ~ 160)	.014 (.008 ~ .016)	230 (195 ~ 260)	.016 (.012 ~ .018)
Ductile cast iron	230 ~ 300HB	150 (115 ~ 180)	.008 (.004 ~ .010)	180 (150 ~ 215)	.010 (.006 ~ .012)	215 (180 ~ 245)	.012 (.008 ~ .014)	230 (195 ~ 260)	.014 (.008 ~ .016)

### ■ MZS type

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	$\leq$ 180HB	260 (165 ~ 395)	.008 (.004 ~ .010)	425 (330 ~ 460)	.010 (.006 ~ .012)	460 (360 ~ 490)	.012 (.008 ~ .014)	490 (395 ~ 525)	.014 (.010 ~ .012)
Carbon steel Alloy steel	180 ~ 280HB	230 (165 ~ 330)	.008 (.004 ~ .010)	360 (260 ~ 395)	.008 (.004 ~ .010)	395 (295 ~ 425)	.010 (.006 ~ .012)	425 (330 ~ 460)	.012 (.008 ~ .014)
	280 ~ 350HB	195 (100 ~ 260)	.006 (.0032 ~ .008)	230 (130 ~ 295)	.008 (.004 ~ .010)	260 (165 ~ 295)	.010 (.006 ~ .012)	295 (195 ~ 330)	.012 (.008 ~ .014)
Stainless steel	$\leq$ 200HB	130 (65 ~ 195)	.004 (.002 ~ .006)	230 (130 ~ 260)	.008 (.004 ~ .010)	260 (165 ~ 295)	.010 (.006 ~ .012)	295 (195 ~ 330)	.010 (.006 ~ .012)
Gray cast iron	180 ~ 220HB	330 (230 ~ 395)	.010 (.006 ~ .012)	425 (330 ~ 460)	.012 (.008 ~ .014)	460 (360 ~ 490)	.014 (.010 ~ .016)	490 (395 ~ 525)	.014 (.010 ~ .016)
Ductile cast iron	230 ~ 300HB	195 (100 ~ 260)	.008 (.004 ~ .010)	230 (130 ~ 295)	.008 (.004 ~ .010)	260 (165 ~ 330)	.010 (.006 ~ .012)	295 (195 ~ 360)	.012 (.008 ~ .014)

# MZ drill, size of screw and drill diameter

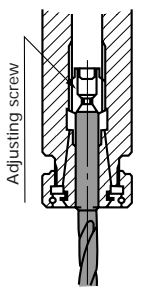
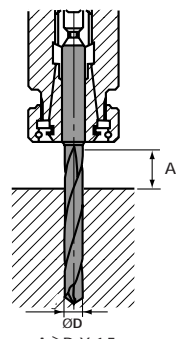
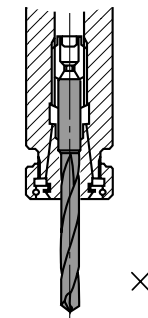
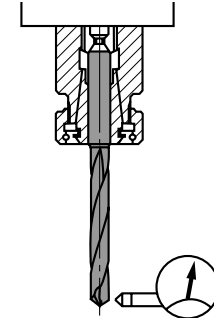
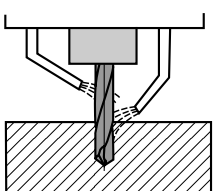
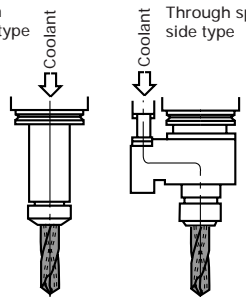
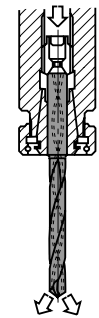
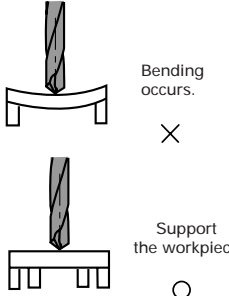
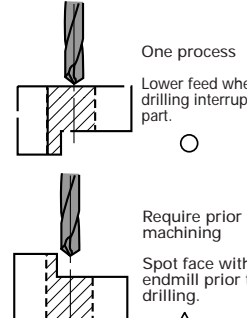
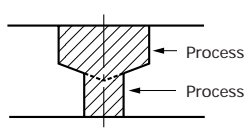
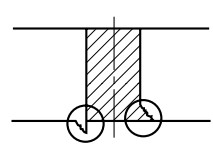
Oversize of MZ drill is + .004 ~+ .0012 inches.

When replacing HSS drill or conventional drills for tap drilling, select MZ drill .004 inches larger than the drills being used. (MZ drill diameter=HSS drill diameter+ .004 inches)

Size of screw Diam.	Pitch	Tap form	MZ drill	
			Drill size	Decimal equivalent
5/16	18	NC	F	.2570
5/16	24	NF	I	.2720
3/8	16	NC	5/16	.3125
3/8	24	NF	Q	.3320
7/16	14	NC	U	.3680
7/16	20	NF	25/64	.3906
1/2	13	NC	27/64	.4219
1/2	20	NF	29/64	.4531
9/16	12	NC	31/64	.4844

Size of screw Diam.	Pitch	Tap form	MZ drill	
			Drill size	Decimal equivalent
9/16	18	NF	33/64	.5156
5/8	11	NC	17/32	.5313
5/8	18	NF	37/64	.5781
11/16	11	NS	19/32	.5937
11/16	16	NS	5/8	.6250
3/4	10	NC	21/32	.6560
3/4	16	NF	11/16	.6870
7/8	9	NC	49/64	.7650

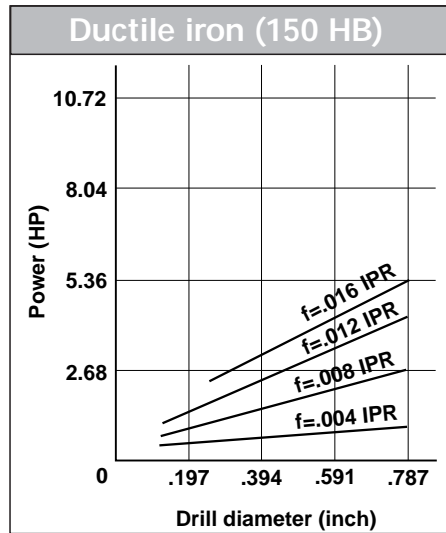
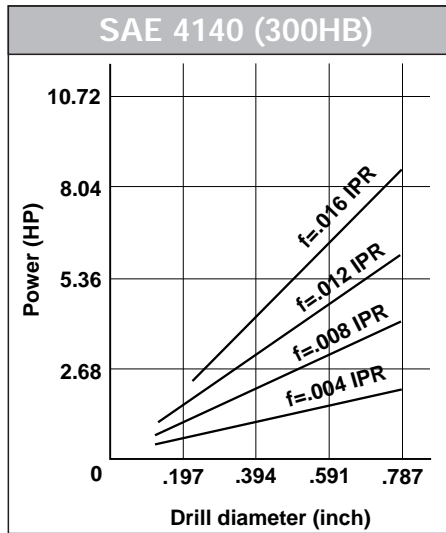
# MZ drill, operational points

<p><b>Drill holding</b></p>  <p>Thrust bearing type collet chuck holds the drill securely.</p>	<p><b>Drill length</b></p>  <p><math>A \geq D \times 1.5</math></p>	<p><b>Drill installation</b></p>  <p>Do not hold flutes.</p>	<p><b>Tolerance at installation</b></p>  <p>Tolerance <math>\leq</math> .0012 inch</p>
<p><b>Coolant method(MZE type)</b></p>  <p>Two coolant positions, at the end and the middle of a drill, are ideal.</p>	<p><b>Coolant method(MZS type)</b></p>  <p>Coolant pressure is app. 72.5-290 PSI. Coolant volume is app. .21-1.06 GPM</p>	<p><b>Drill installation</b></p>  <p>Seal cutting fluid securely.</p>	
<p><b>Thin workpiece</b></p>  <p>Bending occurs. <math>\times</math></p> <p>Support the workpiece. <math>\circ</math></p>	<p><b>Interrupted cutting</b></p>  <p>One process Lower feed when drilling interrupted part. <math>\circ</math></p> <p>Require prior machining Spot face with endmill prior to drilling. <math>\triangle</math></p>	<p><b>Spot facing</b></p>  <p>① Divide into two processes. ② Drill the larger hole first.</p> <p>*Tool for machining both chamfer and spot face is produced to order.</p>	<p><b>Burr, workpiece chipping at the end of through cutting</b></p>  <p>① Lower feed by 1/2 at the end of through cutting. ② Add chamfer angle(45°). ③ Alter the edge angle.</p>

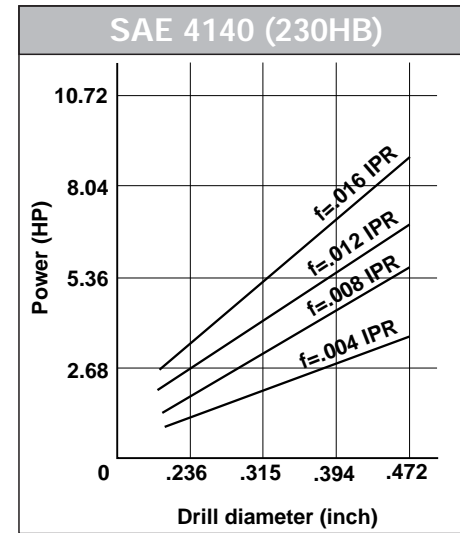
# MZ drill, cutting resistance

## Machine selection standard

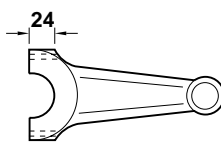
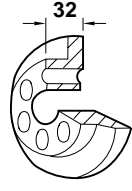
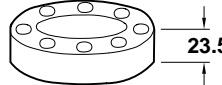
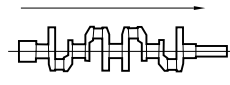
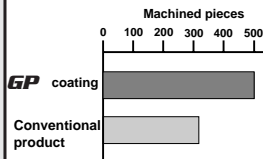
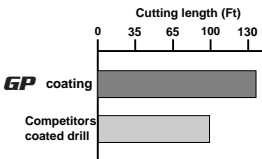
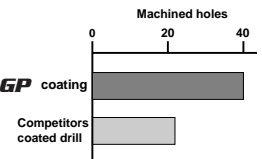
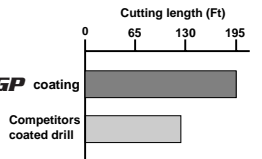
### ● MZE type (Vc=165 SFM)



### ● MZS type (Vc=330 SFM)



## MZ drill, application examples

Drill	MZE0680MA	MZE1200MA	MZSO500LB	MZSO600LB
Workpiece	Carbon steel (AISI 1055) 280HB 	Alloy steel (AISI 5610) 200HB 	Bearing steel (AISI 52100) 	Carbon steel (AISI 1049) 220HB 
Component	Automobile part	Machine part	Machine part	Automobile part
Cutting speed (SFM)	165	195	330	260
Feed (IPR)	.010	.012	.0048	.006
Revolution (r.p.m.)	2342	1592	6450	5090
Feed (IPM)	23.0	18.8	30.5	30.1
Cutting fluid	Water soluble oil	Water soluble oil	Water soluble oil	Water soluble oil
Results	<ul style="list-style-type: none"> <li>● Tool life</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>● Tool life</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>● Tool life</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>● Tool life</li> <li></li> </ul>

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