

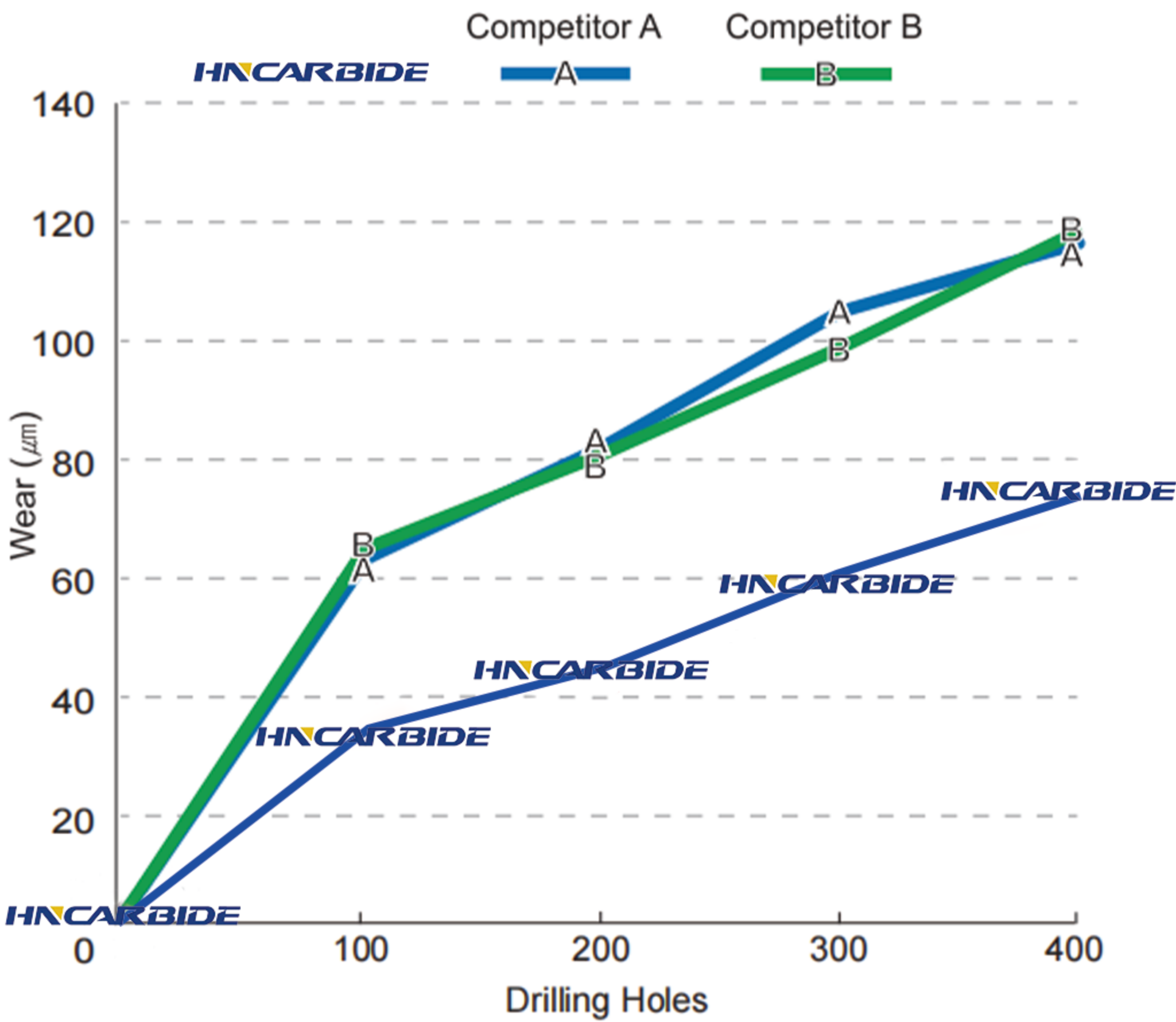
DRILL BITS

► SOLID CARBIDE DRILLS with Coolant Holes

CASE STUDY

Cutting Condition

Tool	DB510015
Size	1/16 × 3 × 15 × 55
Work Material	- AISI : H13 - DIN : X40GrMoV51 - JIS : SKD61 - WR : 1.2344 (HRC30)
RPM	14,856 rev./min.
Feed	.0019 inch/rev.
Drilling Depth	.29" (5xD)
Coolant	Wet Cut

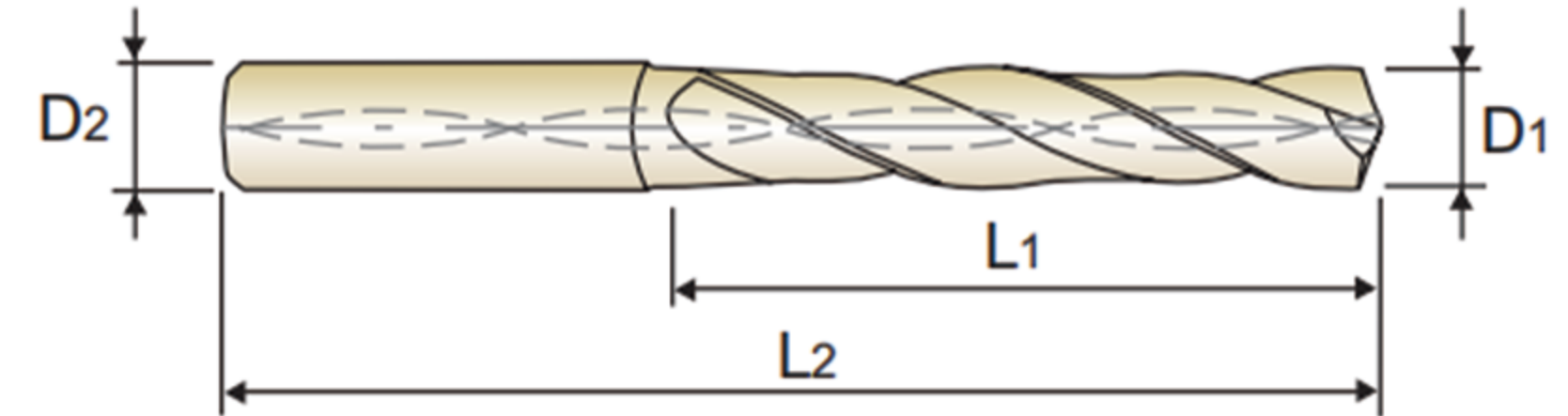


ALCRN-COATED SOLID CARBIDE DRILLS WITH COOLANT HOLES (3XD)

DB310 SERIES

- Drilling for Steel, Cast Steel, Cast Iron, Malleable Cast Iron
- Self centering and chip breaking by R-thinning
- Wave shape and negative land on the cutting edge for low thrust, stable torque and long tool life
- Optimized flute shape for strength of drilling and smooth chip evacuation

3xD



Unit : INCH

EDP No.	Drill Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ALCRN	D1		L1	D2	L2
DB310008	1/8	3.175	20	6	66
DB310009	9/64	3.57	20	6	66
DB310010	5/32	3.970	24	6	66
DB310011	11/64	4.37	24	6	66
DB310012	3/16	4.760	28	6	66
DB310013	13/64	5.16	28	6	66
DB310014	7/32	5.560	28	6	66
DB310015	15/64	5.95	28	6	66
DB310016	1/4	6.350	34	8	79
DB310006L	9/35	6.53	34	8	79
DB310017	17/64	6.750	34	8	79
DB310009L	25/92	6.91	34	8	79
DB310018	9/32	7.140	41	8	79
DB310019	19/64	7.54	41	8	79
DB310020	5/16	7.940	41	8	79
DB310021	21/64	8.33	47	10	89

EDP No.	Drill Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ACRN	D1		L1	D2	L2
DB310017L	1/3	8.430	47	10	89
DB310022	11/32	8.73	47	10	89
DB310023	23/64	9.130	47	10	89
DB310021L	32/87	9.35	47	10	89
DB310024	3/8	9.525	47	10	89
DB310025	25/64	9.92	47	10	89
DB310026	13/32	10.320	55	12	102
DB310027	27/64	10.72	55	12	102
DB310028	7/16	11.110	55	12	102
DB310029	29/64	11.51	55	12	102
DB310030	15/32	11.910	55	12	102
DB310031	31/64	12.30	60	14	107
DB310032	1/2	12.700	60	14	107
DB310036	9/16	14.29	65	16	115
DB310040	5/8	15.880	65	16	115
DB310044	11/16	17.46	73	18	123
DB310048	3/4	19.050	79	20	131

► Other shank types are available on your request.

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VDI 3323																				
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend		☉	☉	☉	○	☉	☉	○	○	☉	○	○	○		☉	○	☉	○	☉	○

ALCRN-COATED SOLID CARBIDE DRILLS WITH COOLANT HOLES (5XD)

DB510 SERIES

- Drilling for Steel, Cast Steel, Cast Iron, Malleable Cast Iron
- Self centering and chip breaking by R-thinning
- Wave shape and negative land on the cutting edge for low thrust, stable torque and long tool life
- Optimized flute shape for strength of drilling and smooth chip evacuation

5xD



Unit : INCH

EDP No.	Drill Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ACRN	D1		L1	D2	L2
DB510008	1/8	3.175	28	6	66
DB510009	9/64	3.57	28	6	66
DB510010	5/32	3.970	36	6	74
DB510011	11/64	4.37	36	6	74
DB510012	3/16	4.760	44	6	82
DB510013	13/64	5.16	44	6	82
DB510014	7/32	5.560	44	6	82
DB510015	15/64	5.95	44	6	82
DB510016	1/4	6.350	53	8	91
DB510006L	9/35	6.53	53	8	91
DB510017	17/64	6.750	53	8	91
DB510009L	25/92	6.91	53	8	91
DB510018	9/32	7.140	53	8	91
DB510019	19/64	7.54	53	8	91
DB510020	5/16	7.940	53	8	91
DB510021	21/64	8.33	61	10	103

EDP No.	Drill Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ACRN	D1		L1	D2	L2
DB510017L	1/3	8.430	61	10	103
DB510022	11/32	8.73	61	10	103
DB510023	23/64	9.130	61	10	103
DB510021L	32/87	9.35	61	10	103
DB510024	3/8	9.525	61	10	103
DB510025	25/64	9.92	61	10	103
DB510026	13/32	10.320	71	12	118
DB510027	27/64	10.72	71	12	118
DB510028	7/16	11.110	71	12	118
DB510029	29/64	11.51	71	12	118
DB510030	15/32	11.910	71	12	118
DB510031	31/64	12.30	77	14	124
DB510032	1/2	12.700	77	14	124
DB510036	9/16	14.29	83	16	133
DB510040	5/8	15.880	83	16	133
DB510048	3/4	19.05	101	20	153

► Other shank types are available on your request.

◎ : Excellent ○ : Good

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VDI 3323																				
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend		◎	◎	◎	○	◎	◎	○	○	◎	○	○	○		◎	○	◎	○	◎	○

ALCRN-COATED SOLID CARBIDE DRILLS WITHOUT COOLANT HOLES (3XD)

DB301 SERIES

- ▶ Drilling for Steel, Cast Steel, Cast Iron, Malleable Cast Iron
- ▶ Self centering and chip breaking by R-thinning
- ▶ Wave shape and negative land on the cutting edge for low thrust, stable torque and long tool life
- ▶ Optimized flute shape for strength of drilling and smooth chip evacuation

3xD

D1=D2



4



Unit : INCH

EDP No.	Drill Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ALCRN	D1		L1	D2	L2
DB301008	1/8	3.175	20	6	66
DB301009	9/64	3.57	20	6	66
DB301010	5/32	3.970	24	6	66
DB301011	11/64	4.37	24	6	66
DB301012	3/16	4.760	28	6	66
DB301013	13/64	5.16	28	6	66
DB301014	7/32	5.560	28	6	66
DB301015	15/64	5.95	28	6	66
DB301016	1/4	6.350	34	8	79
DB301017	17/64	6.75	34	8	79
DB301018	9/32	7.140	41	8	79
DB301019	19/64	7.54	41	8	79
DB301020	5/16	7.940	41	8	79
DB301021	21/64	8.33	47	10	89

EDP No.	Drill Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ALCRN	D1		L1	D2	L2
DB301022	11/32	8.730	47	10	89
DB301023	23/64	9.13	47	10	89
DB301024	3/8	9.525	47	10	89
DB301025	25/64	9.92	47	10	89
DB301026	13/32	10.320	55	12	102
DB301027	27/64	10.72	55	12	102
DB301028	7/16	11.110	55	12	102
DB301029	29/64	11.51	55	12	102
DB301030	15/32	11.910	55	12	102
DB301031	31/64	12.30	60	14	107
DB301032	1/2	12.700	60	14	107
DB301036	9/16	14.29	65	16	115
DB301040	5/8	15.880	65	16	115
DB301044	11/16	17.46	73	18	123
DB301048	3/4	19.050	79	20	131

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

◎ : Excellent ○ : Good

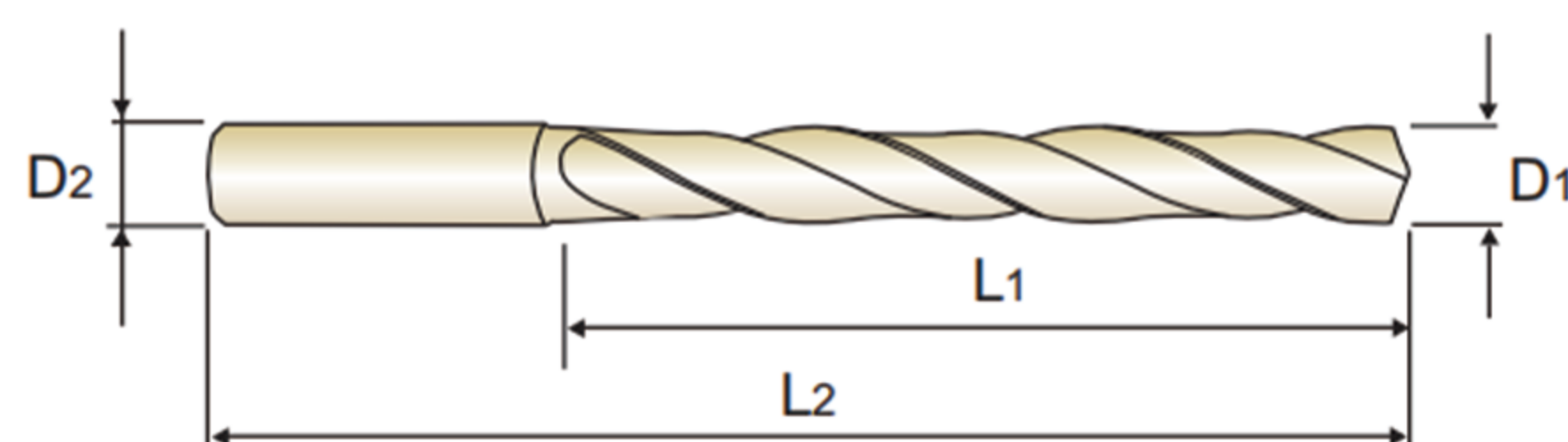
ISO	P											M			K						
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel,and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron		
	VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
	HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
	Recommend		◎	◎	◎	○	◎	◎	○	○	◎	○	○	○		◎	○	◎	○	◎	○

ALCRN-COATED SOLID CARBIDE DRILLS WITHOUT COOLANT HOLES (5XD)

DB501 SERIES

- ▶ Drilling for Steel, Cast Steel, Cast Iron, Malleable Cast Iron
- ▶ Self centering and chip breaking by R-thinning
- ▶ Wave shape and negative land on the cutting edge for low thrust, stable torque and long tool life
- ▶ Optimized flute shape for strength of drilling and smooth chip evacuation

5xD



Unit : INCH

EDP No.	Dril Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ALCRN	D1		L1	D2	L2
DB501004	1/16	1.59	10	6	66
DB501005	5/64	1.98	12	6	66
DB501006	3/32	2.38	14	6	66
DB501007	7/64	2.78	17	6	66
DB501008	1/8	3.18	28	6	66
DB501009	9/64	3.57	28	6	66
DB501010	5/32	3.97	36	6	74
DB501011	11/64	4.37	36	6	74
DB501012	3/16	4.76	44	6	82
DB501013	13/64	5.16	44	6	82
DB501014	7/32	5.56	44	6	82
DB501015	15/64	5.95	44	6	82
DB501016	1/4	6.35	53	8	91
DB501017	17/64	6.75	53	8	91
DB501018	9/32	7.14	53	8	91
DB501019	19/64	7.54	53	8	91

EDP No.	Dril Diameter		Flute Length	Shank Diameter	Overall Length
	Fractional	Metric			
ALCRN	D1		L1	D2	L2
DB501020	5/16	7.94	53	8	91
DB501021	21/64	8.33	61	10	103
DB501022	11/32	8.73	61	10	103
DB501023	23/64	9.13	61	10	103
DB501024	3/8	9.53	61	10	103
DB501025	25/64	9.92	61	10	103
DB501026	13/32	10.32	71	12	118
DB501027	27/64	10.72	71	12	118
DB501028	7/16	11.11	71	12	118
DB501029	29/64	11.51	71	12	118
DB501030	15/32	11.91	71	12	118
DB501031	31/64	12.30	77	14	124
DB501032	1/2	12.70	77	14	124
DB501036	9/16	14.29	83	16	133
DB501040	5/8	15.88	83	16	133
DB501048	3/4	19.05	101	20	153

▶ Other shank types are available on your request.

◎ : Excellent ○ : Good

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend		◎	◎	◎	○	◎	◎	○	○	◎	○	○	○		◎	○	◎	○	◎	○

SOLID CARBIDE DRILLS

ISO	VDI 3323	Material Description	SFM	Drill Diameter		SFM	Drill Diameter																				
			1.0 ~ 2.9	METRIC	1.0	2.0	3.0 ~ 20.0	METRIC	3.0	-	4.0	-	5.0	6.0	-	-	8.0	-	10.0	12.0	-	14.0	-	16.0	18.0	-	20.0
			-	FRACTIONAL	-	-	1/8 ~ 3/4	FRACTIONAL	-	1/8	-	3/16	-	-	1/4	5/16	-	3/8	-	-	1/2	-	9/16	5/8	-	3/4	-
P	2	Non-alloy steel	230	RPM FEED	22,280 .0012-.0020	11,140 .0020-.0028	329	RPM FEED	10,610 .0024-.0047	7,960 .0031-.0055	6,370 .0055-.0079	5,310 .0063-.0087	3,980 .0071-.0094	3,180 .0075-.0106	2,650 .0083-.0114	2,510 .0083-.0114	2,270 .0091-.0122	1,990 .0098-.0130	1,770 .0110-.0150	1,680 .0110-.0150	1,590 .0118-.0157						
	3		230	RPM FEED	22,280 .0012-.0020	11,140 .0020-.0028	329	RPM FEED	10,610 .0024-.0047	7,960 .0031-.0055	6,370 .0055-.0079	5,310 .0063-.0087	3,980 .0071-.0094	3,180 .0075-.0106	2,650 .0083-.0114	2,510 .0083-.0114	2,270 .0091-.0122	1,990 .0098-.0130	1,770 .0110-.0150	1,680 .0110-.0150	1,590 .0118-.0157						
	4		230	RPM FEED	22,280 .0012-.0020	11,140 .0020-.0028	329	RPM FEED	10,610 .0016-.0039	7,960 .0028-.0051	6,370 .0039-.0063	5,310 .0047-.0071	3,980 .0055-.0079	3,180 .0059-.0091	2,650 .0067-.0098	2,510 .0067-.0098	2,270 .0071-.0102	1,990 .0075-.0106	1,770 .0079-.0118	1,680 .0079-.0118	1,590 .0087-.0126						
	5		197	RPM FEED	19,100 .0012-.0020	9,550 .0020-.0028	263	RPM FEED	8,490 .0016-.0039	6,370 .0028-.0051	5,090 .0039-.0063	4,240 .0047-.0071	3,180 .0055-.0079	2,550 .0059-.0091	2,120 .0067-.0098	2,010 .0067-.0098	1,820 .0071-.0102	1,590 .0075-.0106	1,410 .0079-.0118	1,340 .0079-.0118	1,270 .0087-.0126						
	6	Low alloy steel	230	RPM FEED	22,280 .0012-.0020	11,140 .0020-.0028	329	RPM FEED	10,610 .0024-.0047	7,960 .0031-.0055	6,370 .0055-.0079	5,310 .0063-.0087	3,980 .0071-.0094	3,180 .0075-.0106	2,650 .0083-.0114	2,510 .0083-.0114	2,270 .0091-.0122	1,990 .0098-.0130	1,770 .0110-.0150	1,680 .0110-.0150	1,590 .0118-.0157						
	7		197	RPM FEED	19,100 .0012-.0020	9,550 .0020-.0028	263	RPM FEED	8,490 .0024-.0047	6,370 .0031-.0055	5,090 .0039-.0079	4,240 .0047-.0094	3,180 .0063-.011	2,550 .0075-.0106	2,120 .0083-.0114	2,010 .0083-.0114	1,820 .0091-.0122	1,590 .0098-.0130	1,410 .0110-.0150	1,340 .0110-.0150	1,270 .0118-.0157						
	8		197	RPM FEED	19,100 .0008-.0016	9,550 .0012-.0020	263	RPM FEED	8,490 .0016-.0039	6,370 .0028-.0051	5,090 .0039-.0063	4,240 .0047-.0071	3,180 .0055-.0079	2,550 .0059-.0091	2,120 .0067-.0098	2,010 .0067-.0098	1,820 .0071-.0102	1,590 .0075-.0106	1,410 .0079-.0118	1,340 .0079-.0118	1,270 .0087-.0126						
	9		99	RPM FEED	9,550 .0008-.0016	4,770 .0012-.0020	132	RPM FEED	4,240 .0012-.0031	3,180 .0020-.0043	2,550 .0031-.0055	2,120 .0039-.0063	1,590 .0047-.0071	1,270 .0051-.0075	1,060 .0055-.0079	1,010 .0055-.0079	910 .0059-.0083	800 .0063-.0087	710 .0067-.0098	670 .0067-.0098	640 .0071-.0110						
	10	High alloyed steel, and tool steel	165	RPM FEED	15,920 .0012-.0020	7,960 .0020-.0028	230	RPM FEED	7,430 .0016-.0039	5,570 .0028-.0051	4,460 .0039-.0063	3,710 .0047-.0071	2,790 .0055-.0079	2,230 .0059-.0091	1,860 .0067-.0098	1,760 .0067-.0098	1,590 .0071-.0102	1,390 .0075-.0106	1,240 .0079-.0118	1,170 .0079-.0118	1,110 .0087-.0126						
	11		99	RPM FEED	9,550 .0008-.0016	4,770 .0012-.0020	132	RPM FEED	4,240 .0012-.0031	3,180 .002-.0043	2,550 .0031-.0055	2,120 .0039-.0063	1,590 .0047-.0071	1,270 .0051-.0075	1,060 .0055-.0079	1,010 .0055-.0079	910 .0059-.0083	800 .0063-.0087	710 .0067-.0098	670 .0067-.0098	640 .0071-.0110						
M	12	Stainless steel	165	RPM FEED	15,920 .0012-.0020	7,960 .0020-.0028	230	RPM FEED	7,430 .0024-.0047	5,570 .0031-.0055	4,460 .0055-.0079	3,710 .0063-.0087	2,790 .0071-.0094	2,230 .0075-.0106	1,860 .0083-.0114	1,760 .0083-.0114	1,590 .0091-.0122	1,390 .0098-.0130	1,240 .0110-.0150	1,170 .0110-.0150	1,110 .0118-.0157						
	13		115	RPM FEED	11,140 .0008-.0016	5,570 .0012-.0020	148	RPM FEED	4,770 .0016-.0039	3,580 .0028-.0051	2,860 .0039-.0063	2,390 .0047-.0071	1,790 .0055-.0079	1,430 .0059-.0091	1,190 .0067-.0098	1,130 .0067-.0098	1,020 .0071-.0102	900 .0075-.0106	800 .0079-.0118	750 .0079-.0118	720 .0087-.0126						
	15	Grey cast iron	230	RPM FEED	22,280 .0016-.0024	11,140 .0016-.0024	329	RPM FEED	10,610 .0031-.0055	7,960 .0047-.0071	6,370 .0059-.0087	5,310 .0079-.0102	3,980 .0087-.0110	3,180 .0098-.0130	2,650 .0106-.0138	2,510 .0106-.0138	2,270 .0114-.0146	1,990 .0122-.0154	1,770 .0126-.0165	1,680 .0126-.0165	1,590 .0134-.0173						
	16		214	RPM FEED	20,690 .0016-.0024	10,350 .0016-.0024	263	RPM FEED	8,490 .0024-.0047	6,370 .0031-.0055	5,090 .0055-.0079	4,240 .0063-.0087	3,180 .0071-.0094	2,550 .0075-.0106	2,120 .0083-.0114	2,010 .0083-.0114	1,820 .0091-.0122	1,590 .0098-.0130	1,410 .0110-.0150	1,340 .0110-.0150	1,270 .0118-.0157						
K	17	Nodular cast iron	230	RPM FEED	22,280 .0016-.0024	11,140 .0016-.0024	329	RPM FEED	10,610 .0031-.0055	7,960 .0047-.0071	6,370 .0059-.0087	5,310 .0079-.0102	3,980 .0087-.0110	3,180 .0098-.0130	2,650 .0106-.0138	2,510 .0106-.0138	2,270 .0114-.0146	1,990 .0122-.0154	1,770 .0126-.0165	1,680 .0126-.0165	1,590 .0134-.0173						
	18		165	RPM FEED	15,920 .0016-.0024	7,960 .0016-.0024	230	RPM FEED	7,430 .0024-.0047	5,570 .0031-.0055	4,460 .0055-.0079	3,710 .0063-.0087	2,790 .0071-.0094	2,230 .0075-.0106	1,860 .0083-.0114	1,760 .0083-.0114	1,590 .0091-.0122	1,390 .0098-.0130	1,240 .0110-.0150	1,170 .0110-.0150	1,110 .0118-.0157						
	19	Malleable cast iron	197	RPM FEED	19,100 .0016-.0024	9,550 .0016-.0024	263	RPM FEED	8,490 .0031-.0055	6,370 .0047-.0071	5,090 .0059-.0087	4,240 .0079-.0102	3,180 .0087-.0110	2,550 .0098-.0130	2,120 .0106-.0138	2,010 .0106-.0138	1,820 .0114-.0146	1,590 .0122-.0154	1,410 .0126-.0165	1,340 .0126-.0165	1,270 .0134-.0173						
	20		165	RPM FEED	15,920 .0012-.0020	7,960 .0020-.0028	230	RPM FEED	7,430 .0024-.0047	5,570 .0031-.0055	4,460 .0055-.0079	3,710 .0063-.0087	2,790 .0071-.0094	2,230 .0075-.0106	1,860 .0083-.0114	1,760 .0083-.0114	1,590 .0091-.0122	1,390 .0098-.0130	1,240 .0110-.0150	1,170 .0110-.0150	1,110 .0118-.0157						
H	38.1	Hardened steel	65	RPM FEED	6,370 .0004-.0008	3,180 .0004-.0012	82	RPM FEED	2,650 .0004-.0012	1,990 .0004-.0016	1,590 .0008-.0020	1,330 .0012-.0024	990 .0012-.0024	800 .0016-.0028	660 .0016-.0031	620 .0016-.0031	570 .0020-.0035	500 .0020-.0035	440 .0020-.0039	420 .0020-.0039	400 .0020-.0039						

SOLID CARBIDE DRILLS

ISO	VDI 3323	Material Description	SFM	Drill Diameter			SFM	Drill Diameter																				
			1.0 ~ 2.9	METRIC	1.0	2.0	3.0 ~ 20.0	METRIC	3.0	-	4.0	-	5.0	6.0	-	-	8.0	-	10.0	12.0	-	14.0	-	-	16.0	18.0	-	20.0
			-	FRACTIONAL	-	-	-	FRACTIONAL	-	1/8	-	3/16	-	-	1/4	5/16	-	3/8	-	-	1/2	-	9/16	5/8	-	3/4	-	
P	2	Non-alloy steel	263	RPM FEED	25,460 .0012 - .0020	12,730 .0020 - .0028	362	RPM FEED	11,670 .0024 - .0047	8,750 .0031 - .0055	7,000 .0055 - .0079	5,840 .0063 - .0087	4,380 .0071 - .0094	3,500 .0075 - .0106	2,920 .0083 - .0114	2,770 .0083 - .0114	2,500 .0091 - .0122	2,190 .0098 - .0130	1,950 .0110 - .0150	1,840 .0110 - .0150	1,750 .0118 - .0157							
	3		263	RPM FEED	25,460 .0012 - .0020	12,730 .0020 - .0028	362	RPM FEED	11,670 .0024 - .0047	8,750 .0031 - .0055	7,000 .0055 - .0079	5,840 .0063 - .0087	4,380 .0071 - .0094	3,500 .0075 - .0106	2,920 .0083 - .0114	2,770 .0083 - .0114	2,500 .0091 - .0122	2,190 .0098 - .0130	1,950 .0110 - .0150	1,840 .0110 - .0150	1,750 .0118 - .0157							
	4		263	RPM FEED	25,460 .0012 - .0020	12,730 .0020 - .0028	362	RPM FEED	11,670 .0016 - .0039	8,750 .0028 - .0051	7,000 .0039 - .0063	5,840 .0047 - .0071	4,380 .0055 - .0079	3,500 .0059 - .0091	2,920 .0067 - .0098	2,770 .0067 - .0098	2,500 .0071 - .0102	2,190 .0075 - .0106	1,950 .0079 - .0118	1,840 .0079 - .0118	1,750 .0087 - .0126							
	5		230	RPM FEED	22,280 .0012 - .0020	11,140 .0020 - .0028	296	RPM FEED	9,550 .0016 - .0039	7,160 .0028 - .0051	5,730 .0039 - .0063	4,770 .0047 - .0071	3,580 .0055 - .0079	2,860 .0059 - .0091	2,390 .0067 - .0098	2,260 .0067 - .0098	2,050 .0071 - .0102	1,790 .0075 - .0106	1,590 .0079 - .0118	1,510 .0079 - .0118	1,430 .0087 - .0126							
	6	Low alloy steel	263	RPM FEED	25,460 .0012 - .0020	12,730 .0020 - .0028	362	RPM FEED	11,670 .0024 - .0047	8,750 .0031 - .0055	7,000 .0055 - .0079	5,840 .0063 - .0087	4,380 .0071 - .0094	3,500 .0075 - .0106	2,920 .0083 - .0114	2,770 .0083 - .0114	2,500 .0091 - .0122	2,190 .0098 - .0130	1,950 .0110 - .0150	1,840 .0110 - .0150	1,750 .0118 - .0157							
	7		230	RPM FEED	22,280 .0012 - .0020	11,140 .0020 - .0028	296	RPM FEED	9,550 .0024 - .0047	7,160 .0031 - .0055	5,730 .0039 - .0079	4,770 .0047 - .0094	3,580 .0063 - .0110	2,860 .0075 - .0106	2,390 .0083 - .0114	2,260 .0083 - .0114	2,050 .0091 - .0122	1,790 .0098 - .0130	1,590 .0110 - .0150	1,510 .0110 - .0150	1,430 .0118 - .0157							
	8		230	RPM FEED	22,280 .0008 - .0016	11,140 .0012 - .0020	296	RPM FEED	9,550 .0016 - .0039	7,160 .0028 - .0051	5,730 .0039 - .0063	4,770 .0047 - .0071	3,580 .0055 - .0079	2,860 .0059 - .0091	2,390 .0067 - .0098	2,260 .0067 - .0098	2,050 .0071 - .0102	1,790 .0075 - .0106	1,590 .0079 - .0118	1,510 .0079 - .0118	1,430 .0087 - .0126							
	9		132	RPM FEED	12,730 .0008 - .0016	6,370 .0012 - .0020	165	RPM FEED	5,310 .0012 - .0031	3,980 .0020 - .0043	3,180 .0031 - .0055	2,650 .0039 - .0063	1,990 .0047 - .0071	1,590 .0051 - .0075	1,330 .0055 - .0079	1,260 .0055 - .0079	1,140 .0059 - .0083	990 .0063 - .0087	880 .0067 - .0098	840 .0063 - .0102	800 .0071 - .0110							
	10	High alloyed steel, and tool steel	198	RPM FEED	19,100 .0012 - .0020	9,550 .0020 - .0028	263	RPM FEED	8,490 .0016 - .0039	6,370 .0028 - .0051	5,090 .0039 - .0063	4,240 .0047 - .0071	3,180 .0055 - .0079	2,550 .0059 - .0091	2,120 .0067 - .0098	2,010 .0067 - .0098	1,820 .0071 - .0102	1,590 .0075 - .0106	1,410 .0079 - .0118	1,340 .0079 - .0118	1,270 .0087 - .0126							
	11		132	RPM FEED	12,730 .0008 - .0016	6,370 .0012 - .0020	148	RPM FEED	4,770 .0012 - .0031	3,580 .0020 - .0043	2,860 .0031 - .0055	2,390 .0039 - .0063	1,790 .0047 - .0071	1,430 .0051 - .0075	1,190 .0055 - .0079	1,130 .0055 - .0079	1,020 .0059 - .0083	900 .0063 - .0087	800 .0067 - .0098	750 .0063 - .0102	720 .0071 - .0110							
M	12	Stainless steel	198	RPM FEED	19,100 .0012 - .0020	9,550 .0020 - .0028	263	RPM FEED	8,490 .0024 - .0047	6,370 .0031 - .0055	5,090 .0055 - .0079	4,240 .0063 - .0087	3,180 .0071 - .0094	2,550 .0075 - .0106	2,120 .0083 - .0114	2,010 .0091 - .0122	1,820 .0098 - .0130	1,410 .0110 - .0150	1,340 .0110 - .0150	1,270 .0118 - .0157								
	13		148	RPM FEED	14,320 .0008 - .0016	7,160 .0012 - .0020	181	RPM FEED	5,840 .0016 - .0039	4,380 .0028 - .0051	3,500 .0039 - .0063	2,920 .0047 - .0071	2,190 .0055 - .0079	1,750 .0067 - .0098	1,460 .0067 - .0098	1,380 .0071 - .0102	1,250 .0075 - .0106	1,090 .0079 - .0118	970 .0079 - .0118	880 .0087 - .0126								
	15	Grey cast iron	263	RPM FEED	25,460 .0016 - .0024	12,730 .0016 - .0024	362	RPM FEED	11,670 .0031 - .0055	8,750 .0047 - .0071	7,000 .0059 - .0087	5,840 .0079 - .0102	4,380 .0087 - .0110	3,500 .0098 - .0130	2,920 .0106 - .0138	2,770 .0106 - .0138	2,500 .0114 - .0146	2,190 .0122 - .0154	1,950 .0126 - .0165	1,840 .0126 - .0165	1,750 .0134 - .0173							
	16		247	RPM FEED	23,870 .0016 - .0024	11,940 .0016 - .0024	313	RPM FEED	10,080 .0024 - .0047	7,560 .0031 - .0055	6,050 .0055 - .0079	5,040 .0063 - .0087	3,780 .0071 - .0094	3,020 .0075 - .0106	2,520 .0083 - .0114	2,390 .0091 - .0122	2,160 .0098 - .0130	1,890 .0110 - .0150	1,680 .0110 - .0150	1,590 .0118 - .0157								
K	17	Nodular cast iron	296	RPM FEED	28,650 .0016 - .0024	14,320 .0016 - .0024	395	RPM FEED	12,730 .0031 - .0055	9,550 .0047 - .0071	7,640 .0059 - .0087	6,370 .0079 - .0102	4,770 .0087 - .0110	3,820 .0098 - .0130	3,180 .0106 - .0138	3,020 .0106 - .0138	2,730 .0114 - .0146	2,390 .0122 - .0154	2,120 .0126 - .0165	2,010 .0126 - .0165	1,910 .0134 - .0173							
	18		198	RPM FEED	19,100 .0016 - .0024	9,550 .0016 - .0024	263	RPM FEED	8,490 .0024 - .0047	6,370 .0031 - .0055	5,090 .0055 - .0079	4,240 .0063 - .0087	3,180 .0071 - .0094	2,550 .0075 - .0106	2,120 .0083 - .0114	2,010 .0083 - .0114	1,820 .0091 - .0122	1,590 .0098 - .0130	1,410 .0110 - .0150	1,340 .0110 - .0150	1,270 .0118 - .0157							
	19	Malleable cast iron	230	RPM FEED	22,280 .0016 - .0024	11,140 .0016 - .0024	296	RPM FEED	9,550 .0031 - .0055	7,160 .0047 - .0071	5,730 .0059 - .0087	4,770 .0079 - .0102	3,580 .0087 - .0110	2,860 .0098 - .0130	2,390 .0106 - .0138	2,260 .0106 - .0138	2,050 .0114 - .0146	1,790 .0122 - .0154	1,590 .0126 - .0165	1,510 .0126 - .0165	1,430 .0134 - .0173							
	20		198	RPM FEED	19,100 .0012 - .0020	9,550 .0020 - .0028	263	RPM FEED	8,490 .0024 - .0047	6,370 .0031 - .0055	5,090 .0055 - .0079	4,240 .0063 - .0087	3,180 .0071 - .0094	2,550 .0075 - .0106	2,120 .0083 - .0114	2,010 .0091 - .0122	1,820 .0098 - .0130	1,410 .0110 - .0150	1,340 .0110 - .0150	1,270 .0118 - .0157								
H	38.1	Hardened steel	82	RPM FEED	7,960 .0004 - .0008	3,980 .0004 - .0012	98	RPM FEED	3,180 .0004 - .0012	2,390 .0004 - .0016	1,910 .0008 - .0020	1,590 .0012 - .0024	1,190 .0012 - .0024	950 .0016 - .0028	800 .0016 - .0031	750 .0016 - .0031	680 .0020 - .0035	600 .0020 - .0035	530 .0020 - .0039	500 .0020 - .0039	480 .0020 - .0039							