

Recommended Drilling Parameters

Solid Carbide – MDS

- The solid carbide construction increases rigidity, thus hole oversizing is small (0.0008" - 0.002") and consistent.
- Hole position accuracy and surface finish are also excellent.
- Maximum recommended hole depth is three times the drill diameter. If chip evacuation is smooth, a depth of four times drill diameter is possible.

Solid Carbide With Coolant Holes – MDS - HV

- Combines the characteristics of both MDS and KDS drills.
- Hole depths of five to seven times the drill diameter are possible. (Contact Engineering)

Brazed Carbide Tip – KDS

- Internal coolant holes improve chip flow and allow for deeper hole drilling.
- Hole depths of five times drill diameter are possible.

Recommended Drilling Parameters

The selection of type MDS or KDS

Type	Hole Accuracy	Productivity	Tool Life	Initial Cost	Number of Flutes	Cost per Hole
MDS	⊗	⊗	⊗	△~○	⊗	⊗
KDS	○	⊗~○	○	⊗	△	○

⊗ very good, ○ good, △ reasonable

MDS

RECOMMENDED SPEEDS AND FEEDS (ENGLISH)

Speed: v (sfm) Feed: f (ipr)

MDS-V

Drill Dia. (inch)		Steels Under H _B 250	Steels Over H _B 250	Nodular Cast Iron	Die Steel
.110 ~ .197	v f	100 ~ 220 .006 ~ .010	100 ~ 220 .004 ~ .010	100 ~ 160 .006 ~ .010	50 ~ 120 .002 ~ .006
.197 ~ .315	v f	140 ~ 240 .006 ~ .012	120 ~ 220 .006 ~ .010	140 ~ 260 .008 ~ .012	50 ~ 160 .004 ~ .008
.315 ~ .394	v f	140 ~ 240 .008 ~ .012	120 ~ 220 .006 ~ .012	140 ~ 260 .008 ~ .014	70 ~ 180 .004 ~ .010
.394 ~ .472	v f	180 ~ 280 .008 ~ .012	140 ~ 250 .006 ~ .012	180 ~ 290 .008 ~ .014	70 ~ 180 .004 ~ .010
.472 ~ .551	v f	180 ~ 310 .010 ~ .014	140 ~ 280 .006 ~ .012	180 ~ 310 .008 ~ .014	100 ~ 190 .004 ~ .010
.551 ~ .787	v f	190 ~ 340 .010 ~ .018	170 ~ 280 .008 ~ .014	220 ~ 360 .008 ~ .018	100 ~ 220 .004 ~ .012

MDS-V

Drill Dia. (inch)		Stainless Steel	Exotic Alloys	Titanium Alloy	Aluminum	Gray Cast Iron
.110 ~ .197	v f	40 ~ 100 .002 ~ .006	40 ~ 100 .002 ~ .006	40 ~ 100 .002 ~ .006	120 ~ 600 .008 ~ .016	100 ~ 260 .006 ~ .012
.197 ~ .315	v f	50 ~ 120 .003 ~ .008	50 ~ 120 .003 ~ .008	50 ~ 120 .003 ~ .008	120 ~ 600 .008 ~ .016	120 ~ 290 .006 ~ .014
.315 ~ .394	v f	50 ~ 140 .003 ~ .008	50 ~ 140 .003 ~ .008	50 ~ 140 .003 ~ .008	240 ~ 720 .008 ~ .016	170 ~ 340 .008 ~ .016
.394 ~ .472	v f	70 ~ 180 .004 ~ .008	70 ~ 180 .004 ~ .008	70 ~ 180 .004 ~ .008	300 ~ 720 .008 ~ .018	190 ~ 340 .010 ~ .018
.472 ~ .551	v f	70 ~ 180 .004 ~ .010	70 ~ 180 .004 ~ .010	70 ~ 180 .004 ~ .010	300 ~ 720 .008 ~ .028	220 ~ 360 .010 ~ .024
.551 ~ .787	v f	70 ~ 180 .004 ~ .010	70 ~ 180 .004 ~ .010	70 ~ 180 .004 ~ .010	300 ~ 720 .008 ~ .028	220 ~ 380 .010 ~ .024

MDS-P

Drill Dia. (inch)		Steels Under H _B 250	Steels Over H _B 250	Nodular Cast Iron	Die Steel
.110 ~ .197	v f	80 ~ 180 .006 ~ .010	80 ~ 160 .004 ~ .010	80 ~ 130 .006 ~ .010	40 ~ 100 .002 ~ .006
.197 ~ .315	v f	120 ~ 200 .006 ~ .012	100 ~ 180 .006 ~ .010	120 ~ 220 .008 ~ .012	40 ~ 130 .004 ~ .008
.315 ~ .394	v f	120 ~ 200 .008 ~ .012	100 ~ 180 .006 ~ .012	120 ~ 220 .008 ~ .014	60 ~ 150 .004 ~ .010

MDS-P

Drill Dia. (inch)		Steels Under H _B 250	Steels Over H _B 250	Nodular Cast Iron	Die Steel
.394 ~ .472	v f	150 ~ 230 .008 ~ .012	120 ~ 210 .006 ~ .012	150 ~ 240 .008 ~ .014	60 ~ 150 .004 ~ .010
.472 ~ .551	v f	150 ~ 260 .010 ~ .014	120 ~ 230 .006 ~ .012	150 ~ 260 .008 ~ .014	80 ~ 160 .004 ~ .010
.551 ~ .787	v f	160 ~ 280 .010 ~ .018	140 ~ 230 .008 ~ .014	180 ~ 300 .008 ~ .018	80 ~ 180 .004 ~ .012

MDS-HV

Material		Steels	Steels	Alloy Steels	Prehard Steels	Die Steels	Stainless Steels*	Ductile Cast Irons	Gray Cast Irons	Titanium Alloys	Inconel, Monel, etc.
Drill Dia. (inch)		<HB200	HB200-300	>HB300	HRC45	Annealed	-	-	-	Ti-6Al-4V	-
< .196	v f	250-400 .006-.010	165-330 .006-.010	135-265 .004-.008	65-165 .003-.004	100-185 .003-.006	100-195 .004-.008	130-330 .006-.010	265-395 .006-.012	65-130 .003-.004	35-75 .002-.003
.197 ~ .394	v f	360-480 .008-.014	230-460 .008-.014	135-265 .004-.010	100-195 .004-.006	160-240 .004-.008	165-280 .004-.010	265-400 .008-.014	330-470 .008-.014	80-130 .003-.005	35-85 .003-.004
.395 ~ .630	v f	430-550 .010-.014	265-495 .010-.014	135-330 .006-.012	100-195 .005-.008	160-240 .005-.009	165-310 .006-.012	280-400 .010-.014	400-550 .010-.016	80-130 .004-.006	35-100 .003-.006
.631 ~ .787	v f	430-600 .012-.016	265-525 .010-.016	165-395 .006-.012	100-195 .006-.010	160-240 .006-.010	165-325 .006-.012	310-430 .010-.016	400-550 .010-.016	80-130 .004-.006	35-115 .003-.008

* For difficult to machine stainless steels (316, 302, 304, 17-4ph, etc.) adjust speeds & feeds accordingly.

KDS-AV

Material		Low Carbon Steel	Medium Carbon Steel	Hardened	Stainless	Gray Cast Iron	Ductile Iron	Die Steel	Ti Alloy	Inconel
Drill Dia. (inch)		<HB200	<HB300	<HRC45	<HB200	AI3135	60/48/8	-	6Al-4V-Ti	Inconel 718
.375 ~ .591	v f	165-300 .006-.012	165-300 .005-.010	115-165 .004-.008	115-165 .004-.008	200-330 .008-.012	180-250 .006-.012	130-230 .004-.010	65-115 .004-.006	35-100 .003-.004
.591 ~ .787	v f	165-300 .008-.016	165-300 .006-.014	115-165 .005-.009	115-165 .005-.009	200-330 .008-.014	200-265 .007-.013	130-230 .006-.012	65-130 .004-.006	35-100 .003-.004
.787 ~ 1.181	v f	180-300 .008-.018	180-300 .008-.016	115-165 .006-.010	115-165 .006-.010	200-360 .010-.016	200-295 .008-.015	130-230 .008-.014	80-130 .004-.008	50-115 .003-.005
1.181 ~ 1.575	v f	195-300 .010-.020	195-300 .008-.018	115-165 .006-.010	115-165 .006-.010	200-360 .010-.018	200-330 .008-.016	130-230 .010-.016	80-130 .004-.008	50-115 .003-.005

MDS

RECOMMENDED SPEEDS AND FEEDS (METRIC)

Speed: v (m/min)
Feed: f (mm/rev)

MDS-V

Drill Dia. (mm)		Steels Under H _B 250	Steels Over H _B 250	Nodular Cast Iron	Die Steel
2.8 ~ 5.0	v f	29 ~ 66 .15 ~ .25	29 ~ 59 .10 ~ .25	29 ~ 48 .15 ~ .25	14 ~ 36 .05 ~ .15
5.0 ~ 8.0	v f	44 ~ 73 .15 ~ .30	36 ~ 66 .10 ~ .25	44 ~ 80 .20 ~ .30	14 ~ 48 .10 ~ .20
8.0 ~ 10.0	v f	44 ~ 73 .20 ~ .30	36 ~ 66 .15 ~ .30	44 ~ 80 .20 ~ .36	22 ~ 55 .10 ~ .25
10.0 ~ 12.0	v f	55 ~ 84 .20 ~ .30	44 ~ 77 .15 ~ .30	55 ~ 88 .20 ~ .36	22 ~ 55 .10 ~ .25
12.0 ~ 14.0	v f	55 ~ 95 .25 ~ .36	44 ~ 84 .15 ~ .30	55 ~ 95 .20 ~ .36	29 ~ 59 .10 ~ .25
14.0 ~ 20.0	v f	59 ~ 102 .25 ~ .46	52 ~ 84 .20 ~ .36	66 ~ 109 .20 ~ .46	29 ~ 66 .10 ~ .30

MDS-V

Drill Dia. (mm)		Stainless Steel	Exotic Alloys	Titanium Alloy	Aluminum	Gray Cast Iron
2.8 ~ 5.0	v f	11 ~ 29 .05 ~ .15	11 ~ 29 .05 ~ .15	11 ~ 29 .05 ~ .15	36 ~ 184 .20 ~ .41	29 ~ 80 .15 ~ .30
5.0 ~ 8.0	v f	14 ~ 36 .08 ~ .20	14 ~ 36 .08 ~ .20	14 ~ 36 .08 ~ .20	36 ~ 184 .20 ~ .41	36 ~ 88 .15 ~ .36
8.0 ~ 10.0	v f	14 ~ 44 .08 ~ .20	14 ~ 44 .08 ~ .20	14 ~ 44 .08 ~ .20	73 ~ 220 .20 ~ .41	52 ~ 102 .20 ~ .41
10.0 ~ 12.0	v f	22 ~ 55 .10 ~ .20	22 ~ 55 .10 ~ .20	22 ~ 55 .10 ~ .20	91 ~ 220 .20 ~ .46	59 ~ 102 .25 ~ .46
12.0 ~ 14.0	v f	22 ~ 55 .10 ~ .25	22 ~ 55 .10 ~ .25	22 ~ 55 .10 ~ .25	91 ~ 240 .20 ~ .71	66 ~ 109 .25 ~ .61
14.0 ~ 20.0	v f	22 ~ 55 .10 ~ .25	22 ~ 55 .10 ~ .25	22 ~ 55 .10 ~ .25	91 ~ 240 .20 ~ .71	66 ~ 118 .25 ~ .61

MDS-HV

Material		Steels	Steels	Alloy Steels	Prehard Steels	Die Steels	Stainless Steels*	Ductile Cast Irons	Gray Cast Irons	Titanium Alloys	Inconel, Monel, etc.
Drill Dia. (inch)		<HB200	HB200-300	>HB300	HRC45	Annealed	-	-	-	Ti-6Al-4V	-
< 4.9	v f	76-122 .15-.25	50-100 .15-.25	41-81 .10-.20	20-50 .08-.10	31-56 .08-.15	31-60 .10-.20	39-100 .15-.25	81-120 .15-.30	20-40 .08-.10	11-23 .05-.08
5.0 ~ 10.0	v f	110-146 .20-.35	70-40 .20-.35	41-81 .10-.25	31-60 .10-.15	49-73 .10-.20	50-85 .10-.25	81-122 .20-.25	100-143 .20-.35	24-40 .08-.13	11-26 .08-.10
10.1 ~ 16.0	v f	131-168 .25-.35	81-151 .25-.35	41-100 .15-.30	31-60 .13-.20	49-73 .13-.23	50-95 .15-.30	85-122 .25-.36	122-168 .25-.41	24-40 .10-.15	11-30 .07-.15
16.1 ~ 20.0	v f	131-183 .30-.40	81-160 .25-.40	51-120 .15-.30	31-60 .15-.25	49-73 .15-.25	50-99 .15-.30	94-131 .25-.40	122-168 .25-.40	24-40 .10-.15	11-35 .07-.20

* For difficult to machine stainless steels (316, 302, 304, 17-4ph, etc.) adjust speeds & feeds accordingly.

MDS-P

Drill Dia. (mm)		Steels Under H _B 250	Steels Over H _B 250	Nodular Cast Iron	Die Steel
2.8 ~ 5.0	v f	24 ~ 55 .15 ~ .25	24 ~ 49 .10 ~ .25	24 ~ 40 .15 ~ .25	12 ~ 30 .05 ~ .15
5.0 ~ 8.0	v f	37 ~ 61 .15 ~ .30	30 ~ 55 .15 ~ .25	37 ~ 67 .20 ~ .30	12 ~ 40 .10 ~ .20
8.0 ~ 10.0	v f	37 ~ 61 .20 ~ .30	30 ~ 55 .15 ~ .30	37 ~ 67 .20 ~ .36	18 ~ 46 .10 ~ .25
10.0 ~ 12.0	v f	46 ~ 70 .20 ~ .30	37 ~ 64 .15 ~ .30	46 ~ 73 .20 ~ .36	18 ~ 46 .10 ~ .25
12.0 ~ 14.0	v f	46 ~ 79 .25 ~ .36	37 ~ 70 .15 ~ .30	46 ~ 79 .20 ~ .36	24 ~ 49 .10 ~ .25
14.0 ~ 20.0	v f	49 ~ 85 .25 ~ .46	43 ~ 70 .20 ~ .36	55 ~ 91 .20 ~ .46	24 ~ 55 .10 ~ .30

KDS

WDS

SMD

sumi Chamfer™

Drill Adapters & Holders