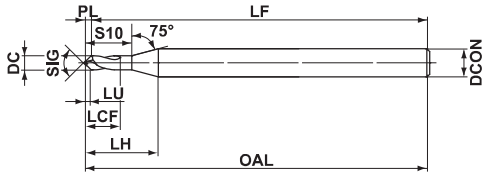
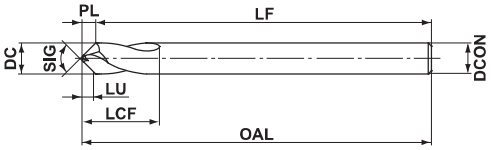
DLE
Leading Drill Series

P M K N S H

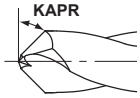
External Coolant



Type1



Type2



h7	DCON=3	3 < DCON≦6	6<DCON≦10	10<DCON≦16
	0 −0.010	0 −0.012	0 −0.015	0 −0.018

(mm)

	DC	SIG	DP1020	DP102A	Order Number	LU	LCF	LH	S10	OAL	LF	PL	KAPR	DCON	Fig.
NEW	3.0	60°	●		**DLE0300S030P060**	2.0	9	—	—	45	42.9	2.1	60°	3	2
NEW	4.0	60°	●		**DLE0400S040P060**	2.7	12	—	—	50	47.2	2.8	60°	4	2
NEW	5.0	60°	●		**DLE0500S050P060**	3.4	14	—	—	60	56.5	3.5	60°	5	2
NEW	6.0	60°	●		**DLE0600S060P060**	4.0	15	—	—	66	61.8	4.2	60°	6	2
NEW	7.0	60°	●		**DLE0700S070P060**	4.7	18	—	—	74	69.1	4.9	60°	7	2
NEW	8.0	60°	●		**DLE0800S080P060**	5.4	20	—	—	74	68.4	5.6	60°	8	2
NEW	10.0	60°	●		**DLE1000S100P060**	6.8	24	—	—	84	77.0	7.0	60°	10	2
NEW	12.0	60°	●		**DLE1200S120P060**	8.1	28	—	—	95	86.6	8.4	60°	12	2
NEW	1.0	90°		●	**DLE0100S030P090**	0.35	2	6.7	3.0	45	44.6	0.4	45°	3	1
NEW	1.5	90°		●	**DLE0150S030P090**	0.55	3	7.3	4.5	45	44.4	0.6	45°	3	1
NEW	2.0	90°		●	**DLE0200S030P090**	0.80	4	7.9	6.1	45	44.1	0.9	45°	3	1
NEW	2.5	90°		●	**DLE0250S030P090**	1.00	5	7.9	7.1	45	43.9	1.1	45°	3	1
	3.0	90°	●		**DLE0300S030P090**	1.2	9	—	—	45	43.7	1.3	45°	3	2
	4.0	90°	●		**DLE0400S040P090**	1.6	12	—	—	50	48.3	1.7	45°	4	2
	5.0	90°	●		**DLE0500S050P090**	2.0	14	—	—	60	57.9	2.1	45°	5	2
	6.0	90°	●		**DLE0600S060P090**	2.4	15	—	—	66	63.4	2.6	45°	6	2
	7.0	90°	●		**DLE0700S070P090**	2.8	18	—	—	74	71.0	3.0	45°	7	2
	8.0	90°	●		**DLE0800S080P090**	3.2	20	—	—	74	70.6	3.4	45°	8	2
	10.0	90°	●		**DLE1000S100P090**	4.1	24	—	—	84	79.7	4.3	45°	10	2
	12.0	90°	●		**DLE1200S120P090**	4.9	28	—	—	95	89.9	5.1	45°	12	2
	16.0	90°	●		**DLE1600S160P090**	6.6	35	—	—	113	106.2	6.8	45°	16	2

Note 1) In the region of roughly **DC**/4, which is the region of the two-step point angles, the central area will not have a 60°, 90° hole bottom. Chamfering will also not be possible in this region.
Note 2) The centering diameter should be less than the drill diameter (processing diameter) **DC** and the usable length **LU** should be referred to as a guideline.

DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter
SIG = Point Angle

● : **Inventory maintained in Japan.**

Solid Carbide Drills for Centering and Chamfering

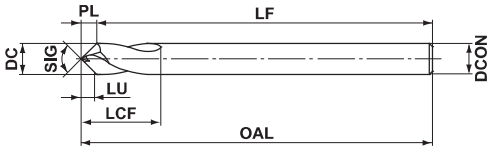
DLE

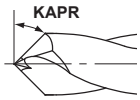
NEW

Leading Drill Series

P M K N S H

External Coolant





h7	DCON=3	3 < DCON≤6	6<DCON≤10	10<DCON≤16
	0 −0.010	0 −0.012	0 −0.015	0 −0.018

(mm)

DC	SIG	DP1020	Order Number	LU	LCF	OAL	LF	PL	KAPR	DCON
3	120°	●	**DLE0300S030P120**	0.8	9	45	44.1	0.9	30°	3
4	120°	●	**DLE0400S040P120**	1.1	12	50	48.8	1.2	30°	4
5	120°	●	**DLE0500S050P120**	1.3	14	60	58.6	1.4	30°	5
6	120°	●	**DLE0600S060P120**	1.6	15	66	64.3	1.7	30°	6
7	120°	●	**DLE0700S070P120**	1.9	18	74	72.0	2.0	30°	7
8	120°	●	**DLE0800S080P120**	2.2	20	74	71.7	2.3	30°	8
10	120°	●	**DLE1000S100P120**	2.8	24	84	81.1	2.9	30°	10
12	120°	●	**DLE1200S120P120**	3.3	28	95	91.5	3.5	30°	12
3	145°	●	**DLE0300S030P145**	0.4	9	45	44.5	0.5	17.5°	3
4	145°	●	**DLE0400S040P145**	0.5	12	50	49.4	0.6	17.5°	4
5	145°	●	**DLE0500S050P145**	0.7	14	60	59.2	0.8	17.5°	5
6	145°	●	**DLE0600S060P145**	0.8	15	66	65.1	0.9	17.5°	6
7	145°	●	**DLE0700S070P145**	1.0	18	74	72.9	1.1	17.5°	7
8	145°	●	**DLE0800S080P145**	1.1	20	74	72.7	1.3	17.5°	8

Note 1) The centering diameter should be less than the drill diameter (processing diameter) **DC** and the usable length **LU** should be referred to as a guideline.

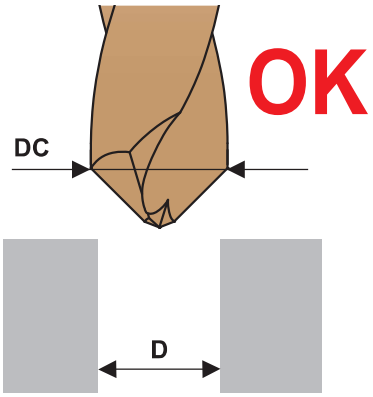
DC = Cutting Diameter
LU = Usable Length
LCF = Length Chip Flute
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter
SIG = Point Angle

● : **Inventory maintained in Japan.**

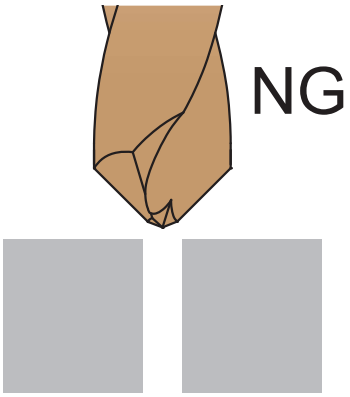
Drill Diameter Selection

When Chamfering

With respect to guide hole diameter **D**, select the drill diameter (cutting diameter) **DC** to be within the range of **D** < **DC** < 2**D**.

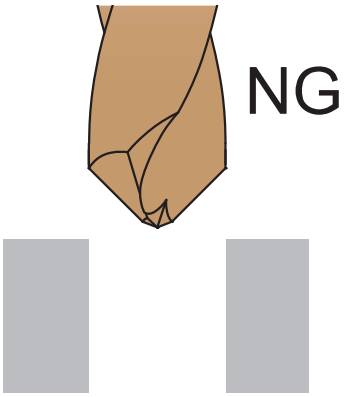


Example) If guide hole diameter **D** is 5 mm: Drill diameter **DC** should be greater than 6 mm but less than 10 mm. Select a **DC** of 6 mm, 7 mm, or 8 mm.



If DC is equal to or greater than 2D:

If drill diameter **DC** is too large compared to guide hole diameter **D** (equal to or greater than 2**D**), chamfering cannot be performed.

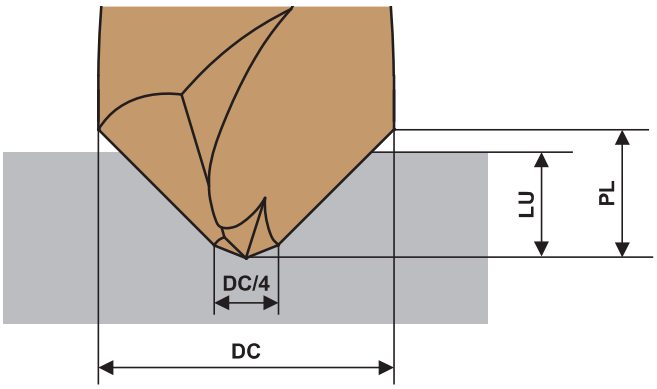


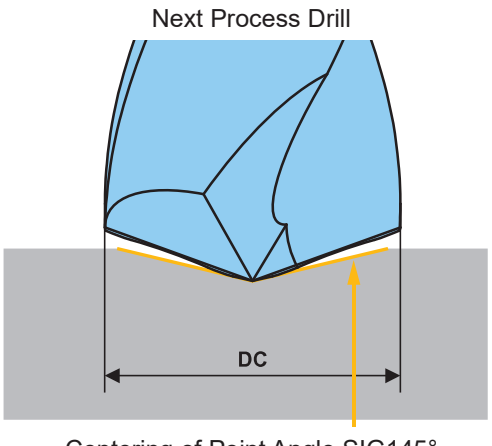
If DC is a drill diameter equal to D:

Chamfering cannot be performed if drill diameter **DC** is the same as guide hole diameter **D**.

When Centering

The tool cannot be used for processing if the centering diameter has the same guide hole diameter as drill diameter **DC**. Refer to the usable length **LU** (page 3,4) as a guideline.
In the region of roughly **DC**/4, which is the region of the two-step point angles, the central area will not have a 90° hole bottom.
Select a leading drill with a point angle larger than that of the next process drill, if it is desired to make drills required in next processes bite from the centre.





Centering of Point Angle SIG145°

Point Angle SIG 60°

Recommended Cutting Conditions

(mm)

Work Material	Mild Steels (≤180HB) JIS SS400, S10C etc.		Carbon Steels, Alloy Steels (180—280HB) JIS S45C, SCM440 etc.		Carbon Steels, Alloy Steels (280—350HB) JIS SNCM439 etc.	
DC	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)
3	7900	0.05(0.03—0.07)	6800	0.05 (0.03—0.07)	6300	0.04 (0.02—0.06)
4	5900	0.05(0.03—0.07)	5100	0.05 (0.03—0.07)	4700	0.04 (0.02—0.06)
5	5000	0.06(0.04—0.08)	4400	0.06 (0.04—0.08)	4100	0.05 (0.03—0.07)
6	4200	0.06(0.04—0.08)	3700	0.06 (0.04—0.08)	3400	0.05 (0.03—0.07)
7	3600	0.07(0.04—0.09)	3100	0.07 (0.04—0.09)	2900	0.05 (0.03—0.07)
8	3100	0.07(0.04—0.09)	2700	0.07 (0.04—0.09)	2500	0.05 (0.03—0.07)
10	2700	0.08(0.04—0.10)	2300	0.08 (0.04—0.10)	2200	0.06 (0.03—0.08)
12	2200	0.08(0.04—0.10)	1900	0.08 (0.04—0.10)	1800	0.06 (0.03—0.08)

Work Material	Austenitic Stainless Steels (≤200HB) JIS SUS304, SUS316 etc.		Gray Cast Irons (≤350MPa) JIS FC300 etc.		Ductile Cast Irons (≤450MPa) JIS FCD450 etc.	
DC	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)
3	1500	0.03 (0.01—0.05)	7900	0.05 (0.03—0.07)	5800	0.05 (0.03—0.07)
4	1100	0.03 (0.01—0.05)	5900	0.05 (0.03—0.07)	4300	0.05 (0.03—0.07)
5	1200	0.04 (0.02—0.06)	5000	0.06 (0.04—0.08)	3800	0.06 (0.04—0.08)
6	1000	0.04 (0.02—0.06)	4200	0.06 (0.04—0.08)	3100	0.06 (0.04—0.08)
7	900	0.04 (0.02—0.06)	3600	0.07 (0.04—0.09)	2700	0.06 (0.04—0.08)
8	790	0.04 (0.02—0.06)	3100	0.07 (0.04—0.09)	2300	0.06 (0.04—0.08)
10	630	0.04 (0.02—0.06)	2700	0.08 (0.04—0.10)	1900	0.07 (0.04—0.09)
12	530	0.04 (0.02—0.06)	2200	0.08 (0.04—0.10)	1500	0.07 (0.04—0.09)

Note 1) When chamfering a circumference of a guide hole, make sure that the tool diameter(**DC**) is **D** <**DC** <2**D**.
Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.
Note 3) When V-grooving and chamfering, please reduce cutting conditions.
Note 4) When chatter vibration or abnormal noise is generated, please shorten the time of dwell program or lower the rotation speed.
Note 5) When centering, please do not exceed the **LU** (usable length).

Operational Guidance

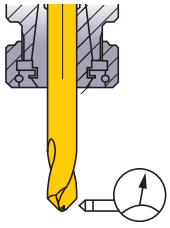
Drill Holding

Collet chuck holds the drill securely.

Drill Length

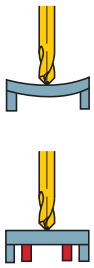
Do not clamp on the flutes.

Installation Tolerance

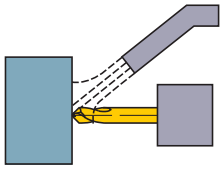


Run-out ≤ 0.03mm

Thin Workpiece



Coolant Method



Coolant positions,at the end at the centre are ideal.

Point Angle SIG 90°, 120° and 145°

Recommended Cutting Conditions

(mm)

Work Material	Mild Steels (≤180HB) JIS SS400, S10C etc.		Carbon Steels, Alloy Steels (180—280HB) JIS S45C, SCM440 etc.		Carbon Steels, Alloy Steels (280—350HB) JIS SNCM439 etc.	
DC	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)
1.0	9500	0.02 (0.01—0.03)	6300	0.02 (0.01—0.03)	4700	0.02 (0.01—0.03)
1.5	9500	0.02 (0.01—0.03)	7400	0.02 (0.01—0.03)	6300	0.02 (0.01—0.03)
2.0	9500	0.04 (0.03—0.05)	7900	0.04 (0.03—0.05)	7100	0.04 (0.03—0.05)
2.5	9500	0.04 (0.03—0.05)	8200	0.04 (0.03—0.05)	7600	0.04 (0.03—0.05)
3.0	7900	0.06 (0.04—0.08)	6800	0.06 (0.04—0.08)	6300	0.05 (0.03—0.07)
4.0	5900	0.06 (0.04—0.08)	5100	0.06 (0.04—0.08)	4700	0.05 (0.03—0.07)
5.0	5000	0.07 (0.05—0.09)	4400	0.07 (0.05—0.09)	4100	0.06 (0.04—0.08)
6.0	4200	0.07 (0.05—0.09)	3700	0.07 (0.05—0.09)	3400	0.06 (0.04—0.08)
7.0	3600	0.08 (0.05—0.10)	3100	0.08 (0.05—0.10)	2900	0.06 (0.04—0.08)
8.0	3100	0.08 (0.05—0.10)	2700	0.08 (0.05—0.10)	2500	0.06 (0.04—0.08)
10.0	2700	0.09 (0.05—0.11)	2300	0.09 (0.05—0.11)	2200	0.07 (0.04—0.09)
12.0	2200	0.09 (0.05—0.11)	1900	0.09 (0.05—0.11)	1800	0.07 (0.04—0.09)
16.0	1700	0.12 (0.10—0.14)	1500	0.12 (0.10—0.14)	1400	0.08 (0.06—0.10)

Work Material	Austenitic Stainless Steels (≤200HB) JIS SUS304, SUS316 etc.		Gray Cast Irons (≤350MPa) JIS FC300 etc.		Ductile Cast Irons (≤450MPa) JIS FCD450 etc.	
DC	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)	**n** (min^{-1})	**fr** (Min.—Max.) (mm/rev)
1.0	6300	0.01 (0.005—0.015)	9500	0.02 (0.01—0.03)	3100	0.02 (0.01—0.03)
1.5	4200	0.01 (0.005—0.015)	9500	0.02 (0.01—0.03)	5300	0.02 (0.01—0.03)
2.0	3100	0.04 (0.03—0.05)	9500	0.04 (0.03—0.05)	6300	0.04 (0.03—0.05)
2.5	2500	0.04 (0.03—0.05)	9500	0.04 (0.03—0.05)	7000	0.04 (0.03—0.05)
3.0	2100	0.04 (0.02—0.06)	7900	0.06 (0.04—0.08)	5800	0.06 (0.04—0.08)
4.0	1600	0.04 (0.02—0.06)	5900	0.06 (0.04—0.08)	4300	0.06 (0.04—0.08)
5.0	1200	0.06 (0.04—0.08)	5000	0.07 (0.05—0.09)	3800	0.07 (0.05—0.09)
6.0	1000	0.06 (0.04—0.08)	4200	0.07 (0.05—0.09)	3100	0.07 (0.05—0.09)
7.0	900	0.06 (0.04—0.08)	3600	0.08 (0.05—0.10)	2700	0.07 (0.05—0.09)
8.0	790	0.06 (0.04—0.08)	3100	0.08 (0.05—0.10)	2300	0.07 (0.05—0.09)
10.0	630	0.06 (0.04—0.08)	2700	0.09 (0.05—0.11)	1900	0.08 (0.05—0.10)
12.0	530	0.06 (0.04—0.08)	2200	0.09 (0.05—0.11)	1500	0.08 (0.05—0.10)
16.0	390	0.08 (0.06—0.10)	1700	0.12 (0.10—0.14)	1100	0.11 (0.09—0.13)

Note 1) When chamfering a circumference of a guide hole, make sure that the tool diameter(**DC**) is **D** <**DC** <2**D**.
Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.
Note 3) When V-grooving and chamfering, please reduce cutting conditions.
Note 4) When chatter vibration or abnormal noise is generated, please shorten the time of dwell program or lower the rotation speed.
Note 5) When centering, please do not exceed the **LU** (usable length).