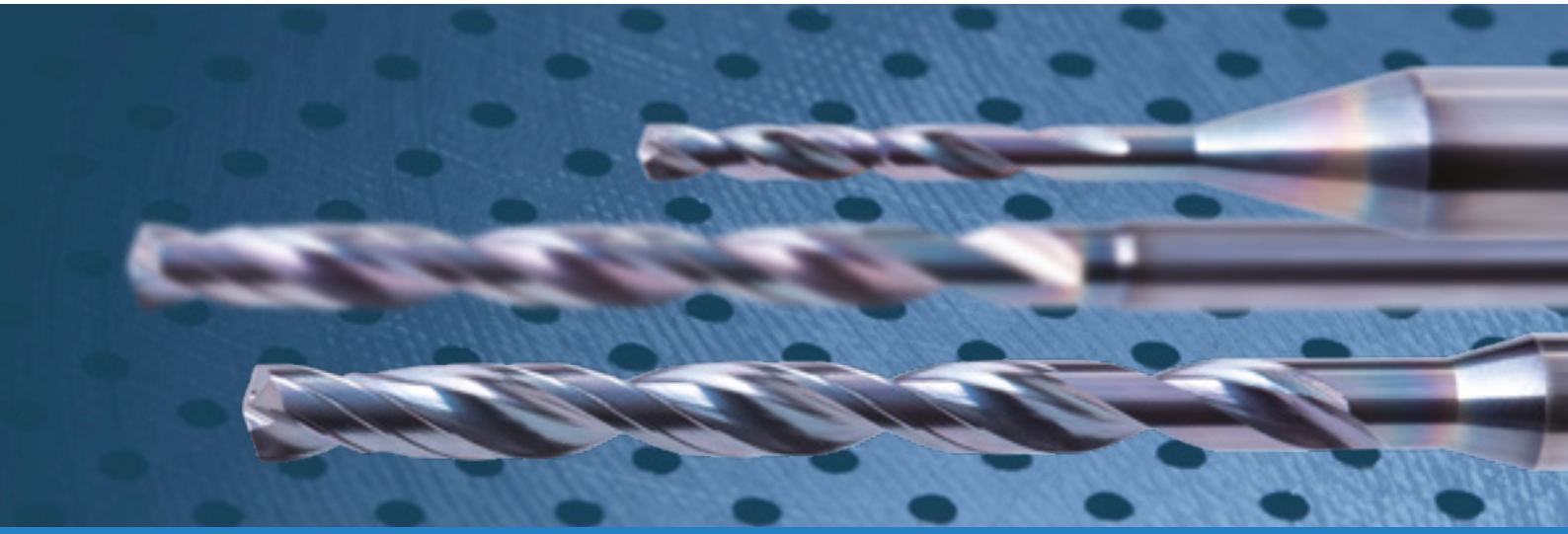
KDA mini



Large line-up of smaller diameters from Ø1 – 2.9 mm up to 8×D

- Newly developed triple and double margin designs
- New MEGACOAT NANO EX coating
- High precision, long tool life, and stable machining
- Large line-up to solve various drilling challenges.

KEEPS YOU AHEAD

Discover your solution

KDA mini

High precision small diameter solid drill

Small diameter drills require high stability, machining accuracy, quality of surface finish, chip control, and tool life etc …

KDA Mini, with its redesigned shape and coating technology, was engineered as a complete solution for a variety of drilling applications

01 New design

Type C

Triple and double margin

Tip : Triple Margin / Middle : Double Margin.

High precision and stable machining.

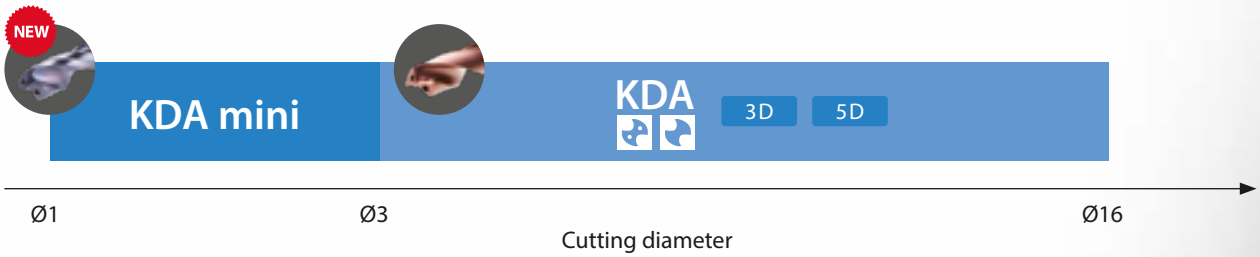
02 New coating

MEGACOAT NANO EX

“Double Lamination Technology” : Multi-layer structure with two unique nano layers.

Suppresses wear, adhesion, and chipping to provide longer tool life.

Line-up Ø1.0 – 2.9 mm



Type C

with Coolant hole

With coolant hole

Excellent machining accuracy with triple and double margins.
Recommended for stainless steel machining.
Internal coolant available.

3D 5D 8D

Type N

Normal type

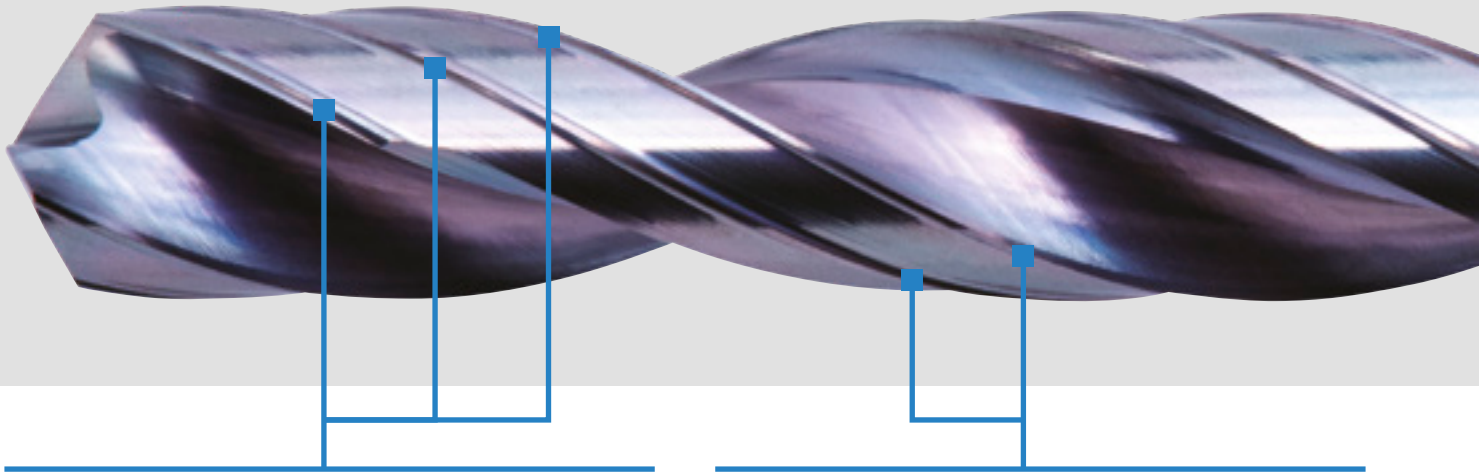
No coolant hole

High precision machining with double margins.
Economical style for machining with external coolant.

2D 4D


K-series
Let your potential shine

01 Unique shape for stable machining



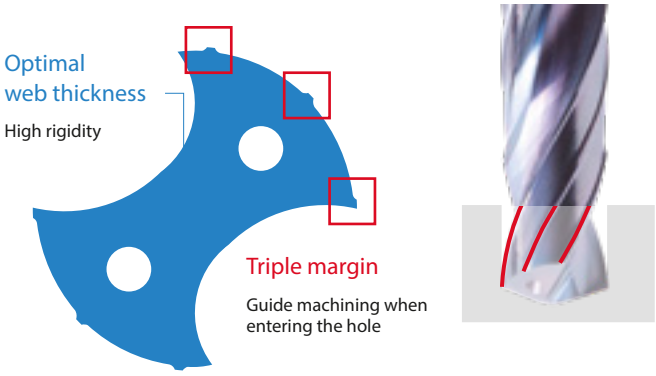
Tip

Triple margin
Excellent machining accuracy

Three sets of margins support the hole and guide machining for improved stability.

High rigidity with optimal web thickness.

Cross-section image

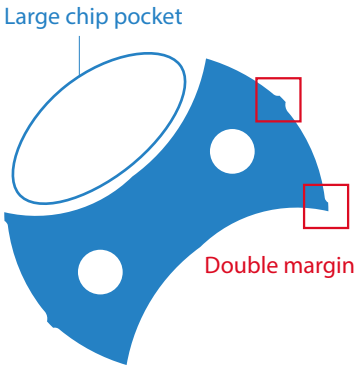


Middle

Double margin
Excellent chip control

Excellent chip evacuation with large chip pocket.

Cross-section image



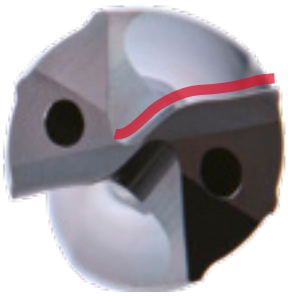
Chip shape
(Internal evaluation)

Cutting conditions:
n = 9,000 min-1 • (Vc = 60 m/min)
Vf = 540 mm/min • (f = 0.06 mm/rev)
Cutting diameter: Ø2.1 mm
Drilling depth: 5 mm
Wet (Internal coolant)
Workpiece: S50C

Curved cutting edge design

Maintains both sharpness and toughness.

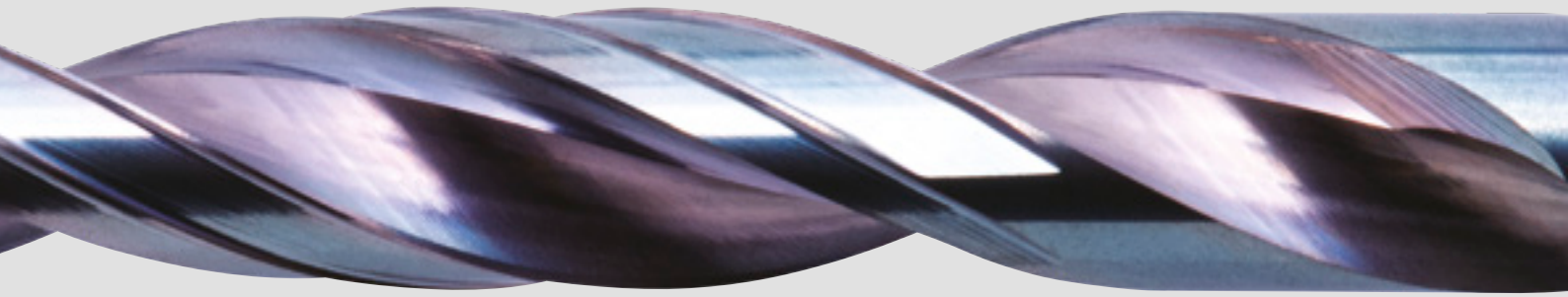
Breaks chips into small pieces and reduces cutting pressure.



Unique triple and double margin combination

Type C

Triple margin at the tip and double margin in the middle
Provides high precision and stable machining



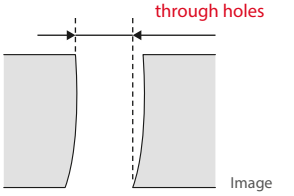
Cutting performance (Internal evaluation)

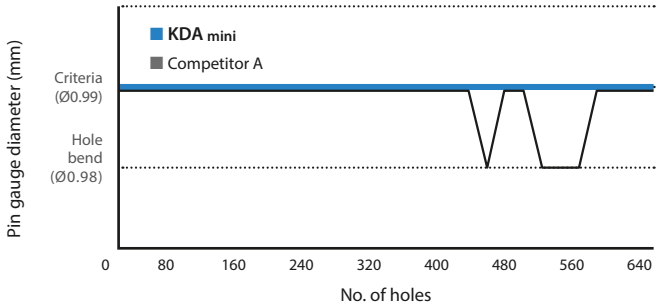
Case 1 **High precision in drilling at depths of 8×D with excellent hole straightness and cylindricity**

S50C Drilling accuracy comparison.

Straightness of the hole.

Compare max diameter of pin gauge that passes through holes
Criteria : Ø0.99

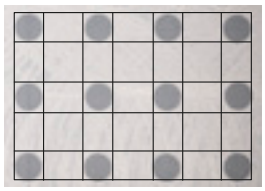




Hole position accuracy

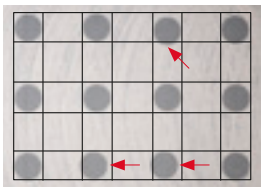
Measure the hole position near the center of the workpiece

KDA mini



Good

Competitor A



Hole misalignment occurred

Cutting edge condition (After drilling approx. 630 holes)

KDA mini

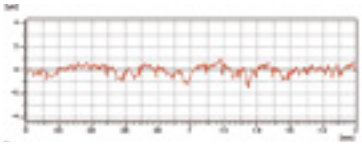
Competitor A

Cutting conditions: n = 12,000 min^{-1} (Vc = 38 m/min) / Vf = 420 mm/min (f = 0.035 mm/rev) / Cutting diameter: Ø1 • Drilling depth: 8 mm • Wet (Internal coolant).

Case 2 **Excellent surface finish in stainless steel machining**

SUS304 Surface finish comparison

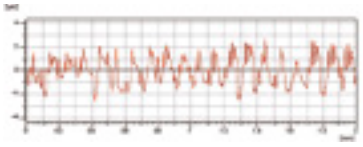
KDA mini



2.3 µmRz (0.3 µmRa)

Good

Competitor B

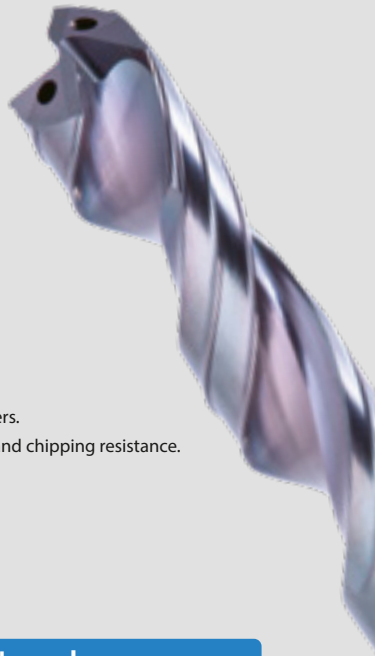


5.0 µmRz (1.0 µmRa)

Rifling & dullness occurred

Cutting conditions: n = 8,500 min^{-1} (Vc = 77 m/min) / Vf = 850 mm/min (f = 0.1 mm/rev) / Cutting diameter: Ø2.9 mm • Drilling depth: 23 mm • Wet (Internal coolant).

02 Unique coating for longer tool life



MEGACOAT NANO EX | Solid

Double lamination technology

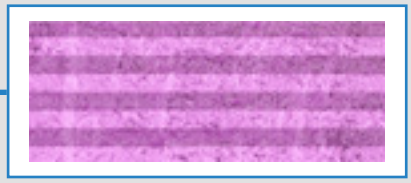
Multi-layer structure with two unique nano layers.
Provides wear resistance, adhesion resistance, and chipping resistance.

Special nano layer × Multilayer lamination

Nano-layer

AlCrN based coating

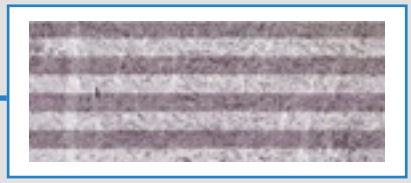
Optimized Cr content
Excellent lubricity and adhesion resistance



Nano-layer

TiAlN based coating

Excellent wear resistance with high hardness
Increases toughness by optimization of internal stress



Multi-layering of high-performance nano layers
Suppressed crack growth
Excellent chipping resistance

Film

Base material

CG Image

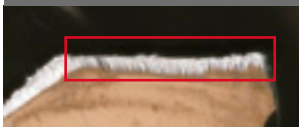
Wear resistance comparison (Internal evaluation)

Cutting edge conditions (Corner)

KDA mini (After drilling 660 holes)

Less damage to the cutting edge provides continuous drilling operations.

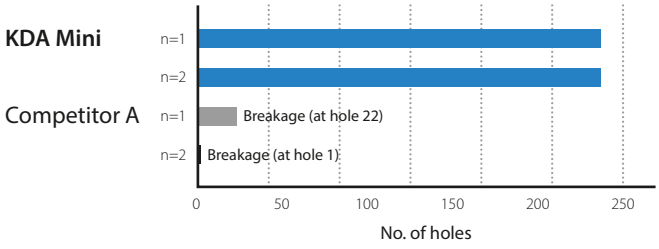
Competitor C (After drilling 455 holes)



Adhesion and wear progresses.
Build up edge.

Cutting conditions: n = 8,000 min^{-1} (Vc = 73 m/min) / Vf = 400 mm/min (f = 0.05 mm/rev)
Cutting diameter: Ø2.9 mm • Drilling depth: 10 mm • Wet (Internal coolant) • Workpiece: S50C.

Fracture resistance comparison (Internal evaluation)



Cutting conditions: n = 9,500 min^{-1} (Vc = 30 m/min) / Vf = 285 mm/min (f = 0.03 mm/rev)
Cutting diameter: Ø1.0 mm • Drilling depth: 8 mm • Wet (Internal coolant) • Workpiece: SUS304.

Type N (without coolant hole) is also available – provides stable machining results

Type N

Normal type

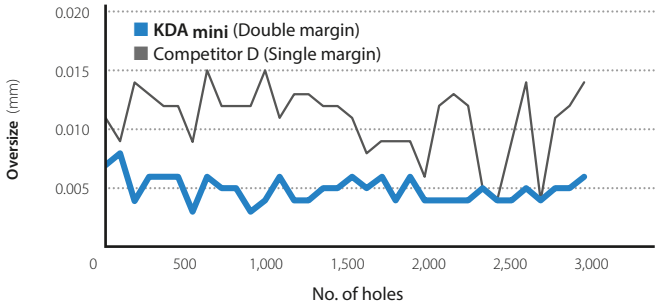
2D 4D

	Cutting diameter DC tolerance (mm)
2D	+0.012 +0.002
4D	0 -0.014

Excellent machining accuracy and quality with double margin
MEGACOAT NANO EX provides longer tool life
2D can also be used as a pilot drill

High precision — Suppresses hole diameter variation

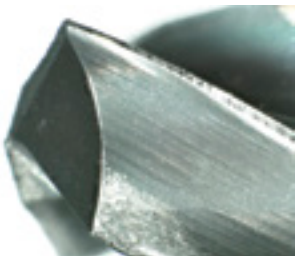
Drilling accuracy comparison (Internal evaluation)



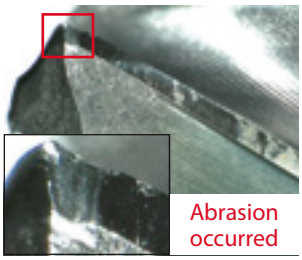
Cutting conditions: n = 6,300 min-1 (Vc = 57 m/min) / Vf = 700 mm/min (f = 0.1 mm/rev)
Cutting diameter: Ø2.9 mm • Drilling depth: 12 mm • Wet (External coolant) • Workpiece: SCM440.

Cutting edge condition (After drilling 2,900 holes)

KDA mini
Double margin



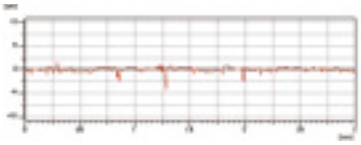
Competitor D
Single margin



High quality — High quality both on the wall and bottom

Quality of surface finish comparison (Internal evaluation)

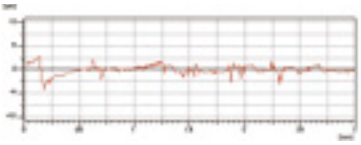
KDA mini



3.7 µmRz (0.3 µmRa)

Good

Competitor D



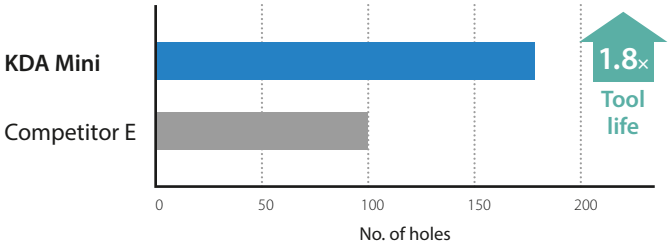
5.5µmRz (0.7µmRa)

Rifling & dullness occurred

Cutting conditions: n = 8,000 min-1 (Vc = 73 m/min) / Vf = 960 mm/min (f = 0.12 mm/rev) • Cutting diameter: Ø2.9 mm • Drilling depth: 12 mm • Wet (External coolant) • Workpiece: S50C.

Durability — Suppresses edge defects and improves tool life

Tool life comparison (Internal evaluation)

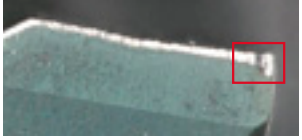


Cutting Edge (Corner)

KDA mini
(After drilling approx. 180 holes)

Steady wear

Competitor E
(After drilling approx. 100 holes)



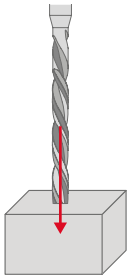
Edge wear progresses

Cutting conditions: n = 3,200 min-1 (Vc = 25 m/min) / Vf = 80 mm/min (f = 0.025 mm/rev) • Cutting diameter: Ä2.5 mm • Drilling depth: 5 mm • Wet (External coolant) • Workpiece: SKD61 (Unhardened steel).

Case Studies

Double tool life with good chip control

Mechanical part: SUS316L



Cutting conditions:
n = 3,200 min-1 (Vc = 28 m/min)
Vf = 65 mm/min (f = 0.02 mm/rev)
Cutting diameter: Ø2.8 mm
Drilling depth: 18 mm
Wet (Internal coolant).

Tool life

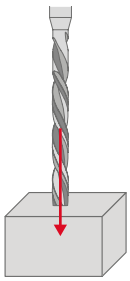
Competitor F often had a defect due to chip clinging and tool life was unstable.

KDA Mini provided stable machining without chip clinging.

(User evaluation)

Achieved 2.8 times machining efficiency. Tool life can be extended

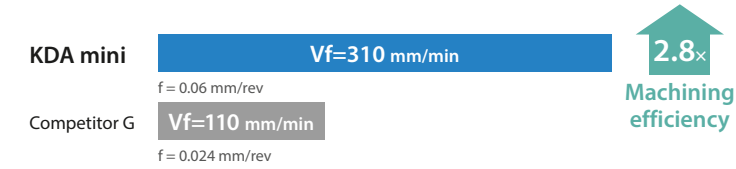
Mechanical part: SUS304



Cutting conditions (KDA mini):
n = 5,100 min-1 (Vc = 42 m/min)
Cutting diameter: Ø2.6 mm
Drilling depth: 13 mm
Wet (Internal coolant)
Without pecking

Cutting conditions (Competitor G):
n = 4,500 min-1 (Vc = 37 m/min)
Cutting diameter: Ø2.6 mm
Drilling depth: 13 mm
Wet (External coolant)
With pecking

Machining efficiency



Tool life

Achieved 2.8 times machining efficiency by replacing competitor G (no coolant hole).

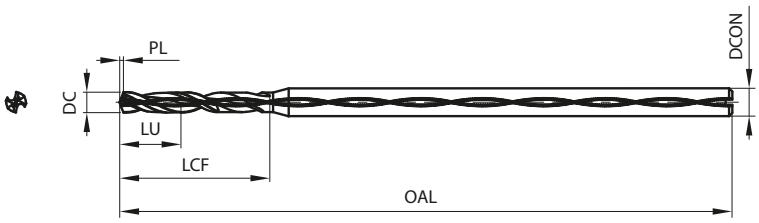
Cutting edge condition was excellent even after drilling 360 holes. Further machining was possible.

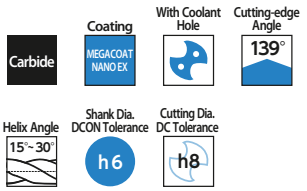
(User evaluation)

Type C With coolant hole

3D

3D





Cutting diameter DC	Tolerance h8 (mm)
Ø1.0 ~ Ø2.9	0 -0.014

Description	Available	Dimensions (mm)					
		DC	DCON	OAL	LU	LCF	PL
KDA0100X03S030C	●	1.0	3	54	3.0	8.0	0.19
KDA0110X03S030C	●	1.1			3.3	8.7	0.21
KDA0120X03S030C	●	1.2			3.6	9.4	0.22
KDA0130X03S030C	●	1.3			3.9	10.0	0.24
KDA0140X03S030C	●	1.4			4.2	10.6	0.26
KDA0150X03S030C	●	1.5			4.5	11.3	0.28
KDA0160X03S030C	●	1.6			4.8	11.8	0.30
KDA0170X03S030C	●	1.7			5.1	12.4	0.32
KDA0180X03S030C	●	1.8			5.4	13.0	0.34
KDA0190X03S030C	●	1.9			5.7	13.5	0.36
KDA0200X03S030C	●	2.0	3	60	6.0	14.0	0.37
KDA0210X03S030C	●	2.1			6.3	14.5	0.39
KDA0220X03S030C	●	2.2			6.6	15.0	0.41
KDA0230X03S030C	●	2.3			6.9	15.4	0.43
KDA0240X03S030C	●	2.4			7.2	15.8	0.45
KDA0250X03S030C	●	2.5			7.5	16.3	0.47
KDA0260X03S030C	●	2.6	3	65	7.8	16.6	0.49
KDA0270X03S030C	●	2.7			8.1	17.0	0.50
KDA0280X03S030C	●	2.8			8.4	17.4	0.52
KDA0290X03S030C	●	2.9			8.7	17.7	0.54

●: Available

Identification system

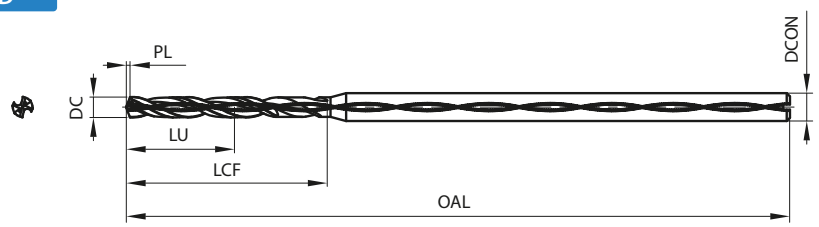
KDA0120X03S030C

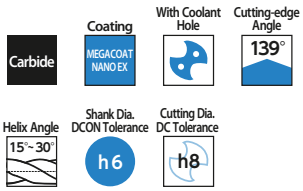
KDA	0120	X	03	S030	C
	Cutting diameter DC Ø1.2 mm		Drilling depth (L/D) 3D	Shank diameter DCON Ø3.0 mm	Type C: With coolant hole N: No coolant hole

Type C With coolant hole

5D

5D





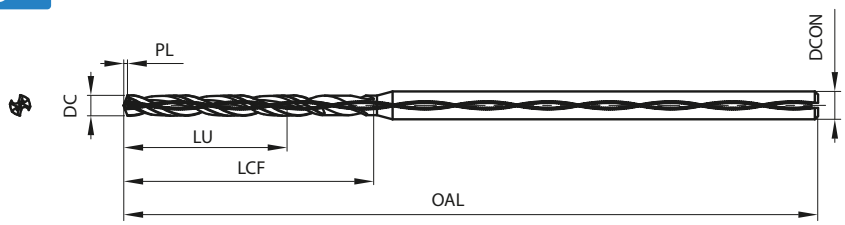
Cutting diameter DC	Tolerance h8 (mm)
Ø1.0 ~ Ø2.9	0 -0.014

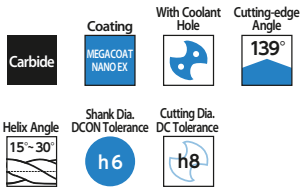
Description	Available	Dimensions (mm)					
		DC	DCON	OAL	LU	LCF	PL
KDA0100X05S030C	●	1.0	3	54	5.0	10.0	0.19
KDA0110X05S030C	●	1.1			5.5	10.9	0.21
KDA0120X05S030C	●	1.2			6.0	11.9	0.22
KDA0130X05S030C	●	1.3			6.5	12.8	0.24
KDA0140X05S030C	●	1.4			7.0	13.7	0.26
KDA0150X05S030C	●	1.5			7.5	14.6	0.28
KDA0160X05S030C	●	1.6			8.0	15.5	0.30
KDA0170X05S030C	●	1.7			8.5	16.4	0.32
KDA0180X05S030C	●	1.8			9.0	17.3	0.34
KDA0190X05S030C	●	1.9			9.5	18.1	0.36
KDA0200X05S030C	●	2.0	3	65	10.0	19.0	0.37
KDA0210X05S030C	●	2.1			10.5	19.8	0.39
KDA0220X05S030C	●	2.2			11.0	20.7	0.41
KDA0230X05S030C	●	2.3			11.5	21.5	0.43
KDA0240X05S030C	●	2.4			12.0	22.3	0.45
KDA0250X05S030C	●	2.5			12.5	23.1	0.47
KDA0260X05S030C	●	2.6	3	80	13.0	23.9	0.49
KDA0270X05S030C	●	2.7			13.5	24.7	0.50
KDA0280X05S030C	●	2.8			14.0	25.5	0.52
KDA0290X05S030C	●	2.9			14.5	26.2	0.54

●: Available

Type C With coolant hole

8D



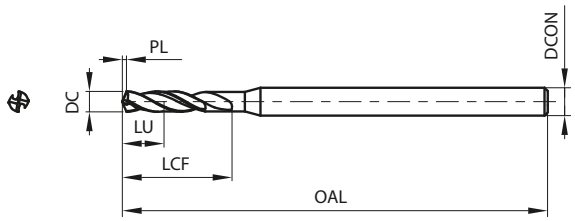


Cutting diameter DC	Tolerance h8 (mm)
Ø1.0 ~ Ø2.9	0 -0.014

Description	vailable	Dimensions (mm)					
		DC	DCON	OAL	LU	LCF	PL
KDA0100X08S030C	●	1.0	3	65	8.0	12.8	0.19
KDA0110X08S030C	●	1.1			8.8	13.9	0.21
KDA0120X08S030C	●	1.2			9.6	15.2	0.22
KDA0130X08S030C	●	1.3			10.4	16.3	0.24
KDA0140X08S030C	●	1.4			11.2	17.4	0.26
KDA0150X08S030C	●	1.5			12.0	18.6	0.28
KDA0160X08S030C	●	1.6			12.8	19.6	0.30
KDA0170X08S030C	●	1.7			13.6	20.8	0.32
KDA0180X08S030C	●	1.8			14.4	21.8	0.34
KDA0190X08S030C	●	1.9			15.2	22.8	0.36
KDA0200X08S030C	●	2.0	3	68	16.0	23.8	0.37
KDA0210X08S030C	●	2.1			16.8	24.5	0.39
KDA0220X08S030C	●	2.2			17.6	25.5	0.41
KDA0230X08S030C	●	2.3			18.4	26.4	0.43
KDA0240X08S030C	●	2.4			19.2	27.3	0.45
KDA0250X08S030C	●	2.5			20.0	28.3	0.47
KDA0260X08S030C	●	2.6	3	81	20.8	29.1	0.49
KDA0270X08S030C	●	2.7			21.6	30.0	0.50
KDA0280X08S030C	●	2.8			22.4	30.9	0.52
KDA0290X08S030C	●	2.9			23.2	31.7	0.54

●: Available

2D



Carbide | Coating: MEGACOAT NANO EX | No Coolant Hole | Cutting-edge Angle: 135° | Helix Angle: 30° | Shank Dia. DCON Tolerance: h6

Cutting diameter DC	Tolerance h8 (mm)
Ø1.0 ~ Ø2.9	+0.012 +0.002

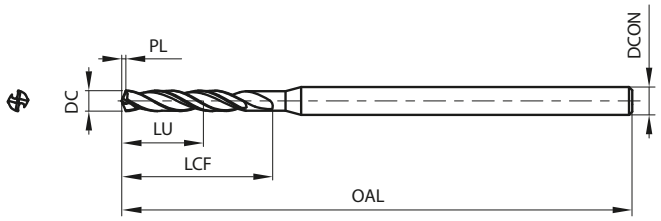
Description	Available	Dimensions (mm)					
		DC	DCON	OAL	LU	LCF	PL
KDA0100X02S030N	●	1.0	3	45	2.0	6.5	0.21
KDA0110X02S030N	●	1.1			2.2	7.0	0.23
KDA0120X02S030N	●	1.2			2.4	7.6	0.25
KDA0130X02S030N	●	1.3			2.6	8.1	0.27
KDA0140X02S030N	●	1.4			2.8	8.5	0.29
KDA0150X02S030N	●	1.5			3.0	9.0	0.31
KDA0160X02S030N	●	1.6			3.2	9.4	0.33
KDA0170X02S030N	●	1.7			3.4	9.9	0.35
KDA0180X02S030N	●	1.8			3.6	10.3	0.37
KDA0190X02S030N	●	1.9			3.8	10.6	0.39
KDA0200X02S030N	●	2.0			4.0	11.0	0.41
KDA0210X02S030N	●	2.1			4.2	11.3	0.43
KDA0220X02S030N	●	2.2			4.4	11.7	0.46
KDA0230X02S030N	●	2.3			4.6	12.0	0.48
KDA0240X02S030N	●	2.4			4.8	12.2	0.50
KDA0250X02S030N	●	2.5			5.0	12.5	0.52
KDA0260X02S030N	●	2.6			5.2	12.7	0.54
KDA0270X02S030N	●	2.7			5.4	13.0	0.56
KDA0280X02S030N	●	2.8			5.6	13.2	0.58
KDA0290X02S030N	●	2.9			5.8	13.3	0.60

Cutting diameter DC is a plus tolerance specification. Can be used as a pilot drill.

●: Available

Type N No coolant hole

4D



Carbide | Coating: MEGACOAT NANO EX | No Coolant Hole | Cutting-edge Angle: 135° | Helix Angle: 30° | Shank Dia. DCON Tolerance: h6 | Cutting Dia. DC Tolerance: h8

Cutting diameter DC	Tolerance h8 (mm)
Ø1.0 ~ Ø2.9	0 +0.014

Description	Available	Dimensions (mm)					
		DC	DCON	OAL	LU	LCF	PL
KDA0100X04S030N	●	1.0	3	50	4.0	8.0	0.21
KDA0110X04S030N	●	1.1			4.4	8.8	0.23
KDA0120X04S030N	●	1.2			4.8	9.5	0.25
KDA0130X04S030N	●	1.3			5.2	10.3	0.27
KDA0140X04S030N	●	1.4			5.6	10.9	0.29
KDA0150X04S030N	●	1.5			6.0	11.7	0.31
KDA0160X04S030N	●	1.6			6.4	12.3	0.33
KDA0170X04S030N	●	1.7			6.8	12.9	0.35
KDA0180X04S030N	●	1.8			7.2	13.7	0.37
KDA0190X04S030N	●	1.9			7.6	14.3	0.39
KDA0200X04S030N	●	2.0			8.0	15.0	0.41
KDA0210X04S030N	●	2.1			8.4	15.5	0.43
KDA0220X04S030N	●	2.2			8.8	16.3	0.46
KDA0230X04S030N	●	2.3			9.2	16.8	0.48
KDA0240X04S030N	●	2.4			9.6	17.5	0.50
KDA0250X04S030N	●	2.5			10.0	18.0	0.52
KDA0260X04S030N	●	2.6			10.4	18.7	0.54
KDA0270X04S030N	●	2.7			10.8	19.2	0.56
KDA0280X04S030N	●	2.8			11.2	19.3	0.58
KDA0290X04S030N	●	2.9			11.6	19.3	0.60

●: Available

Recommended Cutting Conditions

Type C With coolant hole

Workpiece	Cutting speed Vc (m/min)	Cutting diameter DC (mm)	Ø1	Ø1.5	Ø2	Ø2.5	Ø2.9
Mild steel (~180HB) Low carbon steel (~160HB) SS400, S10C	40 - 80	Spindle revolution n (min-1)	12,700	10,600	9,500	7,600	6,600
		Feed rate f (mm/rev)	0.03-0.05	0.04-0.08	0.04-0.10	0.05-0.11	0.06-0.12
Carbon steel / Alloy steel S50C, SCM, SCr (20~30HRC)	40 - 80	Spindle revolution n (min-1)	12,700	10,600	9,500	7,600	6,600
		Feed rate f (mm/rev)	0.02-0.05	0.03-0.06	0.04-0.08	0.05-0.09	0.06-0.11
Alloy steel SCM, SCr (30~38HRC)	30 - 60	Spindle revolution n (min-1)	9,500	9,500	8,000	7,000	6,600
		Feed rate f (mm/rev)	0.02-0.04	0.03-0.06	0.05-0.08	0.06-0.10	0.06-0.12
Special steel / Pre-hardened steel SKS2, SKD61 (30~38HRC)	25 - 50	Spindle revolution n (min-1)	8,000	8,500	7,200	6,400	5,500
		Feed rate f (mm/rev)	0.02-0.03	0.03-0.05	0.03-0.06	0.03-0.06	0.05-0.10
Stainless steel SUS304, SUS410 (~200HB)	30 - 60	Spindle revolution n (min-1)	9,500	9,500	8,000	7,000	6,600
		Feed rate f (mm/rev)	0.02-0.03	0.03-0.05	0.03-0.06	0.03-0.08	0.04-0.10
Gray cast iron FC250 (~29HRC)	40 - 80	Spindle revolution n (min-1)	12,700	10,600	9,500	7,600	6,600
		Feed rate f (mm/rev)	0.02-0.04	0.03-0.06	0.04-0.08	0.05-0.10	0.07-0.12
Nodular cast iron FCD450, FCD600 (~28HRC)	30 - 60	Spindle revolution n (min-1)	9,500	9,500	8,000	7,000	6,600
		Feed rate f (mm/rev)	0.02-0.04	0.03-0.06	0.04-0.08	0.05-0.09	0.06-0.11

Precautions

1. This table shows general starting conditions. Adjust cutting conditions according to the actual workpiece shape and machine used.
2. Above cutting conditions is when water-soluble coolant is applied.
3. If the above revolution exceeds the machine specification, lower the revolution.
4. Use a drill with a run-out of less than 0.02 mm when mounting
5. Be careful not to allow the grooves to enter the holder when installing the drill.

Recommended Cutting Conditions

Type N No coolant hole

Workpiece	Cutting speed Vc (m/min)	Cutting diameter DC (mm)	Ø1	Ø1.5	Ø2	Ø2.5	Ø2.9
Mild Steel (~180HB) Low Carbon Steel (~160HB) SS400, S10C	30 - 80	Spindle revolution n (min^{-1})	10,200	8,900	9,500	9,500	8,500
		Feed rate f (mm/rev)	0.03-0.05	0.04-0.08	0.04-0.10	0.05-0.11	0.06-0.12
Carbon Steel / Alloy Steel S50C, SCM, SCr (20~30HRC)	30 - 80	Spindle revolution n (min^{-1})	10,200	8,900	8,700	8,900	7,900
		Feed rate f (mm/rev)	0.02-0.05	0.03-0.06	0.04-0.08	0.05-0.09	0.06-0.11
Alloy Steel SCM, SCr (30~38HRC)	30 - 80	Spindle revolution n (min^{-1}))	10,200	8,900	8,700	8,900	7,900
		Feed rate f (mm/rev)	0.02-0.04	0.03-0.06	0.05-0.08	0.06-0.10	0.06-0.12
Special Steel / Pre-hardened Steel SKS2, SKD61 (30~38HRC)	30 - 60	Spindle revolution n (min^{-1})	10,200	8,900	7,900	6,400	5,800
		Feed rate f (mm/rev)	0.02-0.03	0.03-0.05	0.03-0.06	0.03-0.06	0.05-0.10
Gray Cast Iron FC250 (~29HRC)	30 - 80	Spindle revolution n (min^{-1})	10,200	8,900	8,700	9,500	8,500
		Feed rate f (mm/rev)	0.02-0.04	0.03-0.06	0.04-0.08	0.05-0.10	0.07-0.12
Nodular Cast Iron FCD450, FCD600 (~28HRC)	30 - 80	Spindle revolution n (min^{-1})	10,200	8,900	8,700	8,900	8,000
		Feed rate f (mm/rev)	0.02-0.04	0.03-0.06	0.04-0.08	0.05-0.09	0.06-0.11

Precautions

1. This table shows general starting conditions. Adjust cutting conditions according to the actual workpiece shape and machine used.
2. Above cutting conditions is when water-soluble coolant is applied.
3. If the above revolution exceeds the machine specification, lower the revolution.
4. Use a drill with a run-out of less than 0.02 mm when mounting
5. Be careful not to allow the grooves to enter the holder when installing the drill.

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