

Deep Hole Drilling

A deep hole is defined by its depth-to-diameter ratio (D:d), and typically holes greater than 10:1 are considered deep holes. Deep hole drilling into metal has a range of applications across several industries, with its origins tracing back to the need for straighter, more accurate gun barrels, and expanding as other industries integrated deep hole drilling processes to improve their own applications.

Deep hole drilling consists of BTA drilling and gun drilling, with additional processes designed for specific tolerance objectives and generally performed on BTA-style deep hole drilling machines. Deep hole drilling is used in a variety of materials from aluminum to super-alloys, and is capable of achieving tight diameter control, straightness, and superior surface finish into workpieces.

Deep hole drilling processes work by using special tools and setups to deliver high pressure coolant, evacuate chips cleanly, and achieve depth-to-diameter holes into metal beyond what a common CNC machine can reach. This allows manufacturers to achieve their manufacturing tolerances and production requirements reliably, accurately, and efficiently.

BTA Drilling

BTA deep hole drilling is used for larger hole drilling, typically 20 – 200 mm [0.80 – 8.00 in] in diameter. High-pressure coolant is introduced around the outside of the tool through the pressure head assembly. Chips are discharged through the tool center, through the drill tube and machine spindle.

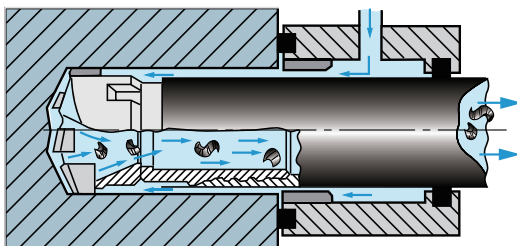
BTA drilling typically performs 5-7 times faster than gundrilling, and requires higher power.

Additional extended diameters can be drilled on BTA machines with secondary deep hole operations, such as counter-boring.

There is 2 types of drilling which are DTS systems and STS systems. We will only focus on STS systems as all our drill heads are for STS system.

The BTA—STS Drill is a single Tube Drilling system used in Deep Hole Drilling applications where fast metal removal is needed. Drill sizes in BTA Drills are from 0.312”-2.559” diameter. New drills are manufactured in a number of grades to fit individual customer requirements. BTA (STS) Drills of brazed construction can be re-tipped in our plant to an “as new” condition at a significant cost reduction and savings to the customer. These drills require high pressure coolant to flush the chips through the tube to the chip box. The STS may also be referred to as the BTA system in the deep hole drilling process.

STS DRILLING SYSTEM

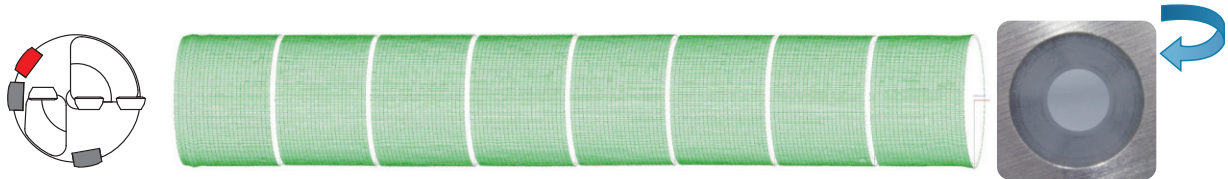


CT Coated Drills: Suitable for Medium and High speed drilling with highly accuracy and longer tool's life. (CT coating is a very special Japanese technology coating)

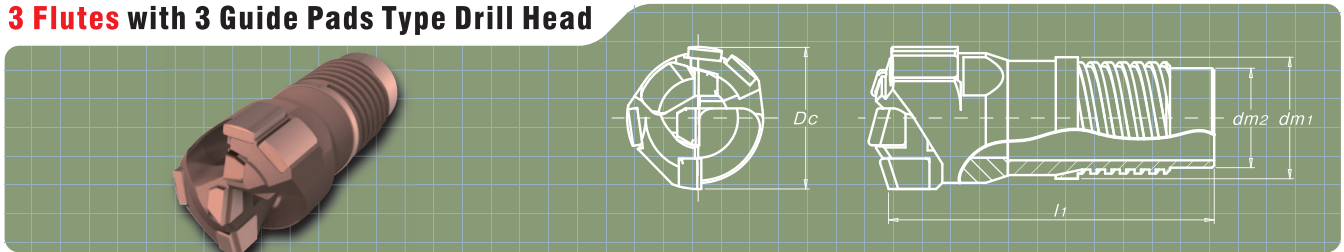
Drill Heads Design with 3 Guide Pads(CT Coating)

A. Unique Design of 3 Flutes with 3 Guide Pads Drill Head(CT Coating)

Feature: Reduced vibration during drilling and highly improved the roundness of the drilling holes
Holes with perfect roundness after drilling



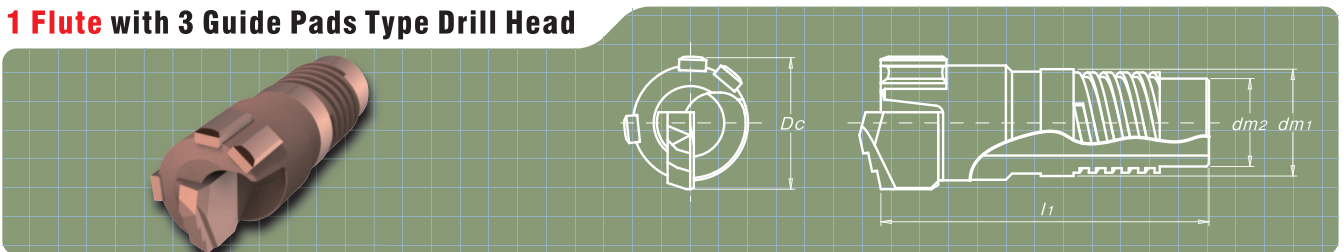
3 Flutes with 3 Guide Pads Type Drill Head



Unit (mm)

Drill Head Model	Drilling Range	Suitable Tube		Dimension			
		Tube Model	Tube Dia(mm)	dm1(mm)	dm2(mm)	L1	List USD
BTA-Dxxxx-CT-3	15.60-16.70	BA4S-0097	14	12.6	10.8	40	100
BTA-Dxxxx-CT-3	17.71-18.90	BA4S-0099	16	14.5	12.5	40	100
BTA-Dxxxx-CT-3	18.91-20.00	BA4S-0000	17	15.5	13.5	44	100
BTA-Dxxxx-CT-3	20.01-21.80	BA4S-00	18	16	14	49	100
BTA-Dxxxx-CT-3	21.81-24.10	BA4S-01	20	18	16	52	100
BTA-Dxxxx-CT-3	24.11-26.00	BA4S-02	22	19.5	17.5	54	100

1 Flute with 3 Guide Pads Type Drill Head



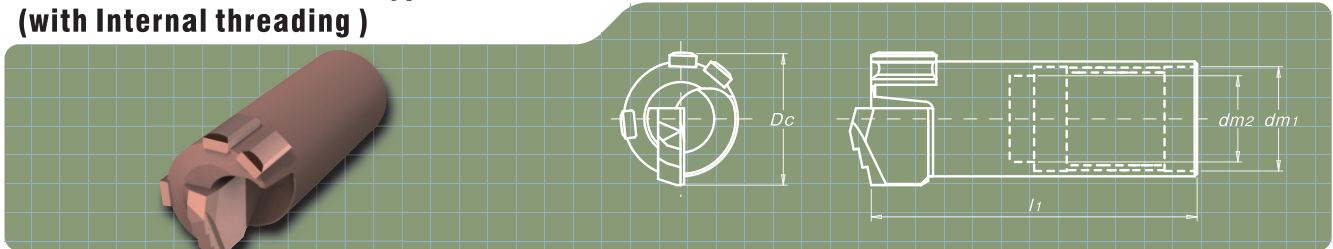
Unit (mm)

Drill Head Model	Drilling Range	Suitable Tube		Dimension			
		Tube Model	Tube Dia(mm)	dm1(mm)	dm2(mm)	L1	List USD
BTA-Dxxxx-CT-T-3	15.60-16.70	BA4S-0097	14	12.6	10.8	40	100

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Drill Heads Design with 3 Guide Pads(CT Coating)

1 Flute with 3 Guide Pads Type Drill Head (with Internal threading)



Unit (mm)

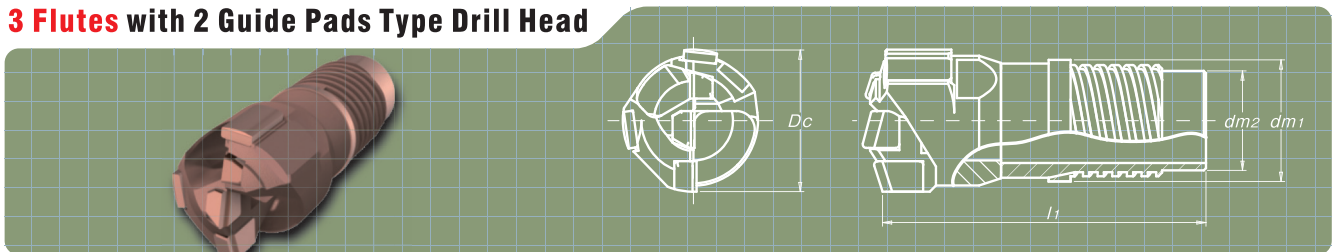
Drill Head Model	Drilling Range	Suitable Tube		Dimention			
		Tube Model	Tube Dia(mm)	dm1(mm)	dm2(mm)	L1	List USD
BTA-Dxxxx-CT-E-3	15.51-16.00	BA1S-1301	13	12.4	10.8	40	100
BTA-Dxxxx-CT-E-3	16.01-16.50	BA1S-1302	13	12.7	11.1	40	100
BTA-Dxxxx-CT-E-3	16.51-17.25	BA1S-1401	14	13.4	11.8	40	100
BTA-Dxxxx-CT-E-3	17.26-18.00	BA1S-1402	14	13.7	12.1	40	100
BTA-Dxxxx-CT-E-3	18.01-19.00	BA1S-1500	15	14.4	12.8	40	100
BTA-Dxxxx-CT-E-3	19.01-19.50	BA1S-1650	16.5	15.4	13.8	40	100

Drill Heads Design with 2 Guide Pads(CT Coating)

B. Drill Heads Design with 2 Guide Pads(CT Coating)

Feature: With 2 guide pads, drill is able to reduce machining resistance, achieving fast and high-precision machining.

3 Flutes with 2 Guide Pads Type Drill Head



Unit (mm)

Drill Head Model	Drilling Range	Suitable Tube		Dimention			
		Tube Model	Tube Dia(mm)	dm1(mm)	dm2(mm)	L1	List USD
BTA-Dxxxx-CT	15.60-16.70	BA4S-0097	14	12.6	10.8	40	100
BTA-Dxxxx-CT	17.71-18.90	BA4S-0099	16	14.5	12.5	40	100
BTA-Dxxxx-CT	18.91-20.00	BA4S-0000	17	15.5	13.5	44	100
BTA-Dxxxx-CT	20.01-21.80	BA4S-00	18	16	14	49	100
BTA-Dxxxx-CT	21.81-24.10	BA4S-01	20	18	16	52	100
BTA-Dxxxx-CT	24.11-26.00	BA4S-02	22	19.5	17.5	54	100

Recommended Cutting Conditions

Machining data for BTA

Unit (mm)

ISO	Material	Condition	Tensile strength (N/mm ²)	Hardness HB	Material No.	Cutting speed Vc (m/min)	Ø15.60 - Ø20.00	
P	Non-alloy steel, cast steel, free cutting steel	<0.25%C	Annealed	420	125	1	70-120	0.08-0.15
		>=0.25%C	Annealed	650	190	2	70-120	0.08-0.15
		<0.55%C	Quenched and tempered	850	250	3	40-70	0.08-0.15
		>=0.55%C	Annealed	750	220	4	70-120	0.08-0.15
			Quenched and tempered	1000	300	5	55-100	0.08-0.12
	Low alloy steel and cast steel (Less than 5% of alloying elements)	Quenched and tempered	Annealed	600	200	6	70-100	0.08-0.15
				930	275	7	55-100	0.08-0.12
				1000	300	8	55-100	0.08-0.12
				1200	350	9	55-100	0.08-0.12
	High alloy steel, cast steel and tool steel	Annealed	680	200	10	50-85	0.08-0.15	
		Quenched and tempered	1100	325	11	55-100	0.08-0.12	
M	Stainless steel and cast steel	Ferritic / martensitic	680	200	12	60-100	0.08-0.15	
		Martensitic	820	240	13	60-100	0.08-0.15	
		Austenitic	600	180	14	60-100	0.05-0.12	
K	Grey cast iron (GG)	Ferritic		160	15	60-100	0.06-0.13	
		Pearlitic		250	16	60-100	0.06-0.13	
	Cast iron nodular (GGG)	Ferritic		180	17	80-100	0.08-0.15	
		Pearlitic		260	18	80-100	0.08-0.15	
	Malleable cast iron	Ferritic		130	19	50-100	0.06-0.13	
		Pearlitic		230	20	50-100	0.06-0.13	
N	Aluminum - wrought alloy	Not cureable		60	21	65-130	0.08-0.15	
		Cured		100	22	65-100	0.08-0.15	
	Aluminum-cast, alloyed	<=12% Si	Not cureable		75	23	65-130	0.08-0.15
			Cured		90	24	65-130	0.08-0.15
		>12% Si	High temp.		130	25	65-130	0.08-0.15
	Copper alloys	>1% Pb	Free cutting		110	26	65-130	0.08-0.15
			Brass		90	27	65-130	0.08-0.15
	Non-metallic		Duroplastics, fiber plastics			29		
			Hard rubber			30		
	S	High temp. alloys	Fe based	Annealed		200	31	10-50
Cured					280	32	10-50	0.06-0.12
Ni or Co based			Annealed		250	33	10-50	0.06-0.12
			Cured		350	34	10-50	0.06-0.12
Titanium, Ti alloys				Rm 400		36	30-50	0.05-0.10
		Alpha+beta alloys cured		Rm 1050		37	30-50	0.05-0.10
H	Hardened steel	Hardened		55HRC	38			
		Hardened		60HRC	39			
	Chilled cast iron	Cast		400	40			
Cast iron nodular	Hardened		55HRC	41				

■ Steel
 ■ Stainless steel
 ■ Cast iron
 ■ Nonferrous
 ■ High temp. alloys
 ■ Hardened steel

Carbide Drills

HSS Drills

U Drills

Head Exchangeable Drills

Deep Hole Drills

CDR 45 Chamfer Cutter

Non-standard Drill made