



**ALLIED MACHINE  
& ENGINEERING**

**WOHLHAUPTER®**

Holemaking Solutions for Today's Manufacturing



Boring



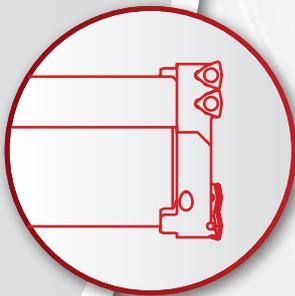
Reaming



Burnishing



Threading



Specials



## Opening Drill®

▶ *DRILLING*

Replaceable IC Insert Drilling System



SECTION

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# A70

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Opening Drill®

# Opening Drill®

## Large Diameter Replaceable IC Insert Drilling System

► **Diameter Range:** 50.80 mm - 142.75 mm (2.000" - 5.620")



### Need larger holes? No problem.

The Opening Drill is an extremely effective tool designed to enlarge existing holes. It is available in nine different shank styles: Straight, ABS 63, CV40, CV50, HSK 63A/C, HSK 100A/C, BT 40, BT 50, and DIN50.

In a *single* operation, an existing hole can be opened and large amounts of material can be removed. The insert design reduces chip size and improves evacuation. Also, inventory and cost are reduced by the adjustable diameters.

Your safety and the safety of others is very important. This catalogue contains important safety messages. Always read and follow all safety precautions.



This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalogue, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalogue. Safety messages follow these words.

#### **WARNING**

**WARNING** (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

**NOTICE** means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

**NOTE** and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit [www.alliedmachine.com](http://www.alliedmachine.com) for the most up-to-date information and procedures.

Excellent chip control.

Improves hole quality and surface finish.

Provides maximum durability and stability.

### Applicable Industries



Aerospace



Agriculture



Automotive



Firearms



General Machining



Oil & Gas



Renewable Energy

## Opening Drill® Contents

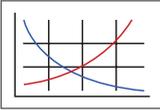
### Reference Icons

The following icons will appear throughout the catalogue to help you navigate between products.



#### Setup / Assembly Information

Detailed instructions and information regarding the corresponding part(s)



#### Recommended Cutting Data

Speed and feed recommendations for optimum and safe drilling



#### Through Coolant Option

Indicates that the product is through coolant

Series	Diameter Range	
	Metric (mm)	Imperial (inch)
OP1	50.80 - 63.50	2.000 - 2.500
OP2	63.50 - 76.20	2.500 - 3.000
OP3	76.20 - 104.64	3.000 - 4.120
OP4	104.64 - 142.75	4.120 - 5.620

### Introduction Information

Product Overview . . . . .	2
Setup Instructions . . . . .	3
Product Nomenclature. . . . .	4 - 5

### Drill Shank Style

Straight Metric . . . . .	6
Straight Imperial . . . . .	7
BT40 . . . . .	8
BT50 . . . . .	9
CV40. . . . .	10
CV50. . . . .	11
HSK63 . . . . .	12
HSK100 . . . . .	13
ABS63 . . . . .	14
DIN50 . . . . .	15

### Recommended Cutting Data

Metric (mm) . . . . .	16 - 17
Imperial (inch) . . . . .	18 - 19



## Product Overview

### Features

- Can be used as a rotating or stationary tool.
- Can be used in rough boring operations.
- Available in multiple different shanks (see chart below).
- Smooth cutting action and quiet operations in lathes and mills.
- Special lengths, diameters, and shanks are available upon request.

### Advantages

- Opens an existing hole in a single operation.
- Ignores core shifts up to 3.18 mm (1/8") providing straight and true holes without the need for boring.
- Allows for large amounts of material removal.
- Unique design enables larger holes to be made on low horsepower machines.
- Replaceable cartridges protect your investment.
- Adjustable diameters reduce inventory and cost.

### Shank Options



Straight



CV40



CV50



BT40



BT50



HSK63



HSK100



DIN50



ABS63



AM300®



AM200®



TiN



2 Inserts  
(OP1 - OP3 series)



3 Inserts  
(OP4 series)

### Insert Application Recommendations

#### Carbide Grade Options

P 35 (C5)	General purpose carbide grade suitable for most applications. ▶ <i>Common application in steels and stainless steels.</i>
K35 (C1)	Toughest carbide grade. Provides the best combination of edge strength and tool life. ▶ <i>Recommended for less rigid applications.</i>
K25 (C2)	Higher wear-resistant carbide suitable for abrasive material applications. ▶ <i>Recommended for grey, ductile, and nodular irons.</i>

#### Additional Geometry Option

High Rake (HR)	Provides superior chip control and tool life in long chipping carbon and alloy steels below 200 BHN.
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### IC Inserts

- The design allows for excellent chip control and aggressive penetration rates.
- The proprietary AM200® and AM300® coatings increase tool life above competitors' premium coatings.
- The same inserts are used for both Revolution Drill and Opening Drill products.

A  
DRILLING

B  
BORING

C  
REAMING

D  
BURISHING

E  
THREADING

X  
SPECIALS

## Setup Instructions



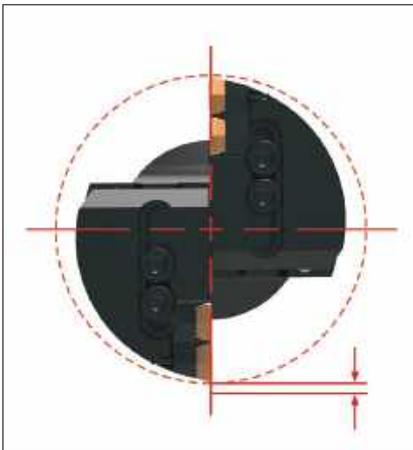
**Step 1:**  
Loosen the mounting screws on both cartridges.



**Step 2:**  
Set one cartridge to the finish diameter by tightening the adjustment screw against the adjustment pin.



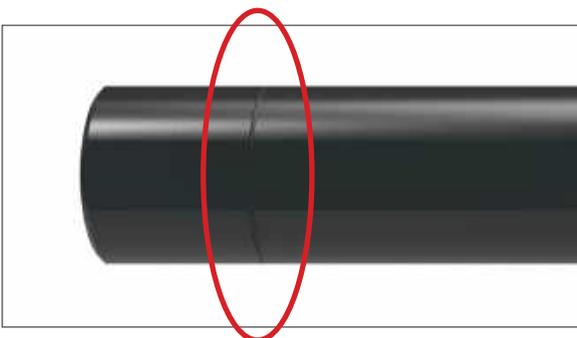
**Step 3:**  
Tighten the mounting screws on the cartridge to 15-19 N-m (11-14 ft-lbf).



**Step 4:**  
Set the opposing cartridge with 4.06 mm (0.160") to 5.08 mm (0.200") radial offset inward by tightening the adjustment screw against the adjustment pin (optimum situation for each insert to remove equal material).



**Step 5:**  
Tighten the mounting screws on the cartridge to 15-19 N-m (11-14 ft-lbf).



### Straight Shanks

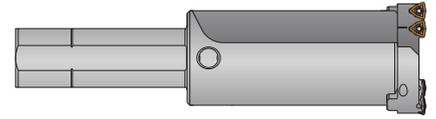
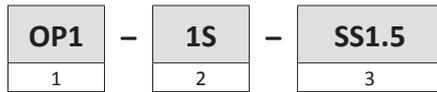
- Designed for lathe applications.
- Can be cut off for use in endmill holders.
- The score mark (circled above) is provided for recommended cut length.
- Cut and deburr at the score mark.
- This improves rigidity when the body sits against the face of an endmill holder.





## Product Nomenclature

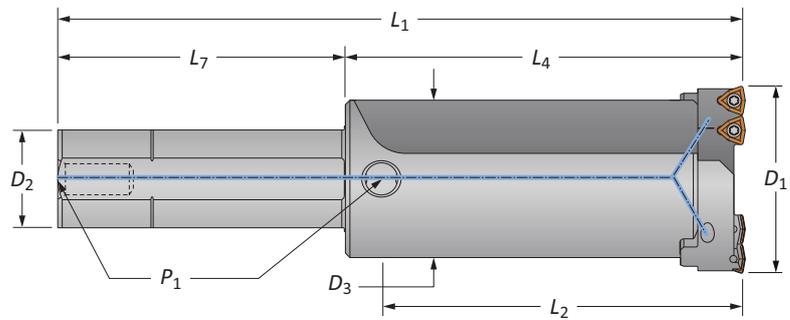
### Opening Drill Holders



1. Series	2. Length	3. Shank Type	
OP1 = 50.80 mm - 63.50 mm (2.000" - 2.500")	1S = Short	SS1.5 = 1-1/2 $\phi$ straight	BT40 = BT40
OP2 = 63.50 mm - 76.20 mm (2.500" - 3.000")	1L = Long	SS2.0 = 2 $\phi$ straight	BT50 = BT50
OP3 = 76.20 mm - 104.65 mm (3.000" - 4.120")		40M = 40 mm straight	HSK63 = HSK 63A/C
OP4 = 104.65 mm - 142.75 mm (4.120" - 5.620")		50M = 50 mm straight	HSK100 = HSK 100A/C
		CV40 = CV40	ABS63 = ABS63
		CV50 = CV50	DV50 = DIN50

### Reference Key

Symbol	Attribute
$D_1$	Drill diameter range
$D_2$	Shank diameter
$D_3$	Body diameter
$L_1$	Overall length
$L_2$	Maximum drill depth
$L_4$	Holder length
$L_7$	Shank length
$P_1$	Rear pipe tap



A DRILLING

B BORING

C REAMING

D BURINISHING

F THREADING

X SPECIALS



**Product Nomenclature**

**Opening Drill Inserts**



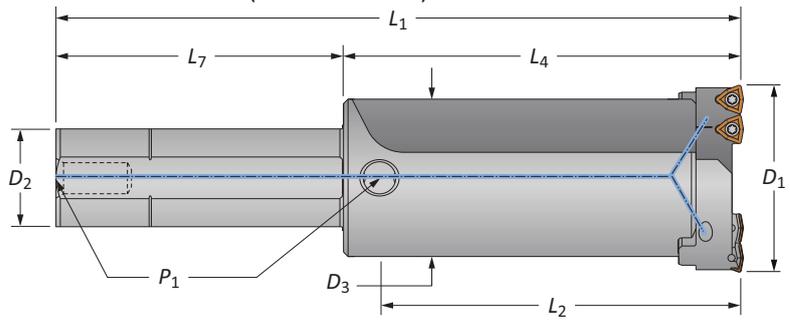
<b>OP</b>	-	<b>05</b>	<b>T3</b>	<b>08</b>	-	<b>1</b>	<b>H</b>	<b>HR</b>
1		2	3	4		5	6	7

<b>1. Compatible with:</b> Opening Drill Revolution Drill®	<b>2. IC Type</b> 05 = 5/16"	<b>3. Thickness</b> T3 = 5/32"	<b>4. Radius</b> 08 = 1/32"	<b>5. Carbide Grade</b> Blank = P 35 (C5) 1 = K35 (C1) 2 = K25 (C2)
<b>6. Coating</b> P = AM300® H = AM200® T = TiN A = TiAlN N = TiCN U = Uncoated	<b>7. Geometry</b> Blank = General Purpose HR = High Rake			

A  
DRILLING  
B  
BORING  
C  
REAMING  
D  
BURNISHING  
E  
THREADING  
X  
SPECIALS

## Opening Drill Holders

Straight Shank | Metric | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holdings

Length	D <sub>1</sub> Range	Holder				Shank			Part No.	Cartridges
		D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>	L <sub>1</sub>	D <sub>2</sub>	L <sub>7</sub>	P <sub>1</sub>		
Short	50.80 - 63.50	46.74	83.46	104.44	174.45	40.00	70.00	-	OP1-1S-40M	OP1-WC05
	Long	50.80 - 63.50	46.74	140.61	161.59	231.60	40.00	70.00		
Short	63.50 - 76.20	56.39	118.52	141.25	211.25	40.00	70.00	-	OP2-1S-40M	OP2-WC05
	Long	63.50 - 76.20	56.39	194.72	217.45	287.45	40.00	70.00		
Short	76.20 - 104.65	71.27	129.90	153.95	223.95	40.00	70.00	-	OP3-1S-40M	OP3-WC05
	Long	76.20 - 104.65	71.27	231.50	255.55	325.55	40.00	70.00		
Short	104.65 - 142.65	88.90	127.43	153.95	233.96	50.00	80.00	-	OP4-1S-50M	OP4-WC05
	Long	104.65 - 142.65	88.90	267.13	293.65	373.66	50.00	80.00		

\*Holder includes cartridges; however, inserts are sold separately.

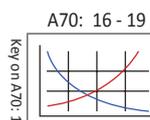
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	OP-05T308-P	OP-05T308-H	OP-05T308-T	IS-10-1	8T-9
K35 (C1)	Standard	OP-05T308-1P	OP-05T308-1H	OP-05T308-1T	IS-10-1	8T-9
K25 (C2)	Standard	OP-05T308-2P	OP-05T308-2H	-	IS-10-1	8T-9
P 35 (C5)	High Rake	OP-05T308-PHR	OP-05T308-HHR	-	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.



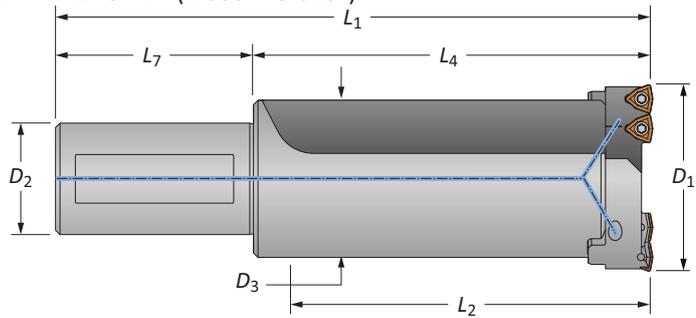
IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

Ⓜ = Metric (mm)  
Ⓢ = Imperial (in)



## Opening Drill Holders

Straight Shank | Imperial | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holder

Length	D <sub>1</sub> Range	Holder				Shank			Part No.	Cartridges
		D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>	L <sub>1</sub>	D <sub>2</sub>	L <sub>7</sub>	P <sub>1</sub>		
Short	2.000 - 2.500	1.840	3-9/32	4-3/64	8-3/64	1-1/2	4	1/4 NPT	<b>OP1-1S-SS1.5</b>	OP1-WC05
Long	2.000 - 2.500	1.840	5-17/32	6-19/64	10-19/64	1-1/2	4	1/4 NPT	<b>OP1-1L-SS1.5</b>	OP1-WC05
Short	2.500 - 3.000	2.220	4-43/64	5-1/2	9-1/2	1-1/2	4	1/4 NPT	<b>OP2-1S-SS1.5</b>	OP2-WC05
Long	2.500 - 3.000	2.220	7-43/64	8-1/2	12-1/2	1-1/2	4	1/4 NPT	<b>OP2-1L-SS1.5</b>	OP2-WC05
Short	3.000 - 4.120	2.806	5-7/64	6	10	1-1/2	4	1/4 NPT	<b>OP3-1S-SS1.5</b>	OP3-WC05
Long	3.000 - 4.120	2.806	9-7/64	10	14	1-1/2	4	1/4 NPT	<b>OP3-1L-SS1.5</b>	OP3-WC05
Short	4.120 - 5.620	3.500	5-1/64	6	10-1/2	2	4-1/2	1/4 NPT	<b>OP4-1S-SS2.0</b>	OP4-WC05
Long	4.120 - 5.620	3.500	10-33/64	11-1/2	16	2	4-1/2	1/4 NPT	<b>OP4-1L-SS2.0</b>	OP4-WC05

\*Holder includes cartridges; however, inserts are sold separately.

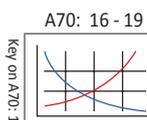
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	OP-05T308-P	OP-05T308-H	OP-05T308-T	IS-10-1	8T-9
K35 (C1)	Standard	OP-05T308-1P	OP-05T308-1H	OP-05T308-1T	IS-10-1	8T-9
K25 (C2)	Standard	OP-05T308-2P	OP-05T308-2H	-	IS-10-1	8T-9
P 35 (C5)	High Rake	OP-05T308-PHR	OP-05T308-HHR	-	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.



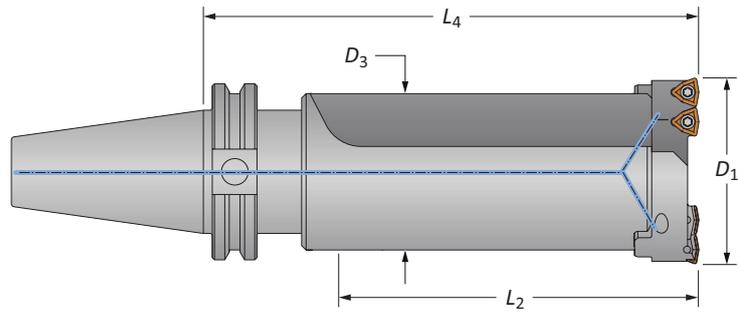
IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

Ⓜ = Metric (mm)  
 Ⓢ = Imperial (in)

A  
DRILLING  
B  
BORING  
C  
REAMING  
D  
BURNISHING  
E  
THREADING  
X  
SPECIALS

## Opening Drill Holders

BT40 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holdings

Length	D <sub>1</sub> Range	Holder			Part No.	Cartridges
		D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>		
Short	50.80 - 63.50	46.74	83.46	137.85	<b>OP1-1S-BT40</b>	OP1-WC05
Long	50.80 - 63.50	46.74	140.61	195.00	<b>OP1-1L-BT40</b>	OP1-WC05
Short	63.50 - 76.20	56.39	118.52	174.68	<b>OP2-1S-BT40</b>	OP2-WC05
Long	63.50 - 76.20	56.39	194.72	250.88	<b>OP2-1L-BT40</b>	OP2-WC05
Short	76.20 - 104.65	71.27	129.90	187.38	<b>OP3-1S-BT40</b>	OP3-WC05
Long	76.20 - 104.65	71.27	231.50	288.98	<b>OP3-1L-BT40</b>	OP3-WC05
Short	104.65 - 142.75	88.90	127.43	187.38	<b>OP4-1S-BT40</b>	OP4-WC05

\*Holder includes cartridges; however, inserts are sold separately.

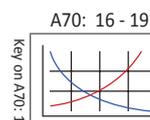
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	<b>OP-05T308-P</b>	<b>OP-05T308-H</b>	<b>OP-05T308-T</b>	IS-10-1	8T-9
K35 (C1)	Standard	<b>OP-05T308-1P</b>	<b>OP-05T308-1H</b>	<b>OP-05T308-1T</b>	IS-10-1	8T-9
K25 (C2)	Standard	<b>OP-05T308-2P</b>	<b>OP-05T308-2H</b>	—	IS-10-1	8T-9
P 35 (C5)	High Rake	<b>OP-05T308-PHR</b>	<b>OP-05T308-HHR</b>	—	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.



IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

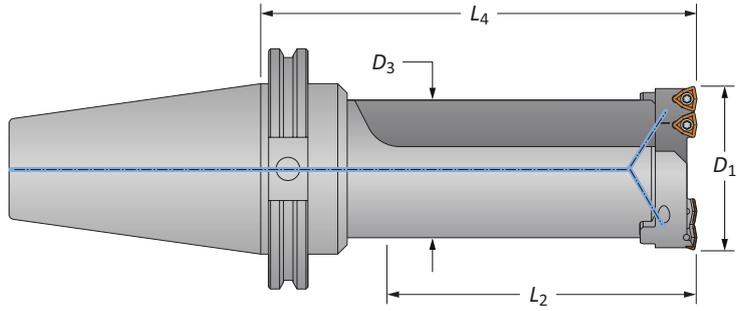
Ⓜ = Metric (mm)  
 Ⓢ = Imperial (in)

A DRILLING  
 B BORING  
 C REAMING  
 D BURNISHING  
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 X SPECIALS



## Opening Drill Holders

BT50 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holder

	Length	D <sub>1</sub> Range	Holder			Part No.	Cartridges
			D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>		
III	Short	50.80 - 63.50	46.74	83.46	147.37	OP1-1S-BT50	OP1-WC05
	Long	50.80 - 63.50	46.74	140.61	204.52	OP1-1L-BT50	OP1-WC05
	Short	63.50 - 76.20	56.39	118.52	184.20	OP2-1S-BT50	OP2-WC05
	Long	63.50 - 76.20	56.39	194.72	260.40	OP2-1L-BT50	OP2-WC05
	Short	76.20 - 104.65	71.27	129.90	196.90	OP3-1S-BT50	OP3-WC05
	Long	76.20 - 104.65	71.27	231.50	298.50	OP3-1L-BT50	OP3-WC05
	Short	104.65 - 142.75	88.90	127.43	196.90	OP4-1S-BT50	OP4-WC05
	Long	104.65 - 142.75	88.90	267.13	336.60	OP4-1L-BT50	OP4-WC05

\*Holder includes cartridges; however, inserts are sold separately.

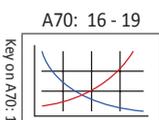
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	OP-05T308-P	OP-05T308-H	OP-05T308-T	IS-10-1	8T-9
K35 (C1)	Standard	OP-05T308-1P	OP-05T308-1H	OP-05T308-1T	IS-10-1	8T-9
K25 (C2)	Standard	OP-05T308-2P	OP-05T308-2H	-	IS-10-1	8T-9
P 35 (C5)	High Rake	OP-05T308-PHR	OP-05T308-HHR	-	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.

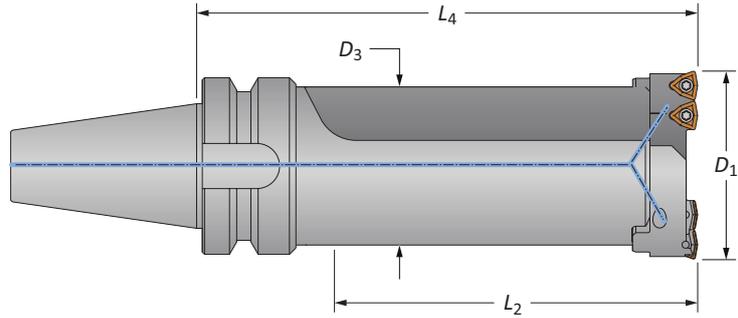


IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

III = Metric (mm)  
 I = Imperial (in)

## Opening Drill Holders

CV40 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holder

Length	D <sub>1</sub> Range	D <sub>3</sub>	Holder		Part No.	Cartridges
			L <sub>2</sub>	L <sub>4</sub>		
Short	2.000 - 2.500	1.840	3-9/32	5-27/64	<b>OP1-1S-CV40</b>	OP1-WC05
Long	2.000 - 2.500	1.840	5-17/32	7-43/64	<b>OP1-1L-CV40</b>	OP1-WC05
Short	2.500 - 3.000	2.220	4-43/64	6-7/8	<b>OP2-1S-CV40</b>	OP2-WC05
Long	2.500 - 3.000	2.220	7-43/64	9-7/8	<b>OP2-1L-CV40</b>	OP2-WC05
Short	3.000 - 4.120	2.806	5-7/64	7-3/8	<b>OP3-1S-CV40</b>	OP3-WC05
Long	3.000 - 4.120	2.806	9-7/64	11-3/8	<b>OP3-1L-CV40</b>	OP3-WC05
Short	4.120 - 5.620	3.500	5-1/64	7-3/8	<b>OP4-1S-CV40</b>	OP4-WC05

\*Holder includes cartridges; however, inserts are sold separately.

### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	<b>OP-05T308-P</b>	<b>OP-05T308-H</b>	<b>OP-05T308-T</b>	IS-10-1	8T-9
K35 (C1)	Standard	<b>OP-05T308-1P</b>	<b>OP-05T308-1H</b>	<b>OP-05T308-1T</b>	IS-10-1	8T-9
K25 (C2)	Standard	<b>OP-05T308-2P</b>	<b>OP-05T308-2H</b>	—	IS-10-1	8T-9
P 35 (C5)	High Rake	<b>OP-05T308-PHR</b>	<b>OP-05T308-HHR</b>	—	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.

A DRILLING  
B BORING  
C REAMING  
D BURNISHING  
E THREADING  
X SPECIALS

A70: 16 - 19 A70: 2 - 3

Key on A70: 1

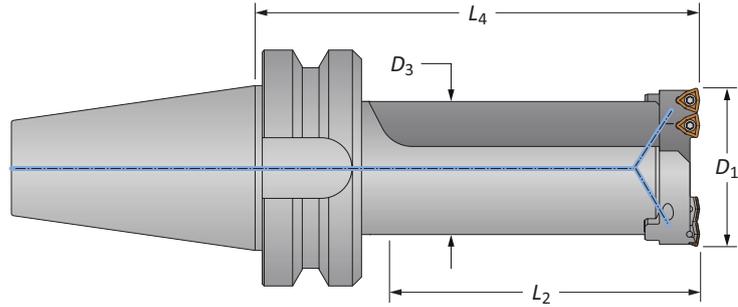
IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

**m** = Metric (mm)  
**i** = Imperial (in)



## Opening Drill Holders

CV50 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holder

Length	D <sub>1</sub> Range	Holder			Part No.	Cartridges
		D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>		
Short	2.000 - 2.500	1.840	3-9/32	5-27/64	OP1-1S-CV50	OP1-WC05
			5-17/32	7-43/64		
Long	2.000 - 2.500	1.840	4-43/64	6-7/8	OP2-1S-CV50	OP2-WC05
			7-43/64	9-7/8		
Short	2.500 - 3.000	2.220	5-7/64	7-3/8	OP3-1S-CV50	OP3-WC05
			9-7/64	11-3/8		
Long	2.500 - 3.000	2.220	5-1/64	7-3/8	OP4-1S-CV50	OP4-WC05
			10-33/64	12-7/8		

\*Holder includes cartridges; however, inserts are sold separately.

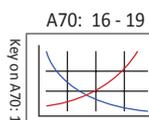
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	OP-05T308-P	OP-05T308-H	OP-05T308-T	IS-10-1	8T-9
K35 (C1)	Standard	OP-05T308-1P	OP-05T308-1H	OP-05T308-1T	IS-10-1	8T-9
K25 (C2)	Standard	OP-05T308-2P	OP-05T308-2H	-	IS-10-1	8T-9
P 35 (C5)	High Rake	OP-05T308-PHR	OP-05T308-HHR	-	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.

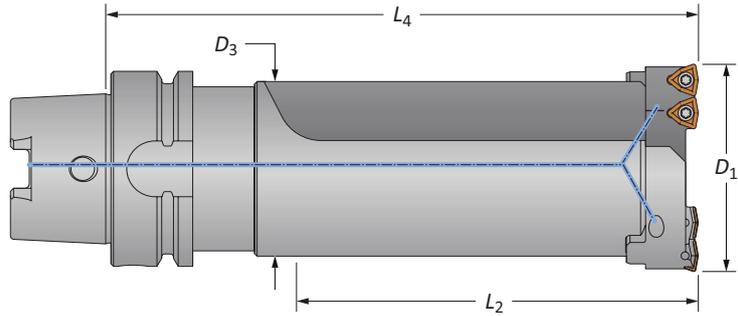


IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

Ⓜ = Metric (mm)  
 Ⓢ = Imperial (in)

## Opening Drill Holders

HSK63 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holdings

Length	D <sub>1</sub> Range	Holder			Part No.	Cartridges
		D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>		
Short	2.000 - 2.500	1.840	3-9/32	5-59/64	<b>OP1-1S-HSK63</b>	OP1-WC05
Long	2.000 - 2.500	1.840	5-17/32	8-11/64	<b>OP1-1L-HSK63</b>	OP1-WC05
Short	2.500 - 3.000	2.220	4-43/64	7-3/8	<b>OP2-1S-HSK63</b>	OP2-WC05
Long	2.500 - 3.000	2.220	7-43/64	10-3/8	<b>OP2-1L-HSK63</b>	OP2-WC05
Short	3.000 - 4.120	2.806	5-7/64	7-7/8	<b>OP3-1S-HSK63</b>	OP3-WC05
Long	3.000 - 4.120	2.806	9-7/64	11-7/8	<b>OP3-1L-HSK63</b>	OP3-WC05
Short	4.120 - 5.620	3.500	5-1/64	7-7/8	<b>OP4-1S-HSK63</b>	OP4-WC05

\*Holder includes cartridges; however, inserts are sold separately.

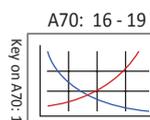
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
<b>OP1-WC05</b>	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
<b>OP2-WC05</b>	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
<b>OP3-WC05</b>	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
<b>OP4-WC05</b>	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	<b>OP-05T308-P</b>	<b>OP-05T308-H</b>	<b>OP-05T308-T</b>	IS-10-1	8T-9
K35 (C1)	Standard	<b>OP-05T308-1P</b>	<b>OP-05T308-1H</b>	<b>OP-05T308-1T</b>	IS-10-1	8T-9
K25 (C2)	Standard	<b>OP-05T308-2P</b>	<b>OP-05T308-2H</b>	—	IS-10-1	8T-9
P 35 (C5)	High Rake	<b>OP-05T308-PHR</b>	<b>OP-05T308-HHR</b>	—	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.



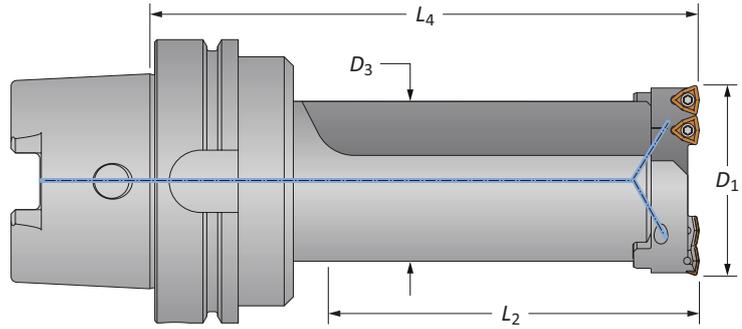
IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

Ⓜ = Metric (mm)  
 ⓘ = Imperial (in)

A DRILLING  
 B BORING  
 C REAMING  
 D BURNISHING  
 E THREADING  
 X SPECIALS

## Opening Drill Holders

HSK100 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holder

Length	D <sub>1</sub> Range	Holder			Part No.	Cartridges
		D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>		
Short	2.000 - 2.500	1.840	3-9/32	6-1/64	<b>OP1-1S-HSK100</b>	OP1-WC05
			5-17/32	8-17/64	<b>OP1-1L-HSK100</b>	OP1-WC05
Long	2.000 - 2.500	1.840	4-43/64	7-15/32	<b>OP2-1S-HSK100</b>	OP2-WC05
			7-43/64	10-15/32	<b>OP2-1L-HSK100</b>	OP2-WC05
Short	2.500 - 3.000	2.220	5-7/64	7-31/32	<b>OP3-1S-HSK100</b>	OP3-WC05
			9-7/64	11-31/32	<b>OP3-1L-HSK100</b>	OP3-WC05
Long	2.500 - 3.000	2.220	5-1/64	7-31/32	<b>OP4-1S-HSK100</b>	OP4-WC05
			10-33/64	13-15/32	<b>OP4-1L-HSK100</b>	OP4-WC05

\*Holder includes cartridges; however, inserts are sold separately.

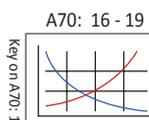
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	<b>OP-05T308-P</b>	<b>OP-05T308-H</b>	<b>OP-05T308-T</b>	IS-10-1	8T-9
K35 (C1)	Standard	<b>OP-05T308-1P</b>	<b>OP-05T308-1H</b>	<b>OP-05T308-1T</b>	IS-10-1	8T-9
K25 (C2)	Standard	<b>OP-05T308-2P</b>	<b>OP-05T308-2H</b>	-	IS-10-1	8T-9
P 35 (C5)	High Rake	<b>OP-05T308-PHR</b>	<b>OP-05T308-HHR</b>	-	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.

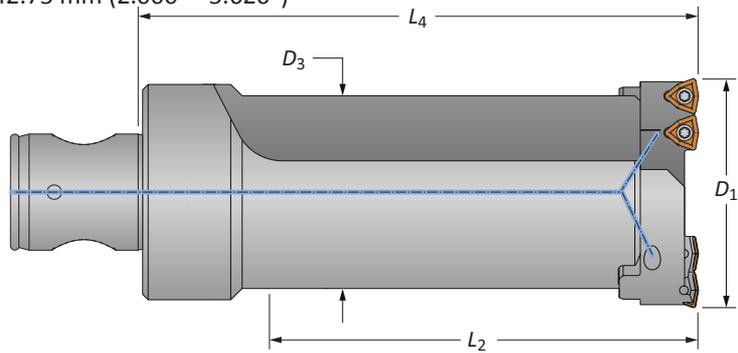


IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

= Metric (mm)  
 = Imperial (in)

## Opening Drill Holders

ABS63 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holdings

Length	D <sub>1</sub> Range	D <sub>3</sub>	Holder			Part No.	Cartridges
			L <sub>2</sub>	L <sub>4</sub>			
Short	2.000 - 2.500	1.840	3-9/32	5-1/2	OP1-1S-ABS63	OP1-WC05	
Long	2.000 - 2.500	1.840	5-17/32	7-3/4			
Short	2.500 - 3.000	2.220	4-43/64	6-1/4	OP2-1S-ABS63	OP2-WC05	
Long	2.500 - 3.000	2.220	7-43/64	9-1/4			
Short	3.000 - 4.120	2.806	5-7/64	6-3/4	OP3-1S-ABS63	OP3-WC05	
Long	3.000 - 4.120	2.806	9-7/64	10-3/4			
Short	4.120 - 5.620	3.500	5-1/64	6-3/4	OP4-1S-ABS63	OP4-WC05	

\*Holder includes cartridges; however, inserts are sold separately.

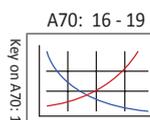
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	OP-05T308-P	OP-05T308-H	OP-05T308-T	IS-10-1	8T-9
K35 (C1)	Standard	OP-05T308-1P	OP-05T308-1H	OP-05T308-1T	IS-10-1	8T-9
K25 (C2)	Standard	OP-05T308-2P	OP-05T308-2H	-	IS-10-1	8T-9
P 35 (C5)	High Rake	OP-05T308-PHR	OP-05T308-HHR	-	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.



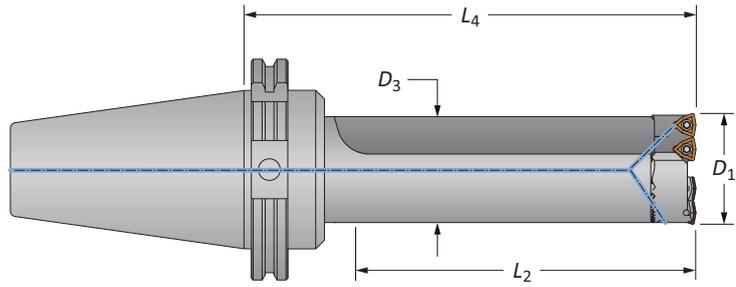
IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

**m** = Metric (mm)  
**i** = Imperial (in)



## Opening Drill Holders

DIN50 Shank | Diameter Range: 50.80 mm - 142.75 mm (2.000" - 5.620")



### Holder

Length	D <sub>1</sub> Range	Holder			Part No.	Cartridges
		D <sub>3</sub>	L <sub>2</sub>	L <sub>4</sub>		
Short	50.80 - 63.50	46.74	83.46	137.92	<b>OP1-1S-DV50</b>	OP1-WC05
			140.61	195.07		
Long	50.80 - 63.50	46.74	118.52	174.75	<b>OP2-1S-DV50</b>	OP2-WC05
			194.72	250.95		
Short	63.50 - 76.20	56.39	129.90	187.45	<b>OP3-1S-DV50</b>	OP3-WC05
			231.50	289.05		
Long	63.50 - 76.20	56.39	127.43	187.45	<b>OP4-1S-DV50</b>	OP4-WC05
			267.13	327.15		
Short	76.20 - 104.65	71.27	127.43	187.45	<b>OP4-1S-DV50</b>	OP4-WC05
			267.13	327.15		
Long	76.20 - 104.65	71.27	127.43	187.45	<b>OP4-1S-DV50</b>	OP4-WC05
			267.13	327.15		
Short	104.65 - 142.75	88.90	127.43	187.45	<b>OP4-1S-DV50</b>	OP4-WC05
			267.13	327.15		
Long	104.65 - 142.75	88.90	127.43	187.45	<b>OP4-1S-DV50</b>	OP4-WC05
			267.13	327.15		

\*Holder includes cartridges; however, inserts are sold separately.

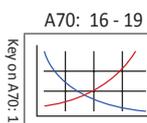
### Cartridges

Replacement Cartridges	Qty. Inserts Needed	Mounting Screw	Key Size	Adjusting Screw	Driver
OP1-WC05	2	MS-13M-1	5 mm	AS-10T9-1	8T-9
OP2-WC05	2	MS-15M-1	5 mm	AS-10T9-1	8T-9
OP3-WC05	2	MS-15M-1	5 mm	AS-12T9-1	8T-9
OP4-WC05	3	MS-15M-1	5 mm	AS-14T9-1	8T-9

### IC Inserts

Carbide Grade	Geometry	Part No.			Insert Screws*	Driver
		AM300®	AM200®	TiN		
P 35 (C5)	Standard	OP-05T308-P	OP-05T308-H	OP-05T308-T	IS-10-1	8T-9
K35 (C1)	Standard	OP-05T308-1P	OP-05T308-1H	OP-05T308-1T	IS-10-1	8T-9
K25 (C2)	Standard	OP-05T308-2P	OP-05T308-2H	-	IS-10-1	8T-9
P 35 (C5)	High Rake	OP-05T308-PHR	OP-05T308-HHR	-	IS-10-1	8T-9

\*Admissible Tightening Torque: 175 N-cm (15.5 in-lbs). Tightening torques are calculated with a friction coefficient of  $\mu = 0.14$  and develop 90% of ultimate yield strength.



IC inserts sold in multiples of 10 | Insert screws sold in multiples of 10  
 Mounting screws sold in multiples of 4 | Adjusting screws sold in multiples of 4

Ⓜ = Metric (mm)  
 Ⓢ = Imperial (in)

A  
DRILLING  
B  
BORING  
C  
REAMING  
D  
BURNISHING  
E  
THREADING  
X  
SPECIALS

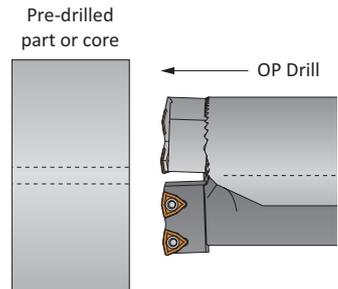


**Recommended Cutting Data | Metric (mm)**

ISO	Material	Hardness (BHN)	Speed (m/min)			Feed Rate (mm/rev)
			 AM300®	 AM200®	 TIN	
P	<b>Free-Machining Steel</b> 1118, 1215, 12L14, etc.	100 - 250	274 - 396	259 - 366	213 - 274	0.09 - 0.18
	<b>Low-Carbon Steel</b> 1010, 1020, 1025, 1522, 1144, etc.	85 - 275	259 - 381	244 - 351	198 - 259	0.08 - 0.17
	<b>Medium-Carbon Steel</b> 1030, 1040, 1050, 1527, 1140, 1151, etc.	125 - 325	244 - 320	229 - 290	183 - 259	0.09 - 0.17
	<b>Alloy Steel</b> 4140, 5140, 8640, etc.	125 - 375	229 - 305	213 - 274	183 - 259	0.09 - 0.17
	<b>High-Strength Alloy</b> 4340, 4330V, 300M, etc.	225 - 400	183 - 259	168 - 229	122 - 198	0.08 - 0.13
	<b>Structural Steel</b> A36, A285, A516, etc.	100 - 350	259 - 320	244 - 290	198 - 259	0.08 - 0.17
	<b>Tool Steel</b> H-13, H-21, A-4, O-2, S-3, etc.	150 - 250	122 - 244	107 - 213	76 - 198	0.06 - 0.13
S	<b>High-Temp Alloy</b> Hastelloy B, Inconel 600, etc.	140 - 310	76 - 137	76 - 107	46 - 91	0.06 - 0.11
M	<b>Stainless Steel 400 Series</b> 416, 420, etc.	185 - 350	183 - 259	168 - 229	122 - 198	0.08 - 0.15
	<b>Stainless Steel 300 Series</b> 304, 316, 17-4PH, etc.	135 - 275	183 - 259	168 - 229	122 - 198	0.08 - 0.15
	<b>Super Duplex Stainless Steel</b>	135 - 275	152 - 228	137 - 198	91 - 152	0.05 - 0.12
K	<b>Nodular, Grey, Ductile Cast Iron</b>	120 - 320	213 - 274	198 - 244	152 - 213	0.10 - 0.20
N	<b>Cast Aluminium</b>	30 - 180	381 - 503	381 - 472	290 - 335	0.15 - 0.30
	<b>Wrought Aluminium</b>	30 - 180	381 - 503	381 - 472	290 - 335	0.15 - 0.30
	<b>Brass</b>	30 - 100	290 - 411	274 - 381	229 - 335	0.13 - 0.23

**Minimum Pilot Hole Diameter = Finish Diameter – C**

Ex: To open an existing diameter hole to 69.85 mm diameter, an OP2 tool would be used. The minimum pilot hole diameter would be: **69.85 - 47.75 = 22.10**



Opening Drill Series	Drill Diameter Range	C
OP1	50.80 - 63.50	47.75
OP2	63.50 - 76.20	47.75
OP3	76.20 - 104.64	47.75
OP4	104.64 - 142.75	68.07

**IMPORTANT:** The speeds and feeds listed above are considered a general starting point for all applications. Factory technical assistance is available for your specific applications through our Application Engineering department.



Formulas and Constants | Metric (mm)

Material Constants

Type of Material	Hardness (BHN)	K <sub>m</sub> (kPa)
Free-Machining Steel	100 - 250	5.17
Low-Carbon Steel	85 - 275	5.86
Medium-Carbon Steel	125 - 325	6.21
Alloy Steel	125 - 375	6.90
High-Strength Steel	225 - 400	7.93
Structural Steel	100 - 350	6.90
Tool Steel	150 - 250	6.21
High-Temperature Alloy	140 - 310	9.93
Titanium Alloy	140 - 310	4.97
Aerospace Alloy	185 - 350	4.48
Stainless Steel 400 Series	185 - 350	7.45
Stainless Steel 300 Series	135 - 275	6.48
Super Duplex Stainless Steel	135 - 275	6.48
Wear Plate	400 - 600	11.04
Hardened Steel	300 - 500	9.66
Nodular, Ductile Cast Iron	120 - 320	4.48
Grey Cast Iron	120 - 320	5.17
Cast Aluminium	30 - 180	2.76
Wrought Aluminium	30 - 180	2.76
Aluminium Bronze	100 - 250	3.45
Brass	100	2.41
Copper	60	2.07

Formulas

1. <b>RPM</b>	<b>= (318.31 • m/min) / DIA<sub>F</sub></b> where: RPM = revolutions per minute (rev/min) m/min = speed (m/min) DIA <sub>F</sub> = finish diameter of drill (mm)
2. <b>kW</b>	<b>= ((DIA<sub>F</sub><sup>2</sup> - DIA<sub>P</sub><sup>2</sup>) • mm/rev • RPM • K<sub>m</sub>) / 205,154</b> where: kW = tool power (kW) DIA <sub>F</sub> = finish diameter of drill (mm) DIA <sub>P</sub> = pre-drill diameter (mm) mm/rev = feed rate (mm/rev) RPM = revolutions per minute (rev/min) K <sub>m</sub> = specific cutting energy (kPa) machine efficiency (using 205,154 as constant)
3. <b>Thrust</b>	<b>= 148.78 • mm/rev • (DIA<sub>F</sub> - DIA<sub>P</sub>) • K<sub>m</sub></b> where: Thrust = axial thrust (N) IPR = feed rate (mm/rev) DIA <sub>F</sub> = finish diameter of drill (mm) DIA <sub>P</sub> = predrill diameter (mm) K <sub>m</sub> = specific cutting energy (kPa)
4. <b>Torque</b>	<b>= (kW • 9549.3) / RPM</b> where: Torque = torque (Nm) kW = tool power (kW) RPM = revolutions per minute (rev/min)

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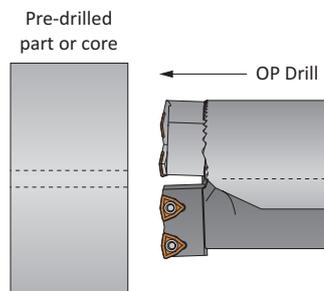
**Recommended Cutting Data | Imperial (inch)**

ISO	Material	Hardness (BHN)	Speed (SFM)			Feed Rate (IPR)
			AM300®	AM200®	TIN	
P	<b>Free-Machining Steel</b> 1118, 1215, 12L14, etc.	100 - 250	900 - 1300	850 - 1200	700 - 900	.0035 - 0.007
	<b>Low-Carbon Steel</b> 1010, 1020, 1025, 1522, 1144, etc.	85 - 275	850 - 1250	800 - 1150	650 - 850	.003 - 0.0065
	<b>Medium-Carbon Steel</b> 1030, 1040, 1050, 1527, 1140, 1151, etc.	125 - 325	800 - 1050	750 - 950	600 - 850	.0035 - 0.0065
	<b>Alloy Steel</b> 4140, 5140, 8640, etc.	125 - 375	750 - 1000	700 - 900	600 - 850	.0035 - 0.0065
	<b>High-Strength Alloy</b> 4340, 4330V, 300M, etc.	225 - 400	600 - 850	550 - 750	400 - 650	.003 - 0.005
	<b>Structural Steel</b> A36, A285, A516, etc.	100 - 350	850 - 1050	800 - 950	650 - 850	.003 - 0.0065
	<b>Tool Steel</b> H-13, H-21, A-4, O-2, S-3, etc.	150 - 250	400 - 800	350 - 700	250 - 650	.0025 - 0.005
S	<b>High-Temp Alloy</b> Hastelloy B, Inconel 600, etc.	140 - 310	250 - 450	250 - 350	150 - 300	.0025 - 0.005
M	<b>Stainless Steel 400 Series</b> 416, 420, etc.	185 - 350	600 - 850	550 - 750	400 - 650	.003 - 0.006
	<b>Stainless Steel 300 Series</b> 304, 316, 17-4PH, etc.	135 - 275	600 - 850	550 - 750	400 - 650	.003 - 0.006
	<b>Super Duplex Stainless Steel</b>	135 - 275	500 - 750	450 - 650	300 - 550	.002 - 0.005
K	<b>Nodular, Grey, Ductile Cast Iron</b>	120 - 320	700 - 900	650 - 800	500 - 700	.004 - 0.008
N	<b>Cast Aluminium</b>	30 - 180	1250 - 1650	1200 - 1550	950 - 1100	.006 - 0.012
	<b>Wrought Aluminium</b>	30 - 180	1250 - 1650	1200 - 1550	950 - 1100	.006 - 0.012
	<b>Brass</b>	30 - 100	950 - 1350	900 - 1250	750 - 1100	.005 - 0.009

**Minimum Pilot Hole Diameter = Finish Diameter – C**

Ex: To open an existing diameter hole to 2.75" diameter, an OP2 tool would be used. The minimum pilot hole diameter would be: **2.750 - 1.880 = 0.870"**

Opening Drill Series	Drill Diameter Range	C
OP1	2.00 - 2.50	1.880
OP2	2.50 - 3.00	1.880
OP3	3.00 - 4.12	1.880
OP4	4.12 - 5.62	2.680



**IMPORTANT:** The speeds and feeds listed above are considered a general starting point for all applications. Factory technical assistance is available for your specific applications through our Application Engineering department. *email: [engineering.eu@alliedmachine.com](mailto:engineering.eu@alliedmachine.com)*



## Formulas and Constants | Imperial (inch)

### Material Constants

Type of Material	Hardness (BHN)	K <sub>m</sub> (lbs/in <sup>2</sup> )
Free-Machining Steel	100 - 250	0.75
Low-Carbon Steel	85 - 275	0.85
Medium-Carbon Steel	125 - 325	0.90
Alloy Steel	125 - 375	1.00
High-Strength Steel	225 - 400	1.15
Structural Steel	100 - 350	1.00
Tool Steel	150 - 250	0.90
High-Temperature Alloy	140 - 310	1.44
Titanium Alloy	140 - 310	0.72
Aerospace Alloy	185 - 350	0.70
Stainless Steel 400 Series	185 - 350	1.08
Stainless Steel 300 Series	135 - 275	0.94
Super Duplex Stainless Steel	135 - 275	0.94
Wear Plate	400 - 600	1.60
Hardened Steel	300 - 500	1.40
Nodular, Ductile Cast Iron	120 - 320	0.65
Grey Cast Iron	120 - 320	0.75
Cast Aluminium	30 - 180	0.40
Wrought Aluminium	30 - 180	0.40
Aluminium Bronze	100 - 250	0.50
Brass	100	0.35
Copper	60	0.30

### Formulas

1.	<b>RPM</b>	<b>= (3.82 • SFM) / DIA<sub>F</sub></b>
	where:	
	RPM	= revolutions per minute (rev/min)
	SFM	= speed (ft/min)
	DIA <sub>F</sub>	= finish diameter of drill (inch)
2.	<b>HP</b>	<b>= (0.5891 • (DIA<sub>F</sub><sup>2</sup> – DIA<sub>P</sub><sup>2</sup>) • IPR • RPM • K<sub>m</sub>) / 0.80</b>
	where:	
	Tool Power	= tool power (HP)
	DIA <sub>F</sub>	= finish diameter of drill (inch)
	DIA <sub>P</sub>	= pre-drill diameter (inch)
	IPR	= feed rate (in/rev)
	RPM	= revolutions per minute (rev/min)
	K <sub>m</sub>	= specific cutting energy (lbs/in <sup>2</sup> ) machine efficiency (using 0.80 as constant)
3.	<b>Thrust</b>	<b>= 148,500 • IPR • (DIA<sub>F</sub> – DIA<sub>P</sub>) • K<sub>m</sub></b>
	where:	
	Thrust	= axial thrust (lbs)
	IPR	= feed rate (in/rev)
	DIA <sub>F</sub>	= finish diameter of drill (inch)
	DIA <sub>P</sub>	= pre-drill diameter (inch)
	K <sub>m</sub>	= specific cutting energy (lbs/in <sup>2</sup> )
4.	<b>Torque</b>	<b>= (HP • 5252) / RPM</b>
	where:	
	Torque	= torque (ft-lbs)
	HP	= tool power (HP)
	RPM	= revolutions per minute (rev/min)

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SPECIALS

# Drilling Guaranteed Application Form

\*The following must be filled out completely before your test will be considered

## CONTACT DETAILS

Trial P.O. No.\* ..... Date\* ..... Proposed Test Date\* .....  
 Favoured Distributor\* ..... Distributor Contact\* .....  
 Customer Name\* ..... Industry..... Contact Name\* .....

## APPLICATION INFORMATION

ATTENTION: The following Information is required to enable the best combination of tooling to be recommended. Please complete all that apply.

Material Type\* ..... Specification\* ..... Material Hardness .....  Kg  BRN  RC  N/mm<sup>2</sup>  
 Material Condition  Flat Stock  Round Stock  Tubular Stock  Plate  
 Stacked Plate  Hot Rolled  Cold Rolled  Casting  Forging  
 Hole Diameter .....  mm  Inch  Hole Depth.....  Through Hole  Blind Hole  
 Drilled Hole Tolerance Req'd ..... Drilled Hole RMS Finished Req'd .....  μInch  μMetre

## MACHINE SETUP

Machine Type  Machining Centre  Lathe  Boring Mill  
 Multi-spindle Auto  Multi-spindle Drill  Transfer Line  
 Gantry Machine  Dial Index Machine  Radial Arm  
 Gun Drilling Machine  Pedestal Drill  Other: .....

Machine Tool Builder\* ..... Model .....

Machine Tool Control\*  CNC  NC  Manual  Other .....

Spindle Orientation\*  Vertical  Horizontal  Other .....

Machine Shank Required  MAS BT  DIN69871  HSK Spindle Taper Size  40  50  63  100  Other .....

Tool\*  Stationary  Revolves

Available Power\*  KW .....  HP ..... Available Feed Trust .....  Newtons  Lbs

Available Speed\*  RPM .....  M/min .....  Variable  Fixed

Preferred Shank Type\*  Flanged  Morse Taper  RCA  Lathe  Diameter .....  mm  Inch

Coolant Type\*  Cutting Oil  Water Soluble Oil  Air Mist  Air  Dry

Coolant Pressure\*  Bar .....  PSI .....

Coolant Flow Rate\*  L/min .....  GPM ..... Coolant Supply  Through Tool  External

## CURRENT DRILL INFORMATION

Drill Manufacturer ..... Part Number .....

Drill Type  Twist  Brazed  Indexable Insert  Gun Drill  
 Removable Tip  Other .....

Tool Grade  HSS  Carbide  Ceramic  Other .....

Tool Coating  Uncoated  TiN  TiCN  TiAlN  Other .....

Current Speed  RPM .....  M/min ..... Current Feed Rate  mm/rev .....  mm/min .....

Average Number of Holes Drilled New ..... After Regrind? .....

Reason(s) for Tool change  Wear  Fracture  Chipping  
 Losing Hole Tolerance  Losing Chip Control  Burr  
 Other .....  Chatter  New Application

What criteria defines a successful test\*  Decreased Cycle Time  Better Chip Control  Safer Process  
 Longer Tool Life  Reduced Cost per Hole  Other .....

Current Annual Usage €/: ..... Current Tools per Annum? .....

\*Required fields where applicable

## FOR OFFICE USE ONLY

Application Engineer:

Number:

Status:

[engineering.eu@alliedmachine.com](mailto:engineering.eu@alliedmachine.com)

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Complete information as to operating conditions, machine, setup, and the application of cutting fluid should accompany any product returned for inspection. This warranty shall not apply to any Allied Machine products which have been subjected to misuse, abuse, improper operating conditions, improper machine setup or improper application of cutting fluid or which have been repaired or altered if such repair or alteration, in the judgement of Allied Machine, would adversely affect the performance of the product.

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