



ALLIED MACHINE & ENGINEERING

Holemaking Solutions for Today's Manufacturing



Boring



Reaming



Burnishing



Threading



ASC 320[®]

► **DRILLING**

High Penetration Solid Carbide Drills



Specials



North America

Allied Machine
120 Deeds Drive
Dover, OH 44622
United States

Allied Machine
485 West 3rd Street
Dover, OH 44622
United States

ThreadMills USA™

4185 Crosstowne Ct #B
Evans, GA 30809
United States

Superion®

1285 S Patton St.
Xenia, OH 45385
United States

Europe

Allied Machine Europe

93 Vantage Point
Pensnett Estate
Kingswinford
West Midlands
DY6 7FR, United Kingdom

Wohlhaupter™ GmbH

Maybachstrasse 4
Postfach 1264
72636 Frickenhausen
Germany

Asia

Wohlhaupter™ India

B-23, 2nd Floor
B Block Community Centre
Janakpuri, New Delhi - 110058
India



Allied Machine & Engineering is a worldwide leader in holemaking and finishing solutions. We are committed to providing practical and dependable solutions to our customers through innovative designs and superior customer and technical support.

We continue to expand our product offering in order to provide new and different solutions. With Field Sales Engineers located around the world, we position ourselves to provide technical support on site, right at your spindle.



ALLIED MACHINE
& ENGINEERING

www.alliedmachine.com

The Foundation

Since 1941, Allied Machine & Engineering has provided dependable and practical holemaking solutions to the world. What was once a small job shop in Ohio is now a worldwide leader in cutting tool technology. With three manufacturing facilities in Ohio, one in Georgia, another in Germany, and headquarters in both the United States and Europe, Allied Machine is positioned to bring innovative solutions and technical expertise directly to the customers' hands.



The Beginning

Harold E. Stokey founded Allied Machine & Engineering to aid the war effort, manufacturing taper bearing lock nuts for the production of M1 tanks. Years later, after a sales meeting gone wrong, Stokey possessed a warehouse stocked with spade drill inserts. He set forth into the industry that would become Allied Machine's thriving identity: holemaking.



The T-A®

When Harold's son, William H. Stokey, became the president and CEO, he developed the Throw Away, or T-A, spade drill insert system. The T-A revolutionized the holemaking industry, launching Allied Machine ahead of the competition. Since then, numerous innovations and advancements have been created from the T-A's inspiration.



The Innovation

Since the development of the T-A, Allied Machine has expanded its product offering to support a vast range of customer applications, including large diameter and deep hole drilling, boring, reaming, burnishing, porting, and threading.

The People

Allied Machine understands that high quality products are only one facet of success. Our customer support is crucial to what we do, and that's why we make sure the best engineers and customer service associates are in place to assist our customers around the world.

The Future

With over 75 years of experience, Allied Machine has encountered the challenges of growth and success. By investing in cutting edge technology and the brightest and sharpest minds, our knowledge and capabilities continue to expand and grow every day.



Steve Stokey
Executive Vice President

William H. Stokey
President and CEO

Mike Stokey
Executive Vice President



Replaceable Insert Drills

- Reduce costs by decreasing setup time and utilizing a single holder for the lives of multiple inserts
- Provide flexibility to quickly switch between inserts with different geometries
- Products:
 - GEN3SYS® XT | GEN3SYS® XT Pro
 - T-A® | T-A® GEN2 | T-A Pro®
 - High Performance | Universal



Indexable Insert Drills

- Protect your investment and reduce your inventory with replaceable cartridges that allow the same holder to be used repeatedly
- Indexable inserts increase productivity and tool life while reducing costs
- Products:
 - 4TEX® Drill
 - Revolution Drill®
 - Opening Drill®



Replaceable / Indexable Insert Drills

- Drill large diameter holes and maximize penetration rates even on low horsepower machines
- Delivers strength and versatility needed for any deep hole drilling application
- Holders cover a range of sizes with the replaceable heads determining the cutting diameter
- Products:
 - APX™ Drill



Solid Carbide Drills

- Offer greater strength and stability when drilling tougher materials
- Available in diameters from 3mm - 20mm
- Can be made-to-order specifically for your application (Superion® quoted specials)
 - ASC 320®
 - Superion®



Structural Steel Solutions

- Deliver outstanding performance and durability in structural steel applications
- Designed to produce optimal results in difficult-to-machine materials
- Available in multiple lengths and diameters
- T-A® style drills have different insert geometry options to improve performance, depending on material
- Products:
 - T-A® | T-A® GEN2
 - GEN3SYS® XT Pro



BTA (STS) Machining Solutions

- The internal ejection system flushes chips and debris from the hole with no interference to the cutting process
- Utilizes the advantages of the T-A® drill insert
- Designed to significantly increase penetration rates over brazed heads and traditional gun drills
- Products:
 - BT-A Drill



Hydraulic Port Contour Cutters

- Save significant time and money by performing four processes in one step
- Replaceable insert design reduces costs, inventory, and setup times
- Available in four industry specifications:
 - Imperial: SAE J-1926
 - Metric: ISO 6149-1:2006
 - Military: SAE AS5202
 - John Deere: JDS-G173.1
- Products:
 - AccuPort 432®

4 IN 1

Enhanced Special Drilling Capabilities

- Allied Machine engineers are available to meet with you to evaluate your application and recommend the best solution for you
- Special drilling solutions can incorporate advanced features such as adjustable diameter locations, multiple steps, additional coolant designs, special lengths and diameters, and more
- Special drills can drastically reduce your cost per hole and increase your overall productivity by eliminating multiple processes and increasing tool life

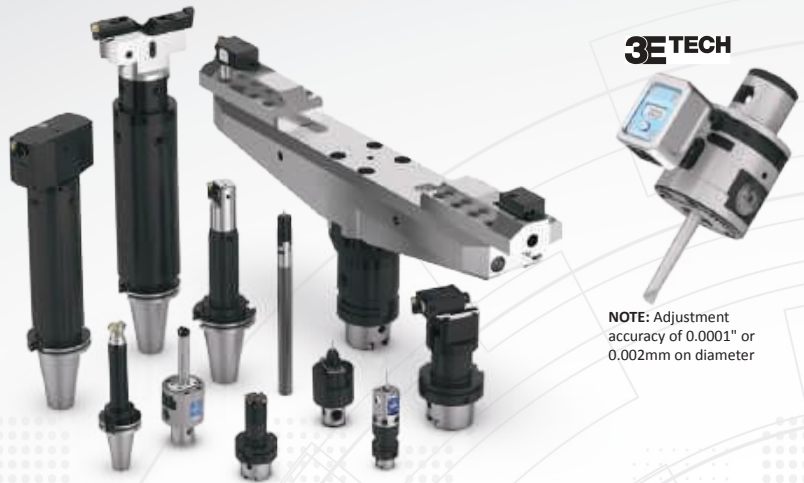


WOHLHAUPTER®

High Precision Boring Systems

- Designs available for high volume applications that increase rigidity to improve performance
- Versatile boring heads that are flexible with changing applications while maintaining excellent performance
- Provides high precision with absolute repeatability to ensure every part is held to tolerance
- Offers an industry leading modular shank connection that maintains rigidity and reduces inventory on your boring system
- Available with both digital and analog settings
- Products:

- Wohlhaupter™ Boring Tools



3E TECH

NOTE: Adjustment accuracy of 0.0001" or 0.002mm on diameter

CRITERION®

Modular Boring Systems

- The modular capabilities are ideal for use across multiple different projects
- Offers versatile boring heads suitable for job shops and tooling rooms
- Provides an economical solution for low volume and/or short-term production applications
- Offers finish boring solutions
- Products:

- Criterion® Boring Tools



S.C.A.M.I.®

Expandable Reaming Solutions

- Expandable cutting diameters accommodate for wear, which extends tool life
- Replaceable cutting heads and rings reduce waste and improve production time versus solid high speed steel and carbide reamers
- Holds tight tolerances to ensure processes are performed to accurate specifications
- Reduces tooling costs because many items are available for reconditioning
- Products:

- ALVAN® Reamers



S.C.A.M.I.®

Roller Burnishing Solutions

- Produce excellent surface finishes
- Provide accurate size control
- Increase surface hardness
- Solutions for both through hole and blind hole applications
- Products:

- S.C.A.M.I.® Roller Burnishing Tools





Solid Carbide Thread Mills

- Available with coolant through options
- Covers a wide range of thread forms
- Provides optimal solutions for both high production projects and short-run applications
- Products
 - AccuThread™ 856
 - AccuThread™ T3
 - ThreadMills USA™



Replaceable Insert Thread Mills

- Three insert lengths are available that cover a wide range of thread forms
- Holders can utilize inserts with different pitches and thread forms
- Repeatability is achieved by both the bolt-in style and the pin style locking systems
- Increases tool life by 25 - 50% with Allied Machine's AM210® coating
- Products
 - AccuThread™ 856: Bolt-in Style
 - AccuThread™ 856: Pin Style



SPECIAL CAPABILITIES

When it comes to designing and developing special solutions for customers, Allied Machine is the top choice. If your application requires special tooling, give us a call. Our engineered specials are developed by the brightest engineers in the industry. Most of our standard tooling can be altered as specials, or we can create entirely new concepts for particularly unique applications.

One special tooling solution is Insta-Quote®, the online system that allows you to design your own special tooling 24/7. Receive a quote and drawings within minutes just by following the steps.

And with the addition of Superion® technology and capabilities, we can customize made-to-order solid carbide tools to achieve optimal results for your applications.

Whatever your application, Allied Machine has the answer.

Insta-Quote® 



 **SUPERION®**





Increase the production and success of your applications today.

- Direct access to 2D drawings and 3D models
- Assemble and view tool images in your browser
- Download drawings for use in most machining software programs
- Browse products, search item numbers, and save assemblies for future use

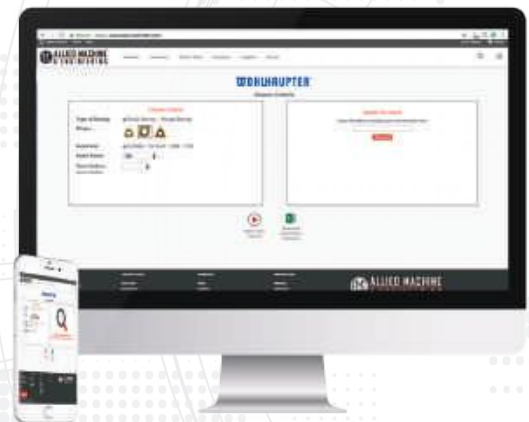
toolmd.com

WOHLHAUPTER®

Boring Insert Selector

Find the best insert for your application.

- Generate the correct boring insert for your job in just six easy steps
- Choose type, shape, substrate, insert form, nose radius, and material
- Order easily by adding the item to your cart



alliedmachine.com/bis

Product Selector

Use the product selector to find the right tool for your application.

- Follow guided steps to generate the right tool for your application
- Learn about your recommended tool and how to maximize its performance



alliedmachine.com/productselector

Insta-Code®

Eliminate the wait. Get your program now.

- Choose the best thread mill for your application
- Create program code for your machine
- Available as a PC download app (that can be used offline)
- Website app available 24/7



Insta-Code also has a
Cycle Time Calculator

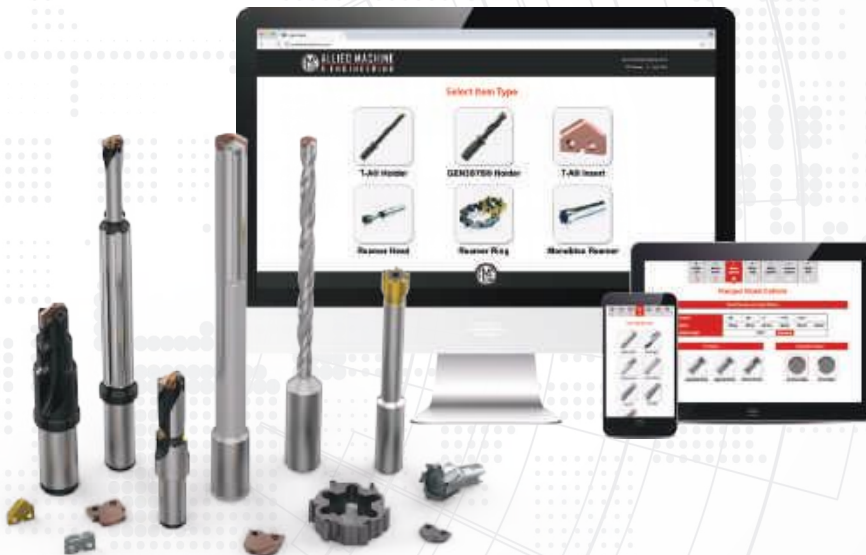
alliedmachine.com/InstaCode



Insta-Quote®

Design your custom tooling and receive a drawing and quote...all within minutes.

- Design and quote your own tooling
- Generate the solution you need in just a few steps
- Features the following products
 - T-A® Inserts
 - T-A® Holders
 - GEN3SYS® XT Holders
 - ALVAN® Reamers



iq.alliedmachine.com

Solution Hub App

All Allied all the time.

- Quickly look up product information
- Links to our free online tools
- Locate distributors
- Stay up to date on news and events



Machinist Tool App

Quickly convert cutting tool parameters for the machine inputs you need.

- Input data to calculate the RPM and speed and feed rates
- Also features the Boring Insert Selector
- Access product literature right at your fingertips



Customer Support

Support You Can Count On

Allied Machine has many lines of support to ensure we're available to assist you at all times. It's important to establish relationships with new customers, but we also know it's equally important to strengthen and support relationships with existing customers. Whether you need help with an order or you need someone to come assist you at the spindle, we have the right people to get you what you need.



1

Inside Sales Support

Our inside sales team is trained to handle your account information and general inquiries. We are happy to assist you and find the answers to your questions.

☎ 1.330.343.4283 ext. 8610

☎ 1.800.321.5537 (toll free United States and Canada)

✉ insidesales@alliedmachine.com



2

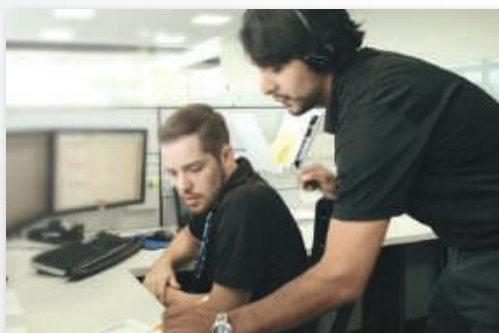
Engineering Support

Our highly trained and skilled Application Engineers are here to assist you. If you are experiencing technical difficulties, our engineers will recommend the best solutions to the problem. Speeds and feeds, coolant pressure, and other machining components all affect the performance of our tooling. Our AEs are experienced in working with difficult materials in many different environments. Give us a call and put our knowledge to the test.

☎ 1.330.343.4283 ext. 7611

☎ 1.800.321.5537 (toll free United States and Canada)

✉ appeng@alliedmachine.com



3

Field Support

Allied Machine provides local engineering support all over the world. Our Field Sales Engineers (FSEs) spend months training in-house before going to the field. This support line allows us to provide assistance to our customers right at the spindle. They are available to visit your facility, run demos and tests, and work hand-in-hand with machine operators and engineers to find the best possible tooling solutions.

NOTE: If you do not know your local FSE, please contact us

☎ 1.330.343.4283

☎ 1.800.321.5537 (toll free United States and Canada)

✉ info@alliedmachine.com





Allied Tool Academy

Online | On-site Technical Education Seminar (TES) | LIVE (Broadcasting)

Online Training

Get **all** the tooling training of our 3-day in-person Technical Education Seminar (TES) through the online **Allied Tool Academy** training platform. Level up your tooling IQ through a series of product overviews, demos, and short quizzes.

- Online TES Certification as well as other training modules
- On demand
- On YOUR schedule



Register online today:
www.alliedtoolacademy.com



Allied LIVE (Broadcasting)

Join us for **LIVE broadcast** training events where you will have the ability to learn about our tooling, watch live demos, and ask our trainers questions.

- Online
- Quick brief presentation provides basic knowledge of our products
- Watch live demos of tools at the spindle at different speeds and feeds

Register online today:
www.alliedmachine.com/live

On-site Technical Education Seminar (TES)

Allied Machine's **Technical Education Seminar (TES)** puts the attendees in front of the machines. When you attend our three day TES program, you'll gain first-hand experience in **real-life** application situations. Test and experiment with different speeds and feeds, observe the results, and discover the best solution.

- Training Lab: In-depth training at the spindle allows you to choose speeds and feeds
- Learning Lab: Quick, brief sessions provide basic knowledge of our products
- Facility Tours: Take guided tours of our two manufacturing facilities located in Dover, Ohio



 Register online today:
www.alliedmachine.com/TES



**Allied Machine
Training Facility**
485 West 3rd Street
Dover, OH 44622



Find what you need. Now.

Flipbooks give you the ability to search for specific item numbers, download PDFs, print pages, and share with others. Save time searching the catalog by hand by using the easy search function. View our flipbooks now at alliedmachine.com/support/literature.

The diagram illustrates the features and navigation of the Allied Machine Engineering flipbook interface. The main interface is shown on a tablet, displaying a technical drawing of a drill bit. A search bar is located in the top right corner, and a search results panel is shown on the right side of the tablet. The search results panel displays the search term "D2031200M-075F" and the results "1 page found." Below the search results, a table of data is shown, including item numbers and dimensions.

Key features and navigation options are highlighted with callouts:

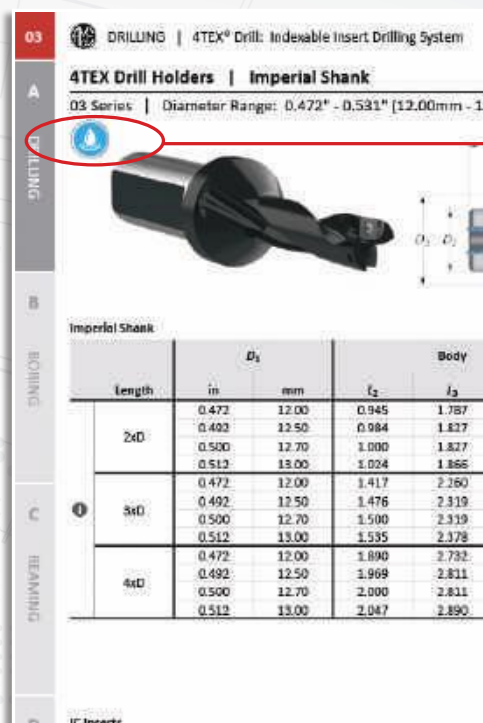
- Search:** A search bar in the top right corner of the flipbook interface.
- Search Results:** A panel showing the search term "D2031200M-075F" and the results "1 page found." Below the search results, a table of data is shown, including item numbers and dimensions.
- Table of Contents:** A sidebar on the left side of the flipbook interface, listing various sections such as Product Overview, Drill Series, Accessories, Technical Information, Recommended Cutting Data, Troubleshooting, Guarantee Test / Demo Application, and Remanufacture.
- Navigation:** A set of icons at the bottom of the flipbook interface, including a menu icon, a scroll icon, a print icon, a download icon, a mute icon, a zoom icon, and a full screen icon.
- View the table of contents:** A callout pointing to the Table of Contents sidebar.
- Scroll through the pages in thumbnail view:** A callout pointing to the scroll icon.
- Add notes:** A callout pointing to the menu icon.
- Mute the sound:** A callout pointing to the mute icon.
- Zoom in for a closer look:** A callout pointing to the zoom icon.
- View in full screen mode:** A callout pointing to the full screen icon.
- Share the Flipbook with others:** A callout pointing to the share icon.
- Print the full catalog or specific pages:** A callout pointing to the print icon.
- Download the catalog PDF:** A callout pointing to the download icon.

Additional details include:

- A "Share" dialog box showing a QR code and a link to the flipbook: <https://alliedmachine.cld.bz/ATEX-Drill>. It also includes a "Copy" button and social media sharing options (Facebook, Twitter, LinkedIn, Email).
- A "Print" dialog box showing a selection of pages to print: "Current Left Page (0.21 MB)". It includes a "Print" button and instructions: "Click print button, wait for the file to download and send it to printing."

Share the link to each Flipbook via email and social media.

Icon Reference Guide



Navigate with ease.

The following icons will appear throughout the catalog to help you navigate between products and find the best solution quickly.

Coating Options

AM200

AM200 Coating

AM300

AM300 Coating

AM210

AM210 Coating

AM420

AM420 Coating

TiCN

TiCN Coating

TiN

TiN Coating

TiAlN

TiAlN Coating

Tool Options

Straight Shank

Straight Shank

Morse Taper

Morse Taper Shank



Coolant Through

ASC 320®

High Penetration Solid Carbide Drilling System

► **Diameter Range:** 0.1181" - 0.7874" (3.00mm - 20.00mm)



Beyond the Cutting Edge

The ASC 320 range of solid carbide high penetration drills has been specifically engineered to deliver high productivity in difficult-to-machine materials, including stainless steels, Inconel, Hastelloy, and Titanium.

The unique combination of cutting edge geometry and high performance coatings provides excellent chip control, hole quality, and extended tool life, making ASC 320 ideal for use in a wide range of challenging applications and market sectors.

Extended tool life	3.5xD, 6xD, and 9xD	Excellent chip control
--------------------	---------------------	------------------------

Applicable Industries



Aerospace



Agriculture



Automotive



Firearms



General
Machining



Oil & Gas



Renewable
Energy

Your safety and the safety of others is very important. This catalog 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 catalog, 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 catalog. 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 for the most up-to-date information and procedures.

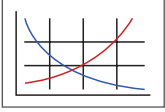
Reference Icons

The following icons will appear throughout the catalog 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

Introduction Information

Product Overview	2
Item Number Nomenclature	3

Drill Length

3.5xD	4 - 5
6xD	6 - 9
9xD	10 - 11

Recommended Cutting Data

Imperial (inch)	12
Metric (mm)	13
Coolant Recommendations	14

Product Overview

The Advantages

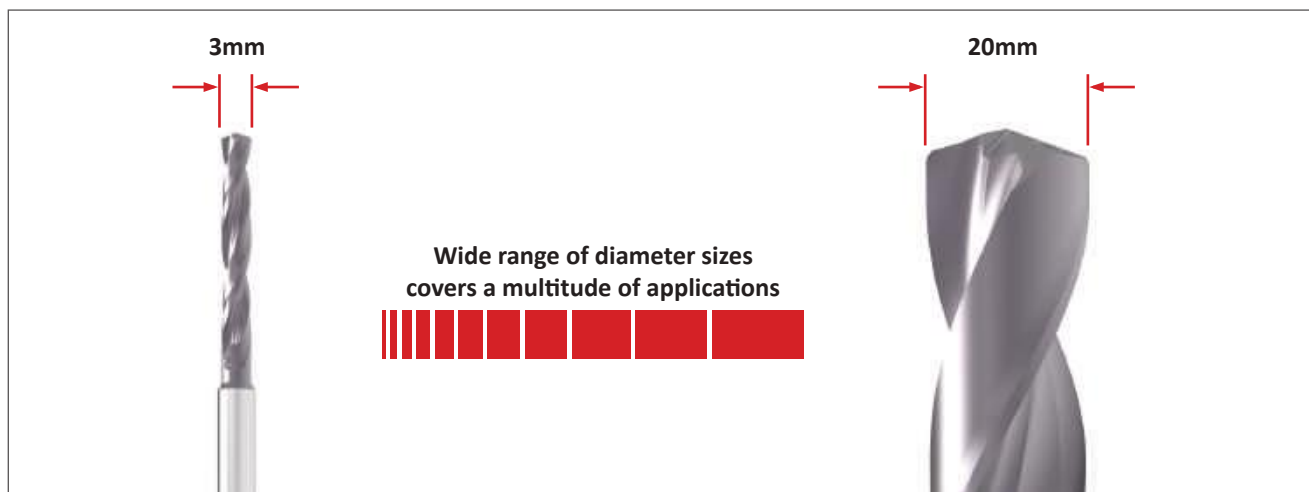
- 
Ideal for a wide variety of applications
 with the unique geometry and coating combination
- 
Increased stability
 with the reinforced shank
- 
Increased tool life
- 
Excellent chip control
- 
Through coolant design
- 
Available in 3.5xD, 6xD, and 9xD lengths



3.5xD

6xD

9xD



P	S	M	H	K	N
Steel N/mm ² <1365	High Temp Materials N/mm ² <1365	Stainless Steel N/mm ² <940	Hardened Materials N/mm ² <1365	Cast and Ductile Iron N/mm ² <1020	Non-Ferrous Materials N/mm ² <855
◆	◆	◆	◆◆	◆◆	◆◆

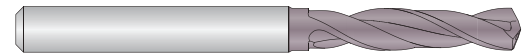
- ◆ First choice
- ◆◆ Second choice



Product Nomenclature

ASC 320 Solid Carbide Drills

3	60	M	07500	A21	M
1	2	3	4	5	6



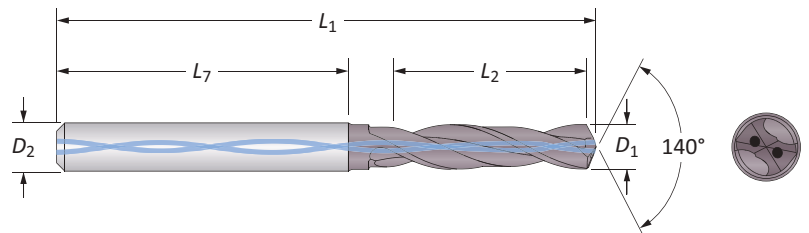
1. ASC 320®	2. Length	3. Style	4. Diameter	5. Substrate Geometry	6. Multi-Layer Coating
3 = Solid carbide	35 = 3.5xD 60 = 6xD 90 = 9xD	E = English (Imperial) M = Metric	07500 = 0.7500"	A21 = Standard	M = TiAlN

Regrind and Recoating

The ASC 320 drills are ground and recoated by Allied Machine to maintain the high level of performance achieved with these tools. Using our services assures the best tool performance is maintained in your production process.

Reference Key

Symbol	Attribute
D_1	Drill diameter
D_2	Shank diameter
L_1	Overall length
L_2	Drill depth
L_7	Shank length



A

DRILLING

B

BORING

C

REAMING

D

BURNISHING

E

THREADING

X

SPECIALS

A

DRILLING

B

BORING

C

REAMING

D

BURNISHING

E

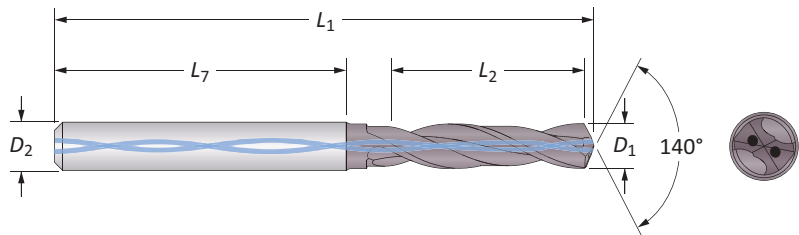
THREADING

X

SPECIALS

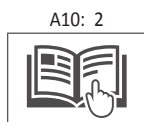
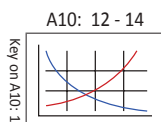
Solid Carbide Drills

3.5xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)



D ₁			Tap Size*	Body				Shank		Part No.
Fractional Equivalent	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
1/8	0.1250	3.17	–	0.551	14	2.47	62.7	36	4	335E01250A21M
–	0.1575	4.00	–	0.551	14	2.47	62.7	36	4	335M04000A21M
–	0.1654	4.20	M5x0.8	0.827	21	2.64	67.1	36	6	335M04200A21M
11/64	0.1719	4.37	–	0.827	21	2.64	67.1	36	6	335E01719A21M
#16	0.1772	4.50	#12-24	0.827	21	2.64	67.1	36	6	335M04500A21M
–	0.1811	4.60	#12-28	0.827	21	2.64	67.1	36	6	335M04600A21M
3/16	0.1875	4.76	–	0.827	21	2.64	67.1	36	6	335E01875A21M
–	0.1969	5.00	M6x1	0.827	21	2.64	67.1	36	6	335M05000A21M
13/64	0.2031	5.16	–	0.827	21	2.64	67.1	36	6	335E02031A21M
7/32	0.2188	5.56	–	0.827	21	2.64	67.1	36	6	335E02188A21M
#1	0.2280	5.79	–	0.827	21	2.64	67.1	36	6	335E02280A21M
15/64	0.2344	5.95	–	0.827	21	2.64	67.1	36	6	335E02344A21M
–	0.2362	6.00	M7x1	0.827	21	2.64	67.1	36	6	335M06000A21M
1/4	0.2500	6.35	–	1.102	28	3.13	79.4	36	8	335E02500A21M
–	0.2559	6.50	–	1.102	28	3.13	79.4	36	8	335M06500A21M
17/64	0.2656	6.75	M8x1.25	1.102	28	3.13	79.4	36	8	335E02656A21M
–	0.2756	7.00	M8x1	1.102	28	3.13	79.4	36	8	335M07000A21M
9/32	0.2812	7.14	–	1.102	28	3.13	79.4	36	8	335E02812A21M
–	0.2874	7.30	–	1.102	28	3.13	79.4	36	8	335M07300A21M
–	0.2953	7.50	–	1.102	28	3.13	79.4	36	8	335M07500A21M
19/64	0.2969	7.54	–	1.102	28	3.13	79.4	36	8	335E02969A21M
–	0.3071	7.80	–	1.102	28	3.13	79.4	36	8	335M07800A21M
5/16	0.3125	7.94	3/8-16	1.102	28	3.13	79.4	36	8	335E03125A21M
–	0.3150	8.00	–	1.102	28	3.13	79.4	36	8	335M08000A21M
21/64	0.3281	8.33	–	1.378	35	3.57	90.7	40	10	335E03281A21M
Q	0.3320	8.43	3/8-24	1.378	35	3.57	90.7	40	10	335E03320A21M
–	0.3346	8.50	M10.1.5	1.378	35	3.57	90.7	40	10	335M08500A21M
11/32	0.3438	8.73	–	1.378	35	3.57	90.7	40	10	335E03438A21M
–	0.3465	8.80	–	1.378	35	3.57	90.7	40	10	335M08800A21M
–	0.3543	9.00	–	1.378	35	3.57	90.7	40	10	335M09000A21M
23/64	0.3594	9.13	–	1.378	35	3.57	90.7	40	10	335E03594A21M
U	0.3680	9.35	7/16-14	1.378	35	3.57	90.7	40	10	335E03680A21M
–	0.3740	9.50	–	1.378	35	3.57	90.7	40	10	335M09500A21M
3/8	0.3750	9.53	–	1.378	35	3.57	90.7	40	10	335E03750A21M
–	0.3858	9.80	–	1.378	35	3.57	90.7	40	10	335E03858A21M
25/64	0.3906	9.92	7/16-20	1.378	35	3.57	90.7	40	10	335E03906A21M
–	0.3937	10.00	–	1.378	35	3.57	90.7	40	10	335M10000A21M

*Tap drill diameters allow approximately 75% of full thread to be produced

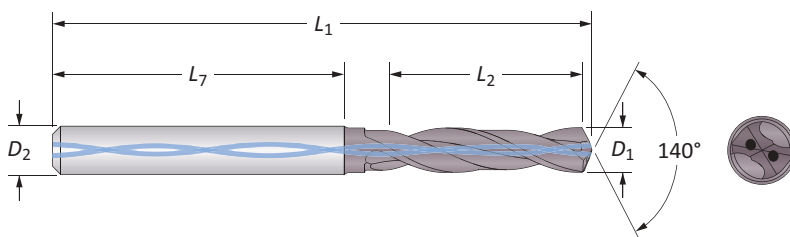


Sizes not shown are available as non-stocked standards.
When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M

Solid Carbide Drills

3.5xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)



Fractional Equivalent	D ₁		Tap Size*	Body				Shank		Part No.
	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
–	0.4016	10.20	M12x1.75	1.654	42	4.18	106.1	45	12	335M10200A21M
13/32	0.4062	10.32	–	1.378	42	4.18	106.1	45	12	335E04062A21M
–	0.4134	10.50	–	1.378	42	4.18	106.1	45	12	335M10500A21M
27/64	0.4219	10.72	1/2-13	1.654	42	4.18	106.1	45	12	335E04219A21M
–	0.4331	11.00	–	1.654	42	4.18	106.1	45	12	335M11000A21M
7/16	0.4375	11.11	–	1.654	42	4.18	106.1	45	12	335E04375A21M
–	0.4528	11.50	–	1.654	42	4.18	106.1	45	12	335M11500A21M
29/64	0.4531	11.51	1/2-20	1.654	42	4.18	106.1	45	12	335E04531A21M
15/32	0.4688	11.91	–	1.654	42	4.18	106.1	45	12	335E04688A21M
–	0.4724	12.00	M14x2	1.654	42	4.18	106.1	45	12	335M12000A21M
31/64	0.4844	12.30	9/16-12	1.929	49	4.55	115.6	45	14	335E04844A21M
–	0.4921	12.50	M14x1.5	1.929	49	4.55	115.6	45	14	335M12500A21M
1/2	0.5000	12.70	–	1.929	49	4.55	115.6	45	14	335E05000A21M
–	0.5118	13.00	–	1.929	49	4.55	115.6	45	14	335M13000A21M
33/64	0.5156	13.10	9/16-18	1.929	49	4.55	115.6	45	14	335E05156A21M
17/32	0.5312	13.49	5/8-11	1.929	49	4.55	115.6	45	14	335E05312A21M
–	0.5315	13.50	–	1.929	49	4.55	115.6	45	14	335M13500A21M
–	0.5394	13.70	–	1.929	49	4.55	115.6	45	14	335M13700A21M
35/64	0.5469	13.89	5/8-12	1.929	49	4.55	115.6	45	14	335E05469A21M
–	0.5512	14.00	M16x2	1.929	49	4.55	115.6	45	14	335M14000A21M
9/16	0.5625	14.29	–	2.205	56	5.07	128.8	48	16	335E05625A21M
–	0.5709	14.50	M16x1.5	2.205	56	5.07	128.8	48	16	335M14500A21M
37/64	0.5781	14.68	5/8-18	2.205	56	5.07	128.8	48	16	335E05781A21M
–	0.5906	15.00	–	2.205	56	5.07	128.8	48	16	335M15000A21M
19/32	0.5938	15.08	–	2.205	56	5.07	128.8	48	16	335E05938A21M
39/64	0.6094	15.48	11/16-12	2.205	56	5.07	128.8	48	16	335E06094A21M
–	0.6102	15.50	M18x2.5	2.205	56	5.07	128.8	48	16	335M15500A21M
5/8	0.6250	15.88	–	2.205	56	5.07	128.8	48	16	335E06250A21M
–	0.6299	16.00	–	2.205	56	5.07	128.8	48	16	335M16000A21M
–	0.6496	16.50	M18x1.5	2.480	63	5.44	138.2	48	18	335M16500A21M
21/32	0.6563	16.67	3/4-10	2.480	63	5.44	138.2	48	18	335E06563A21M
–	0.6693	17.00	–	2.480	63	5.44	138.2	48	18	335M17000A21M
43/64	0.6719	17.07	3/4-12	2.480	63	5.44	138.2	48	18	335E06719A21M
11/16	0.6875	17.46	3/4-16	2.480	63	5.44	138.2	48	18	335E06875A21M
–	0.6890	17.50	M20x2.5	2.480	63	5.44	138.2	48	18	335M17500A21M
45/64	0.7031	17.86	–	2.480	63	5.44	138.2	48	18	335E07031A21M
–	0.7087	18.00	–	2.480	63	5.44	138.2	48	18	335M18000A21M
–	0.7283	18.50	M20x1.5	2.756	70	5.89	149.5	50	20	335M18500A21M
47/64	0.7344	18.65	–	2.756	70	5.89	149.5	50	20	335E07344A21M
–	0.7480	19.00	–	2.756	70	5.89	149.5	50	20	335M19000A21M
–	0.7580	19.25	–	2.756	70	5.89	149.5	50	20	335E07580A21M
–	0.7677	19.50	M22x2.5	2.756	70	5.89	149.5	50	20	335M19500A21M
25/32	0.7813	19.84	–	2.756	70	5.89	149.5	50	20	335E07813A21M
–	0.7874	20.00	–	2.756	70	5.89	149.5	50	20	335M20000A21M

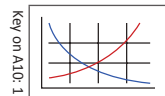
*Tap drill diameters allow approximately 75% of full thread to be produced

Sizes not shown are available as non-stocked standards.
When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M

A10: 12 - 14

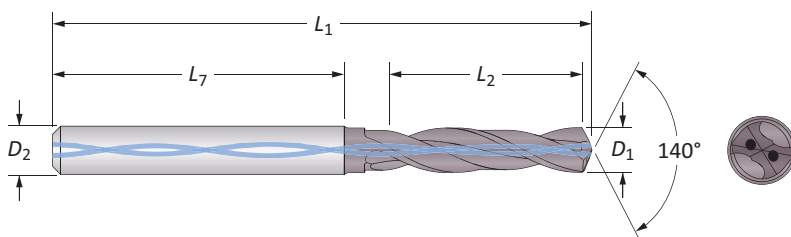
A10: 2





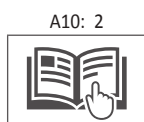
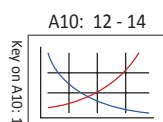
Solid Carbide Drills

6xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)



Fractional Equivalent	D ₁		Tap Size*	Body				Shank		Part No.
	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
–	0.1181	3.00	–	0.9450	24	2.86	72.7	36	4	360M03000A21M
1/8	0.1250	3.18	–	0.9450	24	2.86	72.7	36	4	360E01250A21M
–	0.1260	3.20	–	0.9450	24	2.86	72.7	36	4	360M03200A21M
–	0.1299	3.30	M4x0.7	0.9450	24	2.86	72.7	36	4	360M03300A21M
–	0.1378	3.50	–	0.9450	24	2.86	72.7	36	4	360M03500A21M
9/64	0.1406	3.57	–	0.9450	24	2.86	72.7	36	4	360E01406A21M
#25	0.1496	3.80	#10-24	0.9450	24	2.86	72.7	36	4	360M03800A21M
5/32	0.1563	3.97	–	0.9450	24	2.86	72.7	36	4	360E01563A21M
–	0.1575	4.00	–	0.9450	24	2.86	72.7	36	4	360M04000A21M
–	0.1654	4.20	M5x0.8	1.1417	36	3.27	83.1	36	6	360M04200A21M
11/64	0.1719	4.37	–	1.1417	36	3.27	83.1	36	6	360E01719A21M
#16	0.1772	4.50	#12-24	1.1417	36	3.27	83.1	36	6	360M04500A21M
–	0.1811	4.60	#12-28	1.1417	36	3.27	83.1	36	6	360M04600A21M
–	0.1831	4.65	–	1.1417	36	3.27	83.1	36	6	360M04650A21M
3/16	0.1875	4.76	–	1.1417	36	3.27	83.1	36	6	360E01875A21M
–	0.1950	4.95	–	1.1417	36	3.27	83.1	36	6	360M04950A21M
–	0.1969	5.00	M6x1	1.1417	36	3.27	83.1	36	6	360M05000A21M
#8	0.1990	5.05	–	1.1417	36	3.27	83.1	36	6	360E01990A21M
#7	0.2010	5.11	1/4-20	1.1417	36	3.27	83.1	36	6	360E02010A21M
13/64	0.2031	5.16	–	1.1417	36	3.27	83.1	36	6	360E02031A21M
–	0.2098	5.33	–	1.1417	36	3.27	83.1	36	6	360M05330A21M
#3	0.2130	5.41	1/4-28	1.1417	36	3.27	83.1	36	6	360E02130A21M
–	0.2165	5.50	–	1.1417	36	3.27	83.1	36	6	360M05500A21M
7/32	0.2188	5.56	–	1.1417	36	3.27	83.1	36	6	360E02188A21M
#1	0.2280	5.79	–	1.1417	36	3.27	83.1	36	6	360E02280A21M
–	0.2299	5.84	–	1.1417	36	3.27	83.1	36	6	360M05840A21M
15/64	0.2344	5.95	–	1.1417	36	3.27	83.1	36	6	360E02344A21M
–	0.2362	6.00	M7x1	1.1417	36	3.27	83.1	36	6	360M06000A21M

*Tap drill diameters allow approximately 75% of full thread to be produced



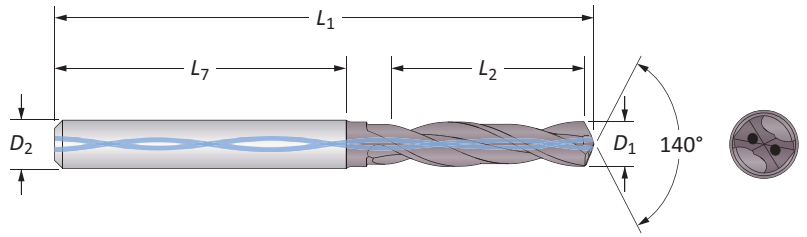
Sizes not shown are available as non-stocked standards.

When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M

Solid Carbide Drills

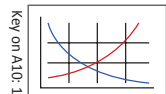
6xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)



Fractional Equivalent	D ₁		Tap Size*	Body				Shank		Part No.
	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
–	0.2398	6.09	–	1.8900	48	4.31	109.4	36	8	360M06090A21M
D	0.2460	6.25	–	1.8900	48	4.31	109.4	36	8	360E02460A21M
1/4	0.2500	6.35	–	1.8900	48	4.31	109.4	36	8	360E02500A21M
–	0.2559	6.50	–	1.8900	48	4.31	109.4	36	8	360M06500A21M
F	0.2570	6.53	5/16-18	1.8900	48	4.31	109.4	36	8	360E02570A21M
17/64	0.2656	6.75	M8x1.25	1.8900	48	4.31	109.4	36	8	360E02656A21M
–	0.2677	6.80	–	1.8900	48	4.31	109.4	36	8	360M06800A21M
I	0.2720	6.91	5/16-24	1.8900	48	4.31	109.4	36	8	360E02720A21M
–	0.2756	7.00	M8x1	1.8900	48	4.31	109.4	36	8	360M07000A21M
–	0.2795	7.10	–	1.8900	48	4.31	109.4	36	8	360M07100A21M
9/32	0.2812	7.14	–	1.8900	48	4.31	109.4	36	8	360E02812A21M
–	0.2874	7.30	–	1.8900	48	4.31	109.4	36	8	360M07300A21M
–	0.2913	7.40	–	1.8900	48	4.31	109.4	36	8	360M07400A21M
–	0.2953	7.50	–	1.890	48	4.31	109.4	36	8	360M07500A21M
19/64	0.2969	7.54	–	1.890	48	4.31	109.4	36	8	360E02969A21M
5/16	0.3125	7.94	3/8-16	1.890	48	4.31	109.4	36	8	360E03125A21M
–	0.3150	8.00	–	1.890	48	4.31	109.4	36	8	360M08000A21M
21/64	0.3281	8.33	–	2.362	60	4.56	115.4	40	10	360E03281A21M
Q	0.3320	8.43	3/8-24	2.362	60	4.56	115.4	40	10	360M08430A21M
–	0.3346	8.50	M10x1.5	2.362	60	4.56	115.4	40	10	360M08500A21M
–	0.3386	8.60	–	2.362	60	4.56	115.4	40	10	360M08600A21M
11/32	0.3438	8.73	–	2.362	60	4.56	115.4	40	10	360E03438A21M
–	0.3465	8.80	–	2.362	60	4.56	115.4	40	10	360M08800A21M
–	0.3543	9.00	–	2.362	60	4.56	115.4	40	10	360M09000A21M
23/64	0.3594	9.13	–	2.362	60	4.56	115.4	40	10	360E03594A21M
–	0.3622	9.20	–	2.362	60	4.56	115.4	40	10	360M09200A21M
U	0.3680	9.35	7/16-14	2.362	60	4.56	115.4	40	10	360E03680A21M
–	0.3730	9.47	–	2.362	60	4.56	115.4	40	10	360M09470A21M
–	0.3740	9.50	–	2.362	60	4.56	115.4	40	10	360M09500A21M
3/8	0.3750	9.53	–	2.362	60	4.56	115.4	40	10	360E03750A21M
–	0.3780	9.60	–	2.362	60	4.56	115.4	40	10	360M09600A21M
–	0.3820	9.70	–	2.362	60	4.56	115.4	40	10	360M09700A21M
25/64	0.3906	9.92	7/16-20	2.362	60	4.56	115.4	40	10	360E03906A21M
–	0.3937	10.00	–	2.362	60	4.56	115.4	40	10	360M10000A21M

*Tap drill diameters allow approximately 75% of full thread to be produced

A10: 12 - 14



A10: 2



Sizes not shown are available as non-stocked standards.

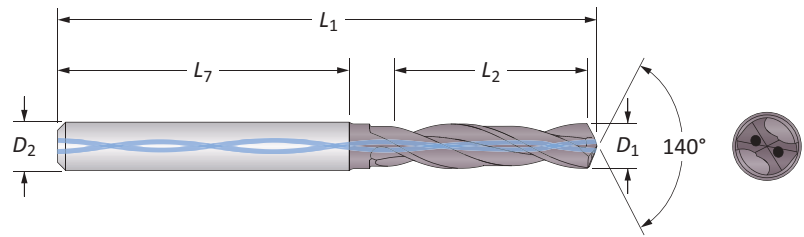
When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M



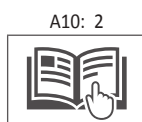
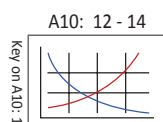
Solid Carbide Drills

6xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)



Fractional Equivalent	D ₁		Tap Size*	Body				Shank		Part No.
	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
–	0.4016	10.20	M12x1.75	2.835	72	5.36	136.2	45	12	360M10200A21M
Y	0.4040	10.31	–	2.835	72	5.36	136.2	45	12	360E04040A21M
13/32	0.4062	10.32	–	2.835	72	5.36	136.2	45	12	360E04062A21M
–	0.4134	10.50	–	2.835	72	5.36	136.2	45	12	360M10500A21M
27/64	0.4219	10.72	1/2-13	2.835	72	5.36	136.2	45	12	360E04219A21M
–	0.4252	10.80	M12x4.25	2.835	72	5.36	136.2	45	12	360M10800A21M
–	0.4290	10.90	–	2.835	72	5.36	136.2	45	12	360M10900A21M
–	0.4331	11.00	–	2.835	72	5.36	136.2	45	12	360M11000A21M
7/16	0.4375	11.11	–	2.835	72	5.36	136.2	45	12	360E04375A21M
–	0.4409	11.20	–	2.835	72	5.36	136.2	45	12	360M11200A21M
–	0.4528	11.50	–	2.835	72	5.36	136.2	45	12	360M11500A21M
29/64	0.4531	11.51	1/2-20	2.835	72	5.36	136.2	45	12	360E04531A21M
–	0.4646	11.80	–	2.835	72	5.36	136.2	45	12	360M11800A21M
15/32	0.4688	11.91	–	2.835	72	5.36	136.2	45	12	360E04688A21M
–	0.4724	12.00	M14x2	2.835	72	5.36	136.2	45	12	360M12000A21M
31/64	0.4844	12.30	9/16-12	3.307	84	5.93	150.5	45	14	360E04844A21M
–	0.4921	12.50	M14x1.5	3.307	84	5.93	150.5	45	14	360M12500A21M
1/2	0.5000	12.70	–	3.307	84	5.93	150.5	45	14	360E05000A21M
–	0.5100	12.95	–	3.307	84	5.93	150.5	45	14	360M12950A21M
–	0.5118	13.00	–	3.307	84	5.93	150.5	45	14	360M13000A21M
33/64	0.5156	13.10	9/16-18	3.307	84	5.93	150.5	45	14	360E05156A21M
–	0.5197	13.20	–	3.307	84	5.93	150.5	45	14	360M13200A21M
17/32	0.5312	13.49	5/8-11	3.307	84	5.93	150.5	45	14	360E05312A21M
–	0.5315	13.50	–	3.307	84	5.93	150.5	45	14	360M13500A21M
–	0.5433	13.80	–	3.307	84	5.93	150.5	45	14	360M13800A21M
35/64	0.5469	13.89	5/8-12	3.307	84	5.93	150.5	45	14	360E05469A21M
–	0.5512	14.00	M16x2	3.307	84	5.93	150.5	45	14	360M14000A21M
9/16	0.5625	14.29	–	3.780	96	6.65	168.9	48	16	360E05625A21M
–	0.5709	14.50	M16x1.5	3.780	96	6.65	168.9	48	16	360M14500A21M
37/64	0.5781	14.68	5/8-18	3.780	96	6.65	168.9	48	16	360E05781A21M
–	0.5906	15.00	–	3.780	96	6.65	168.9	48	16	360M15000A21M
19/32	0.5938	15.08	–	3.780	96	6.65	168.9	48	16	360E05938A21M
39/64	0.6094	15.48	11/16-12	3.780	96	6.65	168.9	48	16	360E06094A21M
–	0.6102	15.50	M18x2.5	3.780	96	6.65	168.9	48	16	360M15500A21M
5/8	0.6250	15.88	–	3.780	96	6.65	168.9	48	16	360E06250A21M
–	0.6299	16.00	–	3.780	96	6.65	168.9	48	16	360M16000A21M

*Tap drill diameters allow approximately 75% of full thread to be produced



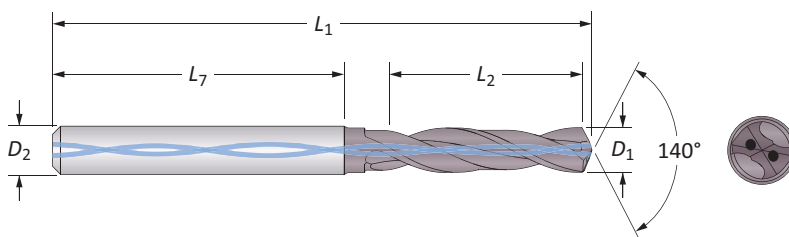
Sizes not shown are available as non-stocked standards.

When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M

Solid Carbide Drills

6xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)

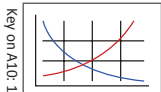


Fractional Equivalent	D ₁		Tap Size*	Body				Shank		Part No.
	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
–	0.6307	16.02	–	4.252	108	7.22	183.3	48	18	360M16020A21M
–	0.6331	16.08	–	4.252	108	7.22	183.3	48	18	360M16080A21M
–	0.6378	16.20	–	4.252	108	7.22	183.3	48	18	360M16200A21M
41/64	0.6406	16.27	–	4.252	108	7.22	183.3	48	18	360E06406A21M
–	0.6496	16.50	M18x1.5	4.252	108	7.22	183.3	48	18	360M16500A21M
21/32	0.6563	16.67	3/4-10	4.252	108	7.22	183.3	48	18	360E06563A21M
–	0.6693	17.00	–	4.252	108	7.22	183.3	48	18	360M17000A21M
43/64	0.6719	17.07	3/4-12	4.252	108	7.22	183.3	48	18	360E06719A21M
11/16	0.6875	17.46	3/4-16	4.252	108	7.22	183.3	48	18	360E06875A21M
–	0.6890	17.50	M20x2.5	4.252	108	7.22	183.3	48	18	360M17500A21M
45/64	0.7031	17.86	–	4.252	108	7.22	183.3	48	18	360E07031A21M
–	0.7087	18.00	–	4.252	108	7.22	183.3	48	18	360M18000A21M
–	0.7098	18.03	–	4.724	120	7.86	199.6	50	20	360M18030A21M
23/32	0.7188	18.26	–	4.724	120	7.86	199.6	50	20	360E07188A21M
–	0.7283	18.50	M20x1.5	4.724	120	7.86	199.6	50	20	360M18500A21M
47/64	0.7344	18.65	–	4.724	120	7.86	199.6	50	20	360E07344A21M
–	0.7480	19.00	–	4.724	120	7.86	199.6	50	20	360M19000A21M
3/4	0.7500	19.05	–	4.724	120	7.86	199.6	50	20	360E07500A21M
–	0.7520	19.10	–	4.724	120	7.86	199.6	50	20	360M19100A21M
–	0.7535	19.14	–	4.724	120	7.86	199.6	50	20	360M19140A21M
–	0.7543	19.16	–	4.724	120	7.86	199.6	50	20	360M19160A21M
–	0.7559	19.20	–	4.724	120	7.86	199.6	50	20	360M19200A21M
–	0.7580	19.25	–	4.724	120	7.86	199.6	50	20	360E07580A21M
–	0.7598	19.30	–	4.724	120	7.86	199.6	50	20	360M19300A21M
49/64	0.7656	19.45	7/8-9	4.724	120	7.86	199.6	50	20	360E07656A21M
–	0.7677	19.50	M22x2.5	4.724	120	7.86	199.6	50	20	360M19500A21M
25/32	0.7813	19.84	–	4.724	120	7.86	199.6	50	20	360E07813A21M
–	0.7874	20.00	–	4.724	120	7.86	199.6	50	20	360M20000A21M

*Tap drill diameters allow approximately 75% of full thread to be produced

A10: 12 - 14

A10: 2



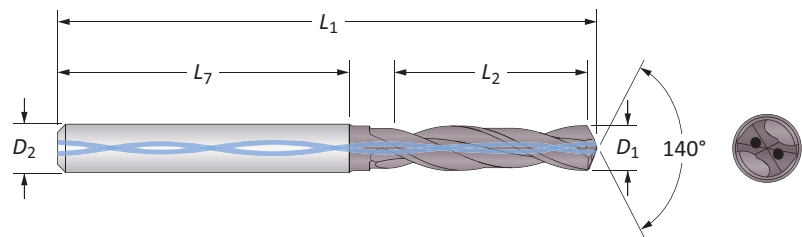
Sizes not shown are available as non-stocked standards.
When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M



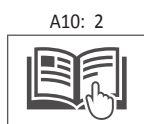
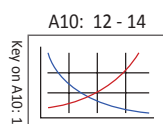
Solid Carbide Drills

9xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)



Fractional Equivalent	D ₁		Tap Size*	Body				Shank		Part No.
	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
–	0.1969	5.00	M6x1	2.126	54	3.98	101.1	36	6	390M05000A21M
–	0.2362	6.00	M7x1	2.126	54	3.98	101.1	36	6	390M06000A21M
D	0.2461	6.25	–	2.835	72	4.86	123.4	36	8	390E02461A21M
1/4	0.2500	6.35	–	2.835	72	4.86	123.4	36	8	390E02500A21M
–	0.2559	6.50	–	2.835	72	4.86	123.4	36	8	390M06500A21M
17/64	0.2656	6.75	M8x1.25	2.835	72	4.86	123.4	36	8	390E02656A21M
I	0.2720	6.91	5/16-24	2.835	72	4.86	123.4	36	8	390E02720A21M
–	0.2756	7.00	M8x1	2.835	72	4.86	123.4	36	8	390M07000A21M
–	0.2953	7.50	–	2.835	72	4.86	123.4	36	8	390M07500A21M
19/64	0.2969	7.54	–	2.835	72	4.86	123.4	36	8	390E02969A21M
5/16	0.3125	7.94	3/8-16	2.835	72	4.86	123.4	36	8	390E03125A21M
–	0.3150	8.00	–	2.835	72	4.86	123.4	36	8	390M08000A21M
21/64	0.3281	8.33	–	3.543	90	5.74	145.8	40	10	390E03281A21M
Q	0.3319	8.43	3/8-24	3.543	90	5.74	145.8	40	10	390M08430A21M
–	0.3346	8.50	M10x1.5	3.543	90	5.74	145.8	40	10	390M08500A21M
–	0.3386	8.60	–	3.543	90	5.74	145.8	40	10	390M08600A21M
11/32	0.3438	8.73	–	3.543	90	5.74	145.8	40	10	390E03438A21M
–	0.3465	8.80	–	3.543	90	5.74	145.8	40	10	390M08800A21M
–	0.3543	9.00	–	3.543	90	5.74	145.8	40	10	390M09000A21M
23/64	0.3594	9.13	–	3.543	90	5.74	145.8	40	10	390E03594A21M
U	0.3680	9.35	7/16-14	3.543	90	5.74	145.8	40	10	390E03680A21M
–	0.3740	9.50	–	3.543	90	5.74	145.8	40	10	390M09500A21M
3/8	0.3750	9.53	–	3.543	90	5.74	145.8	40	10	390E03750A21M
–	0.3780	9.60	–	3.543	90	5.74	145.8	40	10	390M09600A21M
25/64	0.3906	9.92	7/16-20	3.543	90	5.74	145.8	40	10	390E03906A21M
–	0.3937	10.00	–	3.543	90	5.74	145.8	40	10	390M10000A21M
–	0.4016	10.20	M12x1.75	4.252	108	6.78	172.2	45	12	390M10200A21M
–	0.4040	10.26	–	4.252	108	6.78	172.2	45	12	390E04040A21M
13/32	0.4062	10.32	–	4.252	108	6.78	172.2	45	12	390E04062A21M
–	0.4134	10.50	–	4.252	108	6.78	172.2	45	12	390M10500A21M
27/64	0.4219	10.72	1/2-13	4.252	108	6.78	172.2	45	12	390E04219A21M
–	0.4331	11.00	–	4.252	108	6.78	172.2	45	12	390M11000A21M
7/16	0.4375	11.11	–	4.252	108	6.78	172.2	45	12	390E04375A21M
–	0.4528	11.50	–	4.252	108	6.78	172.2	45	12	390M11500A21M
29/64	0.4531	11.51	1/2-20	4.252	108	6.78	172.2	45	12	390E04531A21M
15/32	0.4688	11.91	–	4.252	108	6.78	172.2	45	12	390E04688A21M
–	0.4724	12.00	M14x2	4.252	108	6.78	172.2	45	12	390M12000A21M

*Tap drill diameters allow approximately 75% of full thread to be produced



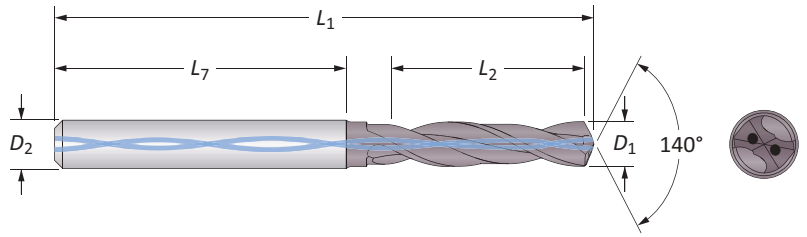
Sizes not shown are available as non-stocked standards.

When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M

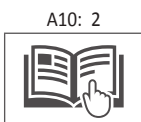
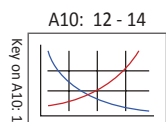
Solid Carbide Drills

9xD | Diameter Range: 0.1181" - 0.7874" (3.00mm - 20.00mm)



Fractional Equivalent	D ₁		Tap Size*	Body				Shank		Part No.
	inch	mm		L ₂ inch	L ₂ mm	L ₁ inch	L ₁ mm	L ₇ mm	D ₂ mm	
31/64	0.4844	12.30	9/16-12	4.961	126	7.58	192.5	45	14	390E04844A21M
–	0.4921	12.50	M14x1.5	4.961	126	7.58	192.5	45	14	390M12500A21M
1/2	0.5000	12.70	–	4.961	126	7.58	192.5	45	14	390E05000A21M
–	0.5118	13.00	–	4.961	126	7.58	192.5	45	14	390M13000A21M
33/64	0.5156	13.10	9/16-18	4.961	126	7.58	192.5	45	14	390E05156A21M
17/32	0.5312	13.49	5/8-11	4.961	126	7.58	192.5	45	14	390E05312A21M
–	0.5315	13.50	–	4.961	126	7.58	192.5	45	14	390M13500A21M
35/64	0.5469	13.89	5/8-12	4.961	126	7.58	192.5	45	14	390E05469A21M
–	0.5512	14.00	M16x2	4.961	126	7.58	192.5	45	14	390M14000A21M
9/16	0.5625	14.29	–	5.669	144	8.54	216.9	48	16	390E05625A21M
–	0.5709	14.50	M16x1.5	5.669	144	8.54	216.9	48	16	390M14500A21M
37/64	0.5781	14.68	5/8-18	5.669	144	8.54	216.9	48	16	390E05781A21M
–	0.5906	15.00	–	5.669	144	8.54	216.9	48	16	390M15000A21M
19/32	0.5938	15.08	–	5.669	144	8.54	216.9	48	16	390E05938A21M
39/64	0.6094	15.48	11/16-12	5.669	144	8.54	216.9	48	16	390E06094A21M
–	0.6102	15.50	M18x2.5	5.669	144	8.54	216.9	48	16	390M15500A21M
5/8	0.6250	15.88	–	5.669	144	8.54	216.9	48	16	390E06250A21M
–	0.6299	16.00	–	5.669	144	8.54	216.9	48	16	390M16000A21M
41/64	0.6406	16.27	–	6.378	162	9.34	237.3	48	18	390E06406A21M
–	0.6496	16.50	M18x1.5	6.378	162	9.34	237.3	48	18	390M16500A21M
21/32	0.6563	16.67	3/4-10	6.378	162	9.34	237.3	48	18	390E06563A21M
–	0.6693	17.00	–	6.378	162	9.34	237.3	48	18	390M17000A21M
43/64	0.6719	17.07	3/4-12	6.378	162	9.34	237.3	48	18	390E06719A21M
11/16	0.6875	17.46	3/4-16	6.378	162	9.34	237.3	48	18	390E06875A21M
–	0.6890	17.50	M20x2.5	6.378	162	9.34	237.3	48	18	390M17500A21M
45/64	0.7031	17.86	–	6.378	162	9.34	237.3	48	18	390E07031A21M
–	0.7087	18.00	–	6.378	162	9.34	237.3	48	18	390M18000A21M
23/32	0.7188	18.26	–	7.087	180	10.22	259.6	50	20	390E07188A21M
–	0.7283	18.50	M20x1.5	7.087	180	10.22	259.6	50	20	390M18500A21M
47/64	0.7344	18.65	–	7.087	180	10.22	259.6	50	20	390E07344A21M
–	0.7480	19.00	–	7.087	180	10.22	259.6	50	20	390M19000A21M
3/4	0.7500	19.05	–	7.087	180	10.22	259.6	50	20	390E07500A21M
49/64	0.7656	19.45	7/8-9	7.087	180	10.22	259.6	50	20	390E07656A21M
–	0.7677	19.50	M22x2.5	7.087	180	10.22	259.6	50	20	390M19500A21M
25/32	0.7813	19.84	–	7.087	180	10.22	259.6	50	20	390E07813A21M
–	0.7874	20.00	–	7.087	180	10.22	259.6	50	20	390M20000A21M

*Tap drill diameters allow approximately 75% of full thread to be produced



Sizes not shown are available as non-stocked standards.
When ordering, please follow the examples shown below:

Inch	Diameter needed = 0.3450"	Part No. = 335E03450A21M
Metric	Diameter needed = 7.250mm	Part No. = 335M07250A21M

Recommended Drilling Data | Imperial (inch)

ISO	Material	Hardness (BHN)	Speed (SFM)	Feed Rate (IPR) by Diameter								
				0.118 - 0.157	0.161 - 0.236	0.240 - 0.315	0.319 - 0.394	0.398 - 0.472	0.476 - 0.551	0.555 - 0.630	0.634 - 0.709	0.713 - 0.787
P	Free Machining Steel 1118, 1215, 12L14, etc.	100 - 150	450	0.007	0.009	0.011	0.013	0.014	0.016	0.018	0.020	0.022
		150 - 200	400	0.005	0.008	0.009	0.011	0.012	0.014	0.016	0.018	0.020
		200 - 250	375	0.004	0.006	0.007	0.009	0.010	0.012	0.014	0.016	0.018
	Low Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 125	425	0.007	0.009	0.011	0.013	0.015	0.017	0.019	0.019	0.021
		125 - 175	390	0.006	0.008	0.010	0.012	0.014	0.016	0.018	0.018	0.020
		175 - 225	360	0.005	0.008	0.010	0.011	0.013	0.015	0.017	0.017	0.019
	Medium Carbon Steel 1030, 1040, 1050, 1527, 1140, 1151, etc.	225 - 275	330	0.004	0.007	0.009	0.010	0.012	0.014	0.016	0.016	0.018
		125 - 175	390	0.006	0.008	0.010	0.012	0.013	0.014	0.016	0.018	0.020
		175 - 225	360	0.005	0.007	0.010	0.012	0.012	0.013	0.015	0.017	0.019
	Alloy Steel 4140, 5140, 8640, etc.	225 - 275	320	0.004	0.006	0.009	0.011	0.011	0.012	0.014	0.016	0.018
		275 - 325	285	0.003	0.006	0.008	0.010	0.010	0.011	0.013	0.015	0.017
		175 - 225	375	0.006	0.008	0.010	0.012	0.013	0.014	0.016	0.018	0.020
	High Strength Alloy 4340, 4330V, 300M, etc.	225 - 275	340	0.005	0.007	0.009	0.011	0.012	0.013	0.015	0.017	0.019
		275 - 325	300	0.004	0.006	0.008	0.010	0.011	0.012	0.013	0.016	0.018
		325 - 375	275	0.003	0.005	0.007	0.009	0.010	0.010	0.012	0.014	0.016
	Structural Steel A36, A285, A516, etc.	225 - 300	260	0.005	0.007	0.008	0.011	0.011	0.012	0.013	0.014	0.016
		300 - 350	210	0.004	0.006	0.007	0.009	0.010	0.011	0.012	0.013	0.015
		350 - 400	160	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.012	0.013
	Tool Steel H-13, H-21, A-4, O-2, S-3, etc.	100 - 150	360	0.005	0.008	0.009	0.011	0.012	0.013	0.014	0.016	0.018
		150 - 250	320	0.004	0.007	0.008	0.010	0.011	0.012	0.013	0.015	0.017
		250 - 350	270	0.003	0.005	0.007	0.008	0.009	0.010	0.011	0.013	0.015
S	High Temp Alloy Hastelloy B, Inconel 600, etc.	150 - 200	260	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011
		200 - 250	220	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
M	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	140 - 220	120	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011
		220 - 310	90	0.002	0.003	0.003	0.004	0.005	0.006	0.007	0.008	0.009
K	Nodular, Grey, Ductile Cast Iron	135 - 185	200	0.004	0.005	0.006	0.007	0.008	0.009	0.011	0.012	0.013
		185 - 275	140	0.003	0.004	0.004	0.005	0.006	0.007	0.009	0.010	0.011
		120 - 150	550	0.008	0.010	0.012	0.014	0.016	0.018	0.020	0.022	0.024
		150 - 200	500	0.008	0.010	0.012	0.014	0.016	0.018	0.020	0.022	0.024
		200 - 220	475	0.007	0.009	0.011	0.013	0.015	0.017	0.019	0.021	0.023
N	Cast Aluminum	220 - 260	430	0.007	0.009	0.011	0.013	0.015	0.017	0.019	0.021	0.023
		260 - 320	400	0.006	0.008	0.010	0.012	0.014	0.016	0.018	0.020	0.022
		30	1500	0.008	0.010	0.013	0.015	0.017	0.020	0.022	0.024	0.026
		180	1000	0.006	0.008	0.011	0.013	0.015	0.018	0.020	0.022	0.024
	Wrought Aluminum	30	1500	0.008	0.010	0.013	0.015	0.017	0.020	0.022	0.024	0.026
		180	1000	0.006	0.008	0.011	0.013	0.015	0.018	0.020	0.022	0.024

Speed and Feed Adjustment

3.5xD	6xD	9xD
See above chart	0.90	0.75

Recommended Speed and Feed Example

If the recommended speed and feed is 300 SFM and 0.010 IPR, then reduce to 225 SFM and 0.0075 IPR when using a 9xD tool	
300 • 0.75 = 225 SFM	0.010 • 0.75 = 0.0075 IPR

Calculations

Value	Formula
IPM	RPM • IPR
SFM	RPM • 0.262 • DIA
RPM	(SFM • 3.82) / DIA

IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Refer to the Coolant Recommendation charts for coolant requirements to run at the recommended speeds and feeds. Factory technical assistance is available through our Application Engineering department.



Recommended Drilling Data | Metric (mm)

ISO Material		Hardness (BHN)	Speed (M/min)	Feed Rate (mm/rev) by Diameter								
				3.00 - 4.00	4.01 - 6.00	6.01 - 8.00	8.01 - 10.00	10.01 - 12.00	12.01 - 14.00	14.01 - 16.00	16.01 - 18.00	18.01 - 20.00
P	Free Machining Steel 1118, 1215, 12L14, etc.	100 - 150	137	0.18	0.23	0.28	0.33	0.36	0.41	0.46	0.51	0.56
		150 - 200	122	0.13	0.20	0.23	0.28	0.30	0.36	0.41	0.46	0.51
		200 - 250	114	0.10	0.15	0.18	0.23	0.25	0.30	0.36	0.41	0.46
	Low Carbon Steel 1010, 1020, 1025, 1522, 1144, etc.	85 - 125	130	0.18	0.23	0.28	0.33	0.38	0.43	0.48	0.48	0.53
		125 - 175	119	0.15	0.20	0.25	0.30	0.36	0.41	0.46	0.46	0.51
		175 - 225	110	0.13	0.20	0.25	0.28	0.33	0.38	0.43	0.43	0.48
	Medium Carbon Steel 1030, 1040, 1050, 1527, 1140, 1151, etc.	225 - 275	101	0.10	0.18	0.23	0.25	0.30	0.36	0.41	0.41	0.46
		125 - 175	119	0.15	0.20	0.25	0.30	0.33	0.36	0.41	0.46	0.51
		175 - 225	110	0.13	0.18	0.25	0.30	0.30	0.33	0.38	0.43	0.48
		225 - 275	98	0.10	0.15	0.23	0.28	0.28	0.30	0.36	0.41	0.48
	Alloy Steel 4140, 5140, 8640, etc.	275 - 325	87	0.08	0.15	0.20	0.25	0.25	0.28	0.33	0.38	0.43
		175 - 225	114	0.15	0.20	0.25	0.30	0.33	0.36	0.41	0.46	0.51
		225 - 275	104	0.13	0.18	0.23	0.28	0.30	0.33	0.38	0.43	0.48
		275 - 325	91	0.10	0.15	0.20	0.25	0.28	0.30	0.33	0.41	0.46
	High Strength Alloy 4340, 4330V, 300M, etc.	325 - 375	84	0.08	0.13	0.18	0.23	0.25	0.25	0.30	0.36	0.41
		225 - 300	79	0.13	0.18	0.20	0.28	0.28	0.30	0.33	0.36	0.41
		300 - 350	64	0.10	0.15	0.18	0.23	0.25	0.28	0.30	0.33	0.38
		350 - 400	49	0.08	0.13	0.15	0.20	0.23	0.25	0.28	0.30	0.33
	Structural Steel A36, A285, A516, etc.	100 - 150	110	0.13	0.20	0.23	0.28	0.30	0.33	0.36	0.41	0.46
		150 - 250	98	0.10	0.18	0.20	0.25	0.28	0.30	0.33	0.38	0.43
		250 - 350	82	0.08	0.13	0.18	0.20	0.23	0.25	0.28	0.33	0.38
	Tool Steel H-13, H-21, A-4, O-2, S-3, etc.	150 - 200	79	0.08	0.10	0.13	0.15	0.18	0.20	0.23	0.25	0.28
		200 - 250	67	0.05	0.08	0.10	0.13	0.15	0.18	0.20	0.23	0.25
S	High Temp Alloy Hastelloy B, Inconel 600, etc.	140 - 220	37	0.08	0.10	0.13	0.15	0.18	0.20	0.23	0.25	0.28
		220 - 310	27	0.05	0.08	0.08	0.10	0.13	0.15	0.18	0.20	0.23
M	Stainless Steel 300 Series 304, 316, 17-4PH, etc.	135 - 185	61	0.10	0.13	0.15	0.18	0.20	0.23	0.28	0.30	0.33
		185 - 275	43	0.08	0.10	0.10	0.13	0.15	0.18	0.23	0.25	0.28
K	Nodular, Grey, Ductile Cast Iron	120 - 150	168	0.20	0.25	0.30	0.36	0.41	0.46	0.51	0.56	0.61
		150 - 200	152	0.20	0.25	0.30	0.36	0.41	0.46	0.51	0.56	0.61
		200 - 220	145	0.18	0.23	0.28	0.33	0.38	0.43	0.48	0.53	0.58
		220 - 260	131	0.18	0.23	0.28	0.33	0.38	0.43	0.48	0.53	0.58
		260 - 320	122	0.15	0.20	0.25	0.30	0.36	0.41	0.46	0.51	0.56
N	Cast Aluminum	30	457	0.20	0.25	0.33	0.38	0.43	0.51	0.56	0.61	0.66
		180	305	0.15	0.20	0.28	0.33	0.38	0.46	0.51	0.56	0.61
	Wrought Aluminum	30	457	0.20	0.25	0.33	0.38	0.43	0.51	0.56	0.61	0.66
		180	305	0.15	0.20	0.28	0.33	0.38	0.46	0.51	0.56	0.61

Speed and Feed Adjustment

3.5xD	6xD	9xD
See above chart	0.90	0.75

Recommended Speed and Feed Example

If the recommended speed and feed is 91 M/min and 0.25 mm/rev, then reduce to 68 M/min and 0.19 mm/rev when using a 9xD tool

$91 \cdot 0.75 = 68 \text{ M/min}$	$0.25 \cdot 0.75 = 0.19 \text{ mm/rev}$
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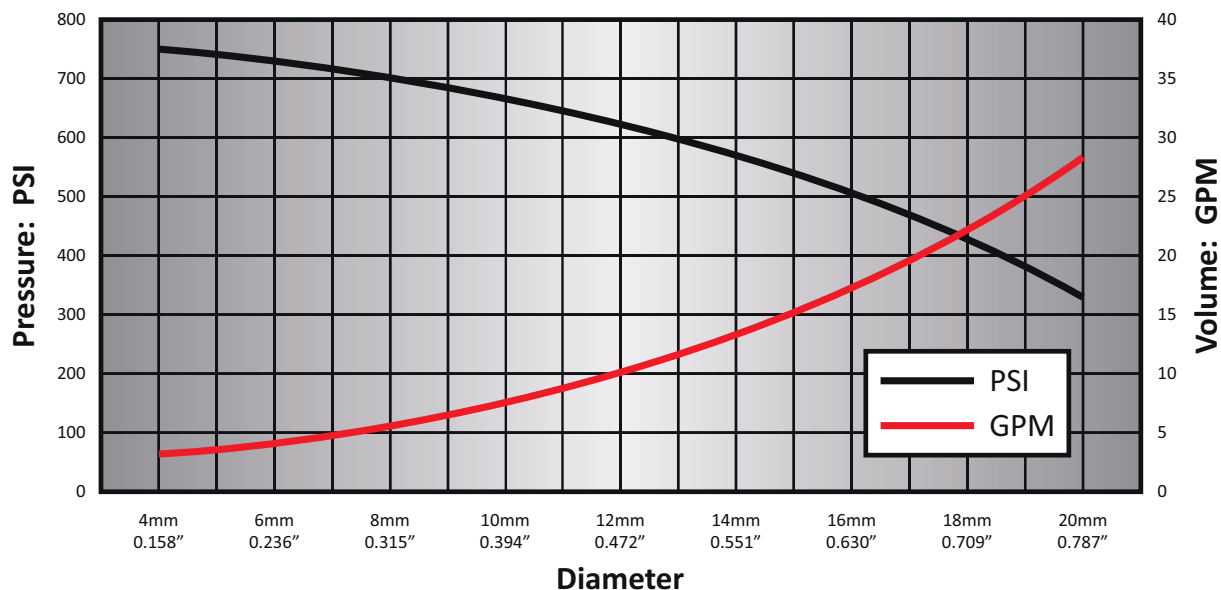
Calculations

Value	Formula
mm/min	$\text{RPM} \cdot \text{mm/rev}$
M/min	$\text{RPM} \cdot 0.003 \cdot \text{DIA}$
RPM	$(\text{M/min} \cdot 318.47) / \text{DIA}$

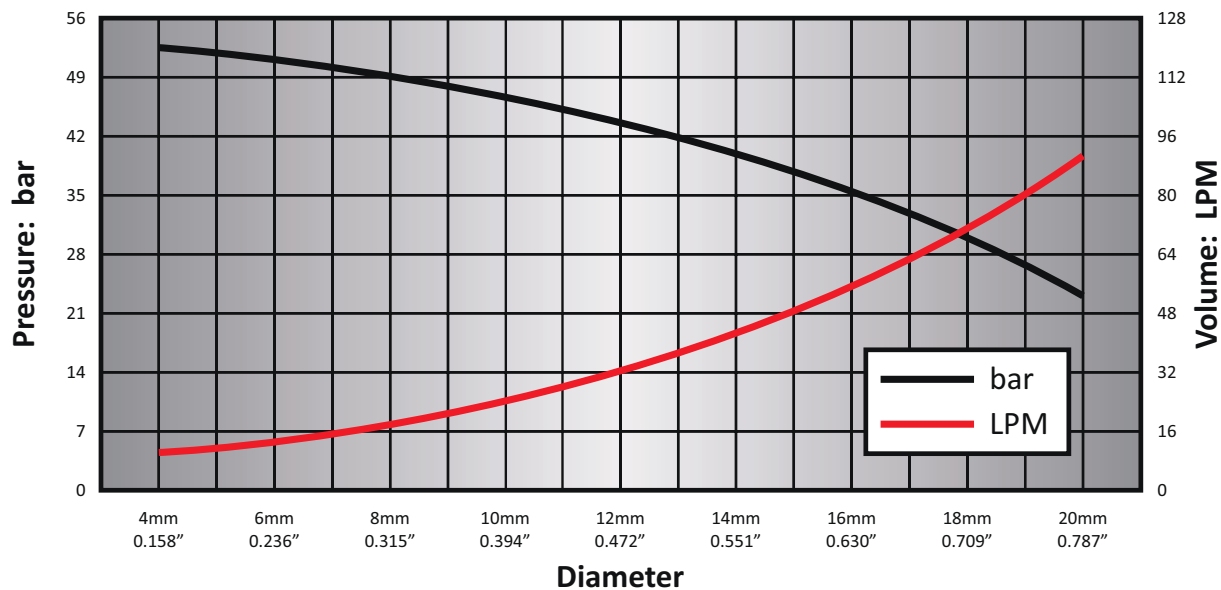
IMPORTANT: The speeds and feeds listed above are a general starting point for all applications. Refer to the Coolant Recommendation charts for coolant requirements to run at the recommended speeds and feeds. Factory technical assistance is available through our Application Engineering department.

Coolant Recommendations

Imperial (PSI)



Metric (bar)



Coolant Adjustment

Drill Length	Pressure and Flow
3.5xD	See above chart
6xD	1.5
9xD	2.0

Coolant Recommendation Example

If the recommended coolant pressure and flow is 600 PSI and 12 GPM for a 3xD tool, the adjusted pressure and flow for a 9xD tool would be:

$$600 \cdot 2 = 1200 \text{ PSI}$$

$$12 \cdot 2 = 24 \text{ GPM}$$

IMPORTANT: The coolant pressure and flow rate recommendations above represent a good approximation to obtain optimum tool life and chip evacuation at Allied recommended speeds and feeds. If lower coolant capabilities exist in a drilling application, the ASC 320 drilling system will still function at reduced penetration rates. Contact our Application Engineering Department for a more specific recommendation of coolant requirements and/or speeds and feeds.

Guaranteed Test / Demo Application Form

Distributor PO #

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

Distributor Information

Company Name: _____
Contact: _____
Account Number: _____
Phone: _____
Email: _____

End User Information

Company Name: _____
Contact: _____
Industry: _____
Phone: _____
Email: _____

Current Process List all tooling, coatings, substrates, speeds and feeds, tool life, and any problems you are experiencing

Test Objective List what would make this a successful test (i.e. penetration rate, finish, tool life, hole size, etc.)

Application Information

Hole Diameter: _____ in/mm	Tolerance: _____	Material: _____ (4150 / A36 / Cast Iron / etc.)
Pre-existing Diameter: _____ in/mm	Depth of Cut: _____ in/mm	Hardness: _____ (BHN / Rc)
Required Finish: _____ RMS		State: _____ (Casting / Hot rolled / Forging)

Machine Information

Machine Type: _____ (Lathe / Screw machine / Machine center / etc.)	Builder: _____ (Haas, Mori Seiki, etc.)	Model #: _____
Shank Required: _____ (CAT50 / Morse taper, etc.)		Power: _____ HP/KW
Rigidity: _____ ☐ Excellent ☐ Good ☐ Poor	Orientation: _____ ☐ Vertical ☐ Horizontal	Tool Rotating: _____ ☐ Yes ☐ No
		Thrust: _____ lbs/N

Coolant Information

Coolant Delivery: _____ (Through tool / Flood)	Coolant Pressure: _____ PSI / bar
Coolant Type: _____ (Air mist, oil, synthetic, water soluble, etc.)	Coolant Volume: _____ GPM / LPM

Requested Tooling

QTY	Item Number

QTY	Item Number



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Warranty Information



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Allied Machine's sole and exclusive obligation under this warranty is limited to, at its option, without additional charge, replacing or repairing this product or issuing a credit. For this warranty to be applied, the product must be returned freight prepaid to the plant designated by an Allied Machine representative and which, upon inspection, is determined by Allied Machine to be defective in material and workmanship.

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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Allied Machine shall not be liable in contract or in tort (including, without limitation, negligence, strict liability or otherwise) for economic losses of any kind or for any special, incidental, indirect, consequential, punitive or exemplary damages arising in any way out of the performance of, or failure to perform this agreement.

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