

# oil & gas / petrochemical **SOLUTIONS**

[www.alliedmachine.com](http://www.alliedmachine.com)

IT'S TIME TO GET  
**READY:**

solutions to **maximise** your  
machining **production**



Maximise your machine's capabilities



Reduce your machining costs



Unearth newfound savings



**APX™ DRILL**

Don't let your machine slow you down



**ALLIED MACHINE  
& ENGINEERING**



**BETA**  
Best Technical Applications









# oil & gas / petrochemical **SOLUTIONS**

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## ORDERING

The solutions listed in this guide represent general standard products and/or special product designs. To order items specific to your application, please contact your local Allied Field Sales Engineer or a member of Allied's Application Engineering Team.



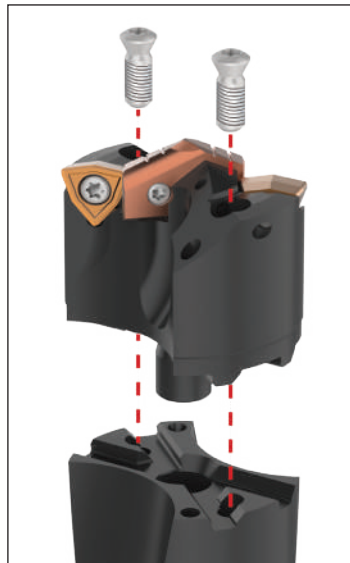
# **ALLIED MACHINE & ENGINEERING**

Holemaking Solutions for Today's Manufacturing





## FRAC BLOCKS



### WOHLHAUPTER® FINISH BORING TOOLS

#### 320 BORING HEAD

- ▶ Vernier scale for quick and easy adjustments.
- ▶ Heads are available in aluminium for weight reduction.
- ▶ Economical boring solution provides cost-effective tooling with the high-precision and quality of the Wohlhaupter brand.

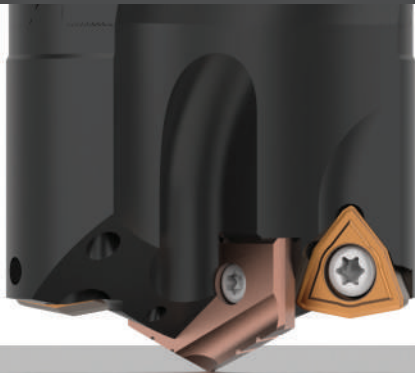
### DEEP HOLE INDEXABLE CARBIDE DRILLS

#### APX™ MODULAR DRILL

- ▶ Typical indexable carbide drills are not ideal for deep applications (over 4 or 5xD). The replaceable pilot insert gives the APX centring ability, allowing you to reap the benefits of an IC drill in deep hole applications.
- ▶ The hybrid design provides the centring and stability of a spade drill while achieving higher spindle speeds on low horsepower machines, taking advantage of power curves on modern CNC machines.
- ▶ Available with T-A or GEN3SYS pilot insert styles.

## DON'T LET YOUR MACHINE SLOW YOU DOWN

The APX Drill is designed to increase the productivity of your machine tool. The single effective cutting design of the outboard indexable carbide inserts allows you to run at lower feed rates while increasing your speed. This combination is ideal for low horse power machines.



## KEEP YOUR IC DRILL CENTRED

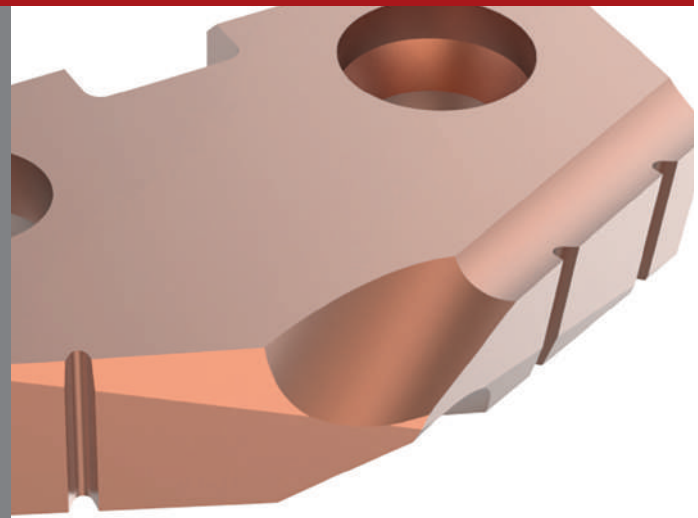
The replaceable pilot insert keeps the tool where it's supposed to be. This point provides excellent centring and straightness, which is difficult for typical indexable carbide insert drills to achieve.

Because of its centring capabilities, the APX is the perfect solution for large diameter deep hole drilling applications. Pair this with the -TC geometry on the T-A pilot insert, and you'll be evacuating nice chips in no time.

## TINY CHIP (-TC) GEOMETRY

Common sense says smaller chips are easier to deal with. But since that's typically easier said than done, we have the -TC geometry to help improve your productivity.

- ▶ Delivers excellent chip control with the unique lip and point design
- ▶ Improves drilling capabilities in long-chipping materials
- ▶ Enhances performance in lower-powered machines



## INDEXABLE CARBIDE INSERTS

A variety of carbides and high heat resistant coatings provides multiple options for your applications. The insert geometry creates small chips that are easy to evacuate. Multiple edges improve tool life per insert. The wiper geometry provides stability for the APX Drill.

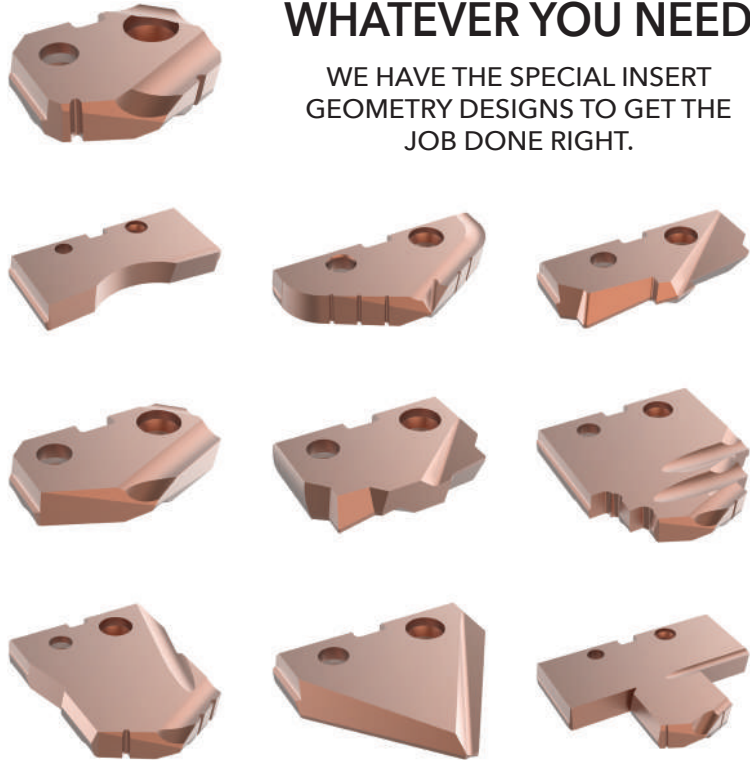


## MUD INJECTION TUBES



### WHATEVER YOU NEED

WE HAVE THE SPECIAL INSERT  
GEOMETRY DESIGNS TO GET THE  
JOB DONE RIGHT.



#### REPLACEABLE INSERT DRILLS

### T-A<sup>®</sup>

- ▶ Large variety of geometries and coatings optimises chip formation in various materials.
- ▶ Replaceable insert reduces setup and down times, increasing productivity.
- ▶ Effectively dissipates heat from the cutting edge, which increases tool life and reduces overall costs.



# OIL FIELD REAMERS



Replaceable cartridges and inserts reduce machine downtime and protect your investment.



## INDEXABLE CARBIDE DRILLS

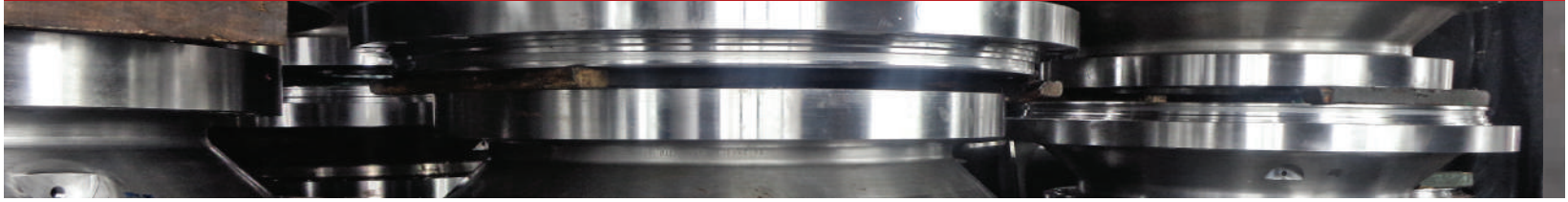
### REVOLUTION DRILL®

- Provides ideal performance on low horsepower machines while maintaining high penetration rates. These capabilities make the drill an excellent solution for large holes.
- Robust geometry allows the tool to drill through uneven surfaces and interrupted cuts.
- Drills from solid with no pilot hole required.

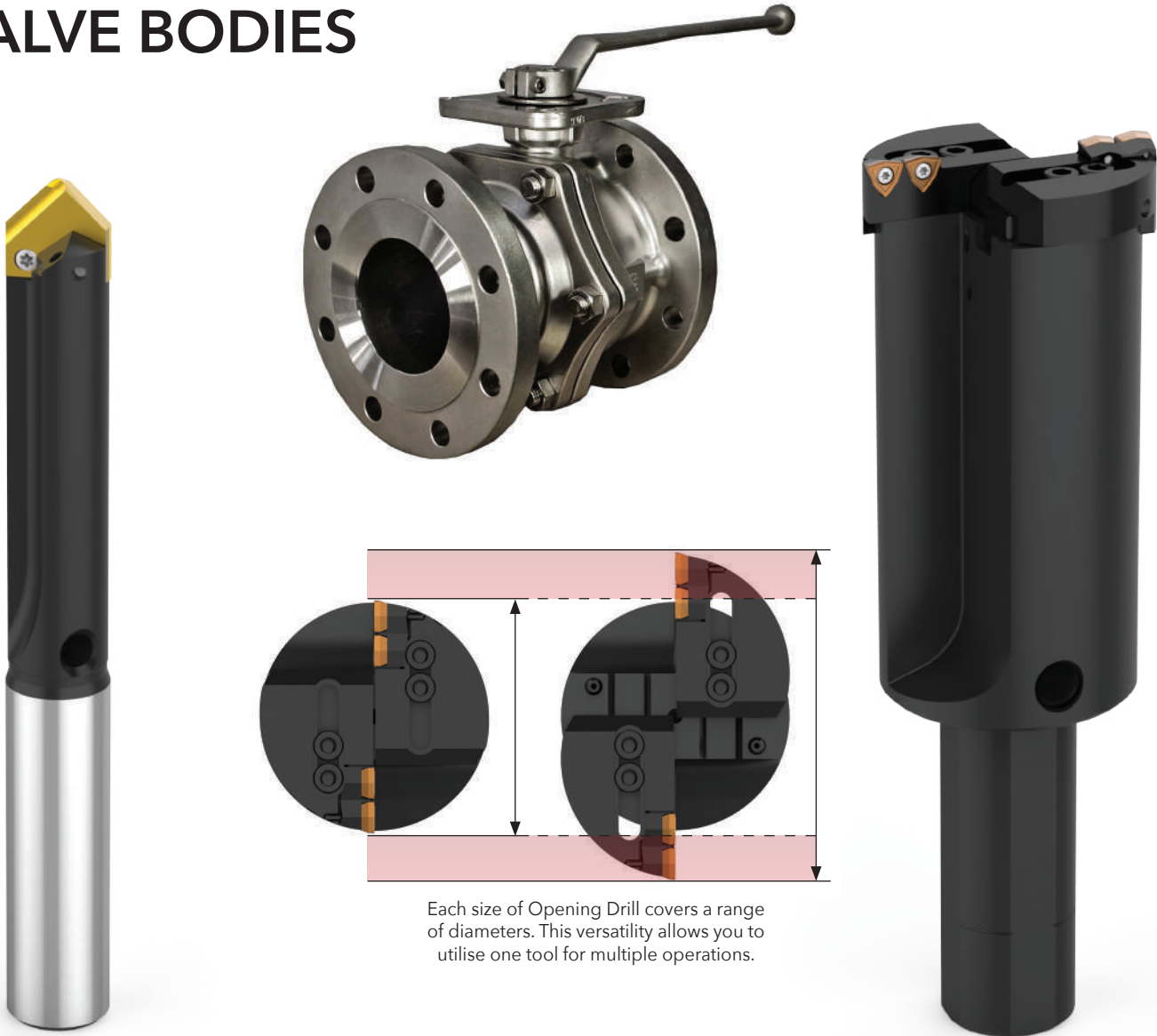
## WOHLHAUPTER® FINISH BORING TOOLS

### 365 BORING HEAD

- Vernier scale for fast and easy 0.002mm (0.0001") diameter adjustments.
- Internal balancing mechanism allows for high spindle speeds, which can increase your throughput.



## ▶ VALVE BODIES



Each size of Opening Drill covers a range of diameters. This versatility allows you to utilise one tool for multiple operations.

### REPLACEABLE INSERT DRILLS

#### T-A® 90° SPOT & CHAMFER

- ▶ Eliminates the need for a secondary chamfering operation, which reduces setups and cycle times.
- ▶ The center cutting web design improves stability and strength.
- ▶ Utilises your existing standard T-A holder.

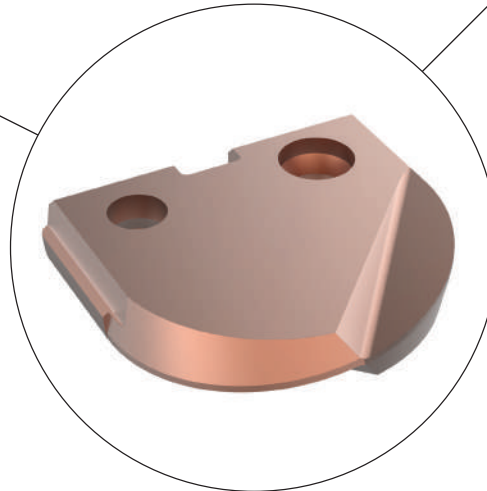
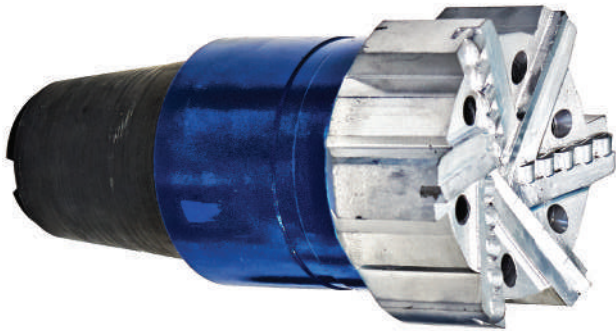
### INDEXABLE CARBIDE DRILLS

#### OPENING DRILL®

- ▶ Opens an existing hole in a single operation.
- ▶ Provides ideal performance on low horsepower machines while maintaining high penetration rates. These capabilities make the drill an excellent solution for large holes.
- ▶ Handles interrupted cuts easily.
- ▶ Eliminates multiple boring passes to improve cost per hole and decrease cycle time.



# ROCK HEAD DRILLS



Utilise special Ball Nose geometry T-A inserts with your existing standard or special T-A holder.



## REPLACEABLE INSERT DRILLS

### T-A<sup>®</sup> GEN2

- ▶ The large assortment of geometries available with the T-A drilling system allows for a consistent drilling process you can rely on regardless of material.
- ▶ Utilising replaceable inserts increases your productivity by reducing setups and down times.
- ▶ The Notch Point<sup>®</sup> geometry on the T-A GEN2 insert improves stability and hole straightness.

## REPLACEABLE INSERT DRILLS

### T-A<sup>®</sup> CHROME HELIX

- ▶ The chrome helix provides full support to ensure maximum stability in the cut, even when passing through interruptions.
- ▶ The chrome on the bodies can be refurbished, extending the life of special tools even after significant usage.



## HEAT EXCHANGER PLATES



The 2 twisted coolant holes provide superior chip evacuation.

### INDEXABLE CARBIDE DRILLS

#### 4TEX® DRILL

- ▶ The robust design allows for reliability in interrupted cuts and undesirable rigidity even when the material is difficult to machine.
- ▶ The single effective cutting on light-duty machines increases penetration rates.
- ▶ Produces excellent chip formation in high temperature alloys.
- ▶ Strengthened core and increased coolant volume improve the hole size.



The replaceable head style allows for multiple diameters and/or coatings to be used within the same arbor.



### REPLACEABLE HEAD REAMERS BY S.C.A.M.I.®

#### ALVAN® REAMERS

- ▶ Replaceable head functionality increases tool life and reduces setup times which can increase your cost savings while also providing superior hole quality.
- ▶ Provides tight tolerances ( $\pm 0.04\text{mm}$ ) and improves the surface finish of the hole.

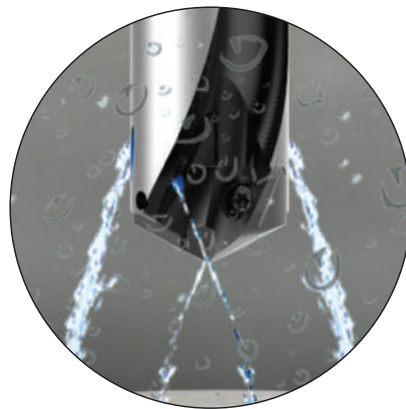
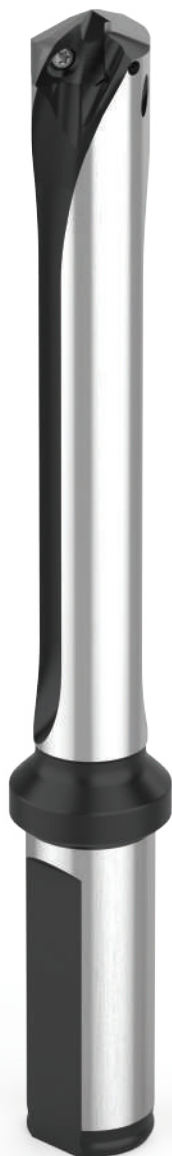
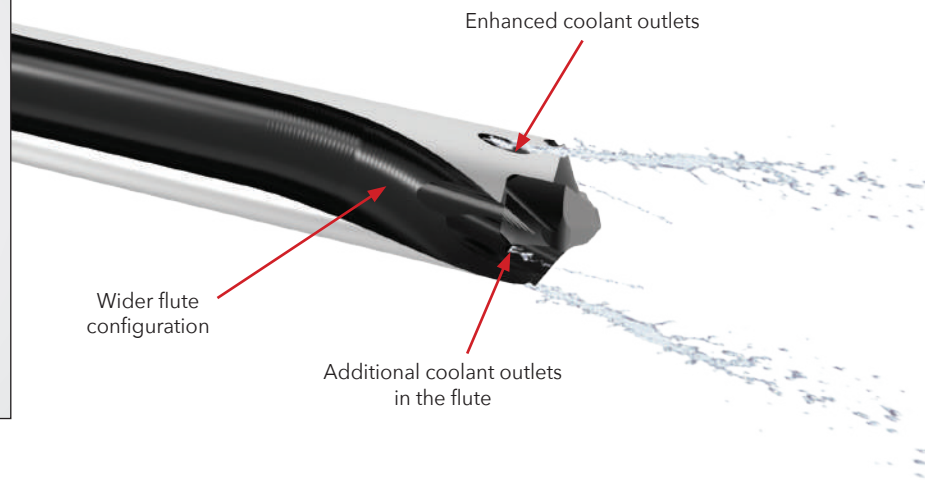


## Packed Chips

Increasing your penetration rates can complicate chip evacuation. Depending on the hole depth and material, the chip gullet inside the hole can become too tight for certain tooling to flush out the chips.

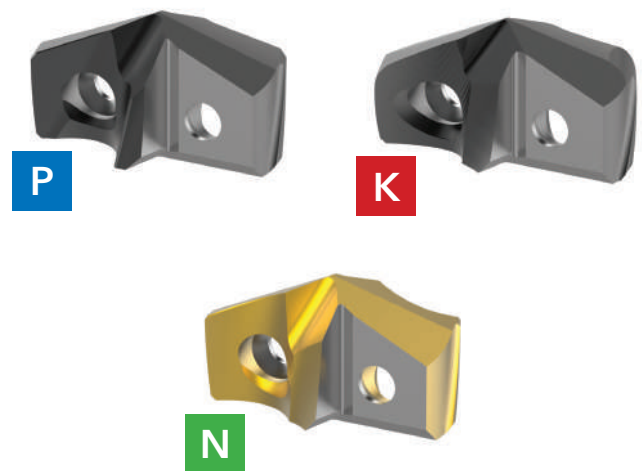
The **GEN3SYS® XT Pro** holder is designed to increase the amount of coolant to the cutting edge. The drill contains a total of 4 coolant outlets (1 for each side outlet and 1 for each flute outlet), supplying more coolant to flush the chips and prevent them from packing. Also, the XT Pro features a wider flute, which increases the amount of space available for chip evacuation.

So if you're dealing with chip evacuation problems, try the XT Pro holder. A slightly different tool design could



Increased coolant and a wider flute help flush the hole and evacuate the chips.

Different geometry/coating combinations designed for ISO-specific materials.



## HIGH PENETRATION DRILLS

### GEN3SYS® XT PRO

- ▶ With increased coolant at the cutting zone, the XT Pro inserts stay cooler and experience longer tool life.
- ▶ The increased coolant exposure also allows the tool to achieve maximum penetration rates, which can help increase your throughput.
- ▶ The wider flute design provides improved chip evacuation.

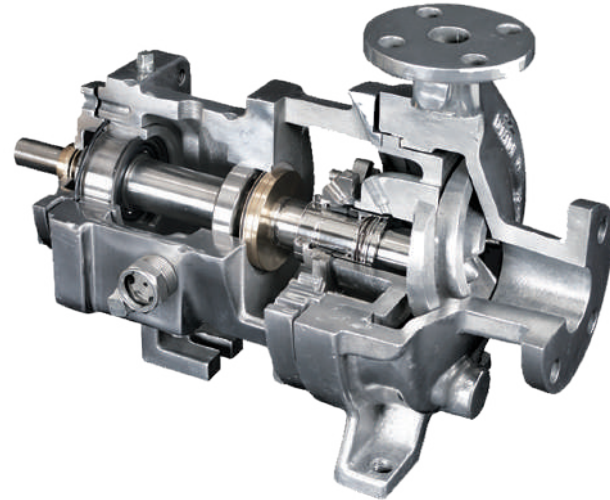


## PUMPS



Damper module with  
vascoelastic bearings

Absorber mass



**WOHLHAUPTER®**  
**NOVITECH™**  
*Vibration Dampened Intermediate Module*

- Machine up to **10xD**
- Connect quickly and easily with the **MVS connection**
- Utilise existing **Wohlhaupter® components**
- **Increase** your productivity, surface quality, and process reliability
- **Increase** your tool and spindle life

**WOHLHAUPTER® FINISH BORING TOOLS**

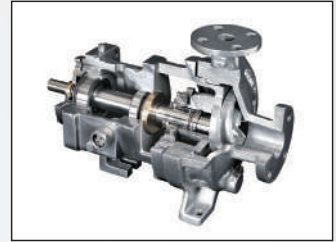
### 320 BORING HEAD *with NOVITECH™*

- ▶ Vernier scale for quick and easy adjustments.
- ▶ Heads are available in aluminium for weight reduction.
- ▶ Economical boring solution provides cost-effective tooling with the high-precision and quality of the Wohlhaupter brand.



## Time is money, so make it count.

If you want to improve your machining processes, cycle time is a key factor to examine. After all, the longer it takes you to produce a part, the fewer parts you can produce in a given time. Our customer was experiencing lengthy cycle times while machining pumps from grey cast iron. The parts required 3 bored holes, each with a 304.8 mm depth and a 3098.8 mm reach.



In order to free up machine time, the customer questioned if their process could be more efficient. The main objectives were to decrease the current cycle time and to maintain a 160 Ra finish, which was required to perform the burnishing process that followed.

The previous tooling ran at a slow 12 mm/min and a paint-drying 84-minute cycle time to bore the three holes on each part. With our **Wohlhaupter 320 Boring Head** utilising the **NOVI<sup>TECH</sup>™ Vibration Dampened Module**, the customer increased to a more efficient 95 mm/min and slashed the cycle time to 10.5 minutes (an 87% decrease). Along with the increased speed, the Wohlhaupter tooling also achieved a 155 Ra finish, accomplishing everything the customer needed.

The Wohlhaupter solution reduced the process cycle time by 74 minutes. Improvements in speed and cycle time can free up machine hours, which means more throughput and higher profit for your company. **Are you losing money on applications with substantially long cycle times?**

<b>Product:</b>	Wohlhaupter® 320 Boring Head with NOVI <sup>TECH</sup> ™	<b>Measure</b>	<b>Competitor Boring Head</b>	<b>320 Boring Head w/ NOVI<sup>TECH</sup></b>
<b>Objectives:</b>	(1) Decrease cycle time (2) Maintain 160 Ra hole finish	<b>RPM</b>	39	469
<b>Industry:</b>	Oil & gas/petrochemical	<b>Speed Rate</b>	17 mm/min	675 SFM
<b>Part:</b>	Pump	<b>Feed Rate</b>	0.3 mm/rev	0.008 IPR
<b>Material:</b>	Grey cast iron	<b>Penetration Rate</b>	12 mm/min	95 mm/min
<b>Hole Ø:</b>	139.7mm	<b>Cycle Time (per hole)</b>	27 min 54 sec	3 min 32 sec
<b>Hole Depth:</b>	304.8mm	<b>Hole Finish</b>	160 Ra	155 Ra

► Boring head  
320 series  
Item No. 320008

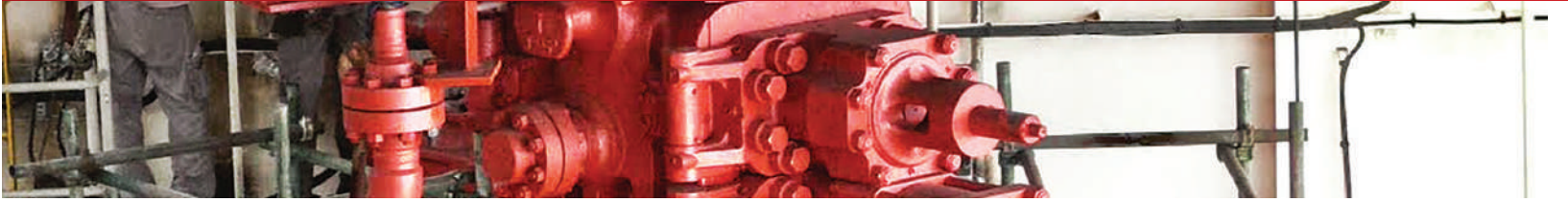
► NOVI<sup>TECH</sup>  
Vibration dampened  
intermediate module  
Item No. 519005



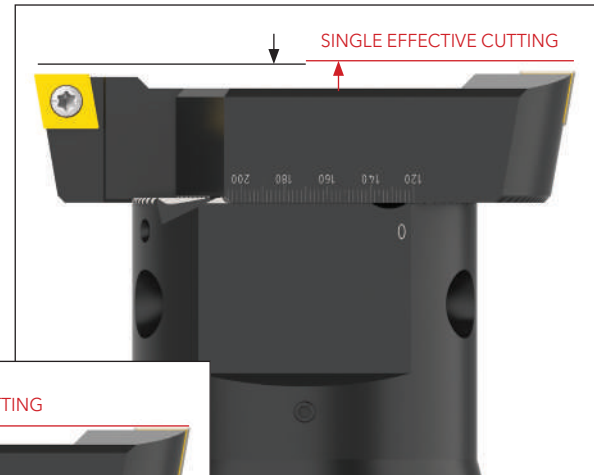
The Wohlhaupter 320 boring head with the NOVI<sup>TECH</sup> vibration dampened module provided:

- ✓ Increased penetration rate
- ✓ Decreased cycle time
- ✓ Excellent finish in deep hole application

74 minute  
cycle time reduction



## BLOWOUT PREVENTERS



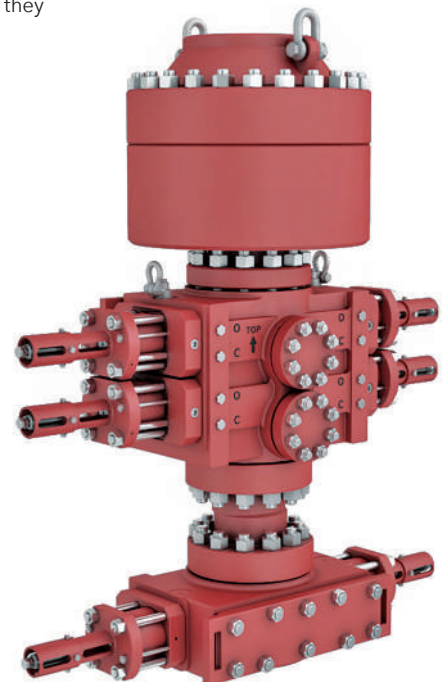
The step twin cartridges are displaced, making the tool single effective. Typically, this means the tool will take longer to make its cut. However, the Wohlhaupter step twin bore outpaces most other step bore tools.

The standard twin bore tools are double effective, which means they remove material at a higher rate than single effective cutting tools. These tools improve production because they can complete holes in less time.

WOHLHAUPTER® FINISH BORING TOOLS

### TWIN BORES / STEP TWIN BORES

- ▶ Exponentially faster than helical milling.
- ▶ Modular construction provides the versatility to be utilised across multiple applications.
- ▶ Produce larger holes without experiencing the stress on your machine that you would incur by drilling large holes.





## 97% PROCESS SPEED INCREASE

### Wohlhaupter® Twin Bore Tools

#### CUSTOMER'S OBJECTIVE: REDUCE THE NUMBER OF STEPS IN THE PROCESS

PREVIOUS TOOLING		ALLIED SOLUTION	
mm/min	COST PER BORE	mm/min	COST PER BORE
81	£4.29	160	£2.14

#### Could you reduce your tooling costs **AND** improve your process?

Finding better tooling doesn't always have to cost more money. More often than not, you're paying a higher price for lower production—something a less expensive tool can end. Case in point, our customer was producing blowout preventers from 4330 modified steel. The objective was to take a 88.9mm diameter hole out to 198.12mm going 279.4mm deep in as few steps as possible.

After drilling the 88.9mm diameter by 279.4mm deep hole with an APX™ Drill, the customer needed to open the hole to 198.12. Our Opening Drill® was their first choice, but it didn't work for this application. Their next choice involved running a variety of different twin bores, including Wohlhaupter Twin Bores.

Comparable twin bores ran at 81mm/min, removed around 10.16mm on diameter, and sounded horrendous in the cut. The Wohlhaupter double effective twin bore doubled the speed at 160mm/min, removed 15.42mm on diameter, and made virtually no noise during the operation. Additionally, the Wohlhaupter **step** twin bore ran at 61 mm/min while removing a fist-pumping 31.75mm on diameter, all while being single effective.

Ultimately, the customer was amazed by the strength of the Wohlhaupter tooling (the slides were maxed out to diameter), the versatility, and the overall performance. The Wohlhaupter twin bore provided a great finish for the next step in the process, while the other tooling required two additional finish passes.

Along with the improvements in machining productivity, the Wohlhaupter twin bore offered three striking advantages:

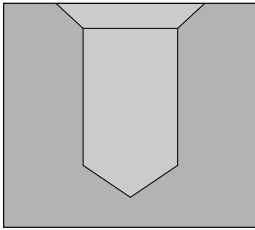
- ▶ The customer could leave the Wohlhaupter tools running without a machinist constantly intervening - freeing up man-hours for other projects.
- ▶ The Wohlhaupter tooling cost around £805 less than the comparable twin boring tools.
- ▶ The insert life excelled, using only 8 edges to bore 12 times. With a total of four inserts, **the cost per bore dropped from £4.29 to £2.14.**

Overall, tool cost isn't always an accurate indicator of performance. Are you spending more on tooling than you need to? Call your local Allied tooling specialist to help you find a more efficient and cost-effective solution.

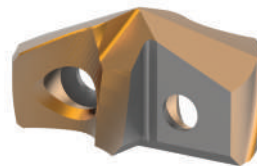
50% cost per bore savings



## WELL HEADS



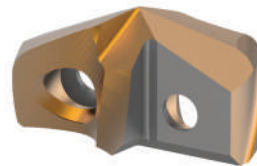
Drill/chamfer style holders are stocked on the shelf to help you optimise your drilling of chamfered holes.



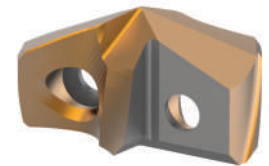
STANDARD



AUSTENITIC STAINLESS



CAST IRON



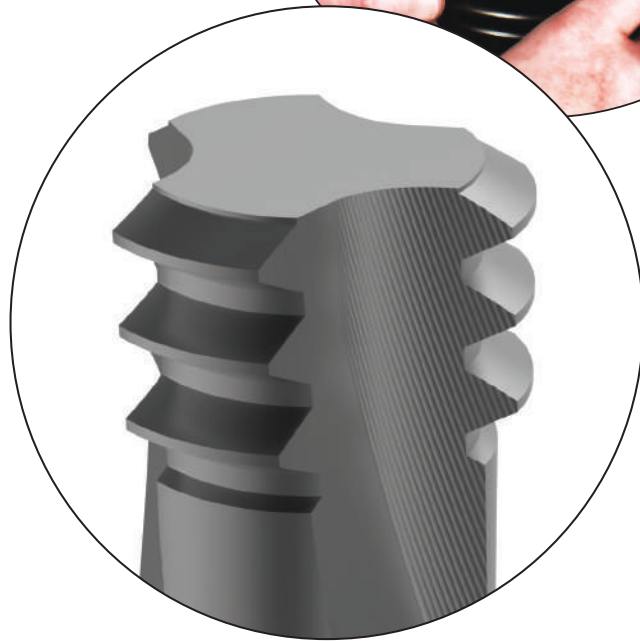
LOW RAKE

### HIGH PENETRATION DRILLS

## GEN3SYS® XT

- ▶ The replaceable insert and aggressive geometry options allow you to match or outperform penetration rates of solid carbide tooling.
- ▶ The ability to replace the inserts on the spindle provides cost benefits by reducing machine downtime and setups.
- ▶ Provides excellent chip control, improved durability, and added stability.
- ▶ Increases penetration rates and tool life.





Designed to machine only 3 threads at a time, reducing tool pressure and dramatically increasing the chances of tool survival.



#### WOHLHAUPTER® FINISH BORING TOOLS

### PRIMEBORE BORING HEAD

- ▶ Vernier scale for quick and easy adjustments.
- ▶ The versatile diameter range is ideal if you have multiple different applications: Ø 3mm - 208mm (.118" - 8.189").
- ▶ Economical boring solution provides cost-effective tooling with the high-precision and quality of the Wohlhaupter brand.

#### SOLID CARBIDE THREAD MILLS

### ACCUTHREAD™ T3

- ▶ Built for machining hardened or hard-to-machine materials such as stainless steel, tool steel, and high temp alloys.
- ▶ Improves rigidity for right-hand threads and maintains climb milling with a left-hand direction.
- ▶ Provides a high-quality thread without the risk of breaking taps.
- ▶ AM210® coating improves cycle times and tool life.



## MANIFOLDS



### PORT CONTOUR CUTTERS

#### ACCUPORT 432® STEP TOOL

- ▶ The special step port tooling not only saves on cycle time, but it also reduces programming time and opens up tool changer positions, allowing you to have more machine flexibility.
- ▶ Performs multiple steps in one process, eliminating the need for additional tooling and operations.
- ▶ The smaller diameter port tool is ideal for connecting cross holes.
- ▶ Utilises standard T-A and IC inserts.

### PORT & THREAD FINISHING KITS

#### ACCUPORT & ACCUTHREAD™

- ▶ Port kits incorporate the AccuThread solid carbide thread mill to increase the manufacturing flexibility by allowing hydraulic ports to be produced in just two operations.
- ▶ Replaceable inserts eliminate the need for regrinds.
- ▶ Includes everything you need to produce a finished port with threads.





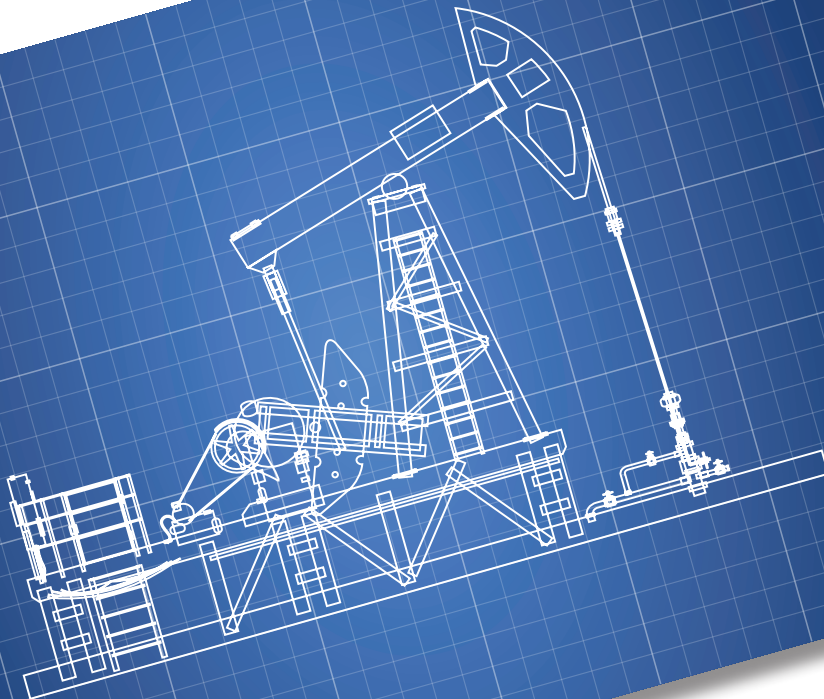
## Whatever type of holmaking or finishing you do, Allied is here to help.

Whether you're a production facility producing thousands of parts for one customer, or a job shop making a handful of parts for a thousand customers, we're here to make sure the job gets done. Our precision holmaking and finishing solutions are backed by our experienced staff of knowledgeable engineers who are standing by.

Don't hesitate to call us. Let us know what problems you're having and give us a chance to find the solution. Machining is what we do, and we don't mind showing off what we know.

All you have to do is ask.

**+44 (0) 1384 400 900**





## COLLISION TESTING PROGRAM

### ToolMD™

- ▶ Offers 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

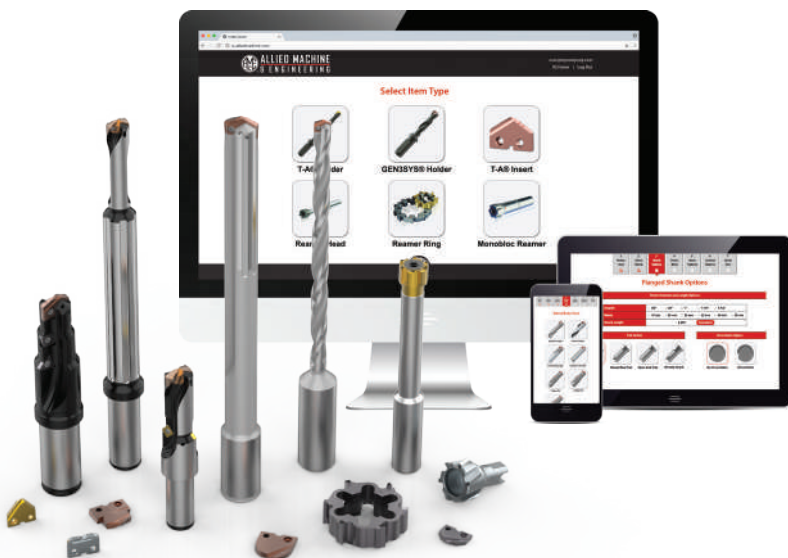
[toolmd.com](http://toolmd.com)

## WOHLHAUPTER® TOOL BUILDER

### Tool-Architect

- ▶ Configure your complete tool assembly
- ▶ Compile an order list to be quoted
- ▶ Search and quickly find components using various criteria
- ▶ Adjust your language and measurement preferences

[tool-architect.com](http://tool-architect.com)



## GET YOUR QUOTE AND DRAWING IN MINUTES

### Insta-Quote™

- ▶ Design and quote your own tooling
- ▶ Guides you through steps to generate the solution you need
- ▶ Features the following products
  - T-A® Inserts
  - T-A® Holders
  - GEN3SYS® XT Holders
  - ALVAN® Reamers

[iq.alliedmachine.com](http://iq.alliedmachine.com)



## THREAD MILL PROGRAM GENERATOR

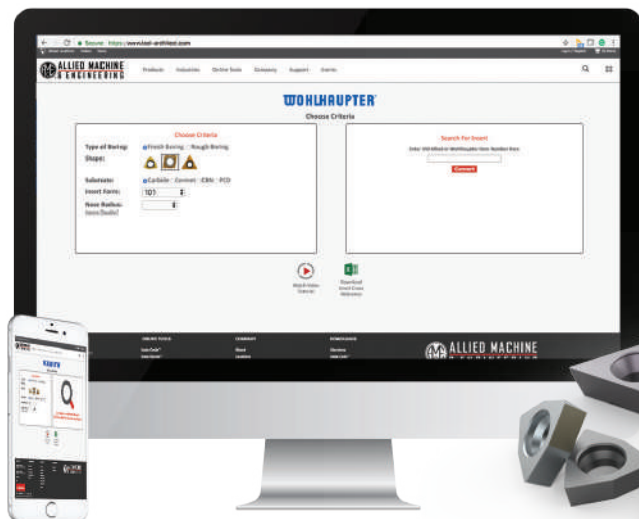
### Insta-Code™

- ▶ 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

[alliedmachine.com/InstaCode](http://alliedmachine.com/InstaCode)



Insta-Code also has a  
Cycle Time Calculator

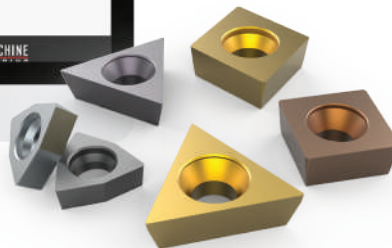


## WOHLHAUPTER® INSERTS

### Boring Insert Selector

- ▶ Generate the correct boring insert for your job in just six easy steps
- ▶ Choose type, shape, substrate, insert form, nose radius, and material

[alliedmachine.com/bis](http://alliedmachine.com/bis)



## Product Selector

- ▶ Find the right tool for the job
- ▶ Guides you through steps to generate the right tool for your application
- ▶ Learn about your recommended tool and how to maximise its performance



[alliedmachine.com/ProductSelector](http://alliedmachine.com/ProductSelector)

## Machinist Tool App

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









# ALLIED MACHINE & ENGINEERING

## Warranty Information



Allied Machine & Engineering warrants to original equipment manufacturers, distributors, industrial and commercial users of its products that each new product manufactured or supplied by Allied Machine shall be free from defects in material and workmanship.

Allied Machine's obligation under this warranty is limited to furnishing without additional charge a replacement or, at its option repairing or issuing credit for any product which shall within one year from the date of sale 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 materials or workmanship.

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

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Allied Machine shall have no liability or responsibility on any claim of any kind, whether in contract, tort or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery or use of any product sold hereunder, in excess of the cost of replacement or repair as provided herein.

ALL PRICES, DELIVERIES, DESIGNS and MATERIALS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



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