

holemaking  
**SOLUTIONS**



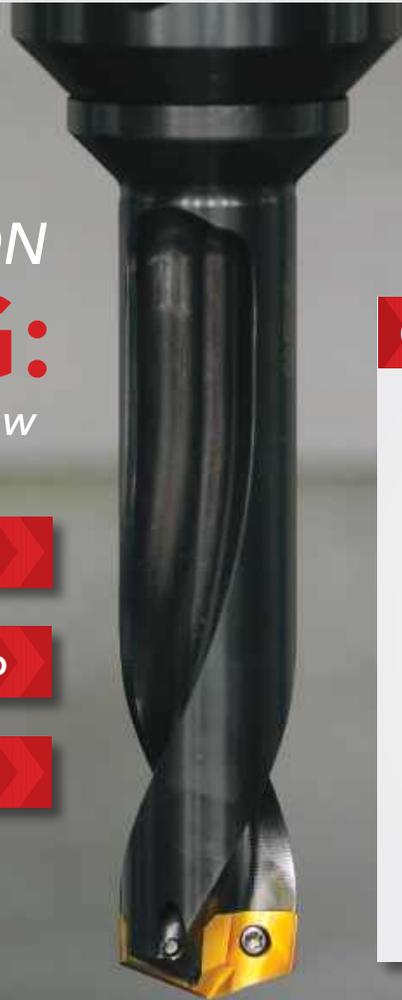
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HIGH PENETRATION  
**DRILLING:**  
*what you need to know*

**01** Using proper coolant

**02** Avoiding edge build-up

**03** Reducing heat

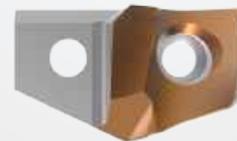


Our featured *solutions:*

GEN3SYS® **XT Pro**



GEN3SYS® **XT**



REPLACEABLE INSERT DRILLS

**VS**

SOLID CARBIDE DRILLS



**ALLIED MACHINE  
& ENGINEERING**

Allied Machine offers a wide range of drilling, boring, reaming, burnishing, and threading tools to lower your **cost-per-hole**.

# What can high penetration do for you?

## ► Check out these *real life results*

### Geometry Matters

A customer manufactures transmission parts for the automotive industry. Because they needed to increase production to accommodate for additional orders, tool life became an issue.

TEST 1	Previous Tooling	GEN3SYS® XT (standard)
Tool Life	1,500 parts	1,500 parts

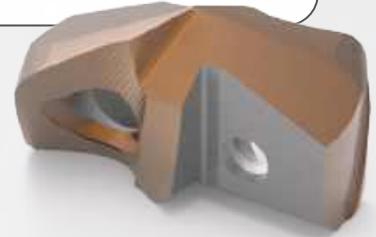
With a raised eyebrow, the customer expressed his disappointment with the results. However, a simple change of geometry told a completely different story.

TEST 2	Previous Tooling	GEN3SYS® XT (CI Geometry)
Tool Life	1,500 parts	<b>10,400</b> parts

By testing a different geometry on the XT insert, the customer achieved **nearly 7x** the tool life of their previous tooling.

**DID YOU KNOW?**

By investing in the GEN3SYS XT or XT Pro, your holder can be used for multiple diameters within the same series. Not only that, but your holder can also be used with different geometries. That means you can use one holder for multiple jobs by simply changing out the insert.



### Cater to Your Machine *Like a PRO*

The customer drills medium carbon tube sheets.

Unsatisfied with the tool life and surface finish of their tooling, the customer needed an improved solution. The hang-up was their machine, which was limited to 1250 RPM.

The high penetration capabilities of the GEN3SYS XT Pro solved this problem, performing impressively under the customer's machine limitations.

RPM	1250
SFM	245
IPM	15

#### Results:

- Superior surface finish
- 3x increase in tool life

This application illustrates the versatility of the XT Pro when you're faced with machine limitations. The XT Pro is designed to be run at higher feeds, so you don't have to live with the poor results your other tooling delivers.

Toss it out, grab an XT Pro, and improve both your parts and your productivity.

### Find Success Where None Was Found Before

The customer tried different options to drill a 23mm diameter hole anywhere from 1" - 2.5" DOC, including replaceable insert drills, high penetration replaceable insert drills, IC drills, and even solid carbide drills. None of these options could exceed 100 SFM without catastrophic failure, and no drill finished more than two holes before problems arose.

	GEN3SYS® XT Pro: Steel (P) Geometry
Material	D2 Tool Steel (55 Rc)
Speed	100 SFM
Feed	0.007 IPR
Load Meter	65% consistently
Tool Life	18 total parts (some with 2 holes, some with 4 holes) = 40 total linear inches
Results	Spectacular chip control, minimal insert wear

The GEN3SYS XT Pro succeeded in an environment and application where no drills had succeeded before. The unique coating/geometry combinations provided new solutions to improve production and quality for the customer.

### Improve Your Machine Usage

A customer manufactures parts for the automotive industry. Previously, they used a special solid carbide drill that required two machines to fulfill their order. Occupying two machines for this job left them shorthanded for other projects that also needed completed.

	Solid Carbide Drill	GEN3SYS® XT
N (RPM)	2,500	1,500
f (mm/min)	0.1 (250) mm/rev	0.28 (420) mm/rev
Tool Life	12,800 holes (3 regrinds)	<b>20,000 holes</b> (no regrinds)

The GEN3SYS XT increased the penetration rate, which allowed the process to be performed on one machine instead of two. This freed up equipment and resources for other jobs and orders. Ultimately, by running the process 68% faster, the customer was able to get 68% more parts on the floor.

# 1.330.343.4283

Call now to speak with a **HOLEMAKING SPECIALIST**. The Allied engineers are standing by, ready to help you make your application a success.



## Increase Your **PRODUCTIVITY**



01

### Get What You Want

You want high productivity. You want hole quality. You want speed.

When you're drilling a hole, the tool path will stay the same no matter the speed. The problem is that when speed and feed rates increase, you also see an increase in any problems that were occurring at the slower speed. A common problem you might experience is the removal of heat and chips throughout the drilling process.

How do you combat these issues? If you can increase your penetration rates, you can increase your productivity. The higher your production, the more parts you can produce, resulting in higher profits.

And you like it when profits grow.



02

### Keep Your Cool(ant)

When you increase your speeds and feeds, you need to ensure there is sufficient coolant to maximize the performance of your tooling. Coolant aids the removal of chips, which if not removed properly can cause chip packing. Increasing penetration rates also increases the heat created in the hole, leading to shorter tool life.

Tooling designed to create and effectively evacuate small chips will help you achieve the higher penetration rates you need. Also, proper tool coatings can increase heat resistance, allowing the tool to last much longer.



03

### Chips and Edge Build-up

Keep chips away from cutting edges. Your tool's cutting edge has microscopic crevices along its surface, and fresh, soft chips will fill in those crevices if they come into contact.

You need tooling designed to prevent that contact. Edge build-up physically changes the cutting edge, causing changes in the tool's performance. This can lead to tool failure, which will lead to machine downtime, which will lead to decreased production.



**ALLIED MACHINE  
& ENGINEERING**

Holemaking Solutions for Today's Manufacturing

# HIGH PENETRATION DRILLING SOLUTIONS



Whatever type of holemaking 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 holemaking and finishing solutions are backed by our complete 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.

## Production Facilities

When demand for parts increases, high penetration tooling helps you push more finished parts out the door in shorter time - *using the equipment you already have*. You don't need to purchase or utilize additional machines and equipment to meet the demand.

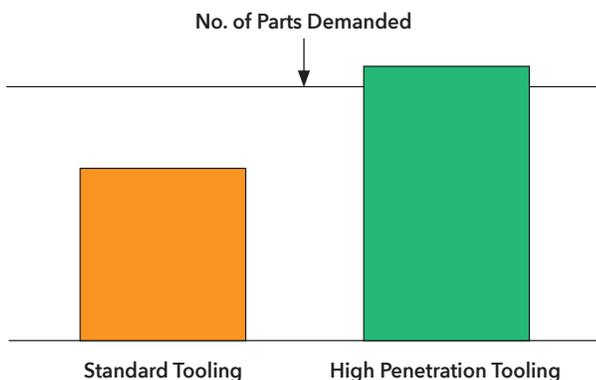
Also, the increased tool life reduces machine downtime. With replaceable insert drills, you don't need to change out an entire tool; you just swap out the insert and continue drilling.

### Scenario

- Customer needs 50,000 parts in 10 days
- Your tooling can drill 400 parts per hour
- 400 parts/hr • 8 hrs/day • 5 days/wk • 2 weeks = 32,000 parts
- Where do the remaining 18,000 parts come from?
  - Do you pull a machine from another project to finish the job?
  - Do you buy another machine to finish the job?
  - Do you pay overtime to finish the parts?
  - Do you outsource the rest of the job to someone else?

### Solution

- Customer needs 50,000 parts in 10 days
- High penetration tooling can drill 650 parts per hour
- 650 parts/hr • 8 hrs/day • 5 days/wk • 2 weeks = 52,000 parts
- Meet the demand without increasing your costs
  - You don't need additional machines or equipment
  - You can meet the demand within the time frame
  - You can reduce downtime by increasing tool life



## Job Shops

If you're working at an hourly rate, you need as much production as possible from every minute. High penetration tooling helps increase profits by speeding up current jobs so you can bring on new additional projects you couldn't do before.

When you can produce current jobs faster, it allows you to earn more money with your time - and that money goes straight to your company's bottom line.

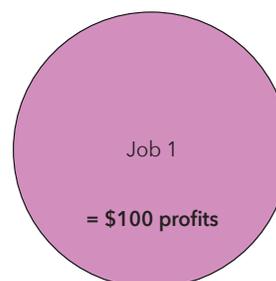
### Scenario

- First project takes one full hour (60 minutes) to complete
- The project is worth \$100
- You have a second project that takes 25 minutes to complete
- The project is worth \$100
- How can you get both projects done in the same hour?
  - Do you use an additional machine to run the first job?
  - Do you buy another machine to run the second job?
  - Do you forfeit the profits of the second job?

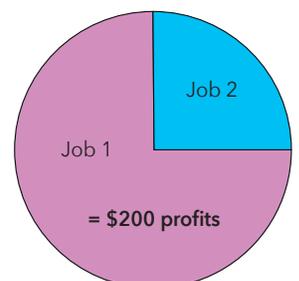
### Solution

- High penetration tooling can finish the first project in 45 minutes
- You still earn the \$100 like you did before
- Now you can finish the second project
- High penetration tooling can finish the second project in 15 minutes
- You add \$100 to your bottom line that wasn't there before
  - You don't need additional machines or equipment
  - You increase the number of jobs you can perform

1 Hour of Machine Time with Standard Tooling



1 Hour of Machine Time with High Penetration Tooling



# Having trouble with chip evacuation?

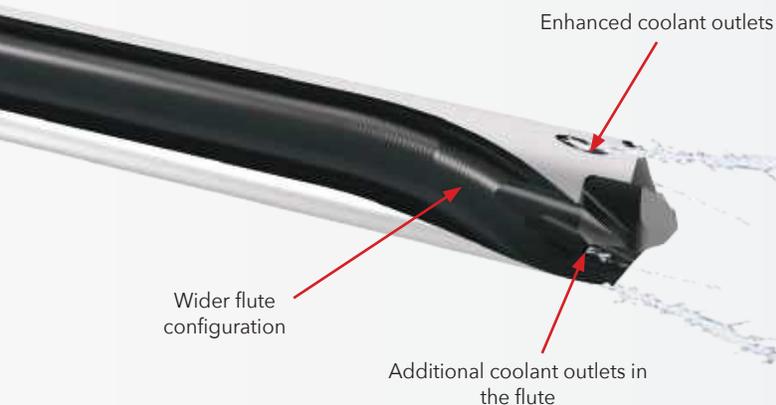
## Impacted Chips

It doesn't always happen, but sometimes increasing your penetration rates can complicate chip evacuation. Depending on the hole depth and material, the cutting zone inside the hole can become too tight for certain tooling to flush out the chips.

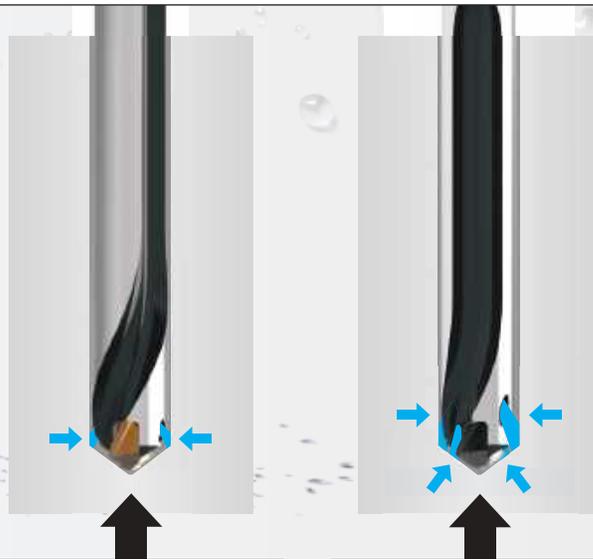
The **GEN3SYS® XT Pro** holder (see image below) is designed to increase the amount of coolant to the cutting zone. The drill contains 4 total coolant outlets (1 for each side outlet and 1 for each flute outlet), supplying more coolant to flush the chips and prevent them from becoming impacted.

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 make all the difference.



In some applications, certain environmental factors hinder chip evacuation, causing chips to become impacted at the bottom of the hole. When this happens, the problem could be quickly solved by simply increasing the coolant flow to the cutting zone. In this case, the **GEN3SYS® XT Pro** provides the answer.



Limited space can minimize the coolant's impact and complicate the chip evacuation process.

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

## High penetration application insiders

### Radial Rake, AKA Speed

Unlike traditional spade drills, high penetration tooling relies primarily on speed to achieve chip control. However, both speed and feed need to be adjusted in order to optimize chip formation and tool life for your application.

### Effects of Speed and Feed

One key advantage that high penetration tools hold over traditional spade drills is that they can perform and achieve results at higher spindle speeds and lower feed rates.

### High Penetration Rates = High Coolant Demands

High penetration drilling requires a high volume of coolant as well as high pressures in order to properly evacuate chips and keep heat from the cutting edge.

### The Right Coating Makes All the Difference

Different coatings can help protect high penetration inserts from heat damage and edge build-up. Coatings designed for optimal performance in certain materials will help improve tool life drastically over general coating options.

## How to choose what's right for you



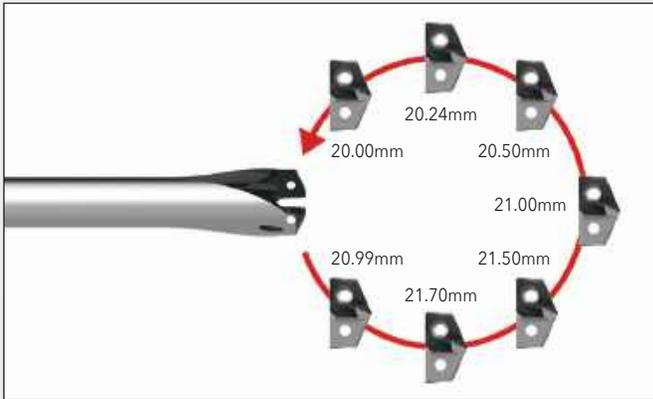
	GEN3SYS® XT	GEN3SYS® XT Pro
<b>Production</b>	Lower volume	Higher volume
<b>Range of Parts/Jobs</b>	Higher range (many different parts, low quantities)	Lower range (few different parts, high quantities)
<b>Coating(s)</b>	AM300®	AM420®, AM440®, TiN
<b>Geometries</b>	Standard Cast Iron Low Rake Stainless Steel	Steel Cast Iron Non-Ferrous Materials
<b>Diameters</b>	11mm - 32mm	11mm - 32mm
<b>Holder Lengths</b>	Stub, 3xD, 5xD, 7xD	3xD, 5xD, 7xD, 10xD
<b>Holder Styles</b>	Drill/chamfer Straight flute Helical flute	Straight flute



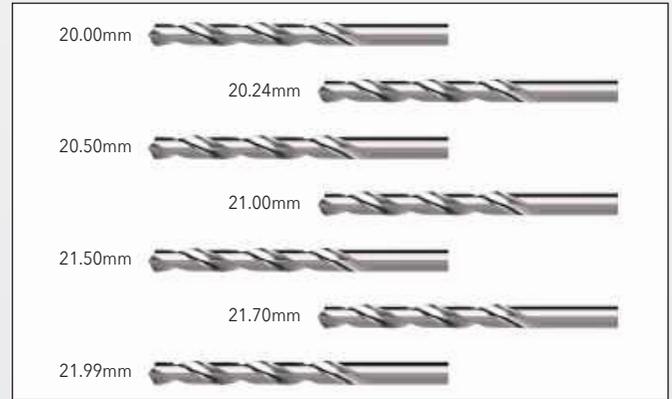
## REPLACEABLE INSERT DRILLS

# VS

## SOLID CARBIDE DRILLS



### ONE HOLDER, **MANY** DIAMETERS



### ONE TOOL, **ONE** DIAMETER

#### Versatility

Each replaceable insert drill holder can accommodate a range of diameters. For example, a single 20 series GEN3SYS XT Pro holder will cover a diameter range of 20.00mm - 21.99mm.

#### Reduced Downtime

Did you wear out an insert? No problem; take it out, put in a new one, and keep drilling. You don't need to change out the entire tool, which reduces the downtime in your production process. Also, there's no need to reset your tool length.

#### No Regrind Float

Because the inserts are designed to be quickly replaced, there's no need to send tools away for regrind. That means you don't need to have a second round of tooling to cover the time while your first round is out for regrind.

#### Limitations

Each solid carbide drill is limited to one specific diameter. If different diameters are required, a new drill is needed for each different diameter, which increases tooling costs.

#### Reduced Throughput

When your tool breaks, you need to stop the entire operation to replace it. This takes time away from your production and ultimately reduces your throughput.

#### Regrind Downfalls

Because solid carbide tooling is so expensive, it's not cost effective to buy a new one anytime you need it. You have to send tools away for regrind, which means you need back-up tooling to use while they're gone. Plus, regrind tools *rarely* perform the same as new tools.



#### What else do we offer?

Allied Machine offers numerous holemaking and finishing products to help you improve your processes. From multiple drilling options to boring, reaming, burnishing, and threading, we have the answer for you.



Drilling



Boring



Reaming



Burnishing



Threading



Specials

Allied Machine offers expert engineering support. Whether you need a quote, a test, or an application solution, a highly skilled and trained engineer is standing by, ready to help.

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