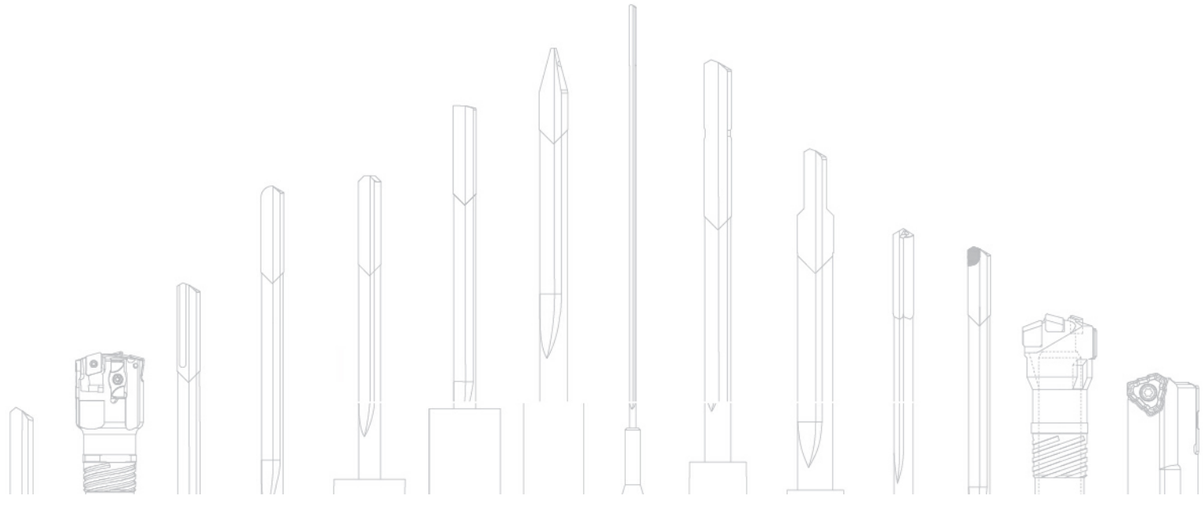
Uvat S.r.l.
corso Bramante 65 , 10126, Torino, ITALY
Tel. (+39) 011.6638846
www.uvat.it
info@uvat.it

SPECIALIZED FOR DEEP HOLE SOLUTIONS

2023

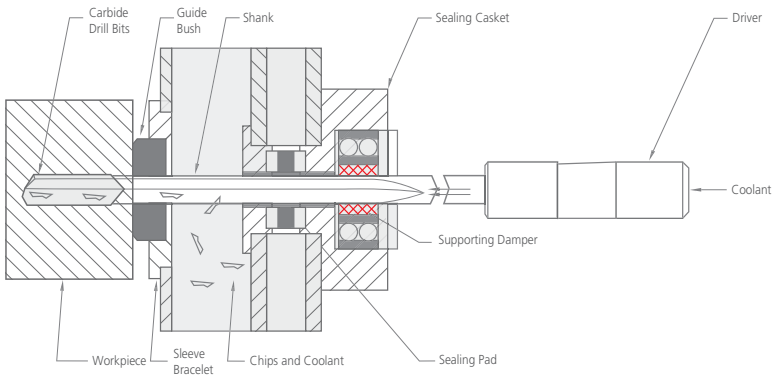
Specialized for Deep Hole Solutions



The gun drill has a decisive impact on the generation and development of deep hole drilling technology. The single flute drills can achieve high quality drilling tolerance, surface and small vibration variance. This allows the gun drill to be used in precise hole machining. In practical application, the direct drills operation can replace part of the reaming operation, which has a strong sense of mechanical reliability.

The gun drill is composed of carbide drill bit, drill rod, and driver, which can be suitable for most of material processing, such as cast iron, stainless steel, aluminum, graphite, wood products, and all kinds of nonferrous metals. The gun drill is a single flute cutting tool, the hole needs to be guided by the guide bush. With the development of the CNC machine industry, gun drill tools are suitable not only for their own use, but also for CNC lathes and machining centers.

Shin-IL company can produce drill tools with diameter of 1 mm-50mm, the length ratio is more than 250x, and the longest length can reach 5000mm. The pattern of drill tool is divided into standard gun drills and non standard ( step gun drills, spherical gun drills, etc. ). Coating and PCD gun drills, overall solid carbide drills, and indexable insert gun drills etc are all available.




- Use vertical and horizontal equipment with a high pressure internal cooling system
- Use special cutting oil or coolant for deep hole drilling and make sure to provide sufficient pressure and flowrate.
- Because the gun drill without self-center orientation, so in the processing it must use guide sleeve or pilot hole, serves as centering for gun drill machining.
- Using the correct machining parameters for optimal drilling hole processing.

Maximum Length
5000mm

Diameter Range
1mm-50mm

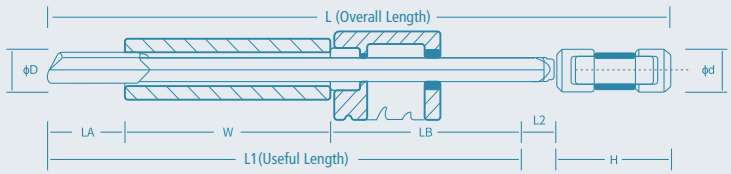




## Gun Drill Order Format And The Calculation of Length

1. The nominal cutting blade diameter can be subdivided to 0.001mm according to customer needs
2. Please mark the order according to the following standard

**D(Drill Bit Diameter) x L(Overall Length) – Driver Number**




| | | | | |
|---|---|---|---|---|
| L(overall length) | D=drill bit diameter | W=drilling depth | L=overall length | LB=width of supporting guide casket |
| L1(useful length) | H=driver number | LA=drill tip length | L1=useful length | L2=minimum for chips discharge allow |

overall length calculated as follows:

overall length= LA (drill tip length) + W (drilling depth) + LB (width of supporting guide casket) + L2 (minimum for chips discharge allow) + H (driver length)

3. Please highlight the workpiece material, hardness, hole tolerance, and hole roughness
4. Mark the driver code number ( catalog page23, page24. page28.)

## Extra Technical Service

### Grinding Tools

Provide carbide gun drill grinding service according to customer request

### Replace, and weld the new carbide drill ( Assume drill driver and rod are available for use )

1.Check the status of the gun drill
2.Remove worn or damaged drill bits and drill rods
3.Install and weld a new bit
4.Calibrate the gun drill

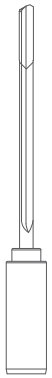
### Replace and renew drill tips and rods. ( Assume drill driver is available for use )

1.Check the status of the gun drill
2.Remove worn or damaged drill bits and drill rods
3.Install and weld new drill bits and drill rods
4.Calibrate the gun drill

### Coating Service

Provide standard and necessary coating service for drilling tools.

## Brazed Single Flute Gun Drill



The brazed single flute gun drill can be manufactured according to various carbide material selections according to the work piece material with a fully welded drill tip, drill rod and drill driver through reasonable tool design. The bit is usually made of integral solid carbide, with the tip portion welded to a heat treated drill rod and then linked to a finely polished steel drill driver. For special materials of the workpiece, drill bits can also be treated with different kinds of coatings.

Maximum Length
5000mm

Diameter Range
2.00-40.00

### Product Features

Hole drilling can be processed in good precision , high cutting stability, excellent drilling quality (straightness, roughness, roundness). Drill bits can be sharpened several times. It can be customized according to customer requirements and can also be used for gun drilling machines, machining centers and modified lathes.

## Brazed Twin Flute Gun Drill

Brazed twin flute gun drill has two symmetrical cutting blades, which has the same cutting fluid circulation system as the single flute gun drill. The cutting flute has two oil holes in the cutting head provided coolant to the blades. The mixture of the coolant and chips are discharged from the "V" groove outside of the cutting tube. Brazed twin flute gun drill is made with drill tip, rod, and driver welded to a whole body, and can also be made of full carbide material. However, due to the limited discharge space of twin flute gun drill, it is suitable for processing soft and brittle materials.

Maximum Length
3000mm

Diameter Range
6.00- 25.00

### Product Features

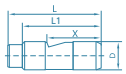
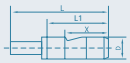
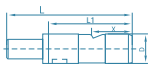
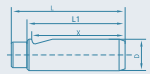
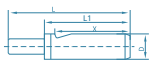
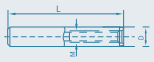
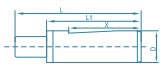
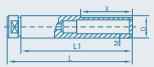
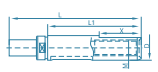
Faster drilling speed than single flute gun drill. But only limited to the processing of cast iron or similar products.

## Stock of Brazed Single Flute Gun Drill

| Specification | 235mm(L) | | 270mm(L) | | Driver | 800 mm (L) | 1000 mm (L) | 1200 mm (L) | 1440 mm (L) | 1650 mm (L) | 1800 mm (L) | Driver |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Standard | Coating | Standard | Coating | | | | | | | | |
| φ3.02 | ◆ | ◆ | | | 10*40 | ◆ | ◆ | | | | | 25*70 |
| φ3.52 | ◆ | ◆ | | | | ◆ | ◆ | | | | | |
| φ4.02 | ◆ | ◆ | | | | ◆ | ◆ | ◆ | | | | |
| φ4.52 | ◆ | ◆ | | | | ◆ | ◆ | ◆ | | | | |
| φ5.02 | ◆ | ◆ | | | | ◆ | ◆ | ◆ | ◆ | | | |
| φ5.52 | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | | | |
| φ6.02 | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ6.52 | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ7.02 | ◆ | ◆ | ◆ | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ7.52 | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ8.02 | ◆ | ◆ | ◆ | | | | ◆ | ◆ | ◆ | ◆ | ◆ | |
| φ8.52 | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ9.02 | ◆ | ◆ | ◆ | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ9.52 | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ10.02 | ◆ | ◆ | ◆ | | | | ◆ | ◆ | ◆ | ◆ | ◆ | |
| φ10.52 | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | ◆ | | |
| φ11.02 | ◆ | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | | |
| φ11.52 | ◆ | ◆ | | | | | | ◆ | ◆ | ◆ | | |
| φ12.02 | ◆ | ◆ | ◆ | | | | | ◆ | ◆ | ◆ | ◆ | |

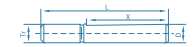
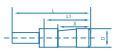
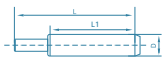
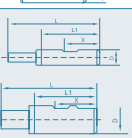
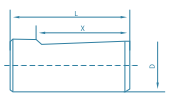
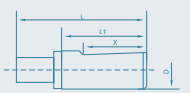
◆ = available stock

## Standard Driver of The Brazed Gun Drill

| Specification | Diameter (mm) | Drawing | Length Calculation | | Fix Position X | Screw Spec M |
|---|---|---|---|---|---|---|
| | | | L1 | L | | |
| SH10-00 | 10 |  | 40 | | 24.0 | |
| SH16-03 | 16 | | 45 | 53 | 31.0 | |
| SH25-00 | 25 | | 70 | 78 | 34.0 | |
| SH10-01 | 10 |  | 40 | 57 | 24.0 | |
| SH16-04 | 16 | | 45 | 72 | 31.0 | |
| SH25-01 | 25 |  | 70 | 105 | 34.0 | |
| SH16-02 | 16 |  | 50 | 58 | 47.5 | |
| SH16-33 | 16 |  | 50 | 77 | 47.5 | |
| SH10-06 | 10 |  | 60 | | | M6x0.5 |
| SH16-15 | 16 | | 80 | | | M10x1 |
| SH25-08 | 25 | | 100 | | | M16x1.5 |
| SH10-28 | 10 | | 60 | 77 | | M6x0.5 |
| SH16-22 | 16 | | 60 | 105 | | M10x1 |
| SH25-10 | 25 | | 100 | 140 | | M16x1.5 |
| SH12.7-00 | 12.7 | | 38.1 | | 25.3 | |
| SH19.05-01 | 19.05 | | 70 | | 45.0 | |
| SH25.4-00 | 25.4 | | 70 | | 57.5 | |
| SH31.7-00 | 31.7 | | 70 | | 57.5 | |
| SH38.1-01 | 38.1 | | 70 | | 57.5 | |
| SH19.05-11 | 19.05 |  | 70 | 97 | 45.0 | |
| SH25.4-11 | 25.4 | | 70 | 100 | 57.5 | |
| SH31.7-01 | 31.7 | | 70 | 111 | 57.5 | |
| SH38.1-01 | 38.1 | | 70 | 110 | 57.5 | |
| SH10-44 | 10 |  | 60 | 68 | 35 | M6x0.5 |
| SH16-31 | 16 | | 80 | 90 | 37 | M10x1 |
| SH25-34 | 25 | | 100 | 100 | 45 | M16x1.5 |
| SH16-66 | 16 |  | 80 | 80 | 37 | M10x1 |
| SH25-40 | 25 | | 100 | 100 | 45 | M16x1.5 |
| SH10-30 | 10 | | 40 | 40 | 28.0 | |
| SH12-14 | 12 | | 45 | 45 | 33.0 | |
| SH16-70 | 16 | | 48 | 48 | 36.0 | |
| SH20-56 | 20 | | 50 | 50 | 38.0 | |





| Specification | Diameter (mm) | Drawing | Length Calculation | | Fix Position X | Screw Spec M |
|---|---|---|---|---|---|---|
| | | | L1 | L | | |
| SH16-00 | 16 |  | 112 | | 73.0 | TR16x1.5 |
| SH20-00 | 20 | | 126 | | 82.0 | TR 20x2 |
| SH28-00 | 28 | | 126 | | 82.0 | TR 28x2 |
| SH36-00 | 36 | | 162 | | 109.0 | TR 36x2 |
| SH16-21 | 16 | | 40 | | 28.0 | |
| SH25-16 | 25 | | 50 | | 35.0 | |
| SH35-00 | 35 | | 60 | | 40.0 | |
| SH16-30 | 16 |  | 40 | 67 | 28.0 | |
| SH25-20 | 25 | | 50 | 77 | 35.0 | |
| SH35-01 | 35 | | 60 | 100 | 40.0 | |
| SH10-40 | 10 | | 40 | | | |
| SH12-18 | 12 | | 45 | | | |
| SH16-11 | 16 | | 48 | | | |
| SH20-01 | 20 | | 50 | | | |
| SH25-11 | 25 | | 56 | | | |
| SH32-24 | 32 | | 60 | | | |
| SH40-03 | 40 | | 70 | | | |
| SH10-41 | 10 |  | 40 | 57 | | |
| SH12-19 | 12 | | 45 | 62 | | |
| SH16-20 | 16 | | 48 | 75 | | |
| SH20-60 | 20 | | 50 | 77 | | |
| SH25-21 | 25 | | 56 | 86 | | |
| SH32-23 | 32 | | 60 | 100 | | |
| SH40-04 | 40 | | 70 | 110 | | |
| SH10-11 | 10 | | 40 | | 23.5 | |
| SH12-07 | 12 | | 45 | | 26.5 | |
| SH16-32 | 16 | | 48 | | 29.0 | |
| SH20-29 | 20 | | 50 | | 30.5 | |
| SH25-22 | 25 | | 56 | | 38.0 | |
| SH32-10 | 32 | | 60 | | 43.0 | |
| SH40-13 | 40 | | 70 | | 47.0 | |
| SH10-23 | 10 |  | 40 | 57 | 23.5 | |
| SH12-02 | 12 | | 45 | 62 | 26.5 | |
| SH16-53 | 16 | | 48 | 75 | 29.0 | |
| SH20-34 | 20 | | 50 | 77 | 30.5 | |
| SH25-31 | 25 | | 56 | 86 | 38.0 | |
| SH32-11 | 32 | | 60 | 100 | 43.0 | |
| SH40-14 | 40 | | 70 | 110 | 47.0 | |
| SH10-20 | 10 |  | 40 | | 28.0 | |
| SH12-08 | 12 | | 45 | | 33.0 | |
| SH16-47 | 16 | | 48 | | 36.0 | |
| SH20-40 | 20 | | 50 | | 38.0 | |
| SH25-36 | 25 | | 56 | | 44.0 | |
| SH32-12 | 32 | | 60 | | 48.0 | |
| SH40-18 | 40 | | 70 | | 66.0 | |
| SH10-24 | 10 |  | 40 | 57 | 28.0 | |
| SH12-05 | 12 | | 45 | 62 | 33.0 | |
| SH16-51 | 16 | | 48 | 75 | 36.0 | |
| SH20-43 | 20 | | 50 | 77 | 38.0 | |
| SH25-37 | 25 | | 56 | 86 | 44.0 | |
| SH32-13 | 32 | | 60 | 100 | 48.0 | |
| SH40-17 | 40 | | 70 | 110 | 66.0 | |
| SH10-29 | 10 | | 40 | | 28.0 | |
| SH12-13 | 12 | | 45 | | 33.0 | |
| SH16-62 | 16 | | 48 | | 36.0 | |
| SH20-55 | 20 | | 50 | | 38.0 | |

BRAZED GUN DRILLS

## Machining Parameters of The Brazed Single Flute Gun Drill

| Workpiece Material | Spring Steel<br>Preharden Steel<br>Cast Iron<br>Chilled Cast Iron<br>Titanium Alloy<br>Special Steel<br>( Nickel Base Heat Resistant Alloy<br>Nickel Alloy ) | Stainless Steel<br>Anti Corrosive Stainless Steel<br>Austenitic Stainless Steel<br>18~25%Cr<br>Ni＞8% | Martensitic Stainless Steel<br>Ferritic Steel<br>( Normal Stainless Steel<br>Cast Stainless Steel )<br>13~25%Cr<br>Free Cutting Steel<br>( Sulphurized Steel ) | Allov Steel<br>Quenching and Tempered Steel<br>Case Hardened Steel<br>Nitriding Steel<br>Tool Steel<br>( ＞900N/mm² ) | Cast Iron<br>Grey Cast Iron<br>( ＜300N/mm² )<br>Nodular Cast Iron<br>( ＜400N/mm² ) | Cast Iron<br>Grey Cast Iron<br>( ＜300N/mm² )<br>Grey Cast Iron<br>( ＜400N/mm² )<br>Malleable Cast Iron<br>White Heart Malleable Cast Iron<br>Black Heart Malleable Cast Iron | Structural Steel<br>Quenching and Tempered Steel<br>High Carbon Low Alloy Steel<br>Case Hardened Steel<br>Nitriding Steel<br>Tool Steel<br>( ＞900N/mm² )<br>Free Cutting Steel | Brass<br>Bronze<br>Copper<br>Plastic | Aluminium<br>Cast Aluminium<br>Si＞5%<br>Free Cutting Aluminium | Aluminium<br>Cast Aluminium<br>Si＞5%<br>Non Quenched Aluminium |
|---|---|---|---|---|---|---|---|---|---|---|
| Cutting Speed m / min | 25~60 | 30~60 | 40~70 | 60~80 | 60~90 | 70~100 | 70~100 | 80~150 | 80~160 | 100~300 |
| Diameter Φ | Feed Rate: mm / rev | | | | | Feed Rate: mm / rev | | | | |
| 2.0~2.49 | 0.001~0.002 | 0.002~0.005 | 0.002~0.006 | 0.002~0.005 | 0.005~0.018 | 0.005~0.019 | 0.003~0.007 | 0.003~0.015 | 0.002~0.012 | 0.005~0.005 |
| 2.5~2.99 | 0.001~0.005 | 0.004~0.007 | 0.004~0.007 | 0.004~0.006 | 0.008~0.028 | 0.008~0.02 | 0.005~0.010 | 0.005~0.020 | 0.004~0.026 | 0.004~0.008 |
| 3.0~3.49 | 0.002~0.007 | 0.006~0.008 | 0.005~0.009 | 0.005~0.007 | 0.009~0.038 | 0.009~0.038 | 0.007~0.012 | 0.006~0.030 | 0.006~0.037 | 0.006~0.012 |
| 3.5~3.99 | 0.004~0.008 | 0.008~0.009 | 0.007~0.011 | 0.007~0.010 | 0.011~0.042 | 0.011~0.046 | 0.009~0.015 | 0.007~0.045 | 0.007~0.055 | 0.007~0.025 |
| 4.0~4.49 | 0.006~0.009 | 0.009~0.010 | 0.008~0.013 | 0.008~0.012 | 0.012~0.047 | 0.012~0.050 | 0.012~0.019 | 0.008~0.050 | 0.008~0.071 | 0.008~0.026 |
| 4.5~4.99 | 0.008~0.011 | 0.010~0.013 | 0.009~0.017 | 0.011~0.015 | 0.016~0.052 | 0.016~0.057 | 0.014~0.020 | 0.009~0.057 | 0.009~0.094 | 0.009~0.028 |
| 5.0~5.99 | 0.010~0.014 | 0.012~0.015 | 0.013~0.019 | 0.013~0.018 | 0.018~0.065 | 0.018~0.068 | 0.016~0.026 | 0.010~0.069 | 0.010~0.109 | 0.010~0.036 |
| 6.0~6.99 | 0.012~0.016 | 0.014~0.017 | 0.015~0.023 | 0.015~0.022 | 0.024~0.071 | 0.024~0.074 | 0.018~0.028 | 0.012~0.079 | 0.012~0.125 | 0.012~0.045 |
| 7.0~7.99 | 0.015~0.018 | 0.016~0.019 | 0.018~0.026 | 0.018~0.025 | 0.028~0.084 | 0.028~0.085 | 0.021~0.035 | 0.014~0.092 | 0.018~0.130 | 0.014~0.049 |
| 8.0~8.99 | 0.018~0.021 | 0.018~0.021 | 0.020~0.031 | 0.020~0.027 | 0.032~0.092 | 0.032~0.096 | 0.024~0.036 | 0.016~0.101 | 0.020~0.144 | 0.016~0.056 |
| 9.0~9.99 | 0.021~0.025 | 0.020~0.028 | 0.023~0.034 | 0.023~0.030 | 0.036~0.110 | 0.036~0.114 | 0.027~0.040 | 0.018~0.113 | 0.023~0.158 | 0.018~0.034 |
| 10.0~11.99 | 0.025~0.030 | 0.025~0.033 | 0.025~0.041 | 0.025~0.038 | 0.045~0.116 | 0.050~0.120 | 0.030~0.04 | 0.020~0.139 | 0.025~0.174 | 0.020~0.074 |
| 12.0~13.99 | 0.027~0.033 | 0.030~0.044 | 0.030~0.045 | 0.029~0.044 | 0.051~0.126 | 0.060~0.138 | 0.036~0.060 | 0.024~0.156 | 0.030~0.182 | 0.024~0.087 |
| 14.0~15.99 | 0.029~0.040 | 0.035~0.044 | 0.035~0.052 | 0.035~0.050 | 0.057~0.138 | 0.070~0.154 | 0.042~0.071 | 0.028~0.179 | 0.035~0.194 | 0.028~0.099 |
| 16.0~17.99 | 0.033~0.044 | 0.041~0.050 | 0.042~0.060 | 0.039~0.053 | 0.620~0.158 | 0.079~0.170 | 0.048~0.079 | 0.033~0.199 | 0.050~0.209 | 0.033~0.108 |
| 18.0~19.99 | 0.037~0.049 | 0.045~0.062 | 0.045~0.067 | 0.044~0.060 | 0.066~0.173 | 0.090~0.191 | 0.054~0.091 | 0.036~0.244 | 0.054~0.228 | 0.036~0.130 |
| 20.0~23.99 | 0.041~0.054 | 0.049~0.071 | 0.050~0.079 | 0.049~0.069 | 0.069~0.189 | 0.106~0.207 | 0.060~0.107 | 0.040~0.249 | 0.060~0.254 | 0.040~0.146 |
| 24.0~27.99 | 0.045~0.057 | 0.052~0.083 | 0.054~0.090 | 0.054~0.0077 | 0.076~0.210 | 0.120~0.221 | 0.069~0.117 | 0.048~0.291 | 0.072~0.295 | 0.048~0.169 |
| 28.0~31.99 | 0.049~0.062 | 0.057~0.091 | 0.059~0.098 | 0.059~0.085 | 0.079~0.212 | 0.140~.0237 | 0.079~0.134 | 0.056~0.327 | 0.084~0.360 | 0.056~0.194 |
| 32.0~40.0 | 0.052~0.065 | 0.063~0.098 | 0.065~0.107 | 0.063~0.098 | 0.086~0.228 | 0.160~0.245 | 0.085~0.154 | 0.064~0.380 | 0.096~0.455 | 0.064~0.221 |

- The cutting speed and feed rate depend on : tool diameter, tool length, cutting fluid, workpiece material, characterization of machine and clamping condition. The processing parameters in the above table are the standard normal value for reference. The practical actual working conditions on site are the true value.

- The cutting speed and feed rate depend on : tool diameter, tool length, cutting fluid, workpiece material, characterization of machine and clamping condition. The processing parameters in the above table are the standard normal value for reference. The practical actual working conditions on site are the true value.

## Solid Carbide Gun Drill

The solid carbide gun drill is made of drill body (drill tip and drill rod integrated) and drill driver by welding as a whole. It can also be made by the whole carbide.( drill tip, rod, and driver integrated). Its stability, efficiency and tool life are better than the brazed type. This design ensures higher reliability and cutting performance while compromising higher rigidity and less distorted vibration. This results in longer tool life.

Maximum Length
550mm

Diameter Range
1.00-12.00

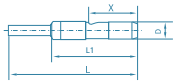
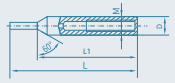
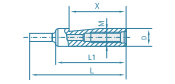
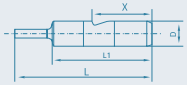
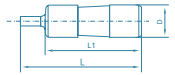
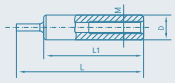
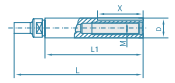
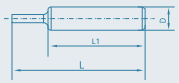
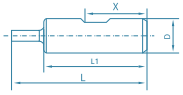
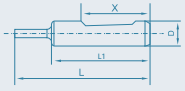
| Solid Carbide Gun Drill Stock Table | | |
|---|---|---|
| Φ1.52*160-10*55 | Φ2.0*250-10*135 | Φ3.8*185-4*38/50-L |
| Φ1.80*160-10*55 | Φ2.2*170-4*38/50 | Φ3.8*240-10*100-L |
| Φ2.02*160-10*55 | Φ2.5*175-4*38/50-L | Φ3.8*275-10*135-L |
| Φ2.02*180-10*55 | Φ2.5*230-10*100-L | Φ4.0*185-4*38/50-L |
| Φ2.02*180-10*55-L | Φ2.5*265-10*135-L | Φ4.0*240-10*100-L |
| Φ2.02*200-10*55 | Φ2.6*175-4*38/50-L | Φ4.0*275-10*135-L |
| Φ2.02*200-10*55-L | Φ2.6*265-10*135-L | Φ4.2*185-4*38/50-L |
| Φ2.52*180-10*55 | Φ2.8*175-4*38/50-L | Φ4.2*240-10*100-L |
| Φ2.52*180-10*55-L | Φ2.8*265-10*135-L | Φ4.2*275-10*135-L |
| Φ3.02*180-10*55 | Φ3.0*175-4*38/50-L | Φ4.5*285-10*135-L |
| Φ3.02*200-10*55 | Φ3.0*230-10*100-L | Φ4.8*250-10*100-L |
| Φ3.02*200-10*55-L | Φ3.0*265-10*135-L | Φ5.0*250-10*100-L |
| Φ2.8*170-2.9*30-L | Φ3.2*180-4*38/50-L | Φ5.0*260-10*100-L |
| Φ3.0*170-2.9*30-L | Φ3.2*230-10*100-L | Φ6.0*260-10*100-L |
| Φ3.2*170-3.1*30-L | Φ3.2*265-10*135-L | Φ6.0*295-10*135-L |
| Φ1.80*200-10*100 | Φ3.5*180-4*38/50-L | Φ7.0*280-10*100-L |
| Φ2.0*170-4*38/50 | Φ3.5*230-10*100-L | Φ9.0*280-10*100-L |
| Φ2.0*220-10*100 | Φ3.5*265-10*135-L | Φ10.0*280-10*100-L |

● L : TIALN





## Standard Driver of Soild Carbide Gun Drill

| Specification | Diameter (mm) | Drawing | Length Calculation | | Fix Position X | Screw Spec M |
|---|---|---|---|---|---|---|
| | | | L1 | L | | |
| SH6-03 | 6 |  | 30 | 45 | 17 | |
| SH10-15 | 10 |  | 55 | 70 | | M6x0.5 |
| SH10-37 | 10 |  | 40 | 55 | 32.7 | M6x0.5 |
| SH10-42 | 10 |  | 40 | 55 | 24 | |
| SH12.7-01 | 12.7 |  | 38 | 48 | 25.4 | |
| SH12.7-09 | 12.7 |  | 51 | 65 | | M6x0.5 |
| SH16-75 | 16 |  | 80 | 105 | 37 | M10x1 |
| SH4-08 | 4 |  | 34 | 46 | | |
| SH6-12 | 6 | | 36 | 50 | | |
| SH10-51 | 10 | | 40 | 55 | | |
| SH12-27 | 12 | | 45 | 60 | | |
| SH16-86 | 16 | | 48 | 63 | | |
| SH6-13 | 6 |  | 36 | 50 | 20 | |
| SH10-47 | 10 | | 40 | 55 | 23.5 | |
| SH12-30 | 12 | | 45 | 60 | 26.5 | |
| SH16-78 | 16 | | 48 | 63 | 29 | |
| SH6-01 | 6 |  | 36 | 50 | 25 | |
| SH10-49 | 10 | | 40 | 55 | 28 | |
| SH12-28 | 12 | | 45 | 60 | 33 | |
| SH16-84 | 16 | | 48 | 63 | 36 | |

SOLID CARBIDE GUN DRILLS

## Machining Parameters of Solid Carbide Gun Drill

| Workpiece Material | Spring Steel<br>Preharden Steel<br>Cast Iron<br>Chilled Cast Iron<br>Titanium Alloy<br>Special Steel<br>( Nickel Base Heat Resistant Alloy<br>Nickel Alloy ) | Stainless Steel<br>Anti Corrosive Stainless Steel<br>Austenitic Stainless Steel<br>18~25%Cr<br>Ni＞8% | Martensitic Stainless Steel<br>Ferritic Steel<br>( Normal Stainless Steel<br>Cast Stainless Steel )<br>13~25%Cr<br>Free Cutting Steel<br>( Sulphurized Steel ) | Allov Steel<br>Quenching and Tempered Steel<br>Case Hardened Steel<br>Nitriding Steel<br>Tool Steel<br>( ＞900N/mm² ) | Cast Iron<br>Grey Cast Iron<br>( ＜300N/mm² )<br>Nodular Cast Iron<br>( ＜400N/mm² ) | Cast Iron<br>Grey Cast Iron<br>( ＜300N/mm² )<br>Grey Cast Iron<br>( ＜400N/mm² )<br>Malleable Cast Iron<br>White Heart Malleable Cast Iron<br>Black Heart Malleable Cast Iron | Structural Steel<br>Quenching and Tempered Steel<br>High Carbon Low Alloy Steel<br>Case Hardened Steel<br>Nitriding Steel<br>Tool Steel<br>( ＞900N/mm² )<br>Free Cutting Steel | Brass<br>Bronze<br>Copper<br>Plastic | Aluminium<br>Cast Aluminium<br>Si＞5%<br>Free Cutting Aluminium | Aluminium<br>Cast Aluminium<br>Si＞5%<br>Non Quenched Aluminium |
|---|---|---|---|---|---|---|---|---|---|---|
| Cutting Speed m / min | 25~60 | 30~60 | 40~70 | 60~80 | 60~90 | 70~100 | 70~100 | 80~150 | 80~160 | 100~300 |
| Diameter Φ | Feed Rate: mm / rev | | | | | | | | | |
| 0.7~0.79 | 0.0004~0.0012 | 0.0005~0.0012 | 0.0007~0.0012 | 0.0005~0.0012 | 0.0009~0.0014 | 0.0007~0.0018 | 0.0004~0.0018 | 0.0005~0.0012 | 0.0007~0.0012 | 0.0005~0.0009 |
| 0.8~0.89 | 0.0006~0.0016 | 0.0070~0.0015 | 0.0011~0.0014 | 0.0006~0.0015 | 0.0012~0.0018 | 0.0010~0.0023 | 0.0004~0.0022 | 0.0008~0.0015 | 0.0012~0.0014 | 0.0008~0.0012 |
| 0.9~0.99 | 0.0009~0.0020 | 0.0011~0.0019 | 0.0014~0.0017 | 0.0009~0.0019 | 0.0015~0.0024 | 0.0014~0.0028 | 0.0007~0.0026 | 0.0011~0.0019 | 0.0017~0.0020 | 0.0011~0.0017 |
| 1.0~1.09 | 0.0013~0.0024 | 0.0014~0.0022 | 0.0019~0.0022 | 0.0010~0.0023 | 0.0019~0.0029 | 0.0018~0.0032 | 0.0010~0.0032 | 0.0015~0.0024 | 0.0020~0.0024 | 0.0015~0.0024 |
| 1.1~1.19 | 0.0017~0.0028 | 0.0017~0.0025 | 0.0022~0.0026 | 0.0013~0.0029 | 0.0025~0.0035 | 0.0022~0.0038 | 0.0014~0.0038 | 0.0019~0.0029 | 0.0022~0.0029 | 0.0019~0.0034 |
| 1.2~1.29 | 0.0020~0.0033 | 0.0020~0.0027 | 0.0024~0.0028 | 0.0015~0.0035 | 0.0031~0.0041 | 0.0030~0.0048 | 0.0018~0.0041 | 0.0024~0.0034 | 0.0024~0.0034 | 0.0024~0.0041 |
| 1.3~1.39 | 0.0023~0.0036 | 0.0022~0.0029 | 0.0031~0.0035 | 0.0020~0.0041 | 0.0040~0.0051 | 0.0039~0.0060 | 0.0020~0.0050 | 0.0028~0.0039 | 0.0026~0.0045 | 0.0026~0.0044 |
| 1.4~1.49 | 0.0026~0.0038 | 0.0023~0.0031 | 0.0034~0.0037 | 0.0021~0.0047 | 0.0047~0.0060 | 0.0049~0.0079 | 0.0021~0.0054 | 0.0031~0.0047 | 0.0028~0.0055 | 0.0032~0.0048 |
| 1.5~1.59 | 0.0029~0.0042 | 0.0024~0.0035 | 0.0035~0.0042 | 0.0021~0.0051 | 0.0053~0.0068 | 0.0056~0.0100 | 0.0021~0.0067 | 0.0032~0.0053 | 0.0035~0.0066 | 0.0038~0.0059 |
| 1.6~1.79 | 0.0035~0.0054 | 0.0036~0.0049 | 0.0040~0.0051 | 0.0024~0.0066 | 0.0064~0.0095 | 0.0064~0.0150 | 0.0028~0.0075 | 0.0035~0.0095 | 0.0040~0.0085 | 0.0040~0.0075 |
| 1.8~1.99 | 0.0040~0.0065 | 0.0040~0.0065 | 0.0050~0.0065 | 0.0030~0.0075 | 0.0070~0.0130 | 0.0070~0.0220 | 0.0030~0.0095 | 0.0040~0.0130 | 0.0050~0.0110 | 0.0050~0.0110 |
| 2.0~2.49 | 0.0050~0.0075 | 0.0050~0.0075 | 0.0050~0.0075 | 0.0030~0.0095 | 0.0100~0.0220 | 0.0090~0.0330 | 0.0040~0.0120 | 0.0040~0.0180 | 0.0050~0.0200 | 0.0070~0.0130 |
| 2.5~2.99 | 0.0060~0.0095 | 0.0060~0.0095 | 0.0060~0.0110 | 0.0040~0.0110 | 0.0130~0.0320 | 0.0110~0.0430 | 0.0050~0.0160 | 0.0050~0.0250 | 0.0060~0.0360 | 0.0080~0.0170 |
| 3.0~3.49 | 0.0080~0.0110 | 0.0080~0.0110 | 0.0080~0.0130 | 0.0050~0.0140 | 0.0150~0.0390 | 0.0140~0.0530 | 0.0080~0.0180 | 0.0060~0.0370 | 0.0080~0.0540 | 0.0100~0.0200 |
| 3.5~3.99 | 0.0090~0.0125 | 0.0100~0.0160 | 0.0090~0.0160 | 0.0070~0.0160 | 0.0180~0.0480 | 0.0180~0.0620 | 0.0090~0.0230 | 0.0070~0.0490 | 0.0110~0.0750 | 0.0100~0.0250 |
| 4.0~4.49 | 0.0100~0.0135 | 0.0110~0.0180 | 0.0100~0.0190 | 0.0080~0.0190 | 0.0200~0.0560 | 0.0200~0.0690 | 0.0120~0.0260 | 0.0080~0.0600 | 0.0120~0.0950 | 0.0130~0.0300 |
| 4.5~4.99 | 0.0110~0.0160 | 0.0140~0.0220 | 0.0110~0.0220 | 0.0110~0.0210 | 0.0230~0.0640 | 0.0230~0.0780 | 0.0140~0.0280 | 0.0090~0.0690 | 0.0140~0.1300 | 0.0160~0.0360 |
| 5.0~5.99 | 0.0130~0.0220 | 0.0150~0.0240 | 0.0130~0.0250 | 0.0120~0.0250 | 0.0250~0.0760 | 0.0250~0.0950 | 0.0150~0.0380 | 0.0100~0.0800 | 0.0150~0.1550 | 0.0200~0.0470 |
| 6.0~7.99 | 0.0150~0.0300 | 0.0180~0.0290 | 0.0150~0.0370 | 0.0150~0.0330 | 0.0300~0.1100 | 0.0300~0.1250 | 0.0180~0.0490 | 0.0120~0.0960 | 0.0180~0.0250 | 0.0260~0.0660 |
| 8.0~12.0 | 0.0180~0.0380 | 0.0210~0.0330 | 0.0170~0.0410 | 0.0180~0.0380 | 0.0330~0.1190 | 0.0350~0.1360 | 0.0210~0.0570 | 0.0140~0.1100 | 0.0210~0.2080 | 0.0290~0.0780 |

- The cutting speed and feed rate depend on : tool diameter, tool length, cutting fluid, workpiece material, characterization of machine and clamping condition. The processing parameters in the above table are the standard normal value for reference. The practical actual working conditions on site are the true value.

- The cutting speed and feed rate depend on : tool diameter, tool length, cutting fluid, workpiece material, characterization of machine and clamping condition. The processing parameters in the above table are the standard normal value for reference. The practical actual working conditions on site are the true value.

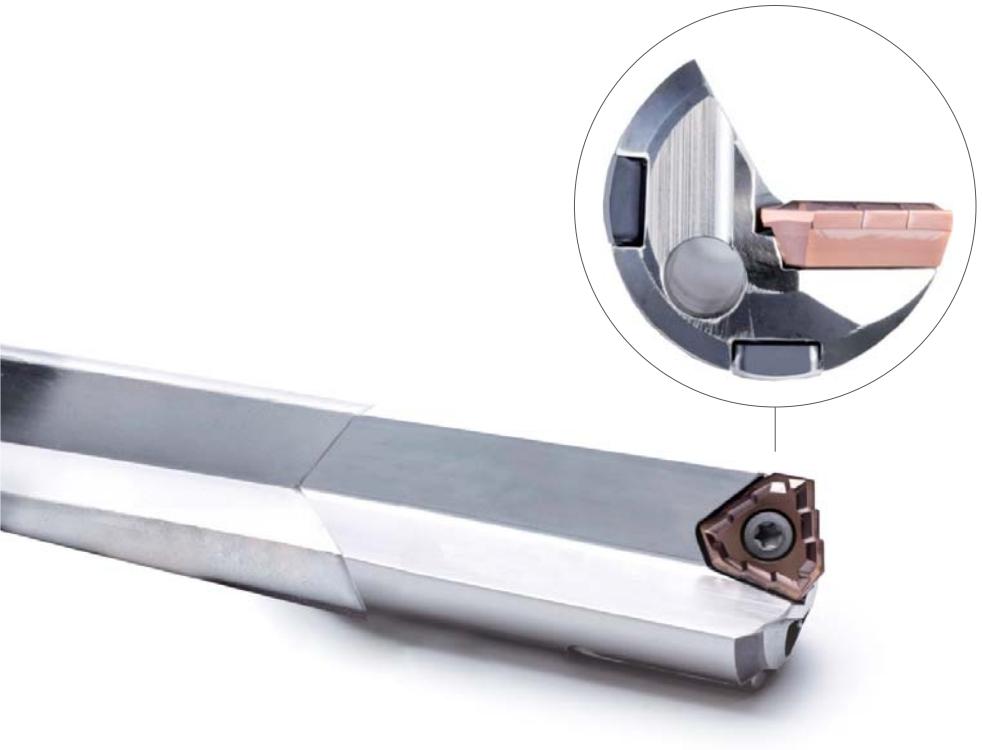
## Indexable Insert Gun Drill

This new high performance deep hole drilling tool applies inserts with blades to replace traditional gun drill tool blades. Manufacturing range from 12-50mm. Large diameter (greater than 28mm to 50 mm) using 3 inserts and BTA type gun drill formation, (see page33)

Diameter Range
ϕ12.0~ ϕ50.0

## Product Features

No more grinding, easy to replace the blades and guides. Special blade port treatment has high cutting speed and cutting ability.







## Allocation Table of Indexable Insert Gun Drill (Single Insert)

| Diameter | Insert Code | Insert Screw Spec | Wrench Code | Guide Pad Code | Pad Screw Spec | Wrench Spec |
|---|---|---|---|---|---|---|
| 11.52-13.99 | TGD060204-JI-T | M2.5×4.5 | T-8F | PGD-04-055-Z | M2.0×3.7 | T-6F |
| 14-15.99 | TGD070304-JI-T | M2.5×5.0 | T-8F | PGD-05-060-Z | M2.2×4.5 | T-7F |
| 16-18.00 | TGD080305-JI-T | M2.5×5.0 | T-8F | PGD-05-075-Z | M2.2×4.5 | T-7F |
| 18.01-19.99 | TGD090305-JI-T | M2.5×5.0 | T-8F | PGD-06-085-Z | M2.5×5.0 | T-8F |
| 20.00-20.99 | TGD100305-JI-T | M3.0×6.5 | T-8F | PGD-06-085-Z | M2.5×5.0 | T-8F |
| 21.00-21.99 | TGD100305-JI-T | M3.0×6.5 | T-9F | PGD-06-100-Z | M2.5×5.0 | T-8F |
| 22.00-25.00 | TGD110405-JI-T | M3.5×9.0 | T-15F | PGD-06-100-Z | M2.5×5.0 | T-8F |
| 25.01-28.99 | TGD120405-JI-T | M4.0×10.0 | T-15F | PGD-06-120-Z | M2.5×5.0 | T-8F |
| 29.00-29.99 | TGD130408-JI-I | M5.0×11 | T-20F | PGD-06-120-Z | M2.5×5.0 | T-8F |
| 30.00-32.02 | TGD130408-JI-I | M5.0×11 | T-20F | PGD-07-120-Z | M3.0×6.4 | T-8F |

## BTA Formation Indexable Insert Type Gun Drill

Mainly used for large hole drilling (32-50mm), It can be widely used in all kinds of high pressure internal coolant ejection CNC machines.

## Product Features

- Faster drilling feed rate : maximum feed 0.35mm/rev. High productivity.
- Excellent machining surface quality : Ra=0.6-2.0 [um]
- Cylindricality of machining hole : 50-80 [um]
- High precision : IT10
- Maximum drilling depth : L=5xD & maximum drilling depth 800mm
- No need for extra auxiliary assistance.
- Only the conventional coolant pressure is required
- Exchangeable guide pads, double head useful
- For the machining of steel and cast iron

## Allocation Table of BTA Formation Indexable Insert Type Gun Drill (3 Inserts)

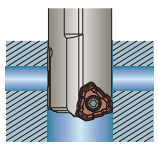
| Items | Diameter Range | | | | Diameter Range | | | |
|---|---|---|---|---|---|---|---|---|
| | ϕ 30.00- ϕ 33.00 | ϕ 33.01- ϕ 35.00 | ϕ 35.01- ϕ 38.00 | ϕ 38.01- ϕ 41.00 | ϕ 41.01- ϕ 44.00 | ϕ 44.01- ϕ 45.00 | ϕ 45.01- ϕ 47.00 | ϕ 47.01- ϕ 50.00 |
| Peripheral Insert | TGDP07504G-T | TGDP07504G-T | TGDP07504G-T | TGDP09004G-T | TGDP09004G-T | TGDP09004G-T | TGDP09004G-T | TGDP110408G-T |
| | TGDP070404G-I | TGDP070404G-I | TGDP070404G-I | TGDP090404G-I | TGDP090404G-I | TGDP090404G-I | TGDP090404G-I | TGDP110404G-I |
| Central Insert | TGDC06504G-T | TGDC06504G-T | TGDC08004G-T | TGDC08004G-T | TGDC08004G-T | TGDC09504G-T | TGDC09504G-T | TGDC09504G-T |
| | TGDC060408G-I | TGDC060408G-I | TGDC080408G-I | TGDC080408G-I | TGDC080408G-I | TGDC090408G-I | TGDC090408G-I | TGDC090408G-I |
| Intermediate Insert | TGDI06504G-T | TGDI06504G-T | TGDI06504G-T | TGDI06504G-T | TGDI08004G-T | TGDI08004G-T | TGDI08004G-T | TGDI08004G-T |
| | TGDI060404G-I | TGDI060404G-I | TGDI060404G-I | TGDI060404G-I | TGDI080404G-I | TGDI080404G-I | TGDI080404G-I | TGDI080404G-I |
| Screw | M2.5×7 | M2.5×7 | M2.5×7 | M2.5×7 | M2.5×7 | M2.5×7 | M2.5×7 | M2.5×7 |
| Wrench | T-8F | T-8F | T-8F | T-8F | T-8F | T-8F | T-8F | T-8F |
| Guide Pad | PGD-07-120-Z | PGD-07-120 | PGD-07-120 | PGD-08-155 | PGD-08-155 | PGD-08-155 | PGD-10-200 | PGD-10-200 |
| Screw | M2.5×6 | M3×7 | M3×7 | M3×7 | M3×7 | M3×7 | M3×7 | M3×7 |
| Wrench | T-8F | T-9F | T-9F | T-9F | T-9F | T-9F | T-9F | T-9F |

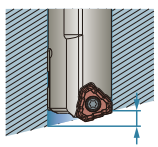
## Standard Machining Parameters

| Workpiece Material | Cutting Speed Vc (m/min) | Feed Rate: F (mm/rev) | | | |
|---|---|---|---|---|---|
| | | Φ12-Φ13.99 | Φ14-Φ18 | Φ18.01-Φ28 | Φ28.01-Φ50 |
| Low Carbon Steel ( C＜0.3) SS400 / St42-1 , SM / St52-3 , S25C / C25,etc. | 50-100 | - | 0.03-0.1 | 0.03-0.1 | - |
| | 80-140 | 0.05-0.1 | 0.05-0.1 | 0.05-0.1 | 0.1-0.2 |
| Carbon Steel ( C＞0.3) S45C / C45 , S55C / C55etc. | 50-100 | - | 0.03-0.1 | 0.03-0.12 | - |
| | 80-140 | 0.05-0.16 | 0.05-0.16 | 0.05-0.2 | 0.1-0.2 |
| Low Alloy Steel ( C＜0.3) SCM415,18CrMo4 , etc. | 50-100 | - | 0.03-0.1 | 0.03-0.1 | - |
| | 80-140 | 0.05-0.1 | 0.05-0.1 | 0.05-0.1 | 0.1-0.2 |
| Alloy Steel ( C＞0.3) SCM440 / 42CrMo4 , etc. | 50-100 | - | 0.03-0.1 | 0.03-0.2 | - |
| | 80-120 | 0.05-0.16 | 0.05-0.16 | 0.05-0.2 | 0.1-0.2 |
| Stainless Steel ( Austenitic) SUS304 / X5CrNi18-9 , SUS316 / X5CrNiMo17-12-3,etc. | 50-100 | - | 0.03-0.06 | 0.03-0.06 | - |
| | 60-100 | 0.05-0.1 | 0.05-0.1 | 0.05-0.1 | 0.1-0.15 |
| Stainless Steel ( Martensitic,Ferritic) SUS430 / X6Cr17 , SUS416 / X12CrS13,etc. | 50-100 | - | 0.03-0.06 | 0.03-0.06 | - |
| | 60-100 | 0.05-0.1 | 0.05-0.1 | 0.05-0.1 | 0.1-0.15 |
| Stainless Steel ( Precipitated) SUS630 / X5CrNiCuNb16-4,etc. | 50-100 | - | 0.03-0.06 | 0.03-0.06 | - |
| | 60-100 | 0.05-0.1 | 0.05-0.1 | 0.05-0.1 | 0.1-0.15 |
| Grey Cast Iron FC250 / 250-2,etc. | 50-100 | - | 0.03-0.15 | 0.05-0.18 | - |
| | 80-140 | 0.05-0.25 | 0.05-0.25 | 0.05-0.3 | 0.1-0.3 |
| Nodular Cast Iron FCD700 / 700-2,etc. | 50-100 | - | 0.03-0.15 | 0.05-0.18 | - |
| | 80-140 | 0.05-0.25 | 0.05-0.25 | 0.05-0.3 | 0.1-0.3 |
| Aluminium Alloy | 80-160 | - | 0.03-0.15 | 0.03-0.15 | - |
| | 100-200 | 0.05-0.2 | 0.05-0.2 | 0.05-0.2 | 0.1-0.25 |
| Heat Resistant Alloy Inconel 718, etc. | 20-50 | - | 0.03-0.06 | 0.03-0.08 | - |
| | 20-50 | 0.04-0.08 | 0.04-0.08 | 0.04-0.1 | 0.06-0.13 |
| Titanium Alloy TI-6AL-4V, etc. | 30-160 | - | 0.03-0.1 | 0.03-0.12 | - |
| | 30-60 | 0.05-0.13 | 0.05-0.13 | 0.05-0.15 | 0.1-0.18 |
| Quenching Steel ≥40HRC | 40-100 | - | 0.03-0.08 | 0.03-0.08 | - |
| | 50-100 | 0.04-0.08 | 0.04-0.08 | 0.04-0.1 | 0.06-0.13 |

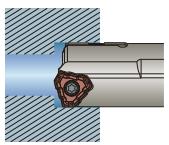
## Standard Machining Parameters

| Feed Rate f(mm/rec) | 0.03-0.05 | 0.03-0.05 | 0.1-0.3 |
|---|---|---|---|
| Application | Cross section drilling | Tilt section drilling | Boring hole |





<16mm,apply to standard drilling

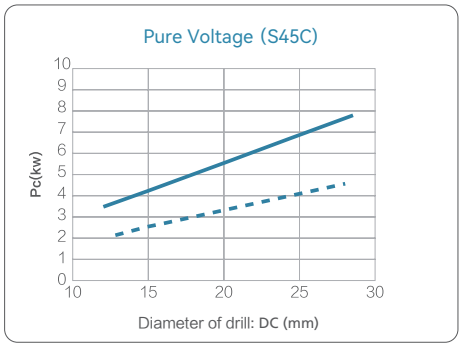


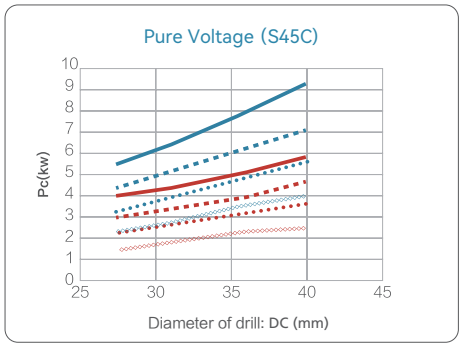
- While processing cross and tilt hole drilling, make sure guide pad attach to workpiece inner wall
- Prepare a pilot hole before processing a boring hole

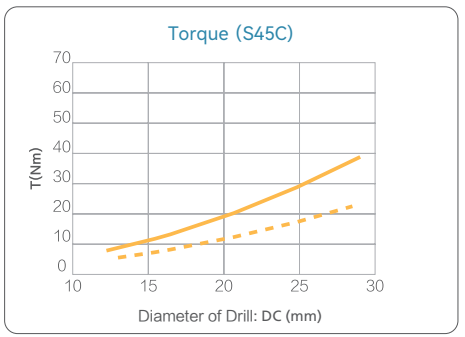


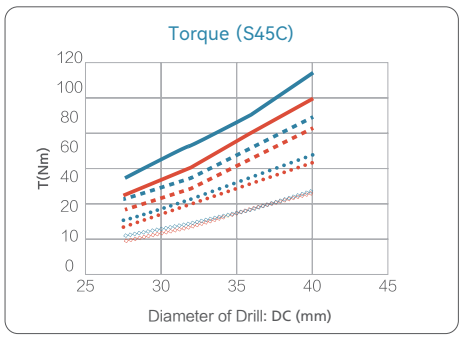


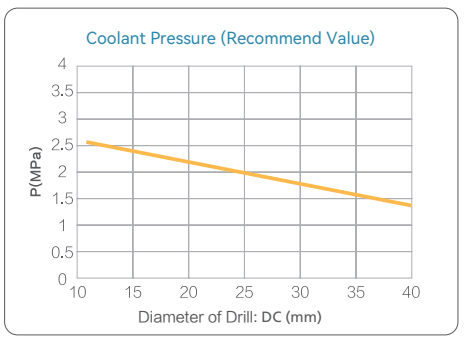
## Spindle Power and Coolant Pressure

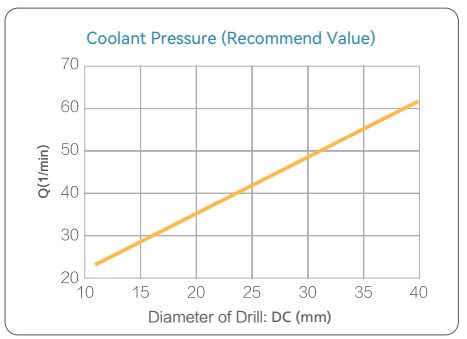



Vc = 120 m/min
fn = 0.1 mm/rev

Vc = 120 m/min
fn = 0.05 mm/rev

Vc = 80 m/min
fn = 0.1 mm/rev

Vc = 80 m/min
fn = 0.05 mm/rev

Vc = 40 m/min
fn = 0.1 mm/rev

Vc = 40 m/min
fn = 0.05 mm/rev

Vc = 100 m/min
fn = 0.25 mm/rev

Vc = 100 m/min
fn = 0.2 mm/rev

Vc = 100 m/min
fn = 0.15 mm/rev

Vc = 100 m/min
fn = 0.1 mm/rev

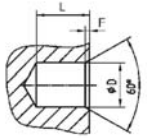
Vc = 60 m/min
fn = 0.25 mm/rev

Vc = 60 m/min
fn = 0.2 mm/rev

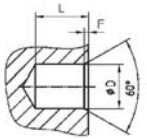
Vc = 60 m/min
fn = 0.15 mm/rev

Vc = 60 m/min
fn = 0.1 mm/rev

## Guiding Hole Dimensions for Brazed Gun Drill

| Diameter Range | Diameter of Drill | Diameter of Guiding Hole | Contrast of The Guiding Hole and Drilling Depth | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L×D Drilling depth | Guiding Hole Depth | | | | | | |
| | | | | Φ1.805 -4.000 | Φ4.001 -8.500 | Φ8.501 -12.000 | Φ12.001 -20.999 | Φ21.000 -30.999 | Φ31.000 -40.999 | Φ41.000 -55.000 |
|  | 1.85mm - 4.00mm | +0.005 to +0.010 | ap.10×D | 2.0×D | 1.0×D | 1.0×D | 1.0×D | 1×D | 1×D | 1×D |
| | 4.01mm - 12.00mm | +0.010 to +0.020 | ap.20×D | 3.0×D | 1.5×D | 1.5×D | 1.5×D | | | |
| | 12.01mm - 50.00mm | +0.015 to +0.040 | ap.25×D | 4.0×D | 2.0×D | 2.0×D | 1.5×D | | | |
| | | | ap.30×D | 6.0×D | 3.0×D | 3.0×D | 1.5×D | | | |
| | | | ap.35×D | 30mm | 35mm | 3.0×D | 1.5×D | | | |
| | | | ap.40×D | 30mm | 35mm | 3.0×D | 1.5×D | | | |

## Guiding Hole Dimensions for Solid Carbide Gun Drill

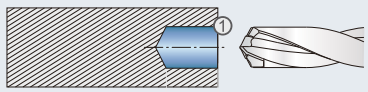
| Diameter Range | Diameter of Drill | Diameter of Guiding Hole | Contrast of The Guiding Hole and Drilling Depth | | | | |
|---|---|---|---|---|---|---|---|
| | | | L×D Drilling Depth | Guiding Hole Depth | | | |
| | | | | Φ0.500-1.599 | Φ1.600-3.999 | Φ4.000-6.999 | Φ7.000-12.000 |
|  | 0.500mm - 4.000mm | +0.005 to +0.010 | ap.20×D | 2.0×D | 2.0×D | 2.0×D | 2.5×D |
| | 4.001mm - 12.000mm | +0.010 to +0.020 | ap.30×D | | 3.0×D | 3.0×D | 3.5×D |
| | | | ap.40×D | | 4.0×D | 4.0×D | 40mm |
| | | | ap.50×D | 6.0×D | 6.0×D | 35mm | |
| | | | ap.60×D | | 30mm | | |
| | | | >40×D | | | | |



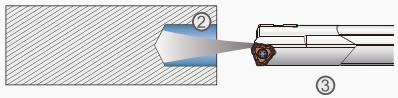


## Indexable Insert Gun Drill Apply on CNC Machine and Lathe

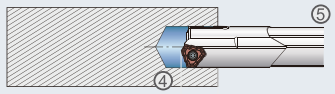
Please Follow The Instructions For Good Performance




① Prepare a pilot hole
Hole tolerance: +0.01-+0.1mm
Depth of hole: H=15mm

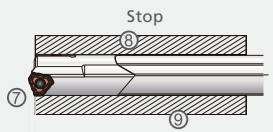



② Turn on coolant
③ Drill slowly into the pilot hole
Revolving speed: n=50-100min-1
Feed rate: Vf=100-300mm/min
Notice: do not enter the pilot hole at high speed




④ Stop at 10mm after enter the pilot hole
⑤ Start process at normal revolving speed

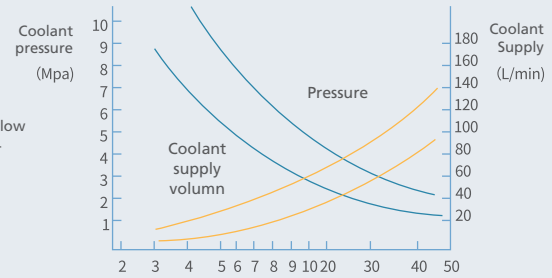
⑥ Start axial moving at 10-20mm while entering the hole at feed rate 80% of the program speed. After drilling depth more than 20mm, drilling speed trends toward to 100% of the program speed.




⑦ Drilling through hole: Continuous drilling till the drill tip thrust 5mm out of the hole.
⑧ Stop spindle revolving and turn off the coolant.
⑨ Withdraw the drill tip.

## 1

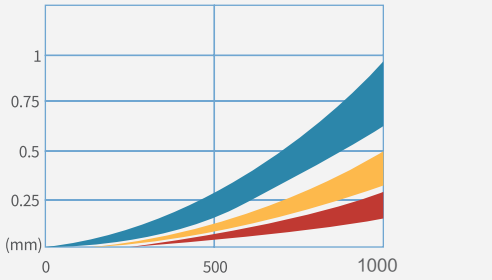
Coolant pressure, coolant flow rate varies on the diameter of the gun drill. (horizontal axis)




## 2

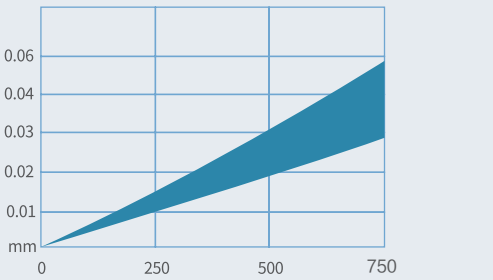
Drilling deviation (vertical axis) varies with the drilling depth (horizontal axis)

- Tools revolving, workpiece standstill
- Tools standstill, workpiece revolving
- Tools revolving, workpiece anti-revolving




## 3

Straightness (vertical axis) varies with drilling depth (horizontal axis)



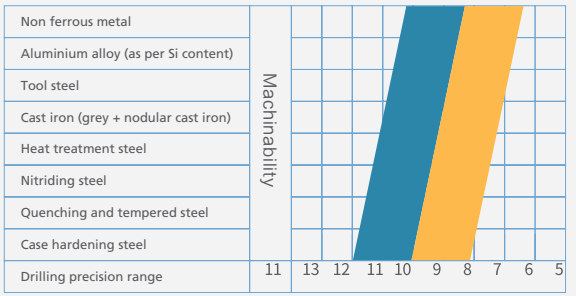





## 4

Single Flute Tolerance

- Normal Condition
- Good Condition




Recommended Value

## 5

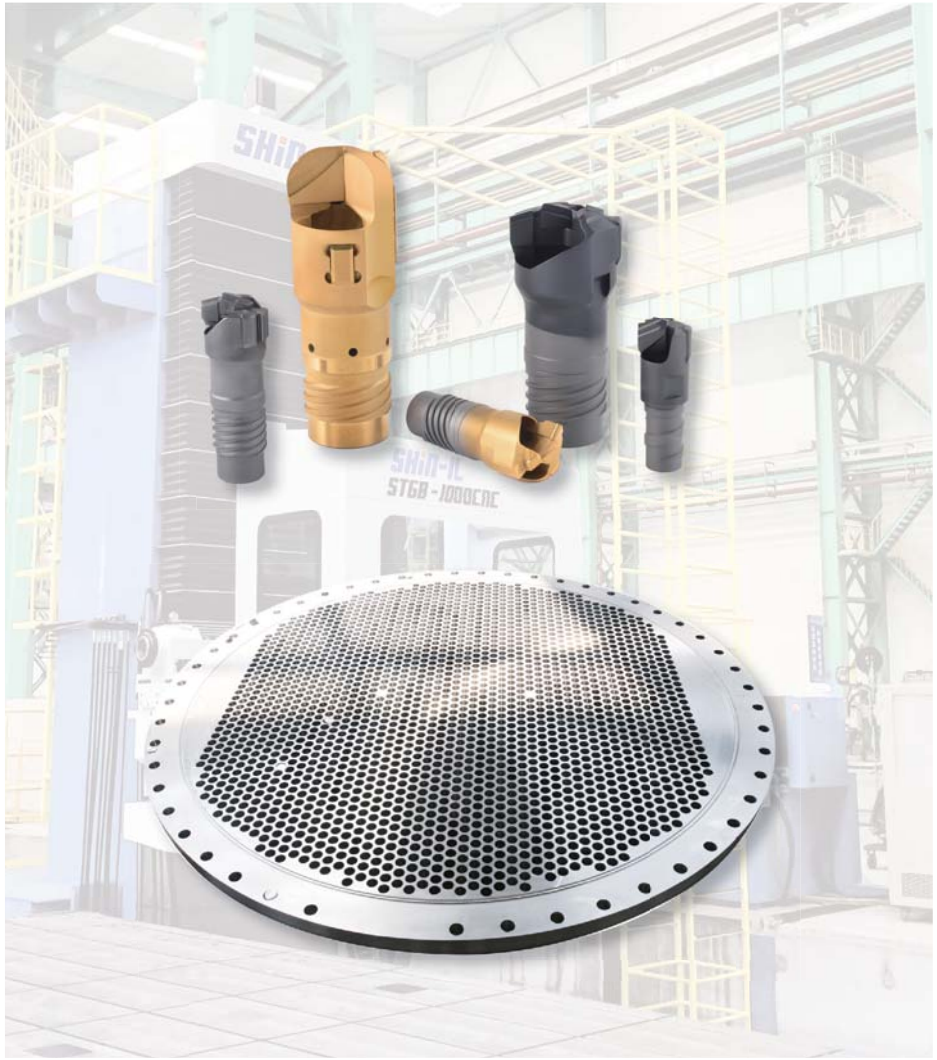
Surface Quality

- Normal Condition
- Good Condition

| Grade of Roundness | | N8 | N7 | N6 | N5 | N4 | N3 |
|---|---|---|---|---|---|---|---|
| Quality Zone | | | | | | | |
| Surface Roughness | R1μm | 21 | 11.5 | 6.2 | 3.4 | 1.9 | 1.0 |
| | Raμm | 3.2 | 1.6 | 0.8 | 0.4 | 0.2 | 0.1 |
| | Rzμm | 14 | 7.6 | 4.5 | 2.2 | 1.2 | 0.65 |

Recommended Value

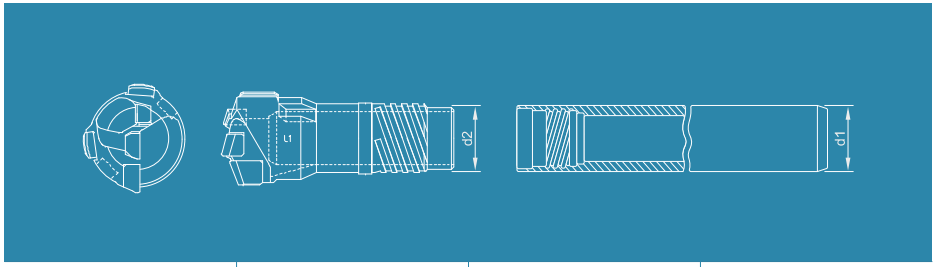
Brazed BTA drill bit is 12.20-28.70 mm in diameter and discharges chips internally by single pipe (STS system). Usually the BTA drill bit is connected to the tool body by a threaded lock, and the cutting fluid is supplied from the hole and between the drill tube. Liquid fluid under high pressure carries the chips out of the tool body. Because the iron chips discharged from the inner channel do not need to discharge the chips from the outer groove. As a result, both processing efficiency and processing quality are improved.







## Allocation Table of Brazed BTA




| Specification | d1 | d2 | Stock |
|---|---|---|---|
| φ12.20~φ13.60 | 11 | 9.6 | |
| φ14.20~φ15.50 | 13 | 11.6 | |
| φ15.60~φ16.70 | 14 | 12.6 | |
| φ16.28 | 14 | 12.6 | ◆ |
| φ16.71~φ17.70 | 16 | 13.6 | |
| φ17.71~φ18.90 | 17 | 14.5 | |
| φ18.91~φ20.00 | 18 | 15.5 | |
| φ19.25 | 18 | 15.5 | ◆ |
| φ19.28 | 18 | 15.5 | ◆ |
| φ19.30 | 18 | 15.5 | ◆ |
| φ19.35 | 18 | 15.5 | ◆ |
| φ20.01~φ21.80 | 18 | 16 | |
| φ21.81~φ24.10 | 20 | 18 | |
| φ24.11~φ26.40 | 22 | 19.5 | |
| φ25.30 | 22 | 19.5 | ◆ |
| φ25.35 | 22 | 19.5 | ◆ |
| φ25.65 | 22 | 19.5 | ◆ |
| φ25.68 | 22 | 19.5 | ◆ |
| φ27.50~φ28.70 | 24 | 22.6 | |

Indexable Insert BTA is generally suitable for large diameter deep hole drilling. It features excellent surface quality, high machining safety and ideal concentricity. Because of the specialization of the tool, a special deep hole drilling machine is required.

| Diameter Range | Insert | | | Guide Pad |
|---|---|---|---|---|
| | Peripheral | Intermediate | Intermediate | |
| φ25.00~φ26.40 | TBDP060308G/L | TBDI050308G/L | TBDC050308G/L | PBD-06A |
| φ26.41~φ28.70 | | | | |
| φ28.71~φ31.00 | | | TBDC06T308G/L | |
| φ31.01~φ33.30 | TBDP08T308G/L | TBDI06T308G/L | | PBD-07A |
| φ33.31~φ36.20 | | | | |
| φ36.21~φ39.60 | | TBDI08T308G/L | TBDC08T308G/L | |
| φ39.61~φ43.00 | TBDP09T308G/L | | | PBD-08A |
| φ43.01~φ47.00 | | | TBDC10T308G/L | |
| φ47.01~φ51.70 | | | | PBD-10A |
| φ51.71~φ56.20 | TBDP11T308G/L | | | |
| φ56.21~φ65.00 | | TBDI12T308G/L | TBDC12T308G/L | PBD-12A |





| Diameter Range | Insert | | | | | | Guide Pad |
|---|---|---|---|---|---|---|---|
| | Peripheral | Peripheral | Intermediate | Intermediate | Central | Central | |
| φ63.50 | CBDP1516-28 | TBDP13T3082/3 | CBDI1216-30 | TBDI16T312R2/3 | CBDC1216-31 | TBDC16T312R2/3 | PBD-65D |
| φ65.00 | | | | | | | |
| φ65.00 | | | | | | | |
| φ69.85 | | | | | | | |
| φ70.00 | | | | | | | PBD-70D |
| φ71.45 | | | | | | | |
| φ75.00 | CBDP1822-28 | TBDP1806082/3 | | | | | PBD-75D |
| φ76.20 | | | | | | | |
| φ80.00 | | | | | | | PBD-80D |
| φ82.55 | | | | | | | |
| φ85.00 | | | | | CBDC1522-31 | TBDC220612R2/3 | PBD-85D |
| φ88.90 | | | | | | | |
| φ90.00 | | | | | | | PBD-90D |
| φ95.00 | | | CBDI1522-30 | TBDI220612R2/3 | | | |
| φ95.25 | | | | | | | PBD-95D |
| φ100.00 | | | | | | | PBD-100D |
| φ101.60 | | | | | | | |
| φ105.00 | | | | | | | PBD-105D |
| φ107.95 | CBDP1516-28 | TBDP13T3082/3 | CBDI1216-30 | TBDI16T312R2/3 | CBDC1216-31 | TBDC16T312R2/3 | |
| φ110.00 | | | | | | | PBD-110D |
| φ114.30 | | | | | | | |
| φ115.00 | | | | | | | PBD-115D |
| φ120.00 | | | | | | | PBD-120D |
| φ120.65 | | | | | | | |
| φ125.00 | | | | | | | PBD-125D |
| φ127.00 | | | | | | | |
| φ130.00 | | | | | | | PBD-130D |

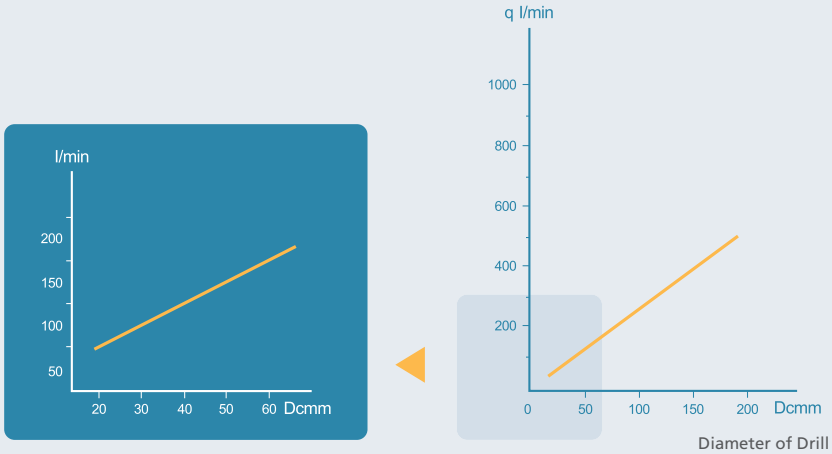
## BTA Recommended Cutting Parameter

| Specification | Hardness HB | Cutting Speed Vc (m/min) | Feed Rate (mm/rev ) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 12-25 | 25-43 | 43.1-65 | 65-85 | >85 |
| Carbon Steel | 125 | 50-120 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| | 190 | 50-120 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| | 250 | 50-120 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| | 220 | 50-120 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| | 300 | 50-120 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| Low Carbon Steel | 200 | 50-110 | 0.05-0.15 | 0.08-0.25 | 0.12-0.30 | 0.15-0.25 | 0.18-0.3 |
| | 275 | 50-110 | 0.05-0.15 | 0.08-0.25 | 0.12-0.30 | 0.15-0.25 | 0.18-0.3 |
| | 300 | 50-110 | 0.05-0.15 | 0.08-0.25 | 0.12-0.30 | 0.15-0.25 | 0.18-0.3 |
| | 350 | 50-110 | 0.05-0.15 | 0.08-0.25 | 0.12-0.30 | 0.15-0.25 | 0.18-0.3 |
| High Carbon Steel | 200 | 50-120 | 0.05-0.15 | 0.08-0.25 | 0.12-0.30 | 0.15-0.25 | 0.18-0.3 |
| | 325 | 50-120 | 0.05-0.15 | 0.08-0.25 | 0.12-0.30 | 0.15-0.25 | 0.18-0.3 |
| Stainless Steel | 200 | 40-110 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| | 240 | 40-110 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| | 180 | 40-110 | 0.05-0.15 | 0.08-0.25 | 0.12-0.35 | 0.15-0.25 | 0.18-0.3 |
| Malleable Cast Iron | 130 | 60-110 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.15-0.2 | 0.18-0.23 |
| | 230 | 60-110 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.15-0.2 | 0.18-0.23 |
| Grey Cast Iron | 160 | 60-110 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.15-0.2 | 0.18-0.23 |
| | 250 | 60-110 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.15-0.2 | 0.18-0.23 |
| Nodular Cast Iron | 180 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.15-0.2 | 0.18-0.23 |
| | 260 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.15-0.2 | 0.18-0.23 |
| Refined Aluminium Alloy | 60 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.1-0.3 | 0.18-0.3 |
| | 100 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.35 | 0.1-0.3 | 0.18-0.3 |
| Malleable Aluminium Alloy | 75 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.28 | 0.1-0.3 | 0.18-0.3 |
| | 90 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.28 | 0.1-0.3 | 0.18-0.3 |
| | 130 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.28 | 0.1-0.3 | 0.18-0.3 |
| Copper Alloy | 110 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.28 | 0.1-0.3 | 0.18-0.3 |
| | 90 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.28 | 0.1-0.3 | 0.18-0.3 |
| | 100 | 60-130 | 0.05-0.15 | 0.08-0.2 | 0.12-0.28 | 0.1-0.3 | 0.18-0.3 |
| Ferritic Alloy | 200 | 20-65 | 0.05-0.15 | 0.08-0.18 | 0.12-0.28 | 0.1-0.3 | 0.18-0.3 |
| | 280 | 20-65 | 0.05-0.15 | 0.08-0.18 | 0.12-0.28 | 0.15-0.25 | 0.18-0.3 |
| Ni Base Alloy | 250 | 20-65 | 0.05-0.15 | 0.08-0.18 | 0.12-0.28 | 0.15-0.25 | 0.18-0.3 |
| Cobalt Base Alloy | 350 | 20-65 | 0.05-0.15 | 0.08-0.18 | 0.12-0.28 | 0.15-0.25 | 0.18-0.3 |
| | 320 | 20-65 | 0.05-0.15 | 0.08-0.18 | 0.12-0.28 | 0.15-0.25 | 0.18-0.3 |
| Titanium Alloy | | 30-60 | 0.05-0.15 | 0.08-0.18 | 0.12-0.28 | 0.15-0.25 | 0.18-0.3 |

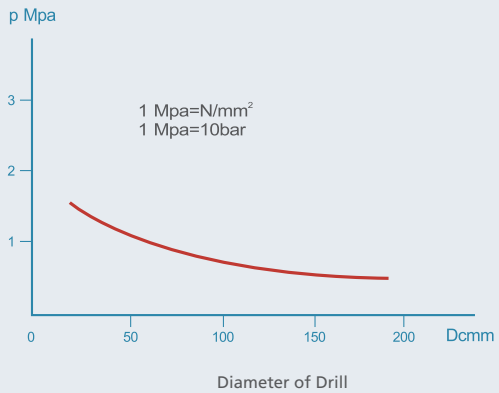




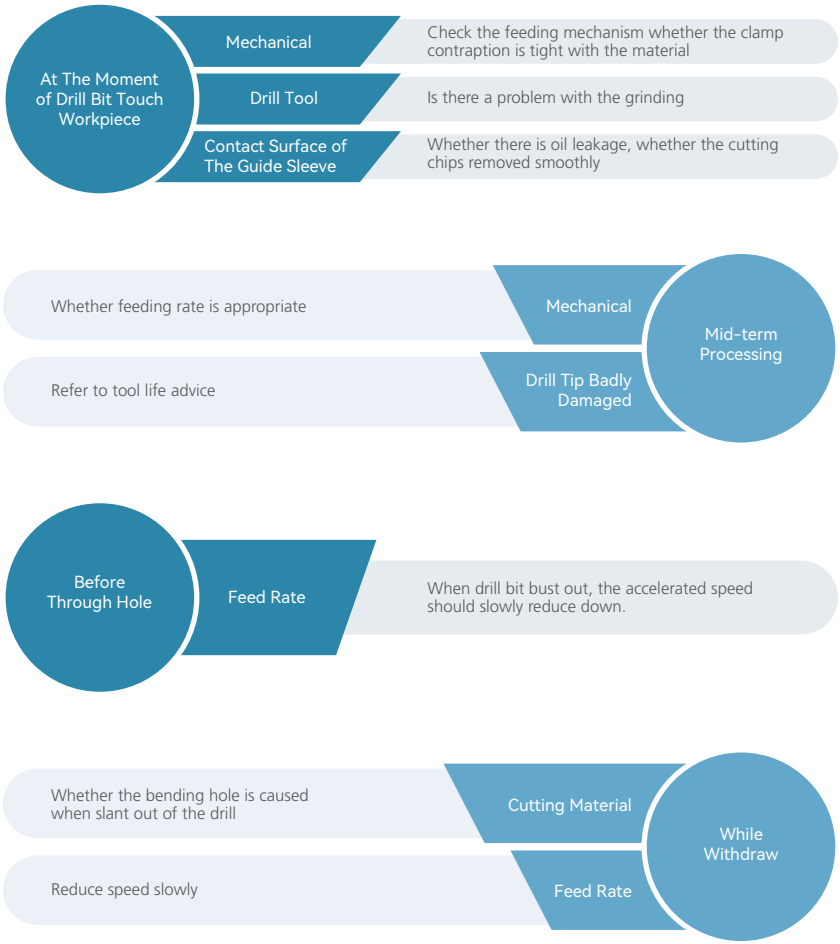
### Recommended Coolant Flow Rate




### Recommended Coolant Pressure



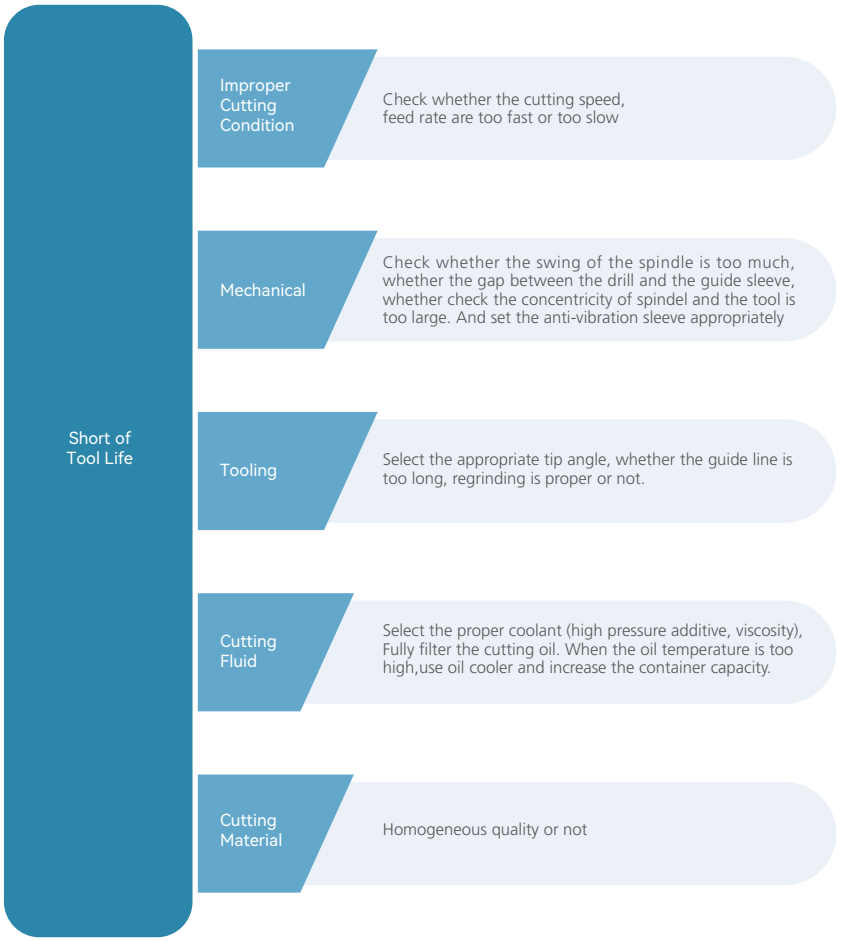
## Wear and Broken Problem



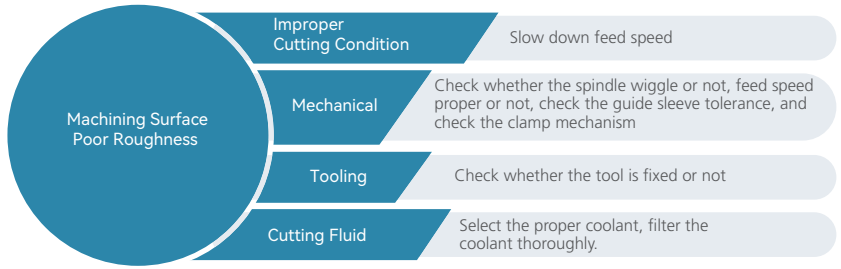


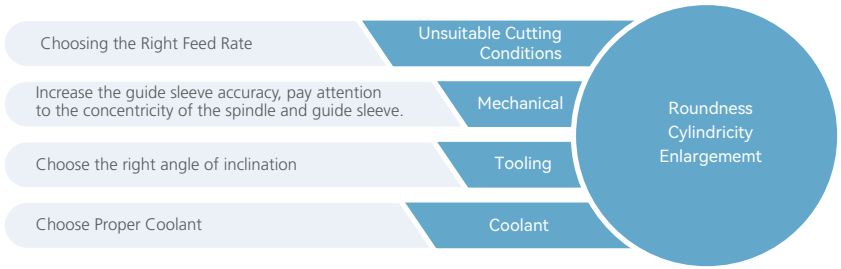


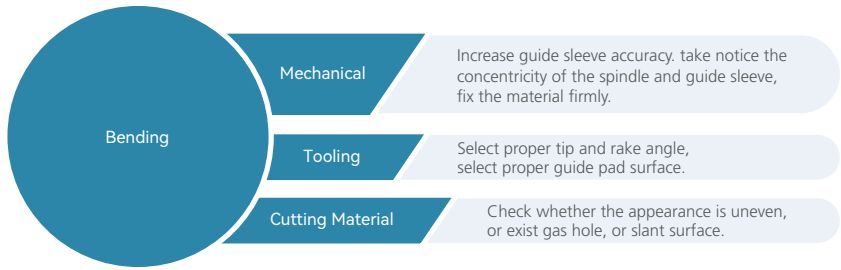

## Tooling Life



## Machining Accuracy

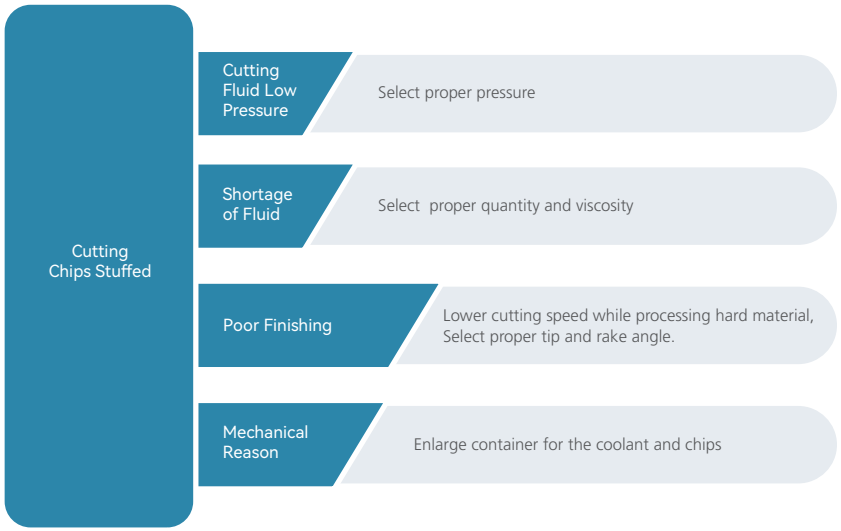
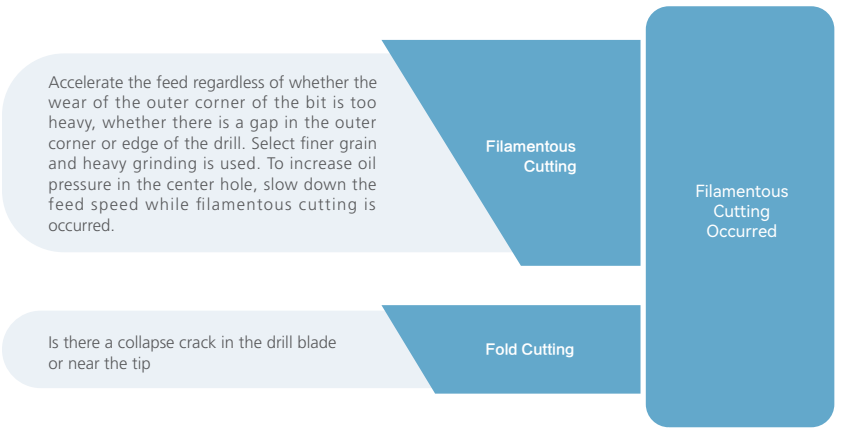







## Cutting Solution