J.W. Done Company

Home of Cross-Drilled Hole Deburring Technology

ORBITOOL® DEBURRING TOOL

"The Next Tool-After-Drill Deburring Technology"

GENERAL USAGE GUIDELINES

ORBITOOL® DEBURRING TOOL is a new and unique cross-hole deburring technology. And, as with every new technology, it takes the user some time to learn how to utilize it to the most of its potential.

We at J.W. Done Company encourage the user to experiment beyond the general guidelines presented below. Safety, however, must not be compromised.

SAFETY:

Never spin ORBITOOL® DEBURRING TOOL before inserting the cutter into the bore of the part. Spinning the tool outside the part may result in the separation of the cutter and injury to the operator.

PRINCIPLES OF OPERATION:

Set up

Trim the shaft of the cutter to the length required. This will reduce vibration and improve operator's ability to control the process. Tighten the shaft of the cutter and the drive pin in the flexible holder.

Tool Path:

Fig. 1: Position tool on the axis of the hole directly above the entrance to the part.

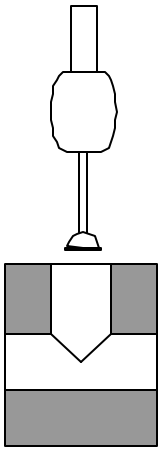

Fig. 2: Move tool inside the hole to a depth close to the intersection.

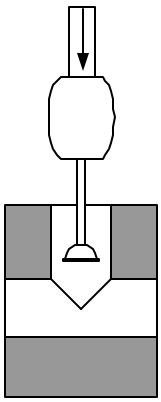

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Fig. 3: Move tool to the side of the hole until the axis of the tool is located at the diameter of interpolation.

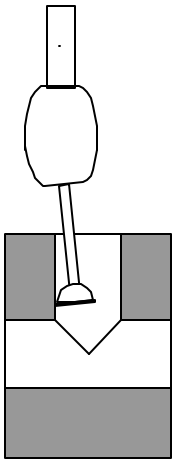


Fig. 4: Begin rotation of tool. Begin helical interpolation. **The direction of Interpolation and the direction tool rotation must coincide.**

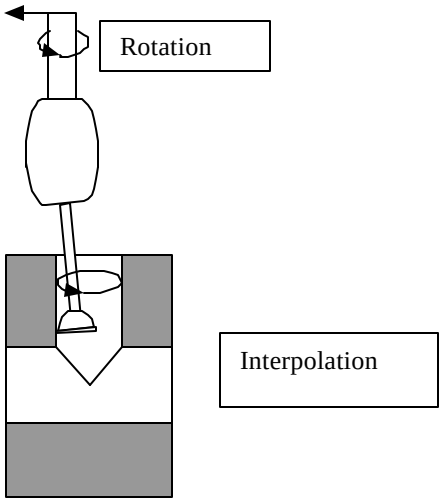


Fig 5: Advance tool to the center of the second hole. Stop rotation and interpolation of the tool.

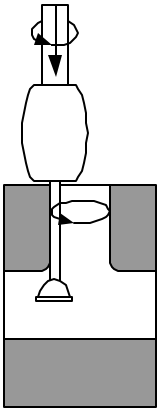


Fig 6: Move tool to the center of the bore.

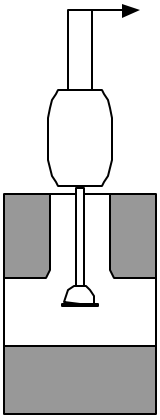
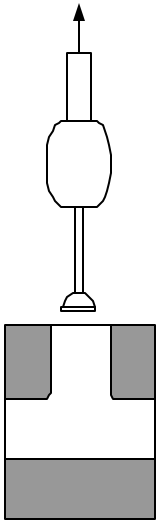


Fig 7: Withdraw tool.



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Speeds and Feeds:

Excessive dwelling and a too slow feed rate can lead to disproportionate material removal and creation of chamfer as shown in *Fig.8 and 9* below.

Fig. 8:

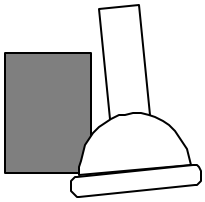
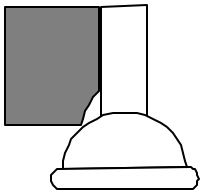
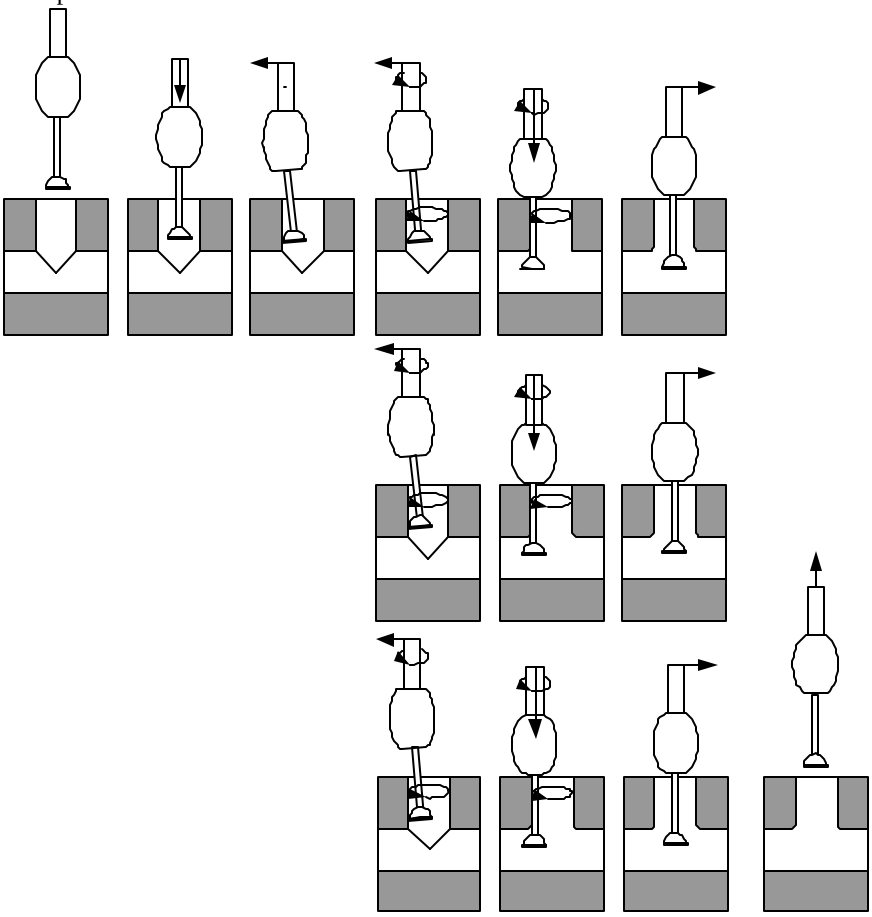


Fig. 9:



To prevent this condition from occurring the strategy of running multiple passes can be utilized. Reduction of rpm on the last pass will improve the surface finish.



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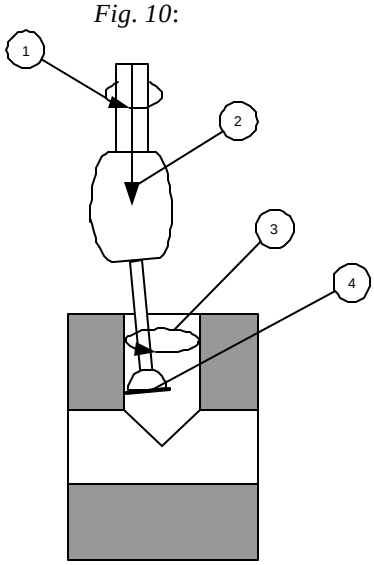
Each of the variables described below and shown in *Fig. 10* can result in the aforementioned situation and must be considered:

Fig. 10:



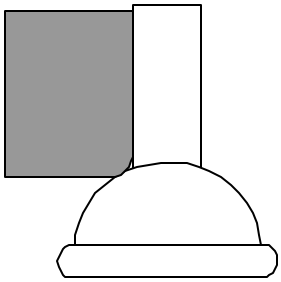
1. RPM of the ORBITOOL® DEBURRING TOOL.

The tool is rotated in a clockwise direction. The faster you spin the shaft, the faster you remove material. The limiting factors are the machine spindle rpm and the desired surface finish. Suggested rpm for the ORBITOOL® DEBURRING TOOL is 2000 to 8000 rpm. A slower rpm results in a lower vibration and a better finish can be expected. Note that harder materials require a faster rpm.

2. FEED RATE.

Feed rate is responsible for the amount of material removal as well as the shape of the RADIUS at the intersection that is being created. On softer material such as aluminum, slow feed rates will result in chamfer creation instead of their RADIUS at the intersection. Feed rates of 0.002 in. to 0.025 in. are recommended.

Fig. 11:



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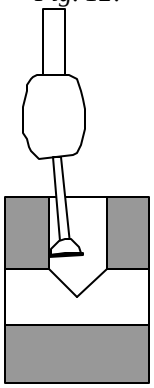
3. RPM OF INTERPOLATION.

There are three possible ways to move ORBITOOL® DEBURRING TOOL around the hole in the part:

SIDE VIEW

Fig. 12:



TOP VIEW

Fig. 13:
Tool is spinning.
Part is spinning.

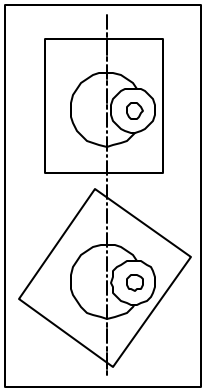


Fig. 14:
Tool is spinning and moving around hole.
Part is stationary.

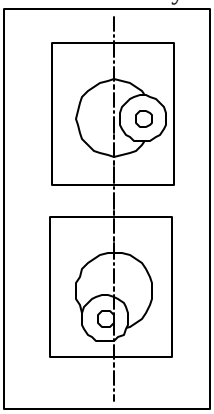
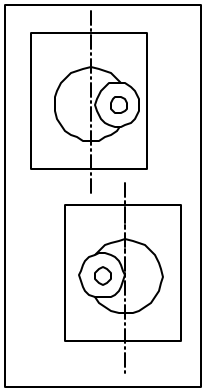


Fig. 15:
Tool is spinning.
Part is moving in X and Y axis.



Generally, 20 to 100 rpm is an acceptable range for interpolation.
The diameter of the interpolation should be: **$D = D_h - D_s$**

D diameter of the interpolation
D_h diameter of the hole
D_s ORBITOOL® DEBURRING TOOL cutter shaft dia meter

4. TOOL STIFFNESS.

Clearly, the stiffer the tool, the more aggressive it is. The stiffness of the cutter can be adjusted by installing a larger Flexible joint. On the smallest size ORBITOOL® DEBURRING TOOL (1/8 in. size), the diameter of the cutter shaft is the limiting factor. The shaft may permanently deform if the flexible joint is too stiff.

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