

TECHNICAL DATA

TYPICAL TAPPING PROBLEMS

1. DIMENSIONAL ACCURACY

Cause Solution

a) Oversize Pitch Diameter

Incorrect Tap	<ol style="list-style-type: none"> 1. Use correct GH limit. 2. Use longer chamfered taps. 3. Consider less free cutting NR style.
Chip Packing	<ol style="list-style-type: none"> 1. Use spiral point or spiral fluted taps. 2. Reduce number of flutes to create extra chip space. 3. Use larger drill size. 4. In blind hole applications, allow deeper holes where applicable or shorten the thread length of the parts. 5. Use recommended lubricant.

Galling	<ol style="list-style-type: none"> 1. Apply surface treatment such as steam oxide, TiN, or chrome. 2. Use recommended lubricant. 3. Reduce tapping speed. 4. Use correct tap for the material being tapped.
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Operating Conditions	<ol style="list-style-type: none"> 1. Ensure correct tapping speeds to avoid torn threads. 2. Check alignment of tap and drilled hole. 3. Use lead screw tapper. 4. Use tapping machine with adequate horsepower. 5. Check misalignment of tap and drilled hole due to loose spindle or worn holder.
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Tool Condition	<ol style="list-style-type: none"> 1. Check accuracy of chamfer lead grinding. 2. Ensure correct cutting angles. 3. Land widths too narrow. 4. Check burrs from regrinding not present.
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b) Oversize Internal Diameter

Hole Size	<ol style="list-style-type: none"> 1. Use smaller drill size. 2. Avoid tapered hole. 3. Use taps with correct chamfer.
Galling	See solutions prescribed under Oversize Pitch Diameter.

c) Undersized Pitch Diameter

Incorrect Tap	<ol style="list-style-type: none"> 1. Use oversize taps. <ol style="list-style-type: none"> a. For cutting materials such as copper alloy, aluminum alloy, and cast iron. b. For cutting tubing which will have "spring back" action after tapping. 2. Use taps with correct chamfer angle. 3. Use taps with higher cutting angle.
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Damaged Thread	Use proper reversing speed to avoid damaging tapped thread on exiting the hole.
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Leftover Chips	<ol style="list-style-type: none"> 1. Improve operating conditions to eliminate leftover chips in the hole. 2. Remove left over chips prior to gage checking.
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d) Undersized Internal Diameter

Hole Size	Use larger drill size.
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2. SURFACE FINISH

a) Torn or Rough Threads

Dull Tap	Resharpen
Chamfer Too Short	Increase chamfer length.
Incorrect	Use correct rake angle suitable for material being tapped

Rake Angle

Galling	<ol style="list-style-type: none"> 1. Use thread relieved taps 2. Reduce land width 3. Apply surface treatment such as steam oxide, TiN, or chrome. 4. Use recommended lubricant.
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2. SURFACE FINISH (Continued)

Cause Solution

Galling (continued)	<ol style="list-style-type: none"> 5. Reduce tapping speed. 6. Use larger drill size. 7. Check alignment between tap and hole.
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Chip Packing	<ol style="list-style-type: none"> 1. Use spiral pointed or spiral fluted taps. 2. Use larger drill size.
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b) Chattering on Tapped Thread

Too Free Cutting	<ol style="list-style-type: none"> 1. Use lower rake angle. 2. Reduce amount of thread relief—consider NR style.
Tool Condition	<ol style="list-style-type: none"> 1. Use taps with wider land.

3. TOOL LIFE

a) Breakage

Incorrect Tap Selection	<ol style="list-style-type: none"> 1. Tapping too deep. Avoid chip packing in the flutes or bottom of the hole. Use spiral-pointed, spiral-fluted or fluteless taps. 2. Use correct surface treatment such as steam oxide, TiN, or chrome.
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Excessive Tapping Torque	<ol style="list-style-type: none"> 1. Hole too small— use correct size drill 2. Shorten thread length. 3. Increase rake angle. 4. Use a tap with more thread relief and reduced land width. 5. Use spiral pointed or spiral fluted taps.
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Operating Conditions	<ol style="list-style-type: none"> 1. Reduce tapping speed. 2. Avoid misalignment between tap and the hole and tapered hole. 3. Use floating type of tapping holder. 4. Use tapping holder with torque adjustment. 5. Avoid hitting bottom of the hole.
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Tool Condition	<ol style="list-style-type: none"> 1. Use taps with wider land width. 2. Remove all worn sections when regrinding the flutes. 3. Regrind tool more frequently.
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b) Chipping

Incorrect Tap Selection	<ol style="list-style-type: none"> 1. Use tap with lower rake angle. 2. Consider different tool steel. 3. Reduce hardness of the tap. 4. Increase chamfer length. 5. Avoid chip packing in the flutes or in the bottom of the hole by using spiral fluted or spiral pointed taps.
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Operating Conditions	<ol style="list-style-type: none"> 1. Reduce tapping speed. 2. Avoid misalignment between tap and hole. 3. Avoid sudden reverse in blind hole tapping. 4. Avoid galling. 5. Use larger drill size. 6. Ensure adequate lubricant. 7. Check for hard spots in the workpiece.
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c) Excessive Wear

Incorrect Tap Selection	<ol style="list-style-type: none"> 1. Consider specially designed taps. 2. Change to an Applix style of tap made from PM material. 3. Apply special surface treatment such as steam oxide., TiN, TiCN or CrN. 4. Increase chamfer length.
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Operating Conditions	<ol style="list-style-type: none"> 1. Reduce tapping speed. 2. Apply adequate lubrication. 3. Avoid work hardening the material being tapped. 4. Use larger drill size.
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Tool Condition	<ol style="list-style-type: none"> 1. Ensure correct rake angle. 2. Minimize heat in grinding process to avoid de-tempering.
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