



Don't get yourself in a jam with packed chips.

Proper chip evacuation is crucial to your application. If chips are packed inside the hole during the operation, it can compromise both your tool and the part. Our customer was machining jet turbine components from 6Al4V Titanium. The application presented chip evacuation challenges, along with breakout complications and tool damage. All these issues were wreaking havoc on the hole quality, tool life and cycle time.

Using an IC drill, the customer achieved decent chip formation, but the chips were cramming on the side of the tool body. This caused the tool to fail and alarm out the machine. The packed chips also created a rough surface finish and work-hardened the material. The increased material hardness destroyed the boring inserts in subsequent rough and finish boring passes.

The customer tested the **APX Modular Indexable Carbide Insert Drill** using a cobalt substrate T-A pilot insert with TiCN coating, a combination that works well in 6Al4V. This coating/substrate combination increases wear resistance and toughness. The APX T-A pilot head created manageable chips for evacuation, and the large flutes on the body allowed chips to evacuate successfully. With the chips removed, the result was an excellent surface finish with no retract witness marks or chip gouges. The improved finish also created a better path of success for following operations.

With the previous IC drill, the poor chip evacuation also caused insert breakage halfway into the hole, which shifted the turret alignment. The customer then had to change the inserts and realign the turret, adding an hour to the cycle time. During the operation, the drill also had to be slowed at the breakout because it had a tendency to push off to one side. As a result, the operator had no confidence and kept one hand on the emergency stop button at all times.

With the APX Drill, the customer no longer worried about any of these problems. Insert breakage wasn't a concern because the chips were properly evacuated. The APX's double-effective cutting action could handle the breakout without shifting the turret. And, not only did the APX provide the reliable solution the customer needed, but the tool also cost less. One insert cartridge alone for the previous IC drill cost more than the entire APX head assembly.

The APX Drill excelled in this application, resolving multiple issues, many of which could be traced back to the packed chips inside the hole.

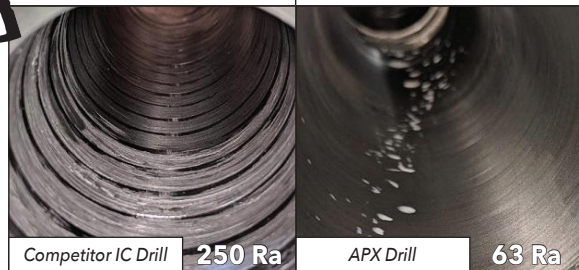
When chip evacuation problems have you jammed, give us a call and we'll find the right solution for your job.



Product:	APX™ Drill	Measure	Competitor IC Drill	APX™ Drill
Objectives:	(1) Improve hole quality (2) Eliminate tool failures	RPM	249	140
Industry:	Aerospace	Speed	179 SFM	101 SFM
Part:	Jet turbine components	Feed Rate	0.005 IPR	0.005 IPR
Material:	6Al4V Titanium	Penetration Rate	1.25 IPM	0.70 IPM
Hole Ø:	2.75"	Cycle Time	8 min 26 sec	15 min
Hole Depth:	10.50"	Chip Evacuation	No	Yes
		Surface Finish	250 Ra	63 Ra

- ▶ APX Drill assembly
 - 5xD holder body: **Item No. W6305H-200F**
 - T-A style pilot head: **Item No. V6302D-0224**
 - T-A pilot insert: **Item No. 182N-0110**
 - APX outboard IC inserts: **Item No. OP-090608-PW**

Surface Finish Results



The APX Drill with cobalt TiCN T-A pilot insert:

- ✓ Eliminated chip packing and tool failures
- ✓ Improved hole quality and surface finish
- ✓ Provided lower tooling costs