HSMcil

The Productivity Enhancer

MILLSTAR

Cutting Edge Solutions

Aluminium Cover test cut with Millstar tools

Objective

The demo was conducted to demonstrate the high-speed, high volume machining capabilities of Millstar insert type and Moldstar solid carbide cutting tools in Aluminium Alloy material machining.

Machining Summary

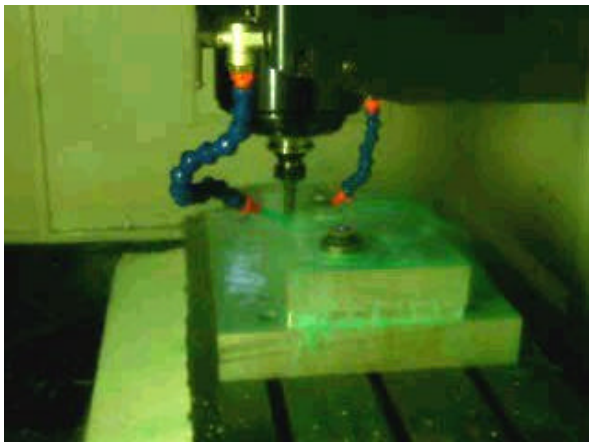
Aluminium alloy material cover was machined in a 3D NC program to demonstrate the high-speed, high volume capabilities of Millstar insert type and Moldstar solid carbide cutting tools.

The size of the Aluminium alloy block was 310 X 200 X 75.

The machine used was Makino MAX 65s milling machine with 12000 RPM spindle.

Over view of the roughing process:

Tool Adapter	Collet Chuck
Tool Holder	**CYF 16 - 160 - 16 (MILLSTAR)**
Holder material	Steel
Neck diameter	D2=16 mm
Neck length	L1=48 mm
Insert, back draft	**BD-16-R –TLN (R 1.3) MILLSTAR**
Tool coating	**Exalon™ (AlTiN)**
Tool path Strategy	Z level machining
Cutting Depth	1.3 mm / pass
Stock remaining	0.4 mm
Step Over	12 mm
Feed	7000 mm/min
Spindle speed	7000 RPM
Machining time	**80 minutes**



Process sheet for 2nd setting machining

Process	Tool	RPM	Feed	Machining Time
Roughing	Dia 16 Back Draft endmill With Chipbreaker (Millstar)	7000	7000mm^{min}	90 mins
Semifinish	Dia 12 Back Draft endmill (Millstar)	6000	2000mm^{min}	28 mins
Finish 1	Dia 12 High helix endmill (Moldstar)	6000	2000mm^{min}	24 mins
Finish 2 (Rest machining)	Dia 10 High helix endmill (Moldstar)	6000	1750mm^{min}	16 mins
Finish 3 (Counter slot machining)	Dia 8 High helix endmill (Moldstar)	8000	2000mm^{min}	10 mins
Finish 4 (“O” Ring slot machining)	Dia 3.5 Square Endmill (Special Corner Radii) (Normal Uncoated tool)	4500	450mm^{min}	10 mins

Total Machining Time	**178 Mins**

Summary

Prior to this test the total milling time for this component was about 36 Hours for 2 settings using normal cutting tools and conventional machining methods.

HSMCIL conducted this test with Millstar back draft type tool with special chip breaker geometry for non ferrous material and Moldstar solid carbide endmill which can cut at very high cutting parameters as demonstrated.

The component was completely machined in 7 hours. This reduced the machining time by more than 80% from the previous machining time. It was observed that the time can be further optimized to machine the component in less than **6 hours** of total machining time. The finish achieved and the accuracies on the component were excellent owing to the superior geometric accuracies on Millstar tools and the **Exalon™ (AlTiN)** coating.

The reduction machining time gives the customer an opportunity to use the machine to produce more components.

Observations

There was very little blunting of the cutting edge at the end of the cut on all the tools used which gives the customer the opportunity to cut more number dies per cutting tool. This brings down the actual tooling cost incurred per component.

The chip breaker geometry in the insert for non ferrous material machining proved to be a winner by cutting at very high cutting feed rates of 7 meters / min. The insert cutting edge was intact even after machining for more than 90 minutes at 7 Meters / Min which gives excellent tooling economics in overall costing.

Using Millstar tools also results in uninterrupted cutting operation due to less number of insert indexing per operation.

Using Moldstar solid carbide tools result in reduced cycle times owing to increased chip loads per tooth and higher life of the tools result in lesser tooling cost per die. The high helix geometry on endmill used in the right manner gave very high surface finish on the component in very less machining time.

This test cut proves that Millstar technology can be very well used on Non ferrous material machining and increase the level of productivity by a very big margin.

This test cut has again proved that using Millstar tools results in enhancing productivity by a huge margin with lesser cost per component (overall). It also gives the customer more flexibility to use the machine to produce more number of components in the same available time.

With today's competitive market forces at work can you afford not to have Millstar tooling and technology at work for you?