

46 HRC Die Casting Die machining with Millstar

Objective

The actual machining was conducted at a customer works to reduce the machining time of a Die Casting Die Core Finishing Operation.

Process Chart for Roughing Operation

Tool Adapter	Collet Chuck
Tool Shank	SFCY 16-160-16 (MILLSTAR)
Shank material	Steel
Overhang	50 mm
Insert	RB 16 N FS -TLN (MILLSTAR)
Tool coating	Exalon™ (AlTiN)
Tool path Strategy	Z level machining
Depth of Cut	0.08 mm / pass
Step Over	0.08mm
Stock remaining	0.25 mm
Feed	3000 mm/min
Spindle speed	10000 RPM
Millstar Machining time	120 minutes !!!
Previous Machining time	720 minutes
Reduction in Machining Time	600 minutes !!! (~85%)
Machine Used	DMC 70V



View of the Core after completion of machining

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Machining Summary

The 46 HRC H13 material Alloy Wheel Die casting die core was machined using Millstar tool. In this case we only replaced the existing tool of the customer with our tool and it was run at an increased parameter which Millstar is capable of. The earlier machining time was 12 hours for all the five lobes.

The challenge before us was to fully machine the component in minimum possible time and to achieve the superior surface finish as well as geometrical accuracy required in a die casting die since this was also the very critical spotting area.

Machine used was DMC 63V CNC Milling machine with a 10,000 RPM spindle.

The tool that was chosen to finish machine was the Millstar Ballnose insert type tool, a diameter 16mm RB16 N FS -TLN (Single insert type design).

Depth of cut used was 0.08mm (which was further increased to 0.2mm owing to superior geometrical accuracy of Millstar which ensures the there is equal distribution of cutting load to both the cutting edges), stepover of 0.08mm, RPM of 10000 and feedrate of 3000mm / min !!! The cutting speed applied was more than 500 meters / min even at a hardness of 46 HRC. The finishing process was completed in 120 Mins which was a record time for an area which was machined and also considering the superior surface finish that was achieved. Previous machining time for the same operation was about 720 mins (12 hours). With Millstar at work the insert life was as predicted which resulted in consistency in the machined geometry. There was no wear pattern visible on the insert at the end of 2 hours of machining even at these high cutting parameters and the insert would comfortable last for another 6 more hours in the same operation.

All this was possible only due to the high performance **Exalon™ (AlTiN)** tool coating and the superior geometry from Millstar coupled with the rock solid V Seating design which has always performed in an exceptional manner.



Closeup View of the finished Lobe

At Millstar, we just don't sell cutting tools, we deliver the latest in cutting technology !!!