MILLSTAR® Application Data

High-Speed Machining Demo

Summary of a Forging Die

This test cut was performed using a program supplied by MasterCam® on a Chevalier VMC (J.M. Precision, machine distributor). The die material is Finkl FX1 with a hardness of 40-44 HRc. The tooling used was Millstar® insert tooling as well as Millstar's new line of Millstar™ solid carbide ball nose tools. Insert tools are used for the roughing and finishing on the larger areas of the part. Small diameter solid carbide tools are used to rough and finish small radii and cavity details.

This part was previously made by using graphite electrodes and the EDM process. With the old process it took 21+ hours machining time plus polishing time to complete the die on multiple machines and set-ups (EDM and Graphite Mill). The die also needed to be hand polished before it could be considered complete.

With the new process used in this High Speed Machining demonstration, the finish on the cavity surfaces is considered complete as machined on the machining center. This HSM process eliminates the polishing time completely.

Operation	Tool Diameter	RPM	Feed Rate (IPM/mm)	Stepdown/stepover tolerance programmed
Rough cavity	0.750" ball insert	4000	120/3048	0.06/0.300/0.001
Finish parting line	0.500" ball insert	5400	120/3048	0.06/-/0.001
Rough lower cavity	0.250" ball solid	8000*	80/2032	0.02/0.100/0.001
Finish lower cavity	0.125" ball solid	8000*	32/812	-/0.010/0.0001
Pick Corners	0.093" ball solid	8000*	32/812	-/0.008/0.0001
Pick Corners	0.062" ball solid	8000*	16/406	-/0.005/0.0001
Finish Flat Areas	0.750" Toroid insert	3000	30/762	
*Max RPM Cycle Time:	4 hours and 27 minutes total			