



CASE STUDY APPLICATION REPORT

High-Speed Production Achieved with “Chips Away” High-Pressure Coolant Delivery System

The demand to produce 1000 high-quality parts per day, at a reasonable cost, using just one lathe, from solid bar stock because of the high costs and questionable availability of tubing, seemed like an impossibility to the northeastern manufacturer. The coil pocket insert, which is used to provide the electromechanical engagement on the all-terrain vehicles, is made from 1117 coarse grain practice cold rolled steel. By using a Mori Seiki 35 HP twin turret turning center in combination with a Hilliard “Chips Away” high-pressure coolant delivery system, they were able to meet the challenge.



A 3-5/8-inch diameter, 4-foot long, 140-pound bar is fed into the four-axis lathe. A 2-7/8-inch insert drill with 8 gpm of coolant at 1000 psig pressure traveling down through the center, is able to bore a 4-3/4-inch-deep hole in just under 20 seconds. This dramatic penetration at 865 surface footage is made possible by the high-pressure coolant expelling the chips from the bored hole. The high-pressure coolant is then used in face-grooving a 0.195-inch-wide, 0.440 inches-deep channel by using the upper and lower turrets and two 4-mm (0.157-inch wide) inserts simultaneously to cut the groove; one for the outer surface and the other on the inner surface. During this operation, in addition to removing the chips, the high-pressure coolant's ability to dissipate heat eliminates the possibility of distorting the very thin 0.060-inch thick wall. The machine tool operator says, “I am allowed 0.003 out of roundness, but I am usually within 0.001.” The coil pocket insert is then cut off; once again using the high-pressure coolant delivery system for chip removal.



The Hilliard model CA-10-8 "Chips Away" high-pressure coolant delivery system is equipped with a built-in 25-micron absolute high-pressure filter which eliminates any plugging and erosion of the coolant pathways in this critical application. Considering the assembly-line demand of 1000 coil pocket inserts per day and the economic impact of any downtime, this is an extremely important feature.

The coil pocket insert is turned, bored, grooved, and cut off in less than 40 seconds. The methods engineer states, "without the Hilliard High-Pressure Coolant Delivery System, we could not make this part." He also noted that they have a consistent, predictable operation, and the use of the high-pressure system has a large impact on the tool life. "We have made approximately 250,000 parts without replacing the insert drill body."

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