

## CASE STUDY

### Quantitative comparison, high pressure coolant vs low pressure flood coolant

Chip control, increased tool life, reduced cycle time, reduced energy cost, improved surface finish are all benefits of high pressure coolant.

*PowerPump* by HP Cool Tech, Inc. can achieve all the above goals.

The following actual case study was executed under controlled conditions in a Swiss Screw Machine shop. In addition to the improved cycle time of **27%**, tool life improved by **2-4 times**.

The primary objective is to increase the output of your CNC equipment. A balance must be established between maximizing feeds and speeds and maximizing tool life.

The case study was a conservative approach to improve cycle time and achieve longer tool life.

Greater improvements can be achieved in cycle time: however tool life will be diminished.

If the tool life when operating with flood coolant is acceptable, the feeds and speeds could be increased and the cycle time could be improved by an additional 15 to 25%.

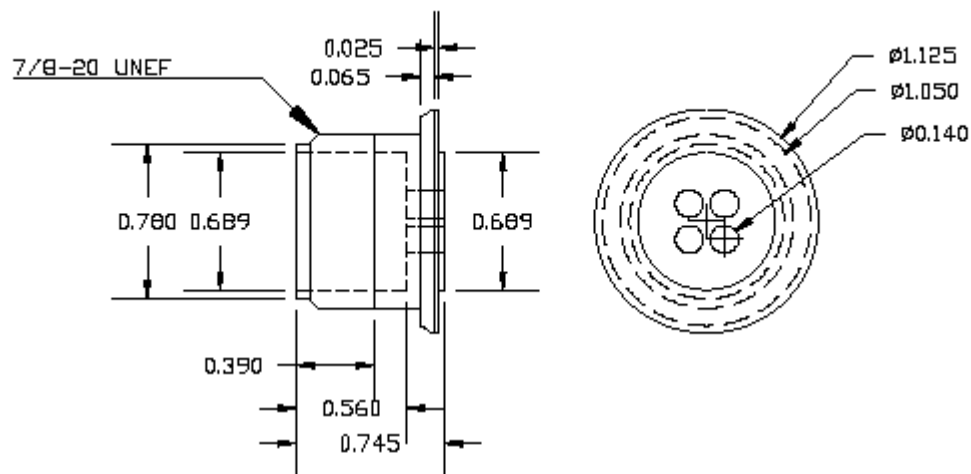
Adding high pressure coolant to the subject operation significantly changed the manufacturing process. Not only did the feeds and speeds increase, the second roughing pass was eliminated.

The pecking cycle was changed to a straight plunge.

The tool life for the .140 drill increased from 600 holes to 1600 holes. **2.67 times improvement**.

The return on investment (ROI) of \$12000.00 operating at 80% utilization was reached in **80.9 days** and the annualized savings after the ROI is recovered is **\$35,616.35** running one 8 hour shift per day.

This production case study shows the typical savings that can be achieved on over 90% of the applications in your machine shop.



Material: 303 SS

Finish: 32 RMS

CUTTING CONDITIONS AND TIMES

TOOL ID MAIN	TOOL	OPERATION	FLOOD COOLANT		
			FEED RATE	RPM	CUT TIME SECONDS
T 02	CCMT3-0 OD TURN	FACE	0.0040	1200	9
T 14	.625 FLAT DRILL	DRILL	0.0040	1200	13
T 12	BORING BAR	ID BORE	0.0012	1500	35
T 02	CCMT3-0 OD TURN	ROUGH TURN	0.0030	1200	15
T 02	CCMT3-0 OD TURN	ROUGH TURN	0.0030	1200	15
T 02	CCMT3-0 OD TURN	FINISH TURN	0.0015	1200	41
T 03	20 TPI THREAD	7/8-20 THREAD	0.0500	700	9
T 01	.086 LH CUTOFF	PART OFF	0.0030	1200	12
SUB					
T 27	OD TURN	ROUGH TURN	0.0030	700	3
T 27	OD TURN	FACE TURN	0.0030	1500	9
T 27	OD TURN	FINISH TURN	0.0015	1500	19
T 24	4MM LIVE SPOT	SPOT DRILL	10.0000	4000	8
T 25	.140 LIVE DRILL	DRILL	6.0000	4000	10
MAIN SPINDLE CYCLE TIME**					153.62
SUBSPINDLE CYCLE TIME**					73.90
** TOOL CHANGES AND RECLAMP ARE ADDED TO CUT TIMES FOR TOTAL CYCLE TIME					

TOOL ID MAIN	TOOL	OPERATION	HIGH PRESSURE COOLANT		
			FEED RATE	RPM	CUT TIME SECONDS
T 02	CCMT3-0 OD TURN	FACE	0.0040	1500	7
T 14	.625 FLAT DRILL	DRILL	0.0050	1500	6
T 12	BORING BAR	ID BORE	0.0010	2000	32
T 02	CCMT3-0 OD TURN	ROUGH TURN	0.0030	1500	12
T 02	CCMT3-0 OD TURN	ROUGH TURN	NOT REQUIRED		
T 02	CCMT3-0 OD TURN	FINISH TURN	0.0015	1500	33
T 03	20 TPI THREAD	7/8-20 THREAD	0.0500	1000	6
T 01	.086 LH CUTOFF	PART OFF	0.0030	1500	10
SUB					
T 27	OD TURN	ROUGH TURN	0.0030	700	3
T 27	OD TURN	FACE TURN	0.0030	1500	9
T 27	OD TURN	FINISH TURN	0.0015	1500	19
T 24	4MM LIVE SPOT	SPOT DRILL	10.0000	4000	8
T 25	.140 LIVE DRILL	DRILL	6.0000	4000	10
MAIN SPINDLE CYCLE TIME**					110.80
SUBSPINDLE CYCLE TIME**					73.90
** TOOL CHANGES AND RECLAMP ARE ADDED TO CUT TIMES FOR TOTAL CYCLE TIME					

HP Cool Tech, Inc. **PowerPump** Return on Investment Calculator

**Current Operation**

Machine Tool	
Cycle Time in Seconds	153.62
Shop Rate \$	\$60.00
Machine Utilization %	80

**Proposed PowerPump**

Cycle Time in seconds	110.8
Current Cost per Part	2.56
Proposed Cost	1.85
Savings per Part	0.71
Cost of Investment \$	\$12,000.00

**Return on Investment**

Savings			RETURN ON INVESTMENT	
Number of Shifts	Hours per Shift	Savings per Day	Number of Days	Number of 20 Day Months
1	8	\$148.40	80.9	4.0
2	8	\$296.80	40.4	2.0
3	8	\$445.20	27.0	1.3

**Profits**

Shifts per Day	First Year	Annual
1	\$23,616.35	\$35,616.35
2	\$59,232.69	\$71,232.69
3	\$94,849.04	\$106,849.04