



Typical Power Consumption In Injection Molding Cylinders Due ONLY to Heat Lost To Radiation and Convection

Energy required to recover heat losses due to Radiation/Convection in Horizontally positioned heated injection units or extruder barrels From Watlow Heat Loss Chart, Watlow Reference Database	Total Radiating Surface Area, Injection cylinder of TMC Machines, and Resultant total energy Lost to Radiation/Convection for that Machine					
Machine Designation, model Number:	E-250-3004	E350-3004	E500-3004	E750-3304	E1000-3204	
Injection Barrel Dimensions:	5.7 Dia. X 44	7.5 Dia.x 53	8.9 Dia. X 61	9.7 Dia. X 71	11.3 Dia. X 87	
Total Surface Area Radiating Heat, Square Inches:	783.70	1253.73	1697.57	2137.86	3052.53	
	Loss Rate W/Sq. In.	Total Watts Lost Per Surface Area of Injection Cylinders Calculated as Watts/Sq. In. X Total Surface Area in Sq. In.				
Watts loss at 100 degrees F above ambient = 0.13 W/Sq. In.	0.13	101.88	162.98	220.68	277.92	396.83
Watts loss at 200 degrees F above ambient = 0.845 W/Sq. In.	0.845	662.23	1059.40	1434.45	1806.49	2579.39
Watts loss at 300 degrees F above ambient = 1.69 W/Sq. In.	1.69	1324.45	2118.80	2868.89	3612.98	5158.78
Watts loss at 400 degrees F above ambient = 2.925 W/Sq. In.	2.95	2311.92	3698.50	5007.83	6306.69	9004.96
Watts loss at 500 degrees F above ambient = 4.55 W/Sq. In.	4.55	3565.94	5704.47	7723.94	9727.26	13889.01
Watts loss at 600 degrees F above ambient = 5.85 W/Sq. In.	5.85	4584.65	7334.32	9930.78	12506.48	17857.30

Given theoretical press loading of 24 hours/day and a 250 day year based on 5 days/week and normal holiday shutdown times, cost per machine to recover heat lost to radiation/convection, WITHOUT REGARD TO THE COST OF ACTUAL MANUFACTURING OF SALEABLE PRODUCT, can be calculated from the above data and the cost per KWH of electricity.
 Lost energy cost would be: Hours run time = 24 x 250 = 6,000 hours annual per machine X Energy Loss Total from above X Cost/KWH

Cost Grid - Annualized Energy Cost WASTED by Typical Injection Molding Machines from Calculations Above

Energy required to recover heat losses due to Radiation/Convection in Horizontally positioned heated injection units From Watlow Heat Loss Chart, Watlow Reference Database	Total Radiating Surface Area, Injection cylinder of TMC Machines, and Resultant total energy Lost to Radiation/Convection for that Machine				
	E-250-3004	E350-3004	E500-3004	E750-3304	E1000-3204
<u>Cost of power in calculations is \$00.10/KWH</u>	783.70	1253.73	1697.57	2137.86	3052.53
Watts loss at 100 degrees F above ambient = 0.13 W/Sq. In.	\$61.13	\$97.79	\$132.41	\$166.75	\$238.10
Watts loss at 200 degrees F above ambient = 0.845 W/Sq. In.	\$397.34	\$635.64	\$860.67	\$1,083.90	\$1,547.63
Watts loss at 300 degrees F above ambient = 1.69 W/Sq. In.	\$794.67	\$1,271.28	\$1,721.34	\$2,167.79	\$3,095.27
Watts loss at 400 degrees F above ambient = 2.925 W/Sq. In.	\$1,387.15	\$2,219.10	\$3,004.70	\$3,784.01	\$5,402.98
Watts loss at 500 degrees F above ambient = 4.55 W/Sq. In.	\$2,139.50	\$3,422.68	\$4,634.37	\$5,836.36	\$8,333.41
Watts loss at 600 degrees F above ambient = 5.85 W/Sq. In.	\$2,750.79	\$4,400.59	\$5,958.47	\$7,503.89	\$10,714.38

Reasonable Savings Expectation When Converting from Existing Design to PMI Heat Capture HyperInsulated System:

Grid intersection points at current radiated heat measurement levels should be adjusted for typical residual radiation level after conversion of 100 to 200 degrees F with proper PMI Heat Capture installation. Example: E1000 - 3204 would reduce from \$10,714.00 annual to no more than \$1547.63 after conversion with 600 degrees reduced to 200 degrees, and annual savings of \$9,166.67 BEFORE inclusion of the PMI Heat Capture System reduced energy level requirement for actual plastic processing. This savings is just from elimination of the wasted heat from improper convection/radiation control.