

A NEW APPROACH FOR HEATING THE PLASTICS INJECTION UNITS

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ABSTRACT

The plastics injection molding machines are one of the most eager consumers of energy. The plasticizing unit itself is the most important energetic consumer among the subassemblies of these machines; that is why this subassembly is the target of most actions of consumption decreasing on such machines. Our concerns on this direction got the shape of developing a new heating system for the plasticizing unit, which system was already patented [1].

Keywords: plastics injection, energetic consumer, heating system, molding machine, plasticizing unit

1. Introduction

The plastics injection molding machines are one of the most eager consumers of energy. The plasticizing unit itself is the most important energetic consumer among the subassemblies of these machines; that is why this subassembly is the target of most actions of consumption decreasing on such machines. Our concerns on this direction got the shape of developing a new heating system for the plasticizing unit, which system was already patented [1].

2. The Classical Solution

We gave up the already known solution of heating sleeves (Photo 1, Photo 2) and we have adopted a new system (Picture 1, Photo 3).



Photo 1 Classical heating sleeve, aluminium casted housing and tubular resistance

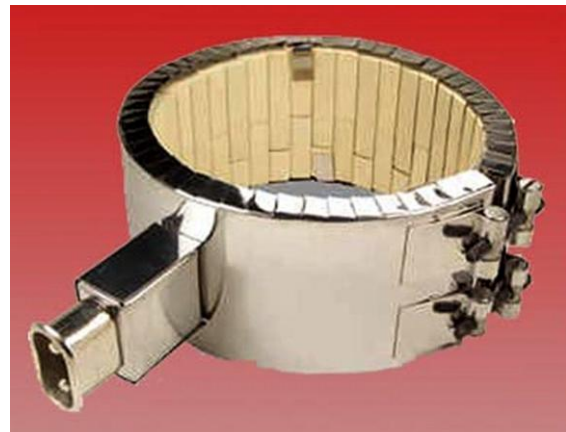


Photo 2 Classical heating sleeve, ceramic tiles and coil resistance

3. The New Solution

The plasticizing cylinder (1) is provided with a number of longitudinal grooves (A) around its circumference. Each groove contains as many of tubular straight resistances as many heating areas are required. The resistances of each heating area are parallel connected, by means of some metallic connecting plates (3), after being already tightened by means of a tightening collar (4). A mineral woolen insulation is provided around each heating area, all the area being surrounded by an individual metallic polished and zinc plated reflector (5).

4. Results

The new solution, with overall dimensions being smaller than those of the old one, brings spectacular results in the matter of energetic consumptions of the plastics injection molding machines. The following tables are relevant to this issue:

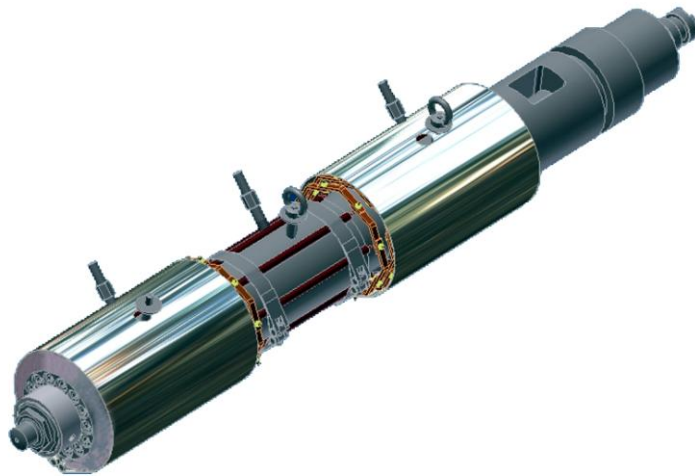
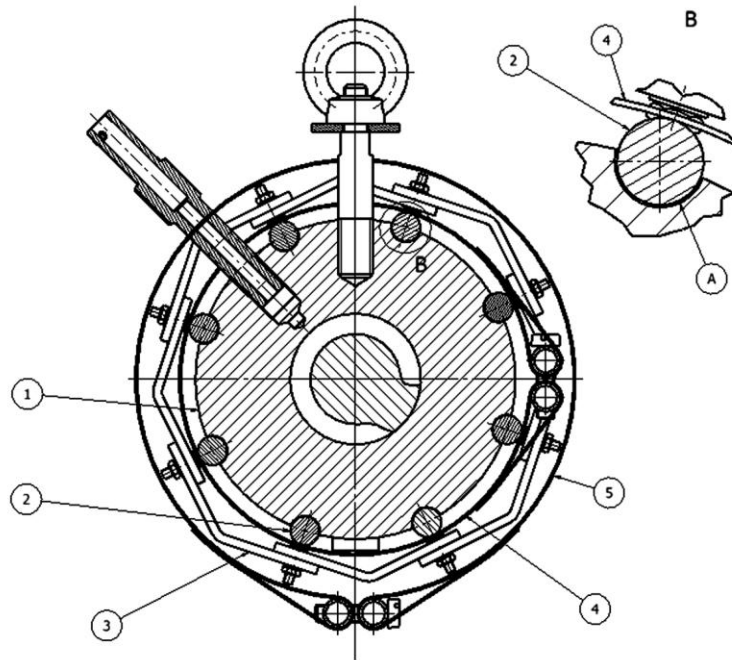


Photo 3. The new heating system put on a plasticizing unit of a 80 tones injection machine



Picture 1. Cross section through the plasticizing unit which is equipped with the new solution

Table 1.
25 tones machine

Measuring conditions		Old solution	New solution
1. Machine type		25 tones Plastics injection molding machine (MI 63/25TP)	
2. Consumed current, measured at the beginning of test [A]		7.340	4.554
3. Measured voltage [V]		196.000	195.5
4. Calculated power [W]		1438.640	890.307
Energetic consumption after 1 hour [W]		3654	2267
Energetic consumption after 2 hours [W]		5489	2808
Energetic consumption after 3 hours [W]		7062	3286
Energetic consumption after 5 hours [W]		9439	4359
Difference after 5 hours	kW	5.080	
	%	53.819	

Table 2.
50 tones machine

Measuring conditions		Old solution	New solution
1. Machine type		50 tones Plastics injection molding machine (MI 100/50TP)	
2. Consumed current, measured at the beginning of test [A]		8.210	6.800
3. Measured voltage [V]		210.000	195.000
4. Calculated power [W]		1724.100	1326.000
Energetic consumption after 1 hour [W]		3051	2463
Energetic consumption after 2 hours [W]		4347	3133
Energetic consumption after 3 hours [W]		5601	3736
Energetic consumption after 5 hours [W]		8148	5405
Difference after 5 hours	kW	2.743	
	%	33.665	

Table 3.
80 tones machine

Measuring conditions		Old solution	New solution
1. Machine type		80 tones Plastics injection molding machine (MI 250/80TP)	
2. Consumed current, measured at the beginning of test [A]		10.860	8.050
3. Measured voltage [V]		197.000	195.000
4. Calculated power [W]		2139.420	1569.750
Energetic consumption after 1 hour [W]		3797	3684
Energetic consumption after 2 hours [W]		5497	4481
Energetic consumption after 3 hours [W]		7600	5471
Energetic consumption after 5 hours [W]		10903	7545
Difference after 5 hours	kW	3.358	
	%	30.799	

References

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