

**A standard for measuring energy consumption in plastic injection moulding machines and assignment of energy-saving class**

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The object for measurement is energy consumption per kg of PS moulded. The unit is kW.h/kg. If peripheral equipments are used, their energy consumption should be included too.

There are 6 energy-saving classes for machines, class 1, 2, 3, 4, 5 and 6. Class 1 consumes the least energy.

The PS material is used. It has a density of 1.05 g/cm<sup>3</sup>, a melt index MVR(200,5) = 4.5 to 5.5 cm<sup>3</sup>/10 min. The melt temperature is 250 +/- 10 deg C.

The environment temperature is 15 – 35 deg C.

The range of injection moulding machine shot volume is > 16 cm<sup>3</sup> and =< 3888 cm<sup>3</sup>.

Five standard disc moulds are defined. They have sprue gates. The parts are defined in Table 1.

For shot volume > 3888 cm<sup>3</sup> or when the standard disc moulds are not appropriate, the supplier or user can supply a mould. The material should be un-dried and un-preheated virgin PP pellets. The shot volume (including sprue volume) should be within 1/4 – 3/4 shot volume of the machine.

The parts made should be good parts: no distortion, uniform thickness, no bubbles, etc.

50 shots are made and the energy consumed in kW.h measured. When the parts have cooled down, measure their weight, including sprues, in kg. Divide one by the other to obtain kW.h/kg.

Table 1 Standard disc part

Theoretical shot volume cm <sup>3</sup>	Standard disc part and sprue dimensions										
	Unit:mm										
A	B	C	D	E	F	G	H	I			
16~48	116.00	±0.57	14	1.00	±0.20	70.5	76.5	6	4	6.4	0.5
49~144	173.00	±0.80	14	1.37	±0.20	70.5	76.5	6	4	6.4	0.6
145~432	211.00	±0.96	16	2.70	±0.20	74.5	95	8	5.5	7.6	1.2
433~1296	345.00	±1.40	20	3.02	±0.22	94.5	118	8	5.5	7.8	1.3
1297~3888	475.00	±1.95	20	4.77	±0.22	114.5	142	8	5.5	7.8	1.8

The classification of machines into 6 energy-saving classes is according to Table 2 below. When energy consumption is less than or equal to 0.55 kW.h/kg, the machine is classified as energy-saving.

Table 2 Injection moulding machine energy-saving class

Injection moulding machine energy-saving class	Energy consumption of making standard part per kg kW. h/kg
1	≤0.4
2	≤0.55
3	≤0.7
4	≤0.85
5	≤1.0
6	>1.0