

EUROMAP 46.2	Extrusion Blow Moulding Machines Determination of Product Related Energy Consumption
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6 pages

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1 Introduction

1.1 Scope and application

This recommendation specifies the procedure for measuring and calculating the absolute and specific energy consumption of a given Extrusion Blow Moulding (EBM) machine in order to manufacture a specific product according to customer/product requirements. In this view, the machine must be equipped with a given mould.

The goal is to provide quantitative indicators of the energy efficiency of a given machine in manufacturing a specified product, so that the comparison of different machines can be performed.

Therefore, all the energy/power values defined and used further on are "product related".

1.2 References

Short name	Title	Version
EUROMAP 46.1	Extrusion Blow Moulding Machines - Determination of Machine Related Energy Efficiency Class	2013-12
IEC 62053-22	Electricity metering equipment (A.C.) - Particular requirements - Part 22: Static meters for active energy (classes 0,2S and 0,5S)	2003-01

2 Definitions

The same definitions as in Sect. 2 of EUROMAP 46.1 shall apply.

3 Energy consumers

Refer to Sect. 3 of EUROMAP 46.1.

4 Measuring method

4.1 Measuring equipment

The power measurements must be performed using instrumentation compliant to the IEC 62053 family of international standards. More specifically, the instrumentation must be certified accordingly to IEC 62053-22:2003 (Static meters for active energy - classes 0,2 S and 0,5 S).

4.2 Product quality

The product quality shall meet the customer requirements.

4.3 Measurement operating conditions

The barrel temperature of all zones (except the cooled ones) shall be within $\pm 10^{\circ}\text{C}$ of the set-point value.

The machine is in a stable condition, i. e.:

- stable automatic operation without the necessity of manual intervention for at least 15 min;
- the barrel has been at set-point temperature for at least 15 min;
- stable oil temperature (for hydraulic machines) has been reached and maintained for at least 15 min.

4.4 Tests for energy consumption measurement

The energy consumption values as defined in Sect. 2 of EUROMAP 46.1 shall be measured at the conditions reported in Sect. 4.3, provided that the following constraint are all verified:

- $\Delta T \geq 10$ min;
- At least 15 cycles are performed.

The collected product mass m shall be weighed and the product related specific energy values determined analogous to Sect. 2.2 of EUROMAP 46.1.

5 Documentation

To determine the product related specific energy consumption for comparison, several facts shall be indicated. Therefore the documentation shall include at least: (* = given by customer)

General machine data

- detailed designation of the machine
- (serial) number of the machine
- year of construction
- relevant machine properties:
 - installed driving/heating/cooling power
 - screw diameter and type
 - barrel insulation (yes/no)

Process data

- part name*
- part weight*
- wall thickness (min/max/average)*
- detailed material name*, supplier of material*
- Cycle data
 - total cycle time (minimum*)
 - cycle time in detail
 - mould closing, opening and translations
 - blowing time*
 - holding time*
- clamping force*
- opening stroke*
- Temperatures
 - melt temperature*
 - barrel zones temperature

Energy measurements

- measurement of time/number of cycles
- product related total specific energy consumption
- average power factor during the test

Remarks

- Remarks of costumer
- Remarks of manufacturer

The template provided by EUROMAP may be used for documentation.

EUROMAP

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