This recommendation has been prepared by the Technical Commission of EUROMAP.

Figure 1: Test arrangement

Figure 2: Injection power and a coefficient of efficiency as a function of the average pressure
1. **Scope**

   This recommendation defines the determination of the theoretical injection capacity and the coefficient of efficiency for comparison reasons.

2. **Definitions**

   2.1 **Theoretical injection capacity**

   Product (cm³/s) of cross section of screw/piston and maximum theoretical axial screw/piston speed.

   2.2 **Maximum theoretical injection power** \( P_{i\,th\,max} \)

   Product (kW) of theoretical injection capacity and maximum injection pressure \( p_{\max} \) as defined in EUROMAP 1.

   2.3 **Maximum actual injection power** \( P_{i\,ac\,max} \)

   Value (kW) achieved by method described below.

   2.4 **Coefficient of efficiency (max. value)** \( \eta_{\max} \)

   Ratio of maximum actual injection power and maximum theoretical injection power.

3. **Measuring method**

   3.1 **Measuring apparatus**

   The measuring apparatus consists of an adjustable orifice nozzle (A), a pressure sensor (B) and instruments for measuring time and stroke (see figure 1).

   3.2 **Test material**

   The test shall be carried out with unmodified and uncoloured HDPE with a melt index MFR 190/2,16 (acc. to ISO 1133) = 3...4 g/10 min.

   The temperature of the melt shall be 240 ± 5 °C.
3.3 Measurements

The test shall be carried out at various pressures $\rho$ which are adjusted by means of the adjustable orifice nozzle (A). Several measurements with the adjustable orifice nozzle differently adjusted shall be carried out. The screw/piston shall be displaced from standstill from 50 % to 0 % of the designed maximum stroke. The average speed for this movement and the average pressure $\bar{\rho}$ have to be determined.

4. Evaluation

The actual injection power $P_{i\,ac}$ (kW) shall be calculated as the product of cross section of screw/piston and its average speed and the average pressure $\bar{\rho}$ at this average speed.

The values thus obtained shall be graphically represented as the function of the average pressure $\bar{\rho}$ (see figure 2). The maximum value obtained from the graph is the maximum actual injection power $P_{i\,ac\,max}$.

The maximum value of the coefficient of efficiency $\eta_{max}$ shall be calculated.

5. Indication of values

In technical documents the theoretical injection capacity and the maximum value of the coefficient of efficiency $\eta_{max}$ shall be given for comparison reasons only.

Examples: Theoretical injection capacity (EUROMAP 4) : 243 cm³/s

Coefficient of efficiency (EUROMAP 4) : 0.78
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