

Evaluation of the energy consumption of the filter concerning the pressure drop

Formula for the energy costs:

$$E = \frac{q \times dp \times t}{\eta \times 1000} \quad [\text{kWh/Year}]$$

LEGEND

q = Airflow (m ³ /s)	var.
dp = Pressure drop (Pa)	var.
t = Operation time (h/year)	6000
η = Efficiency of the plant	0,6

Pressure drop in average

F8 250		
63	Own consumption kWh	0,016

	Investment	Air Flow m ³ /h	m ³ /s each Filter	Quantity F7	kWh	Quantity FE 600 Class F8	kWh FE	Δ Kwh (saving)
A detached house consumes about 5000 kWh/year	1	3400	0,9444	1	2.361,11	1	691,00	1.670,11
	2	6800	0,9444	2	4.722,22	2	1.286,00	3.436,22
	3	10200	0,9444	3	7.083,33	3	1.881,00	5.202,33
	4	13600	0,9444	4	9.444,44	4	2.476,00	6.968,44
	5	17000	0,9444	5	11.805,56	5	3.071,00	8.734,56
	6	20400	0,9444	6	14.166,67	6	3.666,00	10.500,67
	7	23800	0,9444	7	16.527,78	7	4.261,00	12.266,78
	8	27200	0,9444	8	18.888,89	8	4.856,00	14.032,89
	9	30600	0,9444	9	21.250,00	9	5.451,00	15.799,00
	10	34000	0,9444	10	23.611,11	10	6.046,00	17.565,11
	11	37400	0,9444	11	25.972,22	11	6.641,00	19.331,22
	12	40800	0,9444	12	28.333,33	12	7.236,00	21.097,33
	13	44200	0,9444	13	30.694,44	13	7.831,00	22.863,44
	14	47600	0,9444	14	33.055,56	14	8.426,00	24.629,56
	15	51000	0,9444	15	35.416,67	15	9.021,00	26.395,67
	16	54400	0,9444	16	37.777,78	16	9.616,00	28.161,78
	17	57800	0,9444	17	40.138,89	17	10.211,00	29.927,89
	18	61200	0,9444	18	42.500,00	18	10.806,00	31.694,00
	19	64600	0,9444	19	44.861,11	19	11.401,00	33.460,11
	20	68000	0,9444	20	47.222,22	20	11.996,00	35.226,22

[illegible]

1 Investment example n° 20

	Price	Pcs	Total
Fine particle Filter F8	€ 150,00	20,00	€ 3.000,00
Electrostatic Filter FE	€ 1.040,00	20,00	€ 20.800,00
Bigger Investment for the Electrostatic Filter			€ 17.800,00

2 Energy Costs / Year

	kWh	€/kWh	Total
Fine particle Filter F8	47.222,22	0,18	€ 8.500,00
Electrostatic Filter FE	11.996,00	0,18	€ 2.159,28
Saving from lower energy costs using Electrostatic Filter			€ 6.340,72
			€ 6.340,72

3 Maintenance Costs / Filter Replacement per Year

	Price	Pcs	Total
Fine particle Filter F8, Replacement	€ 200,00	20,00	€ 4.000,00
Electrostatic Filter FE, Only Washing	€ 40,00	20,00	€ 800,00
Saving from lower energy costs using Electrostatic Filter			€ 3.200,00
			€ 3.200,00

Saving of energy costs + Maintenance	€ 9.540,72
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Amortization of the Electrostatic Filter in Years	1,87
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1,87