EUROPEAN COMMISSION
DIRECTORATE-GENERAL JRC
JOINT RESEARCH CENTRE
Institute for Energy
Renewable Energy Unit

Ispra, 8 April 2009

Code of Conduct on Energy Efficiency of External Power Supplies

Version 4

1. INTRODUCTION

This Code of Conduct has been prepared by the European Commission, following the discussions and decisions of the ad-hoc working group composed by independent experts, Member States representatives and representatives of industry.

Power supplies contribute substantially to the electricity consumption of households in Europe. The Study on Miscellaneous Standby Power Consumption of Household Equipment (Molinder, 1997) calculated an increase in standby losses, including no-load losses for wall packs and chargers from about 8 TWh in 1996 to about 14 TWh in 2006 (Business as Usual scenario). With actions resulting from this Code of Conduct this increase can be counterbalanced, resulting in savings of a maximum of 5 TWh per year from 2010, this is equivalent to a total saving of 500 Million EURO per year. In addition, energy losses occur also under load operation because the power conversion efficiency is smaller than one. These losses can be reduced by increasing the power conversion efficiency, resulting in energy savings of the same order of magnitude (1 to 5 TWh).

Further savings can be expected from the application of efficient power supplies in electronics appliances, such as TVs, VCRs, microwave ovens, etc.

When addressing efficiency of power supplies, also power quality should be taken into account. Although applying electronics in power supplies can increase efficiency and lower no load losses, it should not adversely effect the power quality.

2. SCOPE

Scope of this Code of Conduct are single voltage external ac-dc and ac-ac power supplies for electronic and electrical appliances, including among others AC adapters, battery chargers for mobile phones, domestic appliances, power tools and IT equipment, in the output power range 0.3W to 250W. As the name implies, external power supplies are contained in a separate housing from the end-use devices they are powering. This specification does not cover dc-dc power supplies, or any internal power supplies (those contained inside the product). In most cases power supplies are specified by the appliance manufacturer; production can be at the appliance manufacturer or at a dedicated manufacturer.

These external power supplies and chargers (hereinafter defined “external power supplies”) have in common that they mostly do not have an on-off switch and consume electricity both in a no-load and under load operation, due to a conversion efficiency that is less than 100%.

3. AIM

To minimise energy consumption of external power supplies both under no-load and load conditions in the output power range 0.3W to 250W.

4. COMMITMENT

Signatories of this Code of Conduct commit themselves to:

4.1 Design power supplies or component so as to minimise energy consumption of external power supplies. Those companies who are not responsible for the production of power supplies shall include the concept of minimisation of energy consumption in their purchasing procedures of power supplies.

4.2 Achieve both the no-load power consumption and on-mode efficiency targets shown in Table 1.1, 1.2 and Table 2.1 and 2.2 within the time schedule for at least 90% of products[1], for the new models of external power supplies that are introduced on the market or specified in a tender/procurement after the indicated date (for new participants after the date they have signed the Code of conduct). Where on-mode efficiency is declared as the simple arithmetic average of efficiency measurements made at 25%, 50%, 75% and 100% of full rated output current.

Table 1.1: No-load Power Consumption (excluding external power supplies up to 8 W for mobile handheld battery driven applications)

Rated Output Power (P_{no})	No-load power consumption from 1.1.2009
≥ 0.3 W and < 50 W	0.30 W
≥ 50 W and < 250 W	0.50 W

Table 1.2: No-load Power Consumption for external power supplies up to 8 W for mobile handheld battery driven applications

Rated Output Power (P_{no})	No-load power consumption
≥ 0.3 W and ≤ 8.0 W	0.25 W from 1.1.2009 to 31.12.2010
≥ 0.3 W and ≤ 8.0 W	0.15 W from 1.1.2011

The no-load power consumption shall be measured and declared according to the method in the Annex.

[1] The external power supplies not meeting the Code of Conduct specifications, shall not in any case exceed 10 % of the total sales volume for all models (falling in the scope of the Code of Conduct) produced or purchased by a participating company

Table 2.1: Energy-Efficiency Criteria for Active Mode (excluding Low Voltage external power supplies)

Rated Output Power (P_{no})	Minimum Four Point Average Efficiency in Active Mode (expressed as a decimal) [2] from 1.1.2009
0 < W ≤ 1	≥ 0.48 * P_{no} + 0.140
1 < W ≤ 49	≥ [0.0626 * ln(P_{no})] + 0.622
49 < W ≤ 250	≥ 0.870

Table 2.2: Energy-Efficiency Criteria for Active Mode for Low Voltage external power supplies[3]

Rated Output Power (P_{no})	Minimum Four Point Average Efficiency in Active Mode (expressed as a decimal) [4] from 1.1.2009
0 < W ≤ 1	≥ 0.497*P_{no}+0.067
1 < W ≤ 49	≥ [0.075*ln(P_{no})]+0.561

4.3 Co-operate with the European Commission and Member States in monitoring the effectiveness of the Code of Conduct for external power supplies.

4.4 External power supplies exempted from the agreement:

1) AC Adapter with more than one output terminal using switching power circuit.

2) Contact-less charger using switching power circuit.

5. MONITORING

Signatories will report on a yearly basis in a confidential manner to the European Commission how many models of external power supplies out of the total number of models a manufacturer produces reach the target in that year. For each model using an

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2 "ln" refers to the natural logarithm. An efficiency of 0.88 in decimal form corresponds to the more familiar value of 88% when expressed as a percentage.

3 A low voltage model is an EPS with a nameplate output voltage of less than 6 volts and a nameplate output current greater than or equal to 550 milliamps.

4 "ln" refers to the natural logarithm. An efficiency of 0.88 in decimal form corresponds to the more familiar value of 88% when expressed as a percentage.

external power supply or each external power supply the associated no-load power consumption and the efficiency values as specified in the Annex shall be reported by means of an electronic spreadsheet that will be provided by the European Commission. The reporting shall be completed by the end of February of the following year. The monitoring results will be discussed in an anonymous manner with parties involved and can be published by the European Commission.

Annex

MEASUREMENT METHOD

Measurements should be carried out according to the method specified in the "Test Method for Calculating the Energy Efficiency of Single Voltage External Ac-Dc and Ac-Ac Power Supplies (August 13, 2004)", issued by US EPA.

The following measurement results should be reported:

- no-load power consumption
- efficiency at 25 %, 50 %, 75 % and 100 % of full rated output current

Code of Conduct
on Efficiency of External Power Supplies

SIGNING FORM

The organisation/company/

……..

signs the Code of Conduct on Efficiency of External Power Supplies and commits itself to abide to the principles described in point 4 "The Commitment" for the following product categories: ……..

The organisation, through regular upgrade reports, will keep the European Commission informed on the implementation of the Code of Conduct on Efficiency of External Power Supplies.

for the organisation

Director or person authorised to sign:
Name: …….
Managerial Function: …….
Address …….
Tel. / Fax. ……./ …….

Signature ……..

Please send the signed form to :

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