

# Uninterruptible Power Supplies

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## 1. Definition of Technology

Uninterruptible power supplies are products that are specifically designed to maintain the continuity and quality of a power supply to electrical appliances or electrically driven equipment. When the mains electricity supply is operating, they charge up an energy storage device, which can be used to provide electrical power for a defined period when the mains electricity supply is interrupted.

## 2. Technology Description

Uninterruptible power supplies are used to allow electrical equipment to continue operating when the mains power supply is interrupted for a period, or the quality of the power supply deteriorates. They are widely used throughout industry and commerce to maintain the safety critical and business critical systems located in process control stations, computer rooms, data centres and server areas.

Uninterruptible power supplies are available with a wide range of different efficiencies. The ECA Scheme aims to encourage the purchase of products with the highest efficiency.

The ECA Scheme covers two categories of products:

- Static uninterruptible power supply units or packages.
- Rotary uninterruptible power supply units or packages.

Investments in uninterruptible power supplies can only qualify for Enhanced Capital Allowances if the specific product is named on the Energy Technology Product List, and in order to be eligible for inclusion on the List, products must meet the eligibility criteria as set out below.

## 3. Eligibility Criteria

To be eligible, products must:

- Be one of the following categories of product:
    - a) A static uninterruptible power supply as defined in BS EN 62040-3:2001.
    - b) A rotary uninterruptible power supply as defined in IEC 88528-11: 2004.
  - Include the following components (within the unit or package):
    - a) An electronic control system that controls the operation of the product.
    - b) Voltage inverter and rectifier devices.
    - c) One or more energy storage devices.
    - d) One or more power supply filters.
    - e) A bypass switch (where required)
    - f) A motor generator set (for rotary uninterruptible power supplies only).
  - Be designed to be connected to, and to provide electrical power backup to, a three-phase electricity supply of nominally fixed frequency and voltage.
  - Have an input power factor that is greater than or equal to (i.e.  $\geq$ ) 0.93 (lagging relative to unity).
  - Have an input total harmonic distortion (THD) that is less than or equal to (i.e.  $\leq$ ) 5%.
  - Be CE Marked.
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**Performance criteria**

Eligible products must meet or exceed the minimum efficiencies at full and part load conditions set out in Table 1 below, which depends on the product category.

**Table 1: Performance thresholds for uninterruptible power supplies**

Product Category	Power range (kVA)	% of rated maximum power (i.e. % full load)			
		25%	50%	75%	100%
Static uninterruptible power supply units or packages	>10 and <= 200	>=92.5	>=93.5	>=93.5	>=93.5
	>200	>=90.4	>=93.0	>=93.8	>=93.5
Rotary uninterruptible power supply units or packages	>100	>=88.0	>=92.0	>=94.0	>=95.0

"<=" means "less than or equal to"  
 ">" means "greater than"  
 ">=" means "greater than or equal to"

For the avoidance of doubt, test data should be presented to one decimal place. As an example, a rotary uninterruptible power supply product with an efficiency of 91.9% when operating at 50% of its rated maximum power would be deemed to be a fail.

**Required test procedures**

Product performance must be tested in accordance with the procedures and standard rating conditions laid down in the following standards, depending on product category:

**a) Static uninterruptible power supply units and packages.**

BS EN 62040-3:2001 (or IEC 62040-3:1999): "Uninterruptible power systems (UPS). Method of specifying the performance and test requirements".

The performance tests must be carried out in accordance with Section 6, "Electrical tests for UPS" and using a non-linear test load as specified in Annex E, "Reference non-linear load". The test load must have a power factor that is greater than or equal to (>=) 0.8 lagging relative to unity.

**b) Rotary uninterruptible power supply units and packages.**

IEC 88528-11: 2004, "Reciprocating internal combustion engine driven alternating current generating set, Part 11: Rotary uninterruptible power systems, Performance requirements and

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*test methods Rotary Uninterruptible Power Systems - Performance requirements and test methods, first edition 2004-03”.*

The performance tests must be carried out in accordance with Section 11.2.1 “Efficiency” and using a non-linear test load. The test load must have a power factor that is greater than or equal to ( $\geq$ ) 0.8 lagging relative to unity.

For both static and rotary uninterruptible power supplies, the package tested must exclude additional isolation transformers that are not physically incorporated into the uninterruptible power supply unit or package, switchgear and low voltage switchboards, or the generation set. Any static bypass switches fitted must be in the ‘open’ position.

#### **4. Scope of Claim**

Expenditure on the provision of plant and machinery can include not only the actual costs of buying the equipment, but other direct costs such as the transport of the equipment to site, and some of the direct costs of installation. Clarity on the eligibility of direct costs is available from [HMRC](#).