PRODUCT ENVIRONMENTAL PROFILE

MEGAFLEX DPA UPS

GENERAL INFORMATION

COMPANY

ABB Power Protection SA
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REFERENCE PRODUCT AND METHODOLOGY

Reference Product: MegaFlex DPA 1500kW IEC Uninterruptible Power Supply with decentralized bypass.

The constituent modules are reported in the following table.

Art. code	Description	Quantity
4NWP106213R0001	UPS MF DPA 1500kW Frame DSB 6 Slot	1
4NWP105924R0001	Power Module MegaFlex DPA M250 DSB	6
4NWP105935R0001	UPS-OPT MegaFlex DPA DRH TFT	1
4NWP105935R0101	UPS-MegaFlex DPA DRH Power Module 1.5MW	1

Functional Unit: To protect the load of 1500 kW against input power failure during 15 years and switch to the energy storage system to avoid power outage.

Product category: UPS with P > 10000W.

MegaFlex DPA 1500kW IEC	
General data	
System power rating (kW)	1500
Core power rating (kW)	250
Static bypass architecture	Distributed
Parallel system capability	Up to 4 UPS system
Topology	Online double conversion
Cable entry	Top or bottom
Serviceability	Frontal access for power frame and connection frame, removable power module with 360° access
Back-feed protection	Built-in as standard
Redundancy	N + 1
Expected lifetime (years)	15
Input Dependency Characteristics according to IEC 62040	multimode, VFI
Nominal input voltage	380 / 400 / 415 VAC
Voltage tolerance (referred to 3x 400 / 230 V)	- 30% at partial loads
Current distortion THDi	<4%
Frequency range	35 – 70 Hz
Power factor	0.99
Output	
Rated output voltage	380 / 400 / 415 VAC
Voltage tolerance (referred to 400 V)	± 1%
Voltage distortion THDU	<2.0%
Frequency	50 or 60 Hz (selectable)
Rated power factor	1.0
Efficiency	
Max system efficiency (VFI) @ 50% load	97.4%
Overall system efficiency (VFI)	Over 97% with varying of load
In eco-mode (VFD)	Up to 99%
Standards	
Safety	IEC / EN 62040-1
EMC	IEC / EN 62040-2
Performance	CFI SS 111 - IEC / EN 62040-3
Manufacturing	ISO 9001:2015, ISO 14001:2015, OHSAS18001
Weight, dimensions	
Weight (kg)	2945
Dimensions w × h × d (mm)	3045 x 2000 x 1000

PRODUCTS CONCERNED

The environmental data are representative also for the MegaFlex DPA 1000 kW IEC and the MegaFlex DPA 1250 kW IEC. Constituent modules for these variants are reported below.

MegaFlex DPA 1000 kW IEC		
Art. code	**Object description**	**Quantity**
4NWP106348R0001	UPS MF DPA 1000kW Frame DSB 4 Slot LS	1
4NWP105924R0001	Power Module MegaFlex DPA M250 DSB	4
4NWP105935R0001	UPS-OPT MegaFlex DPA DRH TFT	1
4NWP105935R0111	UPS-MegaFlex DPA DRH Power Module 1MW	1

MegaFlex DPA 1250 kW IEC		
Art. code	**Object description**	**Quantity**
4NWP106213R0001	UPS MF DPA 1500kW Frame DSB 6 Slot	1
4NWP105924R0001	Power Module MegaFlex DPA M250 DSB	5
4NWP105935R0001	UPS-OPT MegaFlex DPA DRH TFT	1
4NWP105935R0101	UPS-MegaFlex DPA DRH Power Module 1.5MW	1

CONSTITUENT MATERIALS

Total mass of reference product, packaging and elements supplied with reference products: 3183.0 kg. In the following table the distribution data for material, expressed as percentage of the total mass, is reported.

MegaFlex UPS 1500 kW		**UPS Packaging**		**Installation components**		**Installation components packaging**	
Plastics							
Other polymers	2.1%						
PE	0.4%						
PA	0.4%						
PVC	0.1%						
Rubber	<0.1%						
ABS	0.1%						
PC	0.1%			PC	0.1%		
Total plastic	**3.2%**						
Metals							
Steel	35.3%	Steel	1.1%	Steel	1.3%		
Other metal	26.0%						
Copper alloys	15.5%						
Total metals	**79.2%**						
Others							
PWB (printed wiring board)	9.6%	Cardboard	1.7%			Cardboard	0.9%
Electric cables	2.9%						
Other materials	0.9%	Wood	1.6%				
Other electronics components	0.1%						
Total other materials	**17.7%**						

ADDITIONAL ENVIRONMENTAL INFORMATION

MANUFACTURING

The Reference Product is produced in a site certificated ISO 14001:2015.
The manufacturing site is powered exclusively by hydroelectric energy.
The Reference Product is designed in conformity with the requirements of the European RoHS Directive 2011/65/EU and contains, in the authorised proportions, lead, lead monoxide, diboron trioxide and 1,2-dimethoxyethane.
The packaging is composed by cardboard with a recycled material content of 80% of the cardboard weight.

USE

When the critical load is protected by the UPS in double conversion or ECO modes the energy losses, heat dissipation and electricity consumption are minimized.
During standard use the Reference Product has a noise level of 78 dBA.

END OF LIFE

The guide on selective treatment and recycling for end of life recyclers or treatment facilities, in accordance with EU Directive 2012/19/EU is provided by the Company by request.

Calculated by following the method described in technical report IEC/TR 62635, the recyclability rate of the Reference Product is estimated at 75% of its total weight.

ENVIRONMENTAL IMPACTS

The life cycle assessment has been performed on MegaFlex DPA UPS 1500 kW including installation materials and packaging. The following life cycle stages are considered: manufacturing, distribution, installation, use and end-of-life.

MANUFACTURING

The manufacturing stage includes the production and transportation to the manufacturer's last logistic platform of UPS, its packaging, and the materials required for the UPS installation.

Location of the manufacturing plant: ABB Power Protection, Via Luserte Sud 9, 6572 Quartino, Switzerland.

Waste generated during the manufacturing stage are also included.

The energy model used in this phase is the ELCD v3.2 electricity mix for Switzerland: *Electricity mix, AC, consumption mix, at consumer, 1kV - 60kV CH S.*

DISTRIBUTION

The distribution scenario is modeled by considering the distances from the manufacturer's last logistic platform (which coincides with the manufacturing site) to the countries where the product will be sold in the year 2021.

INSTALLATION

End of life of UPS and installation materials packaging is considered in this phase.

USE

The use stage considers the product operation during 15 years of reference life time and includes energy consumption and production, distribution, installation and end-of-life of the components required to maintain the UPS over the reference life time.

Energy consumptions are calculated by following the reference PSR, considering a calculated average efficiency of 97.7%. The energy model used in this phase is a specific energy mix based on ABB sales. For European target countries the energy models are from ELCD v3.2 while for extra-European target countries the energy models are from ecoinvent v3.6.

The maintenance operations include the substitution of the components reported in the following table, with the frequency given by the PSR.

Component	Amount in one Power Module	Maintenance frequency
DC filter capacitors	*6*	*2*
AC filter Capacitors	*3*	*2*
DC filter capacitors	*1*	*2*
DC filter capacitors	*1*	*2*
AC filter Capacitors	*3*	*2*
Fans	*1*	*3*
Power supply PCB	*1*	*2*

END-OF-LIFE

In this phase the UPS removal, dismantle, transportation to the treatment centre, and the treatment processes are included. The default end-of-life scenario for the reference product category provided by the PCR is adopted, considering the average transport of 1000 km and the disposal in landfill.

GEOGRAPHICAL REPRESENTATIVENESS

Data used are site specific: the production stage occurs at *ABB Power Protection SA*, *Switzerland* while the installation and use phase occur in the specific target countries in which the UPS will be distributed in 2021.

TECHNOLOGICAL REPRESENTATIVENESS

Materials and processes data are specific for the production of MegaFlex DPA UPS 1500 kW.

LIFE CYCLE IMPACT ASSESSMENT

The environmental impacts, reported in the following table, are calculated by using SimaPro v9.11 and the databases ecoinvent v3.6 and ELCD v3.2.

Impact category	Unit	Total	Manufacturing		Distribution		Installation		Use		End of life	
Global warming (GWP100a)	kg CO_2 eq.	1.64E+06	2.54E+04	1.6%	7.01E+02	<1%	4.10E+01	<1%	1.61E+06	98.4%	4.75E+02	<1%
Ozone depletion (ODP)	kg CFC-11 eq.	1.28E-01	1.04E-02	8.1%	1.21E-04	<1%	7.90E-06	<1%	1.17E-01	91.7%	9.87E-05	<1%
Acidification of soil and water	kg SO_2 eq.	7575.5	473.9	6.3%	7.77	<1%	0.156	<1%	7091.8	93.6%	1.86	<1%
Water eutrophication	kg PO_4^{3-} eq.	3881.9	218.7	5.6%	0.997	<1%	-0.0113	<1%	3662.8	94.4%	-0.594	<1%
Photochemical ozone formation	kg C_2H_4 eq.	355,9	32.7	9.2%	0.231	<1%	0.00492	<1%	322.9	90.7%	0.0513	<1%
Depletion of abiotic resources-elements	kg Sb eq.	21.4	10.8	50.5%	0.018	<1%	0.00103	<1%	10.6	49.3%	0.00926	<1%
Use of primary energy (total)	MJ	2.32E+07	3.60E+05	1.6%	1.01E+04	<1%	6.45E+02	<1%	2.28E+07	98.4%	7.67E+03	<1%
Net use of fresh water	m^3	6283.5	361.8	5.8%	1.48	<1%	0.121	<1%	5918.4	94.2%	1.69	<1%

The impacts of the different life cycle stages can be extrapolated to other products of the same homogeneous environmental family by applying a rule of proportionality to the following parameters:

UPS Variant	Manufacturing	Distribution	Installation	Use	EoL
1.0 MW UPS	0.66	0.66	0.65	0.83	0.66
1.25 MW UPS	0.89	0.89	1.00	0.67	0.88

Registration number*: ABBG-00002-V01.01-EN*	Drafting rules "PEP-PCR-ed3-EN-2015 04 02" Supplemented by "PSR-0010-ed1.1-FR-2015 10 16"
Verifier accreditation number: VH18	Information and reference documents: www.pep-ecopassport.org
Date of issue: 06-2021	Validity period: 5 years
Independent verification of the declaration and data, in compliance with ISO 14025:2010:	
Internal □	External ■
The PCR review was conducted by a panel of experts chaired by Philippe Osset (SOLINNEN)	
PEP are compliant with XP C08-100-1: 2016	
The elements of the present PEP cannot be compared with elements from another program.	
Document in compliance with ISO 14025:2010 «Environmental labels and declarations. Type III environmental declarations»	