

Product Environmental Profile

Kohler Energy

Mission-critical standby generator KD3750-F
Emergency backup generator providing electrical power in case of a power outage.



Registration number: **KPSE-00001-V01.00-EN**

Drafting rules: «PCR-ed4-FR-2021 09 06»

Verifier accreditation number: **VH39**

Information and reference documents : www.pep-ecopassport.org

Date of issue: **05-2024**

Validity period : **5 years**

Independent verification of declaration and data in accordance with ISO 14025: 2006

Internal:

External:

Critical review of the PCR by a panel of experts chaired by Julie ORGELET (DDemain)

PEPs comply with standards NF C08-100-1:2016 and EN 50693:2019 or NF E38-500:2022.

PEP elements cannot be compared with elements from another program.

Document in accordance with ISO 14025: 2006 "Environmental labels and declarations.

Type III environmental declarations".





GENERAL INFORMATION

Studied product

The commercial reference is :
KD3750-F

List of eligible entities

The following entities are eligible to use the declaration:

KD2000-F
KD2250-F
KD2500-F
KD2800-F
KD3000-F
KD3300-F
KD3500-F
KD4000-F
KD4500-F

Field of application

This declaration and the accompanying report are representative of generator sets. Packaging is also considered throughout the life cycle.

Extrapolation rules are used to calculate the environmental impact of the whole KDXXXX range.

Geographical representation:

Use in France.

Manufactured and assembled in France

Reference

functional unit (UF)

“Ensure 1kVA of back-up electricity in the case of grid disconnection, for 200h/year over a reference lifetime of 40 years according to ISO 8528”

Unit declared at

product level

« Provide 3750 kVA of back-up power in the case of grid disconnection, for 200h/year over a reference lifetime of 40 years in accordance with ISO 8528 »

REFERENCE PRODUCT

The environmental values declared refer to the generating set with the characteristics defined below:



TECHNICAL SPECIFICATIONS

Product	KD3750-F		
Function	Emergency backup generator		
UF Factor	3750		kWh
Characteristics	Fuel		HVO
Main components	<ul style="list-style-type: none"> • Motor/Engine • Alternator • Chassis • Radiator • Console beam-AIPR • Fluids: oil and coolant • Fuel: HVO 		



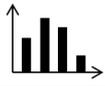
CONSTITUENT MATERIALS

The materials used to make the product are :

Plastics		Metals		Others	
PES	<0,1%	Steel	63,9%	Glycol	3,5%
PU	<0,1%	Cast iron	22,9%	Oil	1,7%
PVC	<0,1%	Copper	5,6%	Electronic	0,6%
PMDI	<0,1%	Aluminium	1,5%	Glass fibre	<0,1%
				Epoxy resin	<0,1%
Total :			Total :	Total :	
	<0,1%		94,2%		5,8%

Weight of reference product	Distribution	
Bare product mass	26 270 kg	99%
Packaging mass	3,5 kg	<0,1%

Biogenic carbon content	
Biogenic carbon content of the product	0 kg of C
Biogenic carbon content of the associated packaging	0 kg of C



ENVIRONMENTAL IMPACT

LIFE CYCLE ASSESSMENT METHODOLOGY

The Life Cycle Assessment on which this Product Environmental Profile (PEP) is based was carried out in compliance with the criteria of PCR-ed4-FR-2021 09 06 of the ecopassport® PEP Programme. The results were obtained using SimaPro 9.5 software, the Ev-DEC pack, the 'Ecoinvent 3.9 - allocation, cut-off by classification' database and the Ev-DEC EF3.1 ei3.9.1 SP 9.5 PEP ecopassport ed.4 method.



MANUFACTURING

The production and treatment of production waste, packaging and emissions linked to the manufacturing stage were considered.

Inbound transport was included in the study.

The energy model for electricity production in 2023 for assembly is based on the country of manufacture: France.



DISTRIBUTION

The KD3750 emergency power unit is distributed from the manufacturer's last logistics platform to the installation site in France. 1000 km per lorry is considered.



INSTALLATION

Installation requires the use of a crane for 1 hour. That's 6l of fuel.

The product generates packaging waste during the installation phase. Disposal is calculated as follows:

On the packaging mass	Metals	Steel	Aluminium	Paper/Cardboard	Wood	Plastics
Percentage of packaging recycled	83%	88%	60%	91%	7%	27%
Percentage of packaging recovered as energy	1%	0%	7%	5%	31%	43%
Percentage of packaging buried	16%	12%	33%	4%	62%	30%

A transport distance of 100 km by lorry has been assumed for this waste.



USE

Maintenance (B2)	Number of interventions over its RLT	87
	Intervention mode	1 person in a van - 100 km
	Type of intervention	Replacement of parts and fluids
Energy consumed by the product (B6)	Type d'énergie	Electricity: Electricity mix France, medium voltage (year 2023)
	C = total energy consumption of the product	Electric : 10 512 kWh Fuel HVO : 102 863 l
	RLT	40 years



END-OF-LIFE

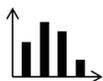
Percentage of product recycled	66,9%
Percentage of product recovered as energy	0,1%
Percentage of product incinerated without recovery	16,5%
Percentage of product landfilled without recovery	16,5%

Transport of the product to the waste collection and treatment centre has been considered.



Modulus D

Module D considers the fact that 66.9% of materials are recycled at the end of their life cycle, thus avoiding the use of the same quantity of virgin raw materials. These avoided impacts are therefore included (as a negative value) in modulus D. However, they are not considered in the 'Total' column of impacts presented below).



ENVIRONMENTAL IMPACTS OF THE REFERENCE PRODUCT per UF

The impact results presented below were obtained using the methods defined in PCR-ed4-FR-2021 09 06 (EF 3.1). The declared impacts are those of the typical product in life cycle reduced to the functional unit. The actual impact of the stages in the life cycle of the product installed in a real situation must be calculated by the PEP user by multiplying the impact considered by the UF factor.

MANDATORY INDICATORS

Indicators	Units	Total w/o modulus D	Manufacturing	Distribution	Installation	Use	End-of-life	Modulus D
Climate change - total	kg CO2 eq/UF	2,42E+03	2,87E+01	1,35E+00	5,70E-03	2,39E+03	2,95E+00	-1,06E+01
Climate change – fossil	kg CO2 eq/UF	2,45E+03	2,82E+01	1,37E+00	5,69E-03	2,42E+03	2,93E+00	-1,06E+01
Climate change – biogenic	kg CO2 eq/UF	5,36E-01	4,60E-01	4,43E-04	7,92E-07	6,27E-02	1,32E-02	-1,15E-02
Climate change – land use and change	kg CO2 eq/UF	-	3,68E-02	6,84E-04	6,53E-07	-3,60E+01	3,05E-03	-1,73E-02
Ozone depletion	kg CFC 11 eq/UF	2,90E-06	7,54E-07	2,99E-08	9,06E-11	1,87E-06	2,41E-07	-2,18E-07
Acidification	mole de H+ eq/UF	4,43E+01	3,50E-01	3,00E-03	5,28E-05	4,39E+01	2,45E-02	-6,28E-02
Eutrophication, freshwater	kg P eq/UF	5,47E-01	2,15E-03	1,12E-05	2,06E-08	5,44E-01	1,71E-04	-1,27E-03
Eutrophication, marine	kg de N eq/UF	4,26E+01	3,23E-02	7,39E-04	2,44E-05	4,26E+01	2,86E-03	-1,43E-02
Eutrophication, terrestrial	mole de N eq/UF	2,36E+02	4,04E-01	7,70E-03	2,66E-04	2,36E+02	3,43E-02	-1,87E-01
Photochemical ozone formation	kg NMCOV eq/UF	5,92E+01	1,65E-01	4,66E-03	7,88E-05	5,90E+01	1,07E-02	-6,52E-02
Depletion of abiotic resources - elements	kg Sb eq/UF	3,87E-03	3,48E-03	4,60E-06	2,07E-09	1,81E-04	2,03E-04	-3,36E-04
Depletion of abiotic resources - fossil fuels	MJ/UF	1,32E+04	3,47E+02	1,95E+01	7,46E-02	1,28E+04	4,03E+01	-1,18E+02
Water requirement	m ³ of deprivation eq worldwide/UF	1,49E+01	6,97E+00	8,05E-02	1,61E-04	6,61E+00	1,29E+00	-1,70E+00
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ/UF	1,40E+02	3,54E+01	3,07E-01	4,24E-04	9,94E+01	4,48E+00	-1,49E+01



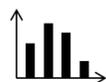
Indicators	Units	Total w/o modulus D	Manufacturing	Distribution	Installation	Use	End-of-life	Modulus D
Use of renewable primary energy resources used as raw materials	MJ/UF	- 1,77E+00	-1,74E+00	0,00E+00	0,00E+00	0,00E+00	-2,86E-02	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ/UF	1,38E+02	3,36E+01	3,07E-01	4,24E-04	9,94E+01	4,46E+00	-1,49E+01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ/UF	1,32E+04	3,47E+02	1,95E+01	7,46E-02	1,28E+04	4,04E+01	-1,18E+02
Use of non-renewable primary energy resources used as raw materials	MJ/UF	3,81E-01	4,20E-01	0,00E+00	0,00E+00	3,08E-02	-6,98E-02	-1,55E-02
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ/UF	1,32E+04	3,47E+02	1,95E+01	7,46E-02	1,28E+04	4,03E+01	-1,18E+02
Use of secondary materials	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels,	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m³/UF	7,41E-01	2,31E-01	2,80E-03	5,83E-06	4,64E-01	4,26E-02	-7,81E-02
Hazardous waste disposed	kg/UF	8,21E+00	6,50E+00	1,88E-02	6,26E-05	1,07E+00	6,21E-01	-2,74E+00
Non-hazardous waste disposed	kg/UF	1,22E+02	1,04E+02	1,13E+00	3,35E-04	9,94E+00	6,40E+00	-2,02E+01
Radioactive waste disposed	kg/UF	1,79E-02	5,08E-04	6,42E-06	8,17E-09	1,72E-02	1,81E-04	-1,50E-04
Components for reuse	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg/UF	5,55E+00	1,05E-01	0,00E+00	0,00E+00	1,16E+00	4,28E+00	0,00E+00
Materials for energy recovery	kg/UF	6,05E-03	0,00E+00	0,00E+00	0,00E+00	6,67E-04	5,38E-03	0,00E+00
Exported energy	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Indicators PCR edition 3 :								
Contribution to global warming	kg CO2 eq/UF	2,20E+03	2,74E+01	1,35E+00	5,63E-03	2,17E+03	3,15E+00	-1,04E+01
Contribution to soil and water acidification	kg SO2 eq/UF	1,57E+01	6,49E-01	2,42E-03	3,72E-05	1,50E+01	2,10E-02	-4,81E-02
Contribution to water eutrophication	kg (PO4) ³⁻ - eq/UF	1,30E+01	1,98E-02	3,25E-04	8,40E-06	1,30E+01	1,65E-03	-9,65E-03
Contribution to photochemical ozone formation	g C2H4 eq/UF	1,15E+00	3,98E-02	1,22E-03	8,34E-06	1,11E+00	2,17E-03	-1,42E-02
Total primary energy use during the life cycle	MJ/UF	1,33E+04	3,49E+02	1,98E+01	7,50E-02	1,29E+04	4,75E+01	-1,33E+02





Optional indicators

Indicators	Units	Total w/o modulus D	Manufacturing	Distribution	Installation	Use	End-of-life	Modulus D
Total primary energy use during the life cycle	MJ/UF	1,34E+04	3,80E+02	1,98E+01	7,50E-02	1,29E+04	4,47E+01	-1,33E+02
Fine particle emissions	Disease index/UF	4,22E-04	2,41E-06	1,02E-07	1,47E-09	4,19E-04	3,27E-07	-9,48E-07
Ionising radiation (human health)	kBq de U235 eq/UF	1,41E+01	6,39E-01	9,89E-03	1,52E-05	1,33E+01	2,05E-01	-2,03E-01
Ecotoxicity (freshwater)	CTUe/UF	5,71E+03	4,49E+02	9,65E+00	3,56E-02	5,22E+03	3,60E+01	-2,22E+02
Human toxicity, carcinogenic effects	CTUh/UF	2,43E-07	1,80E-07	6,26E-10	1,74E-12	2,37E-08	3,91E-08	-7,88E-08
Human toxicity, non-carcinogenic effects	CTUh/UF	8,28E-06	4,17E-06	1,38E-08	1,21E-11	2,67E-06	1,43E-06	-4,96E-07
Impacts related to land use / Soil quality	No dimension/UF	2,83E+02	1,77E+02	1,18E+01	5,02E-03	7,48E+01	1,89E+01	-4,38E+01



ENVIRONMENTAL IMPACTS OF MODULES B1 TO B7 OF THE REFERENCE PRODUCT per UF (ADDITIONAL INFORMATION)

As part of the Life Cycle Assessment of buildings, the environmental impacts of the use stage must be declared according to modules B1 to B7 (B1: Use; B2: Maintenance; B3: Repair; B4: Replacement; B5: Rehabilitation; B6: Energy use; B7: Water use). The values below correspond to the product type in relation to the functional unit (FU).

MANDATORY INDICATORS

Indicators	Units	Use steps / UF	Modulus B1	Modulus B2	Modulus B3	Modulus B4	Modulus B5	Modulus B6	Modulus B7
Climate change - total	kg CO2 eq/UF	2,39E+03	0,00E+00	1,71E+01	0,00E+00	0,00E+00	0,00E+00	2,37E+03	0,00E+00
Climate change – fossil	kg CO2 eq/UF	2,42E+03	0,00E+00	1,71E+01	0,00E+00	0,00E+00	0,00E+00	2,40E+03	0,00E+00
Climate change – biogenic	kg CO2 eq/UF	6,27E-02	0,00E+00	1,35E-02	0,00E+00	0,00E+00	0,00E+00	4,92E-02	0,00E+00
Climate change – land use and change	kg CO2 eq/UF	- 3,60E+01	0,00E+00	-5,22E-03	0,00E+00	0,00E+00	0,00E+00	-3,60E+01	0,00E+00
Ozone depletion	kg CFC 11 eq/UF	1,87E-06	0,00E+00	1,52E-06	0,00E+00	0,00E+00	0,00E+00	3,52E-07	0,00E+00
Acidification	mole de H+ eq/UF	4,39E+01	2,00E+01	6,57E-02	0,00E+00	0,00E+00	0,00E+00	2,39E+01	0,00E+00
Eutrophication, freshwater	kg P eq/UF	5,44E-01	0,00E+00	4,71E-04	0,00E+00	0,00E+00	0,00E+00	5,44E-01	0,00E+00
Eutrophication, marine	kg de N eq/UF	4,26E+01	1,96E+01	1,64E-02	0,00E+00	0,00E+00	0,00E+00	2,29E+01	0,00E+00
Eutrophication, terrestrial	mole de N eq/UF	2,36E+02	1,40E+02	1,63E-01	0,00E+00	0,00E+00	0,00E+00	9,57E+01	0,00E+00
Photochemical ozone formation	kg NMCOV eq/UF	5,90E+01	5,04E+01	7,95E-02	0,00E+00	0,00E+00	0,00E+00	8,56E+00	0,00E+00
Depletion of abiotic resources - elements	kg Sb eq/UF	1,81E-04	0,00E+00	1,09E-04	0,00E+00	0,00E+00	0,00E+00	7,18E-05	0,00E+00
Depletion of abiotic resources - fossil fuels	MJ/UF	1,28E+04	0,00E+00	2,45E+02	0,00E+00	0,00E+00	0,00E+00	1,26E+04	0,00E+00
Water requirement	m ³ of deprivation eq worldwide/UF	6,61E+00	0,00E+00	3,80E+00	0,00E+00	0,00E+00	0,00E+00	2,80E+00	0,00E+00
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ/UF	9,94E+01	0,00E+00	8,56E+00	0,00E+00	0,00E+00	0,00E+00	9,09E+01	0,00E+00
Use of renewable primary energy resources used as raw materials	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

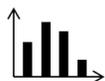


Indicators	Units	Use steps / UF	Modulus B1	Modulus B2	Modulus B3	Modulus B4	Modulus B5	Modulus B6	Modulus B7
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ/UF	9,94E+01	0,00E+00	8,56E+00	0,00E+00	0,00E+00	0,00E+00	9,09E+01	0,00E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ/UF	1,28E+04	0,00E+00	2,45E+02	0,00E+00	0,00E+00	0,00E+00	1,26E+04	0,00E+00
Use of non-renewable primary energy resources used as raw materials	MJ/UF	3,08E-02	0,00E+00	3,08E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ/UF	1,28E+04	0,00E+00	2,45E+02	0,00E+00	0,00E+00	0,00E+00	1,26E+04	0,00E+00
Use of secondary materials	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels,	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m³/UF	4,64E-01	0,00E+00	1,12E-01	0,00E+00	0,00E+00	0,00E+00	3,52E-01	0,00E+00
Hazardous waste disposed	kg/UF	1,07E+00	0,00E+00	6,27E-01	0,00E+00	0,00E+00	0,00E+00	4,39E-01	0,00E+00
Non-hazardous waste disposed	kg/UF	9,94E+00	0,00E+00	5,51E+00	0,00E+00	0,00E+00	0,00E+00	4,42E+00	0,00E+00
Radioactive waste disposed	kg/UF	1,72E-02	0,00E+00	2,21E-04	0,00E+00	0,00E+00	0,00E+00	1,70E-02	0,00E+00
Components for reuse	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg/UF	1,16E+00	0,00E+00	1,16E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg/UF	6,67E-04	0,00E+00	6,67E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Indicators PCR edition 3 :									
Contribution to global warming	kg CO2 eq/UF	2,17E+03	0,00E+00	1,68E+01	0,00E+00	0,00E+00	0,00E+00	2,15E+03	0,00E+00
Contribution to soil and water acidification	kg SO2 eq/UF	1,50E+01	0,00E+00	5,03E-02	0,00E+00	0,00E+00	0,00E+00	1,50E+01	0,00E+00
Contribution to water eutrophication	kg (PO4)³- eq/UF	1,30E+01	0,00E+00	1,21E-02	0,00E+00	0,00E+00	0,00E+00	1,30E+01	0,00E+00
Contribution to photochemical ozone formation	g C2H4 eq/UF	1,11E+00	0,00E+00	2,39E-02	0,00E+00	0,00E+00	0,00E+00	1,09E+00	0,00E+00
Total primary energy use during the life cycle	MJ/UF	1,29E+04	0,00E+00	2,53E+02	0,00E+00	0,00E+00	0,00E+00	1,27E+04	0,00E+00



OPTIONAL INDICATORS

Indicators	Units	Use steps / UF	Modulus B1	Modulus B2	Modulus B3	Modulus B4	Modulus B5	Modulus B6	Modulus B7
Total primary energy use during the life cycle	MJ/UF	1,29E+04	0,00E+00	2,53E+02	0,00E+00	0,00E+00	0,00E+00	1,27E+04	0,00E+00
Fine particle emissions	Disease index/UF	4,19E-04	9,40E-05	8,04E-07	0,00E+00	0,00E+00	0,00E+00	3,24E-04	0,00E+00
Ionising radiation (human health)	kBq de U235 eq/UF	1,33E+01	0,00E+00	2,96E-01	0,00E+00	0,00E+00	0,00E+00	1,30E+01	0,00E+00
Ecotoxicity (freshwater)	CTUe/UF	5,22E+03	5,76E-03	3,20E+02	0,00E+00	0,00E+00	0,00E+00	4,90E+03	0,00E+00
Human toxicity, carcinogenic effects	CTUh/UF	2,37E-08	0,00E+00	1,83E-08	0,00E+00	0,00E+00	0,00E+00	5,38E-09	0,00E+00
Human toxicity, non-carcinogenic effects	CTUh/UF	2,67E-06	3,71E-09	2,33E-07	0,00E+00	0,00E+00	0,00E+00	2,43E-06	0,00E+00
Impacts related to land use / Soil quality	No dimension/UF	7,48E+01	0,00E+00	3,58E+01	0,00E+00	0,00E+00	0,00E+00	3,90E+01	0,00E+00



ENVIRONMENTAL IMPACTS per product (ADDITIONAL INFORMATION)

In the context of Life Cycle Assessment at building level, the environmental impacts to be considered are those of the equipment over its reference lifetime, and not the main results of the PEP, which correspond to the functional unit and the typical product.

Below, the declared values have been multiplied by the UF factor of the typical product.

MANDATORY INDICATORS

Indicators	Units	Total w/o modulus D	Manufacturing	Distribution	Installation	Use	End-of-life	Modulus D
Climate change - total	kg CO2 eq	9,07E+06	1,08E+05	5,08E+03	2,14E+01	8,95E+06	1,11E+04	-3,98E+04
Climate change – fossil	kg CO2 eq	9,20E+06	1,06E+05	5,15E+03	2,14E+01	9,08E+06	1,10E+04	-3,97E+04
Climate change – biogenic	kg CO2 eq	2,01E+03	1,72E+03	1,66E+00	2,97E-03	2,35E+02	4,95E+01	-4,32E+01
Climate change – land use and change	kg CO2 eq	- 1,35E+05	1,38E+02	2,56E+00	2,45E-03	-1,35E+05	1,15E+01	-6,47E+01
Ozone depletion	kg CFC 11 eq	1,09E-02	2,83E-03	1,12E-04	3,40E-07	7,01E-03	9,05E-04	-8,16E-04
Acidification	mole de H+ eq	1,66E+05	1,31E+03	1,13E+01	1,98E-01	1,65E+05	9,18E+01	-2,36E+02
Eutrophication, freshwater	kg P eq	2,05E+03	8,06E+00	4,19E-02	7,71E-05	2,04E+03	6,40E-01	-4,76E+00
Eutrophication, marine	kg de N eq	1,60E+05	1,21E+02	2,77E+00	9,16E-02	1,60E+05	1,07E+01	-5,35E+01
Eutrophication, terrestrial	mole de N eq	8,87E+05	1,51E+03	2,89E+01	9,97E-01	8,85E+05	1,29E+02	-7,02E+02
Photochemical ozone formation	kg NMCOV eq	2,22E+05	6,19E+02	1,75E+01	2,95E-01	2,21E+05	4,00E+01	-2,45E+02
Depletion of abiotic resources - elements	kg Sb eq	1,45E+01	1,31E+01	1,73E-02	7,77E-06	6,78E-01	7,60E-01	-1,26E+00
Depletion of abiotic resources - fossil fuels	MJ	4,97E+07	1,30E+06	7,32E+04	2,80E+02	4,81E+07	1,51E+05	-4,42E+05
Water requirement	m³ of deprivation eq worldwide	5,60E+04	2,61E+04	3,02E+02	6,03E-01	2,48E+04	4,82E+03	-6,37E+03
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	5,23E+05	1,33E+05	1,15E+03	1,59E+00	3,73E+05	1,68E+04	-5,60E+04
Use of renewable primary energy resources used as raw materials	MJ	- 6,63E+03	-6,53E+03	0,00E+00	0,00E+00	0,00E+00	-1,07E+02	0,00E+00

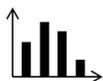


Indicators	Units	Total w/o modulus D	Manufacturing	Distribution	Installation	Use	End-of-life	Modulus D
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	5,17E+05	1,26E+05	1,15E+03	1,59E+00	3,73E+05	1,67E+04	-5,60E+04
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	4,97E+07	1,30E+06	7,32E+04	2,80E+02	4,81E+07	1,51E+05	-4,42E+05
Use of non-renewable primary energy resources used as raw materials	MJ	1,43E+03	1,58E+03	0,00E+00	0,00E+00	1,15E+02	-2,62E+02	-5,82E+01
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	4,97E+07	1,30E+06	7,32E+04	2,80E+02	4,81E+07	1,51E+05	-4,42E+05
Use of secondary materials	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels,	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m³	2,78E+03	8,68E+02	1,05E+01	2,19E-02	1,74E+03	1,60E+02	-2,93E+02
Hazardous waste disposed	kg	3,08E+04	2,44E+04	7,06E+01	2,35E-01	4,00E+03	2,33E+03	-1,03E+04
Non-hazardous waste disposed	kg	4,57E+05	3,92E+05	4,23E+03	1,26E+00	3,73E+04	2,40E+04	-7,59E+04
Radioactive waste disposed	kg	6,71E+01	1,91E+00	2,41E-02	3,06E-05	6,45E+01	6,79E-01	-5,61E-01
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	2,08E+04	3,92E+02	0,00E+00	0,00E+00	4,36E+03	1,60E+04	0,00E+00
Materials for energy recovery	kg	2,27E+01	0,00E+00	0,00E+00	0,00E+00	2,50E+00	2,02E+01	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Indicators PCR edition 3:								
Contribution to global warming	kg CO2 eq	8,25E+06	1,03E+05	5,08E+03	2,11E+01	8,13E+06	1,18E+04	-3,92E+04
Contribution to soil and water acidification	kg SO2 eq	5,89E+04	2,43E+03	9,06E+00	1,40E-01	5,64E+04	7,87E+01	-1,80E+02
Contribution to water eutrophication	kg (PO4)³- eq	4,89E+04	7,43E+01	1,22E+00	3,15E-02	4,88E+04	6,17E+00	-3,62E+01
Contribution to photochemical ozone formation	g C2H4 eq	4,32E+03	1,49E+02	4,58E+00	3,13E-02	4,16E+03	8,15E+00	-5,33E+01
Total primary energy use during the life cycle	MJ	5,00E+07	1,31E+06	7,43E+04	2,81E+02	4,85E+07	1,78E+05	-4,97E+05



OPTIONAL INDICATORS

Indicators	Units	Total w/o modulus D	Manufacturing	Distribution	Installation	Use	End-of-life	Modulus D
Total primary energy use during the life cycle	MJ	5,01E+07	1,43E+06	7,43E+04	2,81E+02	4,85E+07	1,68E+05	-4,97E+05
Fine particle emissions	Disease index	1,58E+00	9,05E-03	3,83E-04	5,53E-06	1,57E+00	1,23E-03	-3,55E-03
Ionising radiation (human health)	kBq de U235 eq	5,30E+04	2,40E+03	3,71E+01	5,72E-02	4,98E+04	7,69E+02	-7,59E+02
Ecotoxicity (freshwater)	CTUe	2,14E+07	1,68E+06	3,62E+04	1,34E+02	1,96E+07	1,35E+05	-8,31E+05
Human toxicity, carcinogenic effects	CTUh	9,12E-04	6,74E-04	2,35E-06	6,54E-09	8,89E-05	1,47E-04	-2,95E-04
Human toxicity, non-carcinogenic effects	CTUh	3,11E-02	1,56E-02	5,19E-05	4,55E-08	1,00E-02	5,36E-03	-1,86E-03
Impacts related to land use / Soil quality	No dimension	1,06E+06	6,65E+05	4,42E+04	1,88E+01	2,81E+05	7,08E+04	-1,64E+05



ENVIRONMENTAL IMPACTS OF MODULES B1 TO B7 at EQUIPMENT level

MANDATORY INDICATORS

Indicators	Units	Use steps / UF	Modulus B1	Modulus B2	Modulus B3	Modulus B4	Modulus B5	Modulus B6	Modulus B7
Climate change - total	kg CO2 eq	8,95E+06	0,00E+00	6,43E+04	0,00E+00	0,00E+00	0,00E+00	8,88E+06	0,00E+00
Climate change – fossil	kg CO2 eq	9,08E+06	0,00E+00	6,42E+04	0,00E+00	0,00E+00	0,00E+00	9,02E+06	0,00E+00
Climate change – biogenic	kg CO2 eq	2,35E+02	0,00E+00	5,07E+01	0,00E+00	0,00E+00	0,00E+00	1,84E+02	0,00E+00
Climate change – land use and change	kg CO2 eq	- 1,35E+05	0,00E+00	-1,96E+01	0,00E+00	0,00E+00	0,00E+00	-1,35E+05	0,00E+00
Ozone depletion	kg CFC 11 eq	7,01E-03	0,00E+00	5,69E-03	0,00E+00	0,00E+00	0,00E+00	1,32E-03	0,00E+00
Acidification	mole de H+ eq	1,65E+05	7,48E+04	2,46E+02	0,00E+00	0,00E+00	0,00E+00	8,95E+04	0,00E+00
Eutrophication, freshwater	kg P eq	2,04E+03	0,00E+00	1,77E+00	0,00E+00	0,00E+00	0,00E+00	2,04E+03	0,00E+00
Eutrophication, marine	kg de N eq	1,60E+05	7,35E+04	6,13E+01	0,00E+00	0,00E+00	0,00E+00	8,60E+04	0,00E+00
Eutrophication, terrestrial	mole de N eq	8,85E+05	5,25E+05	6,10E+02	0,00E+00	0,00E+00	0,00E+00	3,59E+05	0,00E+00
Photochemical ozone formation	kg NMCOV eq	2,21E+05	1,89E+05	2,98E+02	0,00E+00	0,00E+00	0,00E+00	3,21E+04	0,00E+00
Depletion of abiotic resources - elements	kg Sb eq	6,78E-01	0,00E+00	4,09E-01	0,00E+00	0,00E+00	0,00E+00	2,69E-01	0,00E+00
Depletion of abiotic resources - fossil fuels	MJ	4,81E+07	0,00E+00	9,18E+05	0,00E+00	0,00E+00	0,00E+00	4,72E+07	0,00E+00
Water requirement	m ³ of deprivation eq worldwide	2,48E+04	0,00E+00	1,43E+04	0,00E+00	0,00E+00	0,00E+00	1,05E+04	0,00E+00
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	3,73E+05	0,00E+00	3,21E+04	0,00E+00	0,00E+00	0,00E+00	3,41E+05	0,00E+00
Use of renewable primary energy resources used as raw materials	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3,73E+05	0,00E+00	3,21E+04	0,00E+00	0,00E+00	0,00E+00	3,41E+05	0,00E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	4,81E+07	0,00E+00	9,18E+05	0,00E+00	0,00E+00	0,00E+00	4,72E+07	0,00E+00

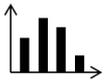


Indicators	Units	Use steps / UF	Modulus B1	Modulus B2	Modulus B3	Modulus B4	Modulus B5	Modulus B6	Modulus B7
Use of non-renewable primary energy resources used as raw materials	MJ	1,15E+02	0,00E+00	1,15E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	4,81E+07	0,00E+00	9,18E+05	0,00E+00	0,00E+00	0,00E+00	4,72E+07	0,00E+00
Use of secondary materials	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels,	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m³	1,74E+03	0,00E+00	4,20E+02	0,00E+00	0,00E+00	0,00E+00	1,32E+03	0,00E+00
Hazardous waste disposed	kg	4,00E+03	0,00E+00	2,35E+03	0,00E+00	0,00E+00	0,00E+00	1,65E+03	0,00E+00
Non-hazardous waste disposed	kg	3,73E+04	0,00E+00	2,07E+04	0,00E+00	0,00E+00	0,00E+00	1,66E+04	0,00E+00
Radioactive waste disposed	kg	6,45E+01	0,00E+00	8,28E-01	0,00E+00	0,00E+00	0,00E+00	6,37E+01	0,00E+00
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	4,36E+03	0,00E+00	4,36E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	2,50E+00	0,00E+00	2,50E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Indicators PCR edition 3 :									
Contribution to global warming	kg CO2 eq	8,13E+06	0,00E+00	6,30E+04	0,00E+00	0,00E+00	0,00E+00	8,07E+06	0,00E+00
Contribution to soil and water acidification	kg SO2 eq	5,64E+04	0,00E+00	1,89E+02	0,00E+00	0,00E+00	0,00E+00	5,62E+04	0,00E+00
Contribution to water eutrophication	kg (PO4) ³⁻ eq	4,88E+04	0,00E+00	4,53E+01	0,00E+00	0,00E+00	0,00E+00	4,88E+04	0,00E+00
Contribution to photochemical ozone formation	g C2H4 eq	4,16E+03	0,00E+00	8,95E+01	0,00E+00	0,00E+00	0,00E+00	4,07E+03	0,00E+00
Total primary energy use during the life cycle	MJ	4,85E+07	0,00E+00	9,50E+05	0,00E+00	0,00E+00	0,00E+00	4,75E+07	0,00E+00

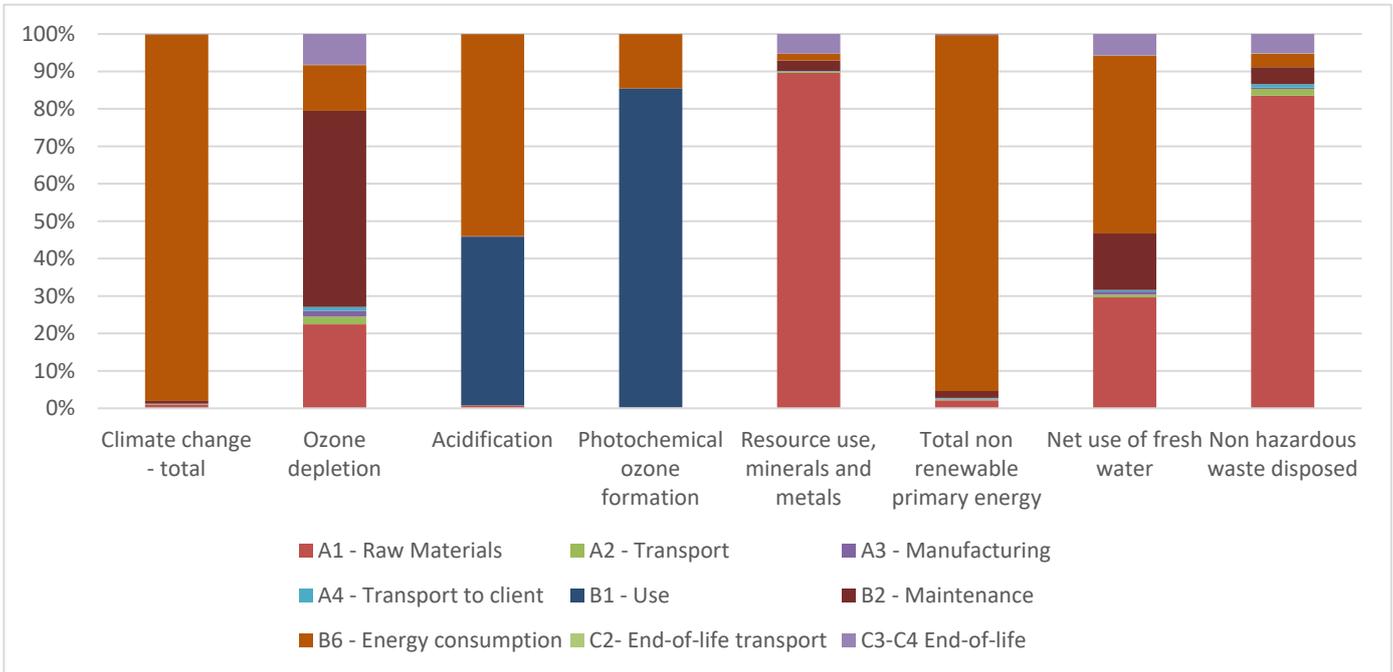


OPTIONAL INDICATORS

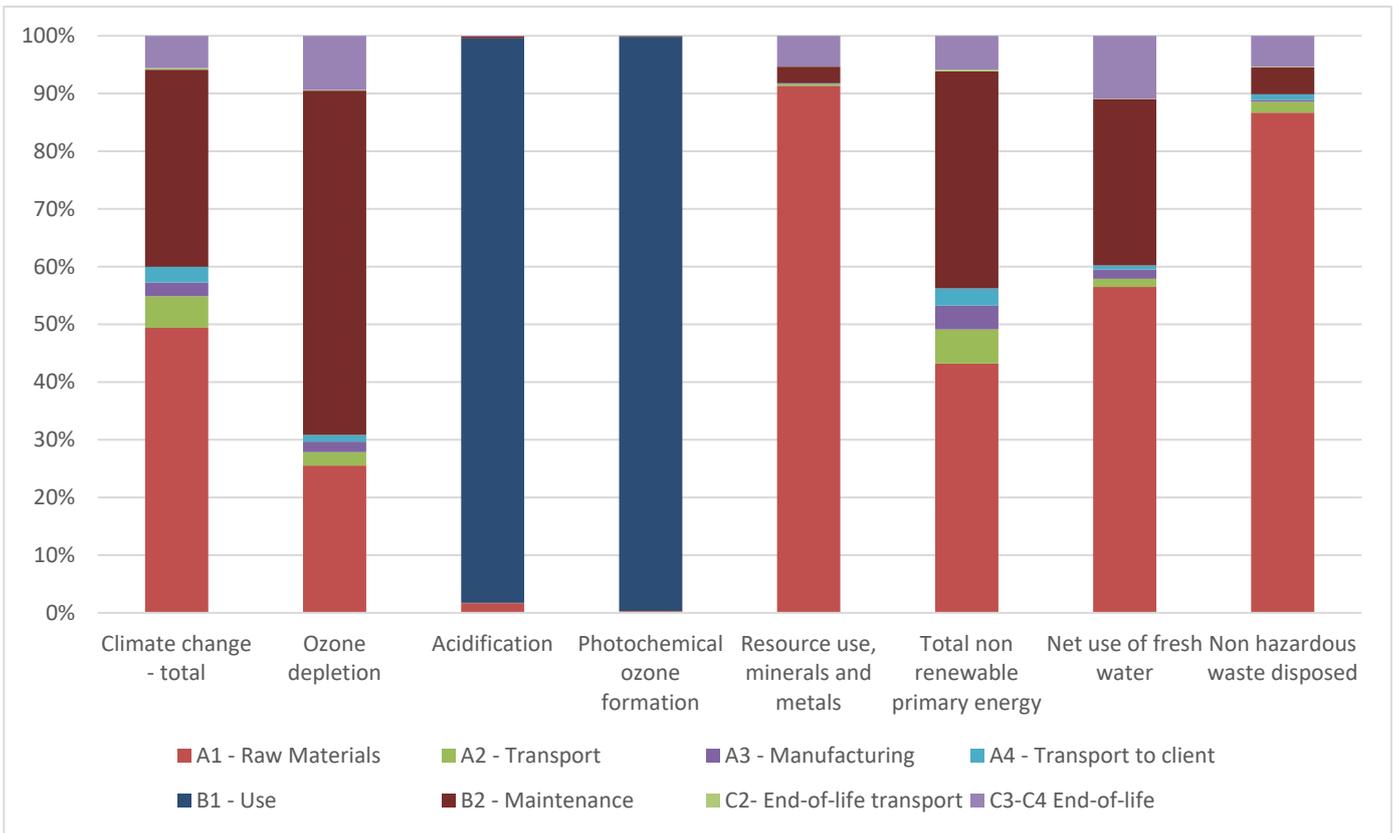
Indicator	Units	Use steps / UF	Modulus B1	Modulus B2	Modulus B3	Modulus B4	Modulus B5	Modulus B6	Modulus B7
Total primary energy use during the life cycle	MJ	4,85E+07	0,00E+00	9,50E+05	0,00E+00	0,00E+00	0,00E+00	4,75E+07	0,00E+00
Fine particle emissions	Disease index	1,57E+00	3,53E-01	3,01E-03	0,00E+00	0,00E+00	0,00E+00	1,21E+00	0,00E+00
Ionising radiation (human health)	kBq de U235 eq	4,98E+04	0,00E+00	1,11E+03	0,00E+00	0,00E+00	0,00E+00	4,87E+04	0,00E+00
Ecotoxicity (freshwater)	CTUe	1,96E+07	2,16E+01	1,20E+06	0,00E+00	0,00E+00	0,00E+00	1,84E+07	0,00E+00
Human toxicity, carcinogenic effects	CTUh	8,89E-05	0,00E+00	6,87E-05	0,00E+00	0,00E+00	0,00E+00	2,02E-05	0,00E+00
Human toxicity, non-carcinogenic effects	CTUh	1,00E-02	1,39E-05	8,72E-04	0,00E+00	0,00E+00	0,00E+00	9,13E-03	0,00E+00
Impacts related to land use / Soil quality	No dimension	2,81E+05	0,00E+00	1,34E+05	0,00E+00	0,00E+00	0,00E+00	1,46E+05	0,00E+00



DISTRIBUTION OF ENVIRONMENTAL IMPACTS



DISTRIBUTION OF ENVIRONMENTAL IMPACTS EXCLUDING B6 / ENERGY CONSUMPTION BY USE





EXTRAPOLATION RULES

The extrapolation coefficients are given for the environmental impact of the functional unit, i.e. 1kVA emergency electrical power. For each stage of the life cycle, the environmental impacts of the product in question are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient. The 'Total' column is calculated by adding together the environmental impacts of each stage of the life cycle.

The extrapolation rules below (from manufacturing to module D) are applicable at product level. A coefficient must be applied to these rules to be able to consider the impacts at functional unit level. This factor considers the difference in power between the product under consideration and the reference product:

$$\left[\frac{Power_{PR}}{Power_{PC}} \right]$$

With:

$Power_{PR}$ = Nominal power of the reference product

$Power_{PC}$ = Nominal power of the product in question

MANUFACTURING

The extrapolation rule at the manufacturing stage is defined as:

$$\left[\frac{M_{totalPC}}{M_{totalPR}} \right]$$

With :

$M_{totalPC}$ = Total mass (including packaging) of the product in question (kg)

$M_{totalPR}$ = Total mass (including packaging) of the reference product (kg)

DISTRIBUTION

The extrapolation rule in the distribution stage is defined as:

$$\left[\frac{M_{totalPC}}{M_{totalPR}} \right]$$

With :

$M_{totalPC}$ = Total mass (including packaging) of the product in question (kg)

$M_{totalPR}$ = Total mass (including packaging) of the reference product (kg)

INSTALLATION

The environmental impacts generated during the installation stage are correlated to the use of a crane for one hour, whatever the mass of the generating set. These are identical within the homogeneous family.

LIFE IN OPERATION (B2)

The extrapolation rule for the life-cycle stage is defined as :

$$\left[\left(\frac{M_{totalremppc}}{M_{totalremppr}} \right) \right]$$

With :

$M_{totalremppc}$ = Mass of fluids replaced during maintenance of the product in question (kg)

$M_{totalremppr}$ = Mass of fluids replaced during the maintenance of the reference product (kg)

ENERGY CONSUMPTION (B6)

The extrapolation rule for the life-cycle stage is defined as follows:

$$\left[\left(\frac{V_{totalPC}}{V_{totalPR}} \right) \right]$$

With :

$V_{totalPC}$ = Total volume of fuel consumed by the product in question (kWh)

$V_{totalPR}$ = Total volume of fuel consumed by the reference product (kWh)

END-OF-LIFE

The extrapolation rule at the end-of-life stage is defined as :

$$\left[\frac{M_{productPC}}{M_{productPR}} \right]$$

with :

M_{produitPC} = Mass of the product under consideration (kg)*

M_{produitPR} = Mass of the reference product (kg)

Modulus D

For the Module D stage, we have assumed the same extrapolation rules as for the distribution stage.

All the impacts of modulus D are linked to the mass of the product and its packaging.

The extrapolation coefficients for other commercial references are as follows:

Commercial references		KD2000- F	KD2250- F	KD2500- F	KD2800- F	KD3000- F	KD3300- F	KD3500- F	KD3750- F
At the declared product	Manufacturing	0,68	0,69	0,71	0,72	0,81	0,85	0,86	1,00
	Distribution	0,68	0,69	0,71	0,72	0,81	0,85	0,86	1,00
	Installation	0,51	0,51	0,51	0,51	1,00	1,00	1,00	1,00
	B2	0,55	0,61	0,68	0,75	0,82	0,88	0,93	1,00
	B6	0,68	0,69	0,71	0,72	0,81	0,85	0,86	1,00
	Maintenance	0,68	0,69	0,71	0,72	0,81	0,85	0,86	1,00
	End-of-life	0,68	0,69	0,71	0,72	0,81	0,85	0,86	1,00
	Modulus D	0,68	0,69	0,71	0,72	0,81	0,85	0,86	1,00
At functional unit	Manufacturing	1,27	1,14	1,06	0,97	1,02	0,97	0,93	1,00
	Distribution	1,27	1,14	1,06	0,97	1,02	0,97	0,93	1,00
	Installation	0,96	0,85	0,77	0,69	1,25	1,14	1,07	1,00
	B2	1,03	1,02	1,03	1,01	1,03	1,00	0,99	1,00
	B6	1,27	1,14	1,06	0,97	1,02	0,97	0,93	1,00
	Maintenance	1,27	1,14	1,06	0,97	1,02	0,97	0,93	1,00
	End-of-life	1,27	1,14	1,06	0,97	1,02	0,97	0,93	1,00
	Modulus D	1,27	1,14	1,06	0,97	1,02	0,97	0,93	1,00

Commercial references		KD4000-F	KD4500-F
At the product	declared		
	Manufacturing	1,28	1,28
	Distribution	1,28	1,28
	Installation	1,67	1,67
	B2	1,07	1,17
	B6	1,28	1,28
	Maintenance	1,28	1,28
	End-of-life	1,20	1,07
	Modulus D	1,20	1,07
At functional unit	Manufacturing	1,56	1,39
	Distribution	1,00	0,98
	Installation	1,20	1,07
	B2	1,20	1,07
	B6	1,28	1,28
	Maintenance	1,28	1,28
	End-of-life	1,67	1,67
	Modulus D	1,07	1,17

ADDITIONAL ENVIRONMENTAL INFORMATION





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