EPD

ENVIRONMENTAL PRODUCT DECLARATION

Production site: Xiamen Hongfa Electric Power Controls Co., Ltd. NO.93, Yinong Road, Haicang District, Xiamen City, Fujian Province 361027, P.R.China

Switches

HF P/N	HFE37-280/9-2SHT1	HFE68/12-2SD7T2-2-R
Code	45886420051	45888880005
Appearance		

PROGRAM OPERATOR	PUBLISHER
EPDITALY	EPDITALY
PRODUCT CATEGORY	**ELECTRONIC AND ELECTRICAL PRODUCTS AND SYSTEMS –SWITCHES**
EPDITALY REGISTRATION NUMBER	**ISSUE DATE**
EPDITALY 0384	2023-02-20
VALID TO	**INTERNAL/ EXTERANL USE**
2028-02-20	EXTERNAL

OWNING ORGANIZATION	DECLARATION NUMBER	REV.	LANG.
XIAMEN HONGFA ELECTRIC POWER CONTROLS CO., LTD.	HFEPC 20221114	1.0	EN

EPD Owner	Xiamen Hongfa Electric Power Controls Co., Ltd.
Manufacturer name and address	Xiamen Hongfa Electric Power Controls Co., Ltd. NO.93, Yinong Road, Haicang District, Xiamen City, Fujian Province 361027, P.R.China
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Program operator	EPDItaly – info@epditaly.it via Gaetano De Castillia n° 10 - 20124 Milano, Italia
Declared product & Functional unit or declared unit	DU: The declared unit is specified in terms of pcs. The declared unit is 1pc of manufactured product incl. packaging material with RSL of 20 years
Product description	HFE37-280/9-2SHT1HFE37 / HFE68/12-2SD7T2-2-RHFE68,, 2 switches in 1 synthesis EPD report
CPC code	46212
Independent verification	INTERNAL ☒ EXTERNAL Third party verification carried out by: ICMQ accredited by: ACCREDIA. This declaration has been developed referring to EPDItaly, following the "REGULATIONS OF THE EPDItaly PROGRAMME" Revision 5.2; further information and the document itself are available at: www.epditaly.it. Independent verification of the declaration and data carried out according to ISO 14025: 2006.
Reference PCR and version number	Core PCR: EPDItaly007 – PCR for Electronic and Electrical Products and Systems, Rev. 2. 21/10/2020 Sub PCR: EPDItaly012 - Electronic and electrical products and systems –Switches, Rev. 0. 16/03/2020
Other reference documents	EN 50693:2019 - Product category rules for life cycle assessments of electronic and electrical products and systems Regulations of the EPDItaly Programme rev. 5.2 published on 2022/02/16
Product RSL description	20 years
Markets of applicability	B2B, HFE37-280/9-2SHT1 for Poland, HFE68/12-2SD7T2-2-R for Brazil
LCA study	This EPD study is based on the LCA study described in the LCA report
EPD type	Product specific
EPD scope	Cradle to grave

Year of reported primary data	2021.1.1~2021.12.31
Technical support	TÜV Rheinland (China) Ltd.
LCA software	SimaPro 9.0.0.48
LCI database	Ecoinvent v3.8
LCIA methodology	EN 15804 + A2 Method V1.02
Comparability	EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.
Liability	EPDItaly declines any responsibility regarding the manufacturer's information, data and results of the life cycle assessment.

CONTENTS

HONGFA PURPOSE & EMBEDDING SUSTAINABILITY

Xiamen Hongfa Electroacoustic Co., Ltd. (The abbreviation is Hongfa Group) is in the process of seeking their own survival and sustainable development. HONGFA considers to achieve the goal of enterprise management and improve enterprise market position, and to keep the enterprise in the leading field of competition and the future expansion of the business environment always maintain sustained earnings growth and improvement of ability, ensure longevity enterprise for a long time.

Hongfa establishes CSR management manual to ensure compliance with laws, regulations and customer requirements and continuous improvement.

1. The CSR policy

People-oriented, green operation, to promote the harmonious and sustainable development of economy, society and environment

2. CSR vision

To build a sustainable social responsibility system and become a first-class enterprise in the global relay field respected by the society and loved by employees

3. The CSR strategy

Develop employee value, promote green environmental protection, pursue win-win ecology and create a better life.

4. CSR practice path

For employees, people-oriented, growth together

For the environment, green environmental protection, clean production

For partners, development together, to achieve win-win

For shareholders, stable operation, create value

For the government, honest and honest, legitimate business

For community, being selfless contribution

GENERAL INFORMATION

Hongfa Group has more than 30 subsidiaries worldwide, and its business covers more than 120 countries and regions, including relays, medium and low voltage products, high and low voltage switchgears, connectors, capacitors, precision parts and automation equipment. Hongfa is the only enterprise that owns postdoctorial working station and academician working station of the industry in China.

Company development history

1) In 1984, Xiamen Hongfa Electroacoustic Co., Ltd (Hongfa Group for short) was established.
2) In 1987, product and company orientation aligned, committed to be an export-oriented enterprise with relays as the main product.
3) In 1999, enterprise reform implemented; Employee stock ownership started.
4) In 2008, Hongfa is nominated as “China’s Most Well-Known Trademark.”
5) In 2012, Hognfa Group was listed on Shanghai Stock Exchange. Accelerated its capital structure adjustment, and started its business again.

Hongfa is committed to providing customers with satisfactory products and solutions through continuous innovation and unremitting pursuit of high quality to bring people a more comfortable and convenient life.

As a responsible company to society and environment, HFEPC applied EPD Italy, conducted LCA study from 2021.1.1 to 2021.12.31, and is willing to disclosure the actual environmental impact to the public and customers for low voltage products.

Declared in this EPD includes the following products and for each product the characteristics and composition were listed from table2-table 4.

Table 1 LCA study related types

Type for LCA Study	Related Types	Internal Code
HFE37	HFE37	45886420051
HFE68	HFE68	45888880005

PRODUCT CHARACTERISTICS

Table 2 Product characteristics of HFE37 and HFE68

Product Model	HFE37-280/9-2SHT1	HFE68/12-2SD7T2-2-R
Nominal short-circuit breaking capacity	2. 5KA	2.5KA
Nominal voltage for Coil	9V DC.	12 V DC.
nominal current intensity	0.56A	0.83 A
Contact material	AgSnO2	AgSnO2
Number of poles of the switch	1	2

MATERIALS COMPOSITION

Table 3 The switch HFE 37 material composition

Materials	IEC62474 Material classes ID	Weight (g/pcs)
PA66	M-208	11.27
PBT	M-211	30.846
PBT, copper	M-211, M-121	24.9
STEEL-DC04	M-119	20.82
Iron- Y33 Ferrite	M101	3.2
Alloy copper	M-121	2.72
Copper	M-121	58.49
Purple manganese copper	M-121	9.95
Copper- 3UEW	M-121	24.08
Copper alloy-Tin bronze	M-121	0.16
Steel- DT4E, pure rods	M119	8.68
Steel -DT4B 2	M119	10.96334
Steel-10B21	M-119	10.56
Steel- DT4B	M−119	25.31

Table 4 The switch HFE68 material composition

Material	IEC62474 Material classes ID	Weight (g/pcs)
PA66	M-208	1.63
PBT	M-211	28.17
PBT, copper	M-211, M-121	0
STEEL-DC04	M-119	65.68
Iron- Y33 Ferrite	M101	2.23
Alloy copper	M-121	2.52
Copper	M-121	88.68
Purple manganese copper	M-121	10.27
Copper- 3UEW	M-121	15.10
Copper alloy-Tin bronze	M-121	0.24
Steel- DT4E	M119	6.04
Steel-10B21	M-119	35.44
Steel- DT4B	M−119	47.53

LCA BACKGROUND INFORMATION

DECLARED UNIT (FUNCTIONAL UNIT)

The declared unit is specified in terms of pcs. The declared unit is 1 pcs of manufactured product incl. packaging material in a reference service life 20 years.

SYSTEM BOUNDARIES

The life cycle of the Switch, an EEPS (Electronic and Electrical Products and Systems), is a “from cradle to grave” analysis and covers the following main life cycle stages.

The following table shows the stages of the product life cycle and the information stages according to EN 50693 for the evaluation of electronic and electrical products and systems.

Table 5 System boundaries

<table>
<tr><th colspan="2" rowspan="2">MANUFACTURING STAGE</th><th>DISTRIBUTION

STAGE</th><th colspan="2">INSTALLATION

STAGE</th><th>USE &

MAINTENANCE

STAGE</th><th>END-OF-LIFE

STAGE

De-installation</th><th></th></tr>
<tr><td>UPSTREAM

MODULE</td><td>CORE

MODULE</td><td colspan="6">DOWNSTREAM MODULE</td></tr>
<tr><td>extraction of raw materials, including waste recycling processes and the production of semi-finished and ancillary products, as well as their packaging</td><td>Manufacturing of the product constituents, including all the stages</td><td rowspan="4">distribution</td><td colspan="2" rowspan="4">installation</td><td rowspan="4">use & maintenance</td><td rowspan="4">de-installation</td><td rowspan="4">end-of-life</td></tr>
<tr><td>Transportation of raw materials to the manufacturing company</td><td>Product assembly</td></tr>
<tr><td></td><td>packaging</td></tr>
<tr><td></td><td>waste recycling processes</td></tr>
<tr><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
</table>

X = module include in EPD

The stages of the product life cycle and the information considered for the evaluation of the cluster are:

- Manufacturing upstream includes raw materials, and production activities of HONGFA suppliers, including transport of semifinished items and subassemblies to HONGFA.
- Manufacturing core includes local consumptions due tomanufacturing of the products , he relevant assembling and waste due to manufacturing. This includes also the packaging production.
- The distribution stage includes the impacts related to the distribution of the product from manufacture to the logistic center of the receiver
- The installation stage includes the impact related to the transportation of packaging waste to recycling place.
- The use stages include the impact related to energy consumption during the service life of the product.
- End of life includes the transportation and operations for the disposal of the product at the end of its service life.

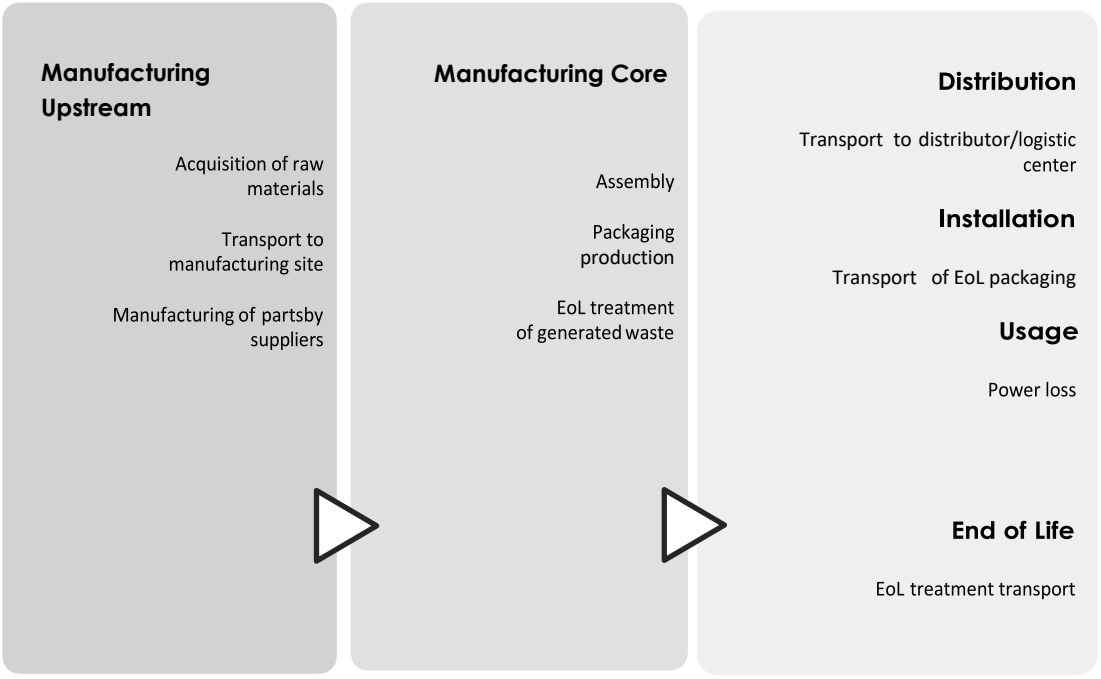

Figure 1 System boundary

TEMPORAL AND GEOGRAPHICAL BOUNDARIES

The HONGFA component suppliers are sourced: China. All primary data collected from HONGFA are from 2021.1.1~2021.12.31, which is a representative production year. Secondary data are also representative for this year, as provided by Ecoinvent v3.8.

The selected Ecoinvent processes in the LCA model have a global representativeness, due to the unclear origin of each component. In this way, a conservative approach has been adopted.

BOUNDARIES IN THE LIFE CYCLE

As indicated in the PCR EPDItaly012, capital goods, such as buildings, machinery, tools and infrastructure, the packaging for internal transport which cannot be allocated directly to the production of the reference product, may be excluded from the system boundary.

DATA QUALITY

In this EPD, both primary and secondary data are used. Site specific foreground data have been provided by HONGFA. Main data sources are the bill of materials available on the enterprise resource planning. For all processes for which primary are not available, generic data originating from the Ecoinvent v3.8 database, allocation cut-off by classification, are used. The Ecoinvent database is available in the SimaPro 9.0.0.48 software used for the calculations.

ENVIRONMENTAL IMPACT INDICATORS

The information obtained from the inventory analysis is aggregated according to the effects related to the various environmental issues. According to PCR EPDItaly012 and EN 50693 the environmental impact indicators must be determined using the characterization factors and impact assessment methods specified in EN 15804 + A2 Method V1.02.

PCR EPDItaly012 and the EN 50693 standard establish four indicators for climate impact(GWP-GHG): GWP (total) which includes all greenhouse gases; GWP (fossil fuels); GWP(biogenic carbon) which includes the emissions and absorption of biogenic carbon dioxide and biogenic carbon stored in the product; GWP (land use).

ALLOCATION RULES

The energy demand for product line and waste for products are allocated by yield based on total production amount from 2021.1.1 till 2021.12.31.

However, the energy demand beyond product line comes from air-conditioner and air-compressing facilities which may consume more energy than product line in a assemble factory. Cause those ancillary facilities are shared capitals with different workshop for different type of products, so

output amount by pcs is not available for such scenario, the economic value allocation method for the products produced was adopt for ancillary equipment energy consumption.

LIMITATIONS AND SIMPLIFICATIONS

The data of energy consumption and pollutants emission in the raw material acquisition stage are from the Ecoinvent 3.8 database published by the European Ecoinvent Center.

The emission factor of China electricity is from the Ecoinvent 3.8 database.

The emission factor of Poland (HFE37) and Brazil (HFE68) electricity is also from the Ecoinvent 3.8 database. The emission factor of China electricity is from the Ecoinvent 3.8 database. This dataset has been extrapolated from year 2015 to the year of the calculation (2020). China state grid launched the green electricity program in late of 2021, however, the green electiricty selling information is not public available when creating this LCA report. Thus we use the Ecoinvnt data base data for China electricity is deemed conservative as this value is higher than the reality.

The uncertainty has been adjusted accordingly. This dataset describes the electricity available on the low voltage level in China, Poland and Brazil. This is done by showing the distribution of 1kWh electricity at low voltage.

INVENTORY ANALYSIS

The Ecoinvent v3.8 by classification system processes are used to model the background system of the processes.

Due to the large amounts of components in the switch, raw material inputs are modelled with data from Ecoinvent representing a global market coverage. These datasets are assumed to be representative.

MANUFACTURING STAGE

Copper is the most frequently used material, followed by PBT , other plastics and metals.

The single use packaging is also included in the analysis in the manufacturing stage- core. HONGFA receives packaging components from outside suppliers and packages the Switchs before shipping them.

The transport distances and weight from raw materials suppliers to the manufacturing are assumed as below:

- Transport, freight, lorry: 0.0000032 tkm/pcs of 0.75t type, 0.00439931 tkm/pcs of 2t type and 0.042098 tkm/pc of 20t type for HFE37;
- Transport, freight, lorry: 0.03927569 tkm/pcs of 2t type and 0.0288 tkm/pcs of 20t type for HFE68;

For lorry outside of 16 to 32 t type, the “Transport, freight, lorry 3.5-7.5 metric ton, EURO6 {GLO}| market for | Cut-off, U” is used; for freight type falls into 16 to 32 t type, the “Transport, freight, lorry 16-32 metric ton, EURO6 {GLO}| market for | Cut-off, U” is used.

The manufacturing of the Switches is located in HONGFA facility of Xiamen, China. In the factory, the different components and subassemblies are assembled into the Switch.

For the manufacturing phase, the general China low voltage electricity mix from Ecoinvent v3.8 is used.

The waste generated by the production and assembly processes is included in the calculation.

DISTRIBUTION

The transport distances and weight from HONGFA plant to the place of use are shown as below:

Table 6 Transportation activity data

HFE37	✓ Transport, freight, lorry: 6.60E-06 tkm/pcs ✓ Transport, freight, sea: 6.23E-03 tkm/pcs
HFE68	✓ Transport, freight, lorry: 7.60E-03 tkm/pcs ✓ Transport, freight, sea: 7.37E+00 tkm/pcs

USE

Use and maintenance are modelled according to the PCR EPDItaly012 - Switches with working time calculation adapted to the specific application.

For the use phase, the general low voltage electricity mix from Ecoinvent v3.8 is used. In order to recognize the function and the realistic energy used for the use stage, the study has been carried out to define the parameters used for E_{use} calculation. It has been known that the relay works with electricity and the coil in the relay is used to drive the contact point when the coil is energized and the action will give a signal to the microwave system (out of this relay) in the power meters . So a transient current will go through the relay coil and cause energy loss in the relay component, however the period is short for the energizing action which is only 0.05 seconds, in this study we assumed the relay we be energized once a month, and the reference service life is defined as 20 years.

Although we can not acquire the specific use scenario like the frequency of motivation by the replay in a power meter, there was one truth that an breaking status for the coil in the relay is the general state for most of the lifetime to the target relay studied and there was not an continuously energy dissipated due to the ohmic losses. The hypothetical scenario also conflicts with the formula define in the PCR for Switch- EPDItaly012 - SUB PCR EN 50693_Switches_en_v0. As we presented in Table 7 Power electricity losses of the switches, the Puse is 2.5W for HFE37 and 10W for HFE68 with the Reference current factor of 50% according to the PCR, consequently the power loss in its use stage is only 0.00000833 kWh for HFE37 and 0.0000333 kWh for HFE68. This power loss is calculated on the basis of the frequency of each energizing period of 0.05ms, once a month in 20 years of service life. Obviously the calculation under the assumed scenario conflicts with the formula defined in the PCR for Switch- EPDItaly012 - SUB PCR EN 50693_Switches_en_v0. Cause the PCR defines a service life time of 20 years, and uses a correction factor α=30% to define the functioning time in its lifetime. If we impose this method in the PCR, we will calculate a large power loss of 131.4 kWh for HFE37 and 525.6kWh for HFE68. The result vary much from the realistic use stage.

Hereto we are inclined to calculate the power loss on the basis of the realistic scenario as the relay comply the definition of switch even if it works in a different way.

Table 7 Power electricity losses of the switches

	HFE37	**HFE68**
P_{use} [W]	2.5	10
E_{use} [kWh]	0.00000833	0.0000333

Since no maintenance happens during the use phase, the environmental impacts linked this procedure have been omitted from the analysis.

END OF LIFE

The end of life stage is modelled according to PCR EPDItaly012 and WEEE Directive(2012/19/EU). Thepercentages for end-of-life treatments of switches are taken from WEEE Directive(2012/19/EU).

ENVIRONMENTAL INDICATORS

The following tables show the environmental impact indicators of the life cycle of a single Switch, as indicated by PCR EPDItaly007, sub-PCR EPDItaly012 and EN 50693:2019.

The indicators are divided into the contribution of the processes to the different modules (upstream, core and downstream) and stages (manufacturing, distribution, use and end-of-life).

Table 8 Environmental impacts of HFE37

Item	Unit	Total	MANUFACTURING STAGE		DISTRIBUTION	INSTALLATION	USE STAGE	END-OF-LIFE
			UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE			
Climate change	kg CO2 eq	2.24E+00	1.57E+00	3.21E-01	5.96E-05	8.36E-02	8.75E-06	3.41E-01
Ozone depletion	kg CFC11 eq	1.14E-06	7.35E-07	4.04E-07	1.18E-11	2.17E-10	1.15E-13	2.64E-09
Photochemical ozone formation	kg NMVOC eq	1.69E-02	1.53E-02	1.41E-03	1.36E-06	1.18E-05	2.16E-08	1.80E-04
Acidification	mol H+ eq	7.64E-02	7.41E-02	2.09E-03	1.91E-06	7.90E-06	6.35E-08	1.88E-04
Eutrophication, freshwater	kg P eq	5.94E-03	5.82E-03	1.15E-04	1.99E-09	1.93E-07	1.08E-08	9.58E-06
Water use	m3 depriv.	1.52E+00	1.39E+00	1.27E-01	1.34E-06	8.68E-05	1.20E-06	8.08E-03
Resource use, fossils	MJ	2.60E+01	2.05E+01	5.20E+00	7.64E-04	1.51E-02	9.52E-05	3.21E-01
Resource use, minerals and metals	kg Sb eq	1.73E-03	1.73E-03	2.04E-06	8.34E-11	2.86E-09	2.78E-11	2.18E-07
Climate change – Fossil	kg CO2 eq	2.27E+00	1.54E+00	3.91E-01	5.96E-05	1.02E-03	8.71E-06	3.40E-01

Climate change – Biogenic	kg CO2 eq	3.24E-02	2.00E-02	-7.02E-02	-6.44E-09	8.26E-02	3.48E-08	2.68E-05
Climate change - Land use and LU change	kg CO2 eq	2.71E-03	2.27E-03	4.05E-04	4.32E-08	3.86E-07	2.07E-09	3.14E-05
Use of resources per pcs of HFE37								
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	**2.40E+01**	1.91E+01	4.50E+00	7.64E-04	1.51E-02	9.52E-05	3.21E-01
Use of renewable primary energy excluding renewable primary energy	MJ, net calorific value	**4.89E+00**	3.59E+00	1.28E+00	5.24E-06	2.25E-04	7.17E-06	2.19E-02

resources used as raw material (PERE)								
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	**2.04E+00**	1.34E+00	6.99E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	**1.08E+00**	0.00E+00	1.08E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and	MJ, net calorific value	2.60E+01	2.05E+01	5.20E+00	7.64E-04	1.51E-02	9.52E-05	3.21E-01

primary energy resources used as raw materials) (PENRT)								
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	5.97E+00	3.59E+00	2.36E+00	5.24E-06	2.25E-04	7.17E-06	2.19E-02
Net use of fresh water (FW)	m^3	3.79E-02	3.43E-02	3.31E-03	4.53E-08	2.87E-06	2.63E-07	2.86E-04
Use of secondary raw materials (MS)	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 (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Generation of waste per pcs of HFE37								
HWD = Hazardous waste disposed,	HWD (kg)	2.66E-04	0.00E+00	2.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD = Non-hazardous waste disposed,	NHWD (kg)	1.12E-01	0.00E+00	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.11E-01
RWD = Radioactive waste disposed,	RWD (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER= Materials for energy recovery,	MER (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

MFR =Material for recycling,	MFR (kg)	2.26E-01	0.00E+00	1.34E-03	0.00E+00	8.82E-02	0.00E+00	1.36E-01
CRU =Components for reuse,	CRU (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE =Exported thermal energy,	ETE (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE= Exported electricity energy.	EEE (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 9 Environmental impacts of HFE68

Item	Unit	Total	MANUFACTURING STAGE		DISTRIBUTION	INSTALLATION	USE STAGE	END-OF-LIFE
			UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE			
Climate change	kg CO2 eq	2.65E+00	1.85E+00	2.90E-01	7.05E-02	7.74E-02	1.06E-05	4.27E-01
Ozone depletion	kg CFC11 eq	7.80E-07	5.31E-07	2.30E-07	1.40E-08	1.24E-09	6.23E-13	3.31E-09
Photochemical ozone formation	kg NMVOC eq	2.06E-02	1.74E-02	1.29E-03	1.60E-03	3.97E-05	2.02E-08	2.26E-04
Acidification	mol H+ eq	8.64E-02	8.20E-02	1.93E-03	2.26E-03	3.31E-05	5.28E-08	2.36E-04
Eutrophication, freshwater	kg P eq	6.61E-03	6.49E-03	1.09E-04	2.35E-06	5.91E-07	1.16E-09	1.20E-05
Water use	m3 depriv.	1.58E+00	1.45E+00	1.10E-01	1.58E-03	3.08E-04	1.99E-06	1.01E-02
Resource use, fossils	MJ	2.86E+01	2.28E+01	4.45E+00	9.03E-01	8.47E-02	9.82E-05	4.02E-01
Resource use, minerals and metals	kg Sb eq	1.90E-03	1.90E-03	1.62E-06	9.85E-08	1.86E-08	1.04E-10	2.73E-07
Climate change - Fossil	kg CO2 eq	2.67E+00	1.81E+00	3.56E-01	7.04E-02	5.64E-03	6.59E-06	4.27E-01
Climate change - Biogenic	kg CO2 eq	4.00E-02	3.54E-02	-6.73E-02	-7.64E-06	7.18E-02	3.34E-06	3.37E-05

Climate change - Land use and LU change	kg CO2 eq	3.16E-03	2.69E-03	3.66E-04	5.11E-05	1.70E-05	5.46E-07	3.94E-05
Use of resources per pcs of HFE68								
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	2.74E+01	2.20E+01	3.99E+00	9.03E-01	8.48E-02	9.85E-05	4.02E-01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	5.38E+00	4.15E+00	1.20E+00	6.19E-03	1.23E-03	1.17E-04	2.75E-02
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	1.23E+00	7.65E-01	4.63E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	1.07E+00	0.00E+00	1.07E+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	MJ, net calorific value	2.86E+01	2.28E+01	4.45E+00	9.03E-01	8.48E-02	9.85E-05	4.02E-01

used as raw materials) (PENRT)								
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	6.46E+00	4.15E+00	2.27E+00	6.19E-03	1.23E-03	1.17E-04	2.75E-02
Net use of fresh water (FW)	m^3	4.00E-02	3.67E-02	2.87E-03	5.36E-05	1.05E-05	7.04E-07	3.58E-04
Use of secondary raw materials (MS)	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 (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Generation of waste per pcs of HFE68								
HWD = Hazardous waste disposed,	HWD (kg)	2.66E-04	0.00E+00	2.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD = Non-hazardous waste disposed,	NHWD (kg)	1.39E-01	0.00E+00	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.39E-01
RWD = Radioactive waste disposed,	RWD (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

MER= Materials for energy recovery,	MER (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR =Material for recycling,	MFR (kg)	2.48E-01	0.00E+00	1.34E-03	0.00E+00	7.67E-02	0.00E+00	1.70E-01
CRU =Components for reuse,	CRU (kg)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE =Exported thermal energy,	ETE (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE= Exported electricity energy.	EEE (MJ)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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