REPORT ON ENVIRONMENTAL AND HEALTH DATA ACCORDING TO STANDARD *NF P 01-010*

Brise-soleil SHAMAL®

24/05/2005

CONTENTS

INTRODUCTION

The environmental and heath report provides a suitable framework for presenting the environmental and health characteristics of building products in accordance with the requirements of Standard NF P 01-010, and for providing additional relevant comments and information in a genuine and transparent manner which adheres to the spirit of the Standard NF P 01-010 § 4.2.
A report supporting the statement has been compiled and is available for reference at TERREAL headquarters, provided that a confidentiality agreement is signed.

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Data Producer (*NF P 01-010 § 4*).

In accordance with Standard *NF P 01-010 § 4.6* TERREAL is responsible for the information contained in this statement.

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1 Product characterization in accordance with NF P 01-010 § 4.3

1.1 Functional Unit (FU) definition

To serve the function of brise-soleil on 10 lm (linear metres) of wall for a period of one year.

1.2 Mass of product contained in a Functional Unit (FU)

- **Product:**

Dimensions: (46×840×200 or 46×1290×200)
Number of products per lm: 1.2 or 0.78
Unit mass: 8.4 kg or 12.9 kg
Mass per lm: 10.1 kg
Typical service life: 100 years
⇨ 1.01 kg of SHAMAL brise-soleil (10.1×10/100) for the chosen Functional Unit.

- **Complementary product(s) (type and quantity in [g]):**

↳ steel mount fittings
Steel quantity per lm of brise-soleil: 200 g
⇨ 0.02 kg of steel (0.2×10/100) for the chosen Functional Unit

- **Packaging for product distribution (type and quantity in [g]):**

The brise-soleil elements are separated by spacers and strapped together with polypropylene strips and protected by corner protectors, wooden battens and a polyethylene cover. They are transported on non-returnable wooden pallets. All packaging is recyclable.

- **Product wastage rate during installation and maintenance (including partial product replacement as necessary):** all necessary cutting operations for installation are carried out at the brise-soleil production site. The brise-soleil does not require any maintenance or change during its service life. *No wastage during installation and service life.*

- **Reason for the quantities provided:** the quantities have been provided by the manufacturer involved in the life cycle analysis (LCA).

1.3 Relevant technical characteristics not included in the Functional Unit definition

2 Inventory data and other data in accordance with NF P 01-010 § 5 and comments relating to product environmental and health effects in accordance with NF P 01-010 § 4.7.2

The life cycle inventory data presented below has been calculated for the Functional Unit as defined in 1.1 and 1.2.

Note on data display format: scientific format. For example, 6.13E-02 means 0.0613.
Rule for data display: data smaller than 10E-06 has not been displayed, except energy data.

2.1 Consumption of natural resources (*NF P 01-010 § 5.1*)

2.1.1 Consumption of natural energy resources and energy indicators (*NF P 01-010 § 5.1.1*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Consumption of natural energy resources								
Wood	kg	6.13E-02	2.10E-11	7.40E-07		1.51E-10	6.13E-02	6.13
Coal	kg	2.97E-03	2.02E-09	1.17E-02		1.46E-08	1.47E-02	1.47
Lignite	kg	5.12E-04	8.99E-10	1.78E-07		6.48E-09	5.12E-04	5.12E-02
Natural gas	kg	0.20	4.47E-07	5.14E-04		3.22E-06	0.20	19.97
Oil	kg	2.07E-02	1.89E-05	3.49E-04		1.36E-04	2.12E-02	2.12
Uranium (U)	kg	1.30E-06	3.22E-14	9.07E-08		2.32E-13	1.39E-06	1.39E-04
Energy indicators								
Total primary energy	MJ	9.82	8.20E-04	4.38E-01		5.90E-03	10.26	1026.21
Renewable energy	MJ	0.04	3.40E-09	3.98E-03		2.45E-08	0.05	4.80
Non-renewable energy	MJ	9.77	8.20E-04	4.34E-01		5.90E-03	10.21	1021.41
Process energy	MJ	9.82	8.20E-04	4.38E-01		5.90E-03	10.26	1026.21
Material energy	MJ	0	0	0		0	0	0
Electricity	kWh	1.13	2.11E-06	2.49E-02		1.52E-05	1.15	115.44

Comments concerning the consumption of energy resources

• Consumption of energy resources

Natural gas is the main energy resource consumed (88.55%% of the total primary energy). The consumption of natural gas is mainly due to the SHAMAL brise-soleil production stage (drying and firing of the SHAMAL brise-soleil elements in natural gas fired kilns).

The consumption of *oil* (9% of the total primary energy) occurs mainly during the production stage, with a percentage equal to 97% (production of diesel for the transport of raw materials).

The consumption of *wood* is due to the manufacture of pallets for packaging.

• Energy indicators

Energy indicators should be used with caution because they add energies from various sources, with differing environmental impacts (please refer preferably to elementary flows).

The SHAMAL brise-soleil production stage uses 96% of the total primary energy, whilst the installation stage uses 4%.

Process energy/ material energy: The total primary energy consists entirely of combustible energy.

Renewable energy/ non-renewable energy: The total primary energy consists of 99.5% of non-renewable energy and 0.5% of renewable energy, which equates to the renewable energy share of French electricity production.

2.1.2 Consumption of non-energy based natural resources (*NF P 01-010 § 5.1.2)*

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Antimony (Sb)	kg							
Silver (Ag)	kg							
Clay	kg	1.54		1.53E-06			1.5413	154.13
Arsenic (As)	kg							
Bauxite (Al_2O_3)	kg	2.26E-06						2.28E-04
Bentonite	kg	3.05E-05						3.05E-03
Bismuth (Bi)	kg							
Boron (B)	kg							
Cadmium (Cd)	kg							
Limestone	kg	4.42E-03		2.35E-03			6.77E-03	0.68
Sodium carbonate (Na_2CO_3)	kg							
Potassium chloride (KCl)	kg							
Sodium chloride (NaCl)	kg	7.05E-06					7.07E-06	7.07E-04
Chromium (Cr)	kg							
Cobalt (Co)	kg							
Copper (Cu)	kg							
Dolomite	kg							
Tin (Su)	kg							
Feldspar	kg							
Iron (Fe)	kg	9.50E-04		2.35E-02			2.44E-02	2.44
Fluorite (CaF_2)	kg							
Gravel	kg	2.15E-05					2.21E-05	2.21E-03
Lithium (Li)	kg							
Kaolin (Al_2O_3, $2SiO_2$,$2H_2O$)	kg							
Magnesium (Mg)	kg							
Manganese (Mn)	kg							
Mercury (Hg)	kg							
Molybdenum (Mo)	kg							
Nickel (Ni)	kg							
Gold (Au)	kg							
Palladium (Pd)	kg							
Platinum (Pt)	kg							
Lead (Pb)	kg							
Rhodium (Rh)	kg							
Rutile (TiO_2)	kg							

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Sand	kg	3.26E-05		1.65E-06			3.42E-05	3.42E-03
Silica (SiO_2)	kg							
Sulfur (S)	kg							
Barium sulfate (Ba SO_4)	kg							
Titanium (Ti)	kg							
Tungsten (W)	kg							
Vanadium (V)	kg							
Zinc (Zn)	kg							
Zirconium (Zr)	kg							
Plant raw materials not previously mentioned	kg							
Animal raw materials not previously mentioned	kg							
Intermediate products not traced (total)	kg	1.42E-04					1.42E-04	1.42E-02
Etc.	kg							

Comments concerning the consumption of non-energy based resources

The clay consumed (98%) relates directly to the production of SHAMAL brise-soleil.
The iron consumed (1.55%) relates directly to the production of steel rods for the installation of SHAMAL brise-soleil elements.

The product not traced is silicone which is diluted in water and used for protecting the product during installation.

2.1.3 Consumption of water (draw-offs) (*NF P 01-010 § 5.1.3*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Water: lake	litre							
Water: sea	litre	3.12E-05					3.12E-05	3.12E-03
Water: water table	litre							2.41E-06
Water: non specified origin	litre	0.30	7.75E-05	1.61		5.58E-04	1.91	191.49
Water: river	litre	8.42E-07						8.42E-05
Potable water (network)	litre	2.67					2.67	266.93
Water consumed (total)	litre	2.97	7.75E-05	1.61		5.58E-04	4.58	458.43

Comments concerning the consumption of water

The SHAMAL brise-soleil production stage uses 64.85% of the total water consumed; this is mainly consumed at the production site for the wet sawing of SHAMAL brise-soleil elements.

The installation stage uses 35.15%% of the total water consumed; this is for the manufacture of steel rods.

2.1.4 Consumption of recovered energy and reclaimed materials (*NF P 01-010 § 5.1.4*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Recovered energy	MJ							
Reclaimed material: total	kg							
Reclaimed material: steel	kg							
Reclaimed material: aluminium	kg							
Reclaimed material: Metal (unspecified)	kg							
Reclaimed material: paper-cardboard	kg							
Reclaimed material: plastic	kg							
Reclaimed material: cullet	kg							
Reclaimed material: biomass	kg							
Reclaimed material: mineral material	kg							
Reclaimed material: unspecified	kg							
Etc.	kg							

Comments concerning the consumption of recovered energy and reclaimed materials

The manufacture of SHAMAL brise-soleil does not use any reclaimed materials.

2.2 Air, water and soil emissions (*NF P 01-010 § 5.2*)

2.2.1 Air emissions (NF *P 01-010 §5.2.1*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Hydrocarbons (unspecified)	g	5.59E-03		1.49E-02			2.05E-02	2.05
Hydrocarbons (unspecified, except methane)	g	0.49	2.19E-04	0.27		1.58E-03	***0.76***	75.66
PAH[a] (unspecified)	g	8.05E-05					8.05E-05	8.05E-03
Methane (CH_4)	g	0.13	8.39E-05	3.61E-03		6.04E-04	0.14	13.79
Volatile organic compounds (for example acetone, acetate etc.)	g							
Carbon dioxide (CO_2)	g	560.65	0.06	34.74		0.44	***595.89***	59588.72
Carbon monoxide (CO)	g	0.14	1.59E-04	1.89E-02		1.15E-03	***0.16***	16.32
Nitrogen oxides (NOx based on NO_2)	g	0.63	7.29E-04	1.88E-02		5.25E-03	***0.66***	65.89
Dinitrogen oxide (N_2O)	g	2.64E-02	7.93E-06	1.85E-03		5.71E-05	2.83E-02	2.83
Ammonia (NH_3)	g	2.48E-05		1.44E-03				0.15
Dust (unspecified)	g	0.34	4.21E-05	0.36		3.03E-04	***0.71***	70.65
Sulfur oxides (SOx based on SO_2)	g	7.25E-02	2.66E-05	6.46E-02		1.91E-04	***0.14***	13.73
Hydrogen sulfide (H_2S)	g	3.00E-03					3.00E-03	0.30
Hydrocyanic acid (HCN)	g	5.60E-07					5.60E-07	5.67E-05
Organic chlorine containing compounds (containing Cl)	g							
Hydrochloric acid (HCl)	g							
Inorganic chlorine containing compounds (containing Cl)	g							
Unspecified chlorine containing compounds (containing Cl)	g	2.68E-06					2.68E-06	2.68E-04
Organic fluorinated compounds (containing F)	g	6.54E-05		4.44E-06			6.99E-05	5.99E-04
Inorganic fluorinated compounds (containing F)	g	5.94E-06					5.99E-06	
Halogenated compounds (unspecified)	g							
Unspecified fluorinated compounds (containing F)	g							
Metals (unspecified)	g	2.03E-04		4.59E-06			2.08E-04	0.02
Antimony and compounds (containing Sb)	g							

Arsenic and compounds (containing As)	g	1.24E-06					1.30E-06	1.30E-04
Boron and compounds (containing B)	g							
Cadmium and compounds (containing Cd)	g	2.01E-06					2.04E-06	2.04E-04
	Units	**Production**	**Transport**	**Installation**	**Service life**	**End of life**	**Total life cycle**	
Flow							**Per year**	**For the whole of the TLS**
Chromium and compounds (containing Cr)	g	2.68E-06					2.75E-06	
Chromium and compounds (containing Cr)	g	2.68E-06					2.75E-06	
Cobalt and compounds (containing Co)	g	1.27E-06					1.30E-06	2.75E-04
Copper and compounds (containing Cu)	g	3.82E-06					3.89E-06	3.89E-04
Tin and compounds (containing Sn)	g	2.11E-08					2.27E-08	2.27E-06
Manganese and compounds (containing Mn)	g	4.50E-05					4.51E-05	4.51E-03
Mercury and compounds (containing Hg)	g	1.97E-06					1.97E-06	1.97E-04
Nickel and compounds (containing Ni)	g	2.67E-05					2.71E-05	2.71E-03
Lead and compounds (containing Pb)	g	1.42E-05					1.45E-05	1.45E-03
Selenium and compounds (containing Se)	g	3.80E-06					3.85E-06	3.85E-04
Tellurium and compounds (containing Te)	g							
Zinc and compounds (containing Zn)	g	1.95E-03				1.71E-05	1.97E-03	0.20
Vanadium and compounds (containing V)	g	8.01E-05		1.25E-06			8.18E-05	8.18E-03
Silicon and compounds (containing Si)	g	5.63E-04		3.63E-05			5.99E-04	0.06
a PAH: Polycyclic Aromatic Hydrocarbons								

NOTE: The parts of this table concerning radioactive emissions will need to be completed as soon as the transposition of the Euratom European Directive on radioactive emissions is published.

Comments concerning air emissions

Air emissions are mainly generated at the SHAMAL brise-soleil production site.

Carbon dioxide (CO_2): carbon dioxide emissions are equal to 595.89 g/FU.
They can be split in the following way:

- production stage (94%)
- installation stage (5.8%)

CO_2 emissions, which are the only greenhouse gas emitted by the production site, account for 98% of the greenhouse effect impact.

- *Methane (CH_4):* methane emissions are equal to 0.14 g/FU.

Methane is mainly emitted during the production stage (93%) and more specifically for the supply of natural gas used for the firing of the brise-soleil, and diesel used for the transport of raw materials.

Carbon monoxide (CO): Carbon monoxide emissions are equal to 0,16 g/FU.
Carbon monoxide emissions are mainly generated during the production stage (88%) and more specifically during the transport of raw materials used at the production site.
Carbon monoxide emissions account for 5% of the air pollution impact.

Sulfur oxides (SOx): Sulfur oxides emissions are equal to 0.14 g/FU.
The emissions are generated at the production stage (52%) and mainly during electricity production, and at the installation stage (46%) during the manufacture of steel rods.
SOx emissions account for 22% of the air acidification impact.

Nitrogen oxides (NOx): Nitrogen oxides emissions are equal to 0.66 g/FU.
The emissions are mainly generated during the production stage (95%) and more specifically during the transport of raw materials used at the production site.
NO_2 emissions account for 74.6% of the air acidification impact.

Dust: Dust emissions are equal to 0.71 g/FU.
The emissions are mainly generated at the production stage (48%) and more specifically during the production of limestone used for the manufacture of SHAMAL brise-soleil, and they are also generated at the installation stage (50.7%) and more specifically during steel production.
Dust emissions account for 60% of the air pollution impact.

Hydrocarbons (non-methane based): Non-methane based emissions are equal to 0.76 g/FU.
The emissions are mainly generated at the production stage (65%) and more specifically during the production of natural gas and diesel, and they are also generated at the installation stage (35%) and more specifically during the production of steel.
Non-methane based hydrocarbons emissions account for 23.3% of the air pollution impact.

Chlorine containing compounds (unspecified): Emissions are equal to 2.68E-06 g/FU.
The emissions are due to electricity production.

Inorganic fluorinated compounds: Emissions are equal to 6.99E-05 g/FU.
The emissions are mostly due to the production stage and are generated mainly during electricity production.

2.2.2 Water emissions (*NF P 01-010 §5.2.2*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
COD (Chemical Oxygen Demand)	g	6.25E-03	2.79E-06	4.59E-06		2.01E-05	6.28E-03	0.63
BCOD5 (Biochemical Oxygen Demand in 5 days)	g	4.29E-04		9.51E-05			5.24E-04	0.05
Material in suspension (MIS)	g	0.21		6.16E-04		3.18E-06	***0.21***	20.83
Cyanide(CN-)	g	1.08E-05		1.96E-06			1.28E-05	1.28E-03
AOX (Adsorbable organic halides)	g							
Hydrocarbons (unspecified)	g	9.10E-02	2.80E-05	4.61E-05		2.02E-04	***9.12E-02***	9.12
Nitrogen compounds (containing N)	g	2.74E-03	1.90E-06	1.38E-05		1.36E-05	2.77E-03	0.28
Phosphorus compounds (containing P)	g	3.35E-05					3.37E-05	3.37E-03
Organic fluorinated compounds (containing F)	g	4.37E-05					4.39E-05	4.39E-03
Inorganic fluorinated compounds (containing F)	g	5.78E-02					5.78E-02	5.78
Unspecified fluorinated compounds (containing F)	g							
Organic chlorine containing compounds (containing Cl)	g							
Inorganic chlorine containing compounds (containing Cl)	g	0.19		2.58E-03			***0.20***	19.55
Unspecified chlorine containing compounds (containing Cl)	g	5.50E-05		2.99E-06			5.82E-05	5.82E-03
PAHs (unspecified)	g	2.49E-05						
Metals (unspecified)	g	7.59E-02		3.60E-05		1.19E-04	***7.60E-02***	7.60
Aluminium and compounds (containing Al)	g	2.40E-03		3.05E-05			2.43E-03	0.24
Arsenic and compounds (containing As)	g	5.48E-06					5.53E-06	5.53E-04
Cadmium and compounds (containing Cd)	g	1.66E-06					1.68E-06	1.68E-04
Chromium and compounds (containing Cr)	g	4.88E-05					4.89E-05	4.89E-03
Copper and compounds (containing Cu)	g	1.26E-05					1.26E-05	1.26E-03
Tin and compounds (containing Sn)	g							
Iron and compounds (containing Fe)	g	2.63E-03		3.69E-05		1.65E-06	2.67E-03	0.27
Mercury and compounds (containing Hg)	g							
Nickel and compounds (containing Ni)	g	1.57E-05					1.58E-05	1.58E-03

Lead and compounds (containing Pb)	g	5.16E-05		1.74E-06			5.34E-05	5.34E-03
Zinc and compounds (containing Zn)	g	8.55E-05					8.57E-05	8.57E-03
Discarded water	litre	0.08	7.91E-05	1.88E-04		5.70E-04	8.21E-02	8.21

Comments concerning water emissions

Water emissions are low.

Material in suspension (MIS): MIS emissions are equal to 0.21 g/FU.
MIS emissions are mainly generated during the production stage (98%) and more specifically during the production of natural gas.

Hydrocarbons (unspecified): hydrocarbons emissions are equal to 0.0912 g/FU.
The emissions are mainly generated during the production stage and more specifically during the production of natural gas.

Chlorine containing emissions (inorganic): the emissions are equal to 0.20 g/FU.
The emissions are generated during the production stage (95%) and more specifically during the supply of light fuel oil.
Chlorine containing emissions are responsible for 95% of the air pollution impact.

Metals (unspecified): Emissions are equal to 0.073 g/FU.
Metals emissions are mainly generated during the production stage and more specifically during the production of natural gas.

2.2.3 Soil emissions (*NF P 01-010 § 5.2.3*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Arsenic and compounds (containing As)	g	1.64E-06					1.64E-06	6.15E-04
Biocides[a]	g							
Cadmium and compounds (containing Cd)	g							
Chromium and compounds (containing Cr)	g	2.05E-05					2.05E-05	2.05E-03
Copper and compounds (containing Cu)	g							
Tin and compounds (containing Sn)	g							
Iron and compounds (containing Fe)	g	8.14E-03					8.14E-03	0.81
Lead and compounds (containing Pb)	g							
Mercury and compounds (containing Hg)	g							
Nickel and compounds (containing Ni)	g							
Zinc and compounds (containing Zn)	g	7.49E-05					7.49E-05	7.49E-03
Heavy metals (unspecified)	g	9.56E-06					9.64E-06	9.64E-04

a Biocides: for example pesticides, herbicides, fungicides, insecticides, bactericides etc.

Comments concerning soil emissions

Soil emissions are generated during the supply of fossil fuels (natural gas for the production site and diesel for the transport of raw materials and of SHAMAL brise-soleil for installation on site).

2.3 Waste production (*NF P 01-010 § 5.3*)

2.3.1 Waste for reuse (*NF P 01-010 § 5.3*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Recovered energy	MJ							
Reclaimed material: total	kg	1.55		9.00E-03			1.56	155.74
Reclaimed material: steel	kg	9.53E-07		6.89E-08			1.02E-06	1.02E-04
Reclaimed material: aluminium	kg							
Reclaimed material: Metal (unspecified)	kg							
Reclaimed material: paper-cardboard	kg							
Reclaimed material: plastic	kg							
Reclaimed material: cullet	kg							
Reclaimed material: biomass	kg							
Reclaimed material: mineral material	kg	1.55					1.55	154.83
Reclaimed material: unspecified	kg	1.28E-05		9.00E-03			9.02E-03	0.90

2.3.2 Waste for disposal (*NF P 01-010 § 5.3*)

	Units	Production	Transport	Installation	Service life	End of life	Total life cycle	
Flow							**Per year**	**For the whole of the TLS**
Hazardous waste	kg	1.29E-04	1.85E-08	4.91E-08		1.34E-07	1.29E-04	1.29E-02
Non-hazardous waste	kg	5.82E-03	1.02E-08	5.35E-02		7.37E-08	5.94E-02	5.94
Inert waste	kg	8.43E-04	3.18E-08	5.69E-05		1.01	1.01	101.09
Radioactive waste	kg	2.05E-05	1.31E-08	6.80E-07		9.47E-08	2.13E-05	2.13E-03

Comments concerning waste production and waste management procedures

↳ Waste for reuse
Waste for reuse includes terracotta waste from the production sites used for embankment construction on quarry access roads.

↳ Waste for disposal
Most of the waste is *inert waste* from the SHAMAL brise-soleil. It is placed in a Class 3 storage centre after the building has been demolished.

Hazardous waste consists mainly of used oils from the production site.

Non-hazardous waste consists mainly of SHAMAL brise-soleil packaging off-cuts generated during the installation phase.

Radioactive waste is generated exclusively through the use of French electricity.

3 Environmental impacts specific to construction products in accordance with NF P 01-010 § 6

All the impacts are informed or calculated in accordance with the guidelines of § 6.1 of Standard NF P01-010, from the data in § 2 and for the reference Functional Unit per year defined in § 1.1 and § 1.2 of this statement, as well as for a Functional Unit covering the whole of the TLS (Typical Lifespan).

No	Environmental impact	Unit	Indicator value per year	Indicator value for the whole of the TLS
1	Consumption of energy resources			
	✓ Total primary energy	MJ	10.26	1026.21
	✓ Renewable energy	MJ	0.048	4.80
	✓ Non-renewable energy	MJ	10.21	1021.41
2	Depletion of resources (ADP)	kg antimony equivalent (Sb)		
	✓ Non-exhaustible resources		0.00393	0.393
	✓ Non-renewable resources		0.0000426	0.00426
3	Total water consumption	litre	4.58	458.43
4	Solid waste			
	✓ Total waste for reuse	kg	1.56	155.74
	✓ Waste for disposal:			
	- Hazardous waste	kg	1.29E-04	0.0192
	- Non-hazardous waste	kg	0.0594	5.94
	- Inert waste	kg	1.01	101.09
	- Radioactive waste	kg	2.13E-05	2.13E-03
5	Climate change	kg CO_2 equivalent	0.6075	60.75
6	Air acidification	kg SO_2 equivalent	0.000618	0.0618
7	Air pollution	m^3	29.49	2948.90
8	Water pollution	m^3	2.05	205
9	Destruction of the stratospheric ozone layer	kg R11 CFC equivalent	0	0
10	Photochemical ozone formation	kg ethene equivalent	0.00031	0.031

4 Contribution of the product to the assessment of health risks and the quality of life inside buildings in accordance with NF P 01-010 § 7

Product contribution		**Relevant clause**	**Measured or calculated values etc.**
To the assessment of health risks	Quality of internal spaces in respect of health	§ 4.1.1	NOT CARRIED OUT
	Water quality in respect of health	§ 4.1.2	
To the quality of life	Hygrothermic wellbeing	§ 4.2.1	
	Acoustic wellbeing	§ 4.2.2	NOT CARRIED OUT
	Visual wellbeing	§ 4.2.3	
	Olfactory wellbeing	§ 4.2.4	

4.1 Useful information for the assessment of health risks (*NF P 01-010 § 7.2*)

4.1.1 Contribution to the quality of interior spaces in respect of health (*NF P 01-010 § 7.2.1*)

Terracotta, mineral and inert products do not release **any gaseous compounds (VOCs)** in the air inside buildings.
The radioelement content of terracotta is close to average concentrations found in the earth's crust. Furthermore, terracotta, along with natural plaster, has **the lowest radon exhalation rate of all building products**.

4.1.2 Contribution to water quality in respect of health (*NF P 01-010 § 7.2.2*)

Not applicable because SHAMAL brise-soleil is not linked to the potable water network.

4.2 Contribution of the product to the quality of life inside buildings (*NF P 01-010 § 7.3*)

4.2.1 Characteristics of the product contributing to hygrothermic wellbeing inside a building (*NF P 01-010 § 7.3.1*)

Not applicable since SHAMAL brise-soleil is installed on the external walls of a building.

4.2.2 Characteristics of the product contributing to acoustic wellbeing inside a building (*NF P 01-010 § 7.3.2*)

Studies are currently underway.

4.2.3 Characteristics of the product contributing to visual wellbeing inside a building (*NF P 01-010 § 7.3.3*)

SHAMAL brise-soleil improves the visual wellbeing of occupiers because it shields them from excessive light radiation.

4.2.4 Characteristics of the product contributing to olfactory wellbeing inside a building (*NF P 01-010 § 7.3.4*)

Not applicable since SHAMAL brise-soleil is installed on the external walls of a building.

5 Other product contributions relating to concerns of building eco-management, economic considerations and corporate environmental policy.

5.1 Building eco-management

5.1.1 Energy management

Studies are currently underway.

5.1.2 Water management

Not applicable because SHAMAL brise-soleil is not linked to the potable water network.

5.1.3 Maintenance

SHAMAL brise-soleil does not require any maintenance.

5.2 Economic considerations

…

5.3 Corporate environmental policy

5.3.1 Natural resources

Clay quarries are open-pit. On average, the manufacture of 10 lm of brise-soleil SHAMAL requires the extraction of 154.13 kg of wet clay (with a moisture content between 10 and 15%).

5.3.2 Air and water emissions

Air emissions:
The industrial site manufacturing SHAMAL brise-soleil uses natural gas as a fuel (the least polluting fossil fuel) which reduces air emissions, in particular carbon dioxide emissions (CO_2) which contribute to the greenhouse effect.

Water emissions:
The manufacturing site does not discard any polluted water from the manufacturing process into the

environment.

5.3.3 Waste

During SHAMAL brise-soleil production:

- Raw and dry waste products are recycled during manufacture since they are mixed back into the clay mixture. This has no effect on product quality.
- Fired waste is used for the repair of quarry roads.

No terracotta waste is disposed of outside the site.

During SHAMAL brise-soleil installation:

SHAMAL brise-soleil elements are cut at the production site; so no cutting operations are carried out on site. The only waste is packaging waste, which is entirely recyclable.

During SHAMAL brise-soleil demolition:

Terracotta waste can be taken to a centre for the storage of inert waste from the contruction and civil engineering industry, according to the technical guide on storage facilities for waste from the construction and civil engineering industry prepared by the MEDD (June 2004 version).

6 *Appendix: Data characterization for calculating the Life Cycle Inventory (LCI)*

6.1 Definition of the LCA (Life Cycle Analysis)

Description of the flows considered for the life cycle of the product.

6.1.1 Stages and flows included

The main manufacturing stages of a SHAMAL brise-soleil are:

- **clay extraction** in open-pit quarries**;**

- **clay preparation:** the clay based raw materials and various additives responsible for the colour are mixed together with water until the correct plasticity for shaping is reached;

- **clay shaping:** the mixture goes through an extruder which shapes the materials; the SHAMAL brise-soleil elements are cut to the desired size;

- **drying:** the brise-soleil elements are dried in a drying kiln, usually fed by air from the firing kiln. Drying stiffens the products so that they can be stacked onto railway cars;

- **firing:** Firing is then carried out at 1000°C approximately, for about 36 hours. The fuel used is natural gas;

- **intermediate storage in a yard:** the brise-soleil elements are protected and stored temporarily in a storage yard;

- **cutting to size:** the brise-soleil elements are cut to the right size (wet sawing) for a given site;

- **packaging:** the brise-soleil elements are checked by an employee who removes any faulty products before being packaged and transported to site.

6.1.2 Flows not included

Standard NF P01-010 permits the removal of the following flows from within the borders of the system:

- lighting, heating and cleaning of workshops
- the administrative department,
- transport of employees,
- manufacture of manufacturing equipment and transport systems (machines, lorries etc.)

6.1.3 Rule for defining borders

Standard NF P01-010 sets the cut-off at 98%. The cut-off rule does not apply to substances classified as highly toxic (T+), toxic (T), harmful (Xn) or hazardous for the environment (N) in accordance with Directives 67-548/EEC and 92-32/ECC (relating to substance declaration, classification, packaging and labelling), as detailed in § 4.5.1 of the Standard.

The product not traced is silicone which has a risk phrase equal to R35 (causes serious burns).

6.2 Data sources

6.2.1 Characterization of main data

Manufacture

The data has been supplied by the production site for the year 2004.

- For the clay extraction stage:

- supply and combustion of diesel for construction site machines,
- no air or water emissions

- For the production stage:

- production and combustion of diesel for the transport of clay from the quarry to the production site,
- production site: consumption of materials, energy and water, air emissions, waste production
- fuel production: natural gas, diesel, heating gas-oil,
- French electricity production,
- packaging production: polypropylene, polyethylene, pallets.

Transport

The transport distances have been provided by the production site for the year 2004.
25% of SHAMAL brise-soleil elements are installed in the South of France, which equates to a distance of 100 km.
25% are installed in greater Paris, which equates to a distance of 750 km.
50% are installed in the rest of France (South East, Lyons region etc.), which equates to a distance of 450 km.

Production of diesel and combustion in lorries.

Installation

The data concerning installation has been provided by the production site since the manufacturer supplies SHAMAL brise-soleil with steel rods for fixing the brise-soleil onto the buildings.

Production of steel for the fixing system.

End of life

Brise-soleil elements are placed in Class 3 landfill sites (for construction and civil engineering waste). Data on product leaching has not been taken into account. The transport distance between the demolition/refurbishment site and the landfill site is 30 km.

Production of diesel and combustion in lorries.

6.2.2 Energy data

Fuel LHV

The data has been taken from the data leaflet FD P01-015 entitled “Environmental quality of construction products – Environmental and health statements for construction products – Documentation leaflet on energy data" published by AFNOR.

Electrical model

The data has been taken from the AFNOR data leaflet NF P01 015.

6.2.3 Secondary data

The data used has been taken from the TEAM software database.

6.3 Traceability

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