

Environmental Product Declaration

from Cradle to Gate

Production of hot mix asphalt concrete
representative of the French market



Warning

The information in this declaration is provided under the responsibility of USIRF (Union of French Road Industry Associations) (issuer of the cradle-to-gate Environmental Product Declaration (EPD)).

Any use of the information provided herein, in whole or in part, must be accompanied as a minimum, by a complete reference to the original EPD and to its issuer, who can deliver a complete copy.

CEN standard EN 15804+A1 defines the Product Category Rules (PCR). This EPD is also compliant with the requirements of standard ISO 14025 on Type III environmental declarations.

NOTE: The literal translation of EPD (Environmental Product Declaration) in French is DEP (Déclaration Environnementale de Produit).

Reading guide

The display of inventory data meets the requirements of standard NF EN 15804+A1.

Results display format:

1.78E-06 shall read: 1.78×10^{-6} (scientific writing)

Used units:

- Kilogramme – “kg”
- Gramme – “g”
- Litre – “L”
- Kilowatt hour – “kWh”
- Megajoule – “MJ”
- Cubic metre – “m³”

Abbreviations:

- LCA: Life Cycle Analysis
- RSL: Reference Service Life
- FU: Functional Unit
- LHV: Lower Heating Value
- MTHB: Materials Treated with Hydraulic Binders

Precautions when using the EPD for product comparison

The French Environmental and Sanitary Declaration Form (FDES) and the EPD of construction products are not comparable if they don't comply with standard NF EN 15804+A1.

In its section 5.3 Comparability of EPD of construction products, standard NF EN 15804+A1 defines the conditions under which construction products can be compared, on the basis of information provided by the FDES:

“Comparison of the environmental performance of building products using EPD information should be based on the use of the products and their impacts on the building, and must take into account the complete life cycle (all the information modules).”

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1. General information

This cradle-to-gate EPD is a declaration (in compliance with NF EN 15804+A1 and its national supplement XP P01-064/CN) used in the preparation of the FDES on “Hot mix asphalt concrete representative of the French market” (complete life cycle FDES in accordance with standard NF EN 15804+A1 and its national supplement XP P01-064/CN and the additional requirements of the FDES INIES program).

- **Name and address of manufacturers**

The companies whose products are covered by the EPD are road companies that are members of USIRF and/or one of the 20 Regional Professional Unions of the Road Industry (SPRIR¹).

- **Entity representing the companies for which this EPD is representative**

Union of French Road Industry Associations (USIRF), 9, Rue de Berri, 75008, Paris

- **EPD type**

Collective EPD (representative of the average products placed on the French market by USIRF members), from cradle to gate

- **Rules of use**

The data in the EPD are provided under the responsibility of USIRF. Only the above-mentioned member companies are authorised to submit these data.

- **Publication date**

January 2016

- **End of validity date**

January 2021

- **Commercial reference of the product**

Hot mix asphalt concrete for surface courses .

- **Verification**

CEN standard EN 15804+A1 defines the Product Category Rules (PCR).

Independent declaration verification, in accordance with EN ISO 14025: 2010



Internal



External

Verifier's name: Sébastien Lasvaux

¹ See: <http://www.usirf.com/usirf/organisation/organisation-20-sprir/>

2. Description of the functional unit and the product

- **Description of the declared unit**

Producing 1 tonne of representative French hot-mix asphalt concrete for surface layers

- **Product description**

The examined product is hot-mix asphalt concrete for surface courses

Hot-mix asphalt concrete for surface courses is a mixture of aggregates (such as gravel, fillers, etc.) and a bituminous binder (bitumen), produced in asphalt plants at temperatures between 130°C to 180°C.

These materials are compliant with the requirements of standard NF EN 13108 "Bituminous mixtures. Material specifications.", Parts 1, 2 and 7 for bituminous mixtures.

- **Description of product use (scope of application)**

Asphalt concrete used in the surface courses of hot-mix asphalt concrete intended for departmental roads.

- **Other technical characteristics not included in the functional unit**

Not applicable

- **Description of the main components and/or materials of the product**

Parameter	Unit	Value
Reclaimed Asphalt Pavement (RAP)	kg/t of asphalt	9.50E+01
Bitumen	kg/t of asphalt	4.80E+01
Aggregates (hard rock aggregate and alluvial aggregate)	kg/t of asphalt	8.57E+02
Distribution packaging	-	Not applicable
Losses during application	%	Not applicable
Complementary products for application	-	Not applicable

- **Clarification concerning the list of candidate substances in accordance with the REACH regulatory framework (if having a mass greater than 0.1%)**

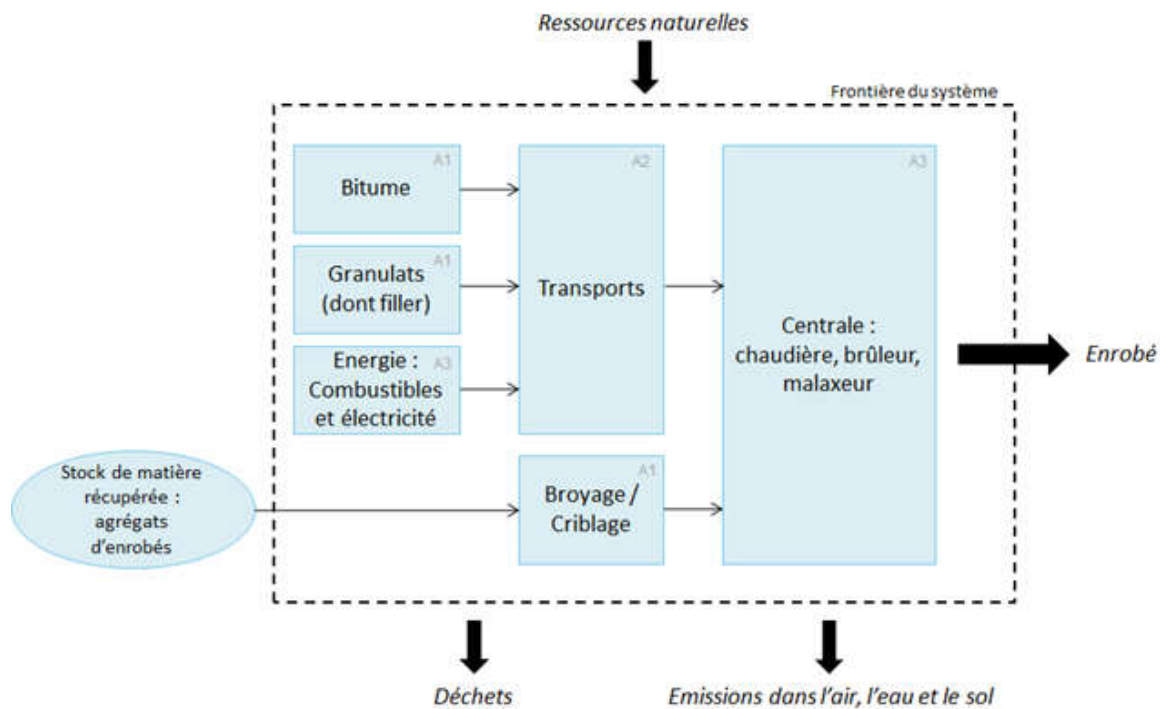
The product does not contain any substance in the candidate list according to the REACH regulatory framework.

- **Description of the reference service life**

Parameter	Unit	Value
Reference service life	Years	Not applicable
Declared product properties (at factory gate) and finishes, etc.	-	Compliant with the requirements of standard NF EN 13108 "Bituminous mixtures. Material specifications.", Parts 1, 2 and 7
Theoretical application parameters	-	Not applicable
Assumed quality of work	-	Not applicable
External environment	-	Not applicable

Parameter	Unit	Value
Internal environment	-	Not applicable
Conditions of use	-	Asphalt mixes are designed according to the bearing capacity of earthwork and traffic, as defined in Standard NF P 98 086 "Structural design of road pavements – Application to new pavements"
Maintenance scenario	-	Not applicable

3. Life cycle stages



Simplified life cycle diagram of the product

3.1. Production stage – modules A1-A3

The production stages (A1-A3) include:

- Extraction and treatment of raw materials used in the production of asphalt (A1):
 - Bitumen,
 - Aggregates (hard rock and alluvial aggregates),
 - Reclaimed asphalt,
- Transportation of raw materials to asphalt production sites (A2),
- Production of the asphalt mix (A3), including:
 - Energy consumption at the burner-dryer, at boiler for binder materials, the asphalt plant, and the operation of machinery, as well as emissions into the air,
 - Water consumptions and discharges, as well as emissions into the water,
 - Use of consumables (oils and lubricants, tyres, metal, non-stick agents and dust filters),
 - Use of infrastructures,
 - Transport of waste and waste disposal,

3.2. Construction stage – modules A4-A5

Not applicable.

3.3. Service life stage – modules B1-B7

Not applicable.

3.4. End of life stage – modules C1-C4

Not applicable

4. Information serving to calculate the life cycle analysis

Information serving to calculate the Life Cycle Analysis	
Used PCR	NF EN 15804+A1 and its national supplement XP P01-064/CN
System boundaries	<p>System boundaries observe the limits imposed by standard NF EN 15804+A1 and its national supplement XP P01-064/CN.</p> <p>No substances that are highly toxic, toxic, harmful or hazardous to the environment are used in bituminous asphalt manufacturing. Cut-off threshold of 99% of the mass of input flows: The consumptions of additional filler, colourants and additives represent less than 0.1% of the composition of asphalts in mass percent.</p>
Sources of data and data collection method	<p>Basic data on the production of asphalt and the life cycle of pavements were retrieved from a previous USIRF LCA study on bituminous mix pavements dating from 2014.</p> <p>Basic asphalt production data:</p> <ul style="list-style-type: none"> - Energy consumption: data were compiled based on a group of plants that account for approximately 77% of French production - Data of emissions into the air: are based on measurements made in 73 plants. It can be estimated that these 73 plants account for about 15% of French production - Other data: survey within the previous LCA study carried out in 2014 at 8 plants located throughout France and having an annual production of 1Mt of asphalt, i.e., approximately 3% of French production. Given the uniformity of asphalt types and manufacturing processes used in France, USIRF considers that these 8 plants are representative for the currently-operated stationary plants in France. <p>Environmental data (life cycle inventories or information modules):</p> <ul style="list-style-type: none"> - Aggregate production: Environmental information modules, UNPG 2011, - Bitumen production: Eurobitume inventory, 2011, - Other processes: the Ecoinvent database, v. 3.1, 2014.
Geographical, temporal and technological representativeness of data	<p>Geographical representativeness:</p> <ul style="list-style-type: none"> - The basic data are representative for the situation in France (mainland France). - Environmental data: France for the LCI of aggregate production and consumption of electricity. Europe for bitumen production and ICVs based on the Ecoinvent database. <p>Temporal representativeness:</p> <ul style="list-style-type: none"> - Basic data: current situation (2011 for the majority of data), - Environmental data: Ecoinvent database, as updated in 2014, aggregate and bitumen data from 2011. <p>Technological representativeness:</p> <ul style="list-style-type: none"> - Basic data: the data are representative of the technologies used by French road industry professionals. - Environmental data: the data are representative of the technologies used in France and in Europe
Allocations	<p>There was no allocation between coproducts.</p> <p>Concurrent production of hot-mix asphalts and warm-mix asphalts by the plants participating in data collection. The proportion of warm-mix asphalts is very small (less than 5% of total production), so that they could be assimilated to hot-mix asphalts.</p> <p>However, allocations were used in preparing the ICV of bitumen in the Eurobitume study.</p>
Variability of results	<p>The variability of the CO₂ flow emitted into the air during combustion is between 7% and 9% relative to the average, and only for the item "Energy consumption during production". The overall variability of the results for the entire system for this parameter is therefore correspondingly lower.</p>

5. Results of the life cycle analysis

Environmental impacts of the production of 1 tonne of asphalt concrete
FU: Producing 1 tonne of representative French hot-mix asphalt concrete

Impacts environnementaux	Étape de production				Étape de mise en œuvre			Étape de vie en œuvre							Étape de fin de vie				D Bénéfices et charges au-delà des frontières du système		
	A1 Extraction	A2 Acheminement	A3 Fabrication	Total A1-A3 Production	A4 Transport	A5 Installation	Total mise en œuvre	B1 Usage	B2 Maintenance	B3 Réparation	B4 Remplacement	B5 Réhabilitation	B6 Utilisation de l'énergie	B7 Utilisation de l'eau	Total vie en œuvre	C1 Déconstruction/démolition	C2 Transport	C3 Traitement des déchets		C4 Décharge	Total fin de vie
Réchauffement climatique kg CO2 eq/UF	1,46E+01	7,54E+00	2,36E+01	4,57E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Appauvrissement de la couche d'ozone kg CFC 11 eq/UF	1,02E-06	1,52E-06	4,09E-06	6,62E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Acidification des sols et de l'eau kg SO2 eq/UF	1,28E-01	3,33E-02	6,30E-02	2,24E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Eutrophisation kg (PO ₄) ³⁻ eq/UF	1,78E-02	5,36E-03	6,66E-03	2,98E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Formation d'ozone photochimique kg Ethene eq/UF	7,78E-03	1,47E-03	5,71E-03	1,50E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Épuisement des ressources abiotiques (éléments) kg Sb eq/UF	1,46E-05	2,37E-05	1,63E-05	5,46E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Épuisement des ressources abiotiques (fossiles) MJ/UF	2,22E+03	1,12E+02	3,78E+02	2,71E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Pollution de l'eau m3/UF	9,52E+00	2,71E+00	6,02E+00	1,82E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Pollution de l'air m3/UF	2,82E+03	1,14E+03	1,43E+03	5,39E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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 resources to produce 1 tonne of asphalt concrete
FU: Producing 1 tonne of representative French hot-mix asphalt**

Utilisation des ressources	Etape de production				Etape de mise en œuvre			Etape de vie en œuvre							Etape de fin de vie					D Bénéfices et charges au-delà des frontières du système		
	A1 Extraction	A2 Acheminement	A3 Fabrication	Total A1-A3 Production	A4 Transport	A5 Installation	Total mise en œuvre	B1 Usage	B2 Maintenance	B3 Réparation	B4 Remplacement	B5 Réhabilitation	B6 Utilisation de l'énergie	B7 Utilisation de l'eau	Total vie en œuvre	C1 Déconstruction/démolition	C2 Transport	C3 Traitement des déchets	C4 Décharge		Total fin de vie	
Utilisation de l'énergie primaire renouvelable, à l'exclusion des ressources d'énergie primaire renouvelables utilisées comme matières premières MJ/UF	2,49E+00	3,57E+00	4,91E+00	1,10E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation des ressources d'énergie primaire renouvelables en tant que matières premières 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation totale des ressources d'énergie primaire renouvelables (énergie primaire et ressources d'énergie primaire utilisées comme matières premières) MJ/UF	2,49E+00	3,57E+00	4,91E+00	1,10E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation de l'énergie primaire non renouvelable, à l'exclusion des ressources d'énergie primaire non renouvelables utilisées comme matières premières MJ/UF	3,21E+02	1,48E+02	4,27E+02	8,96E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation des ressources d'énergie primaire non renouvelables en tant que matières premières MJ/UF	1,93E+03	0,00E+00	0,00E+00	1,93E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation totale des ressources d'énergie primaire non renouvelables (énergie primaire et ressources d'énergie primaire utilisées comme matières premières) MJ/UF	2,25E+03	1,48E+02	4,27E+02	2,83E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation de matière secondaire kg/UF	9,50E+01	0,00E+00	7,33E-02	9,51E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation de combustibles secondaires renouvelables 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation de combustibles secondaires non renouvelables 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Utilisation nette d'eau douce m ³ /UF	1,21E-01	3,94E-02	5,48E-02	2,16E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

**Waste generated by the production of 1 tonne of asphalt concrete
FU: Producing 1 tonne of representative French hot-mix asphalt**

Catégorie de déchets	Étape de production				Etape de mise en œuvre			Etape de vie en œuvre							Etape de fin de vie				D Bénéfices et charges au-delà des frontières du système			
	A1 Extraction	A2 Acheminement	A3 Fabrication	Total A1-A3 Production	A4 Transport	A5 Installation	Total mise en œuvre	B1 Usage	B2 Maintenance	B3 Réparation	B4 Remplacement	B5 Réhabilitation	B6 Utilisation de l'énergie	B7 Utilisation de l'eau	Total vie en œuvre	C1 Déconstruction/démolition	C2 Transport	C3 Traitement des déchets		C4 Décharge	Total fin de vie	
Déchets dangereux éliminés kg/UF	3,68E-01	1,16E-01	1,59E-01	6,42E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Déchets non dangereux éliminés kg/UF	2,09E+00	5,75E+00	1,45E+00	9,28E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Déchets radioactifs éliminés kg/UF	7,70E-04	1,20E-03	1,95E-03	3,92E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

**Output flows of the production of 1 tonne of asphalt concrete
FU: Producing 1 tonne of representative French hot-mix asphalt**

Flux sortants	Étape de production				Etape de mise en œuvre			Etape de vie en œuvre							Etape de fin de vie				D Bénéfices et charges au-delà des frontières du système				
	A1 Extraction	A2 Acheminement	A3 Fabrication	Total A1-A3 Production	A4 Transport	A5 Installation	Total mise en œuvre	B1 Usage	B2 Maintenance	B3 Réparation	B4 Remplacement	B5 Réhabilitation	B6 Utilisation de l'énergie	B7 Utilisation de l'eau	Total vie en œuvre	C1 Déconstruction/démolition	C2 Transport	C3 Traitement des déchets		C4 Décharge	Total fin de vie		
Composants destinés à la réutilisation 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Matériaux destinés au recyclage kg/UF	1,50E-04	0,00E+00	2,02E-01	2,02E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Matériaux destinés à la récupération d'énergie 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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Energie fournie à l'extérieur (par vecteur énergétique) MJ/UF	Electricité	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	vapeur	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	Gas de process	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

6. Additional information on the release of hazardous substances into indoor air, soil and water during the use phase

6.1. Product characteristics contributing to the sanitary quality of indoor air

Not applicable.

The product has no direct or indirect contact with a building interior. Accordingly, it is not directly concerned by indoor air control.

6.2. Product characteristics contributing to the sanitary quality of water

Not applicable.

Bituminous mix leaching tests were carried out in 2005 by the Eurobitume Association. The obtained results were below regulatory emission thresholds or even below detection limits (see the article "WATER AND BITUMEN: NO PROBLEM!" published in Bitume.info No. 26 of September 2011²).

In addition, a study carried out by the École Supérieure d'Ingénieurs des Travaux de la Construction (Graduate School of Building Engineering – ESITC) of Cachan on behalf of USIRF in 2011 has demonstrated that "the amounts of pollutants released in leachate are low for MTHBs and extremely low for bituminous asphalt". For the latter, the concentrations of all the elements in solution are almost systematically below the limits of quantification."

² Can accessed at the following address <http://www.bitume.info/articlespdf/313.pdf>

7. Contribution of the product to quality of life inside buildings

7.1. Product characteristics contributing to hydrothermal comfort in buildings

Not applicable

7.2. Product characteristics contributing to acoustic comfort in buildings

Not applicable

7.3. Product characteristics contributing to visual comfort in buildings

Not applicable

7.4. Product characteristics contributing to olfactory comfort in buildings.

Not applicable