FICHE DE DÉCLARATION ENVIRONNEMENTALE ET SANITAIRE DU PRODUIT

ENVIRONMENTAL AND HEALTH PRODUCT DECLARATION

ARGENTA

Carreau de grès cérame BIa

(8,5 mm-11mm)

En conformité avec la norme NF EN 15804+A2

et son complément national NF EN 15804+A2/CN 2022-10

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FDES VÉRIFIÉE inies

Contenu

Avertissement

Les informations contenues dans cette déclaration sont fournies sous la responsabilité de Argenta (producteur de la FDES) selon la NF EN 15804+A2 et le complément national NF EN 15804+A2/CN.

Toute exploitation, totale ou partielle, des informations fournies par ce document doit au minimum être accompagnée de la référence complète à la DEP d'origine ainsi que le fournisseur qui pourra remettre un exemplaire complet.

La norme EN15804+A2 du CEN, le complément national NF EN 15804+A2/CN servent de règles de définition des catégories de produits (RCP)

NOTE La traduction littérale en français de « EPD (Environnemental Product Declaration) » est « DEP » (Déclaration Environnementale de Produit). Toutefois, en France, on utilise couramment le terme de FDES (Fiche de Déclaration Environnementale et Sanitaire) qui regroupe à la fois la Déclaration Environnementale et des informations Sanitaires pour le produit faisant l'objet de cette FDES. La FDES est donc bien une « DEP » complétée par des informations sanitaires.

Guide de lecture

Exemple de lecture : -9,0 E-03 = -9,0 x 10^{-3}

Les règles d'affichage suivantes s'appliquent :

- Lorsque le résultat de calcul de l'inventaire est nul, alors la valeur zéro est affichée
- Abréviation utilisée : N/A : Non Applicable
  UF : Unité Fonctionnelle
- Les unités utilisées sont précisées devant chaque flux : le kilogramme « kg », le gramme « g », le kilowattheure « kWh », le mégajoule « MJ », le mètre carré « m^2 », le kelvin « K », le watt « W », le kilomètre « km », le millimètre « mm ».

Précaution d'utilisation de la FDES pour la comparaison des produits

Les FDES des produits de construction peuvent ne pas être comparables si elles ne sont pas conformes à la norme NF EN 15804+A2.

La norme NF EN 15804+A2 définie au *§5.3 Comparabilité des DEP* pour les produits de construction*, les conditions dans lesquelles les produits de construction peuvent être comparés, sur la base des informations fournies par la FDES :

« Par conséquent, une comparaison de la performance environnementale des produits de construction en utilisant les informations des DEP doit être basée sur l'usage des produits et leurs impacts sur le bâtiment, et doit prendre en compte la totalité du cycle de vie (tous les modules d'information) »

NOTE 1 En dehors du cadre de l'évaluation environnementale d'un bâtiment, les FDES ne sont pas des outils permettant de comparer des produits et des services de construction.

NOTE 2 Pour l'évaluation de la contribution des bâtiments au développement durable, une comparaison des aspects et des impacts environnementaux doit être entreprise conjointement aux aspects et impacts socioéconomiques relatifs au bâtiment.

NOTE 3 Pour l'interprétation d'une comparaison, des valeurs de référence sont nécessaires.

Informations Générales

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TYPE DE FDES	Cette déclaration est individuelle. Du berceau à la tombe (A+B+C+D)
NOM DU PRODUITE ET REFERENCE	Carreau de grès cérame (17 reference).
CALDRE DE VALIDITÉ	Cette FDES couvre des produits avec une épaisseur variable de 8,5mm à 11mm. Paramètres considérés pour l'étude de la variabilité - Poids minimum : 18,6kg/m^2 - Poids moyenne : 21 kg/m^2 - Poids maximum : 23,6kg/m^2

Étape du cycle de vie A1-A3	Réchauffement climatique	Energie primaire procédé non renouvelable	Déchets non dangereux éliminés
Résultat maximal observé	10,7 **kg CO_2 eq**	180,0 **MJ**	2,7 **kg**
Variation maximale observée	16%	17%	15%

La norme EN 15804 du CEN sert de RCP[a)]
Vérification indépendante de la déclaration et données, conformément à l'EN ISO 14025 :2010 ☐ Interne ☒ Externe
Numéro d'enregistrement au programme conforme ISO 14025 :
Date de 1ère publication : *01/07/2024*
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Date de vérification *: 02/04/2024*
Période de validité *: 12/2028*
a) Règles de définition des catégories de produits

Compagnie

Argenta Cerámica a progressivement développé sa propre identité, se positionnant au niveau mondial à l'une des places prioritaires de la scène céramique actuelle.

Tout a commencé en 1999 comme une entreprise jeune et dynamique, avec l'enthousiasme de développer un concept de céramique différent de l'actuel et proche des gens. Avec le concept #Friendlytile, un projet à long terme est né, où nous voulons partager des idées et être plus proches de vous. Parler de la céramique qui travaille à partir des gens et vers les gens, à une époque où les valeurs des marques s'humanisent pour laisser place à une communication plus directe, vivante et réelle.

1. Description de l'unité fonctionnelle et du produit

Cette FDES décrit les informations environnementales relatives au cycle de vie des carreaux céramiques de Argenta.

1.1. Description de l'unité fonctionnelle

L'unité fonctionnelle considérée est « Le recouvrement de 1m² d'une surface (sol intérieur) avec des carreaux céramiques de grès cérame (poids moyen de 21 kg/m^2 et l'épaisseur entre 8.5-11mm) pendant 50 ans »

1.2. Circuit de distribution

Business to business et Bussines to consumer

1.3. Performance principale de l'unité fonctionnelle et description du produit

Pour la production des carreaux céramiques inclus dans cette FDES, les installations suivantes sont prises en compte :

Factoría 1 (F1) Pol. Ind. Vall d'Alba Vial 5 Parcela 2 12194 Vall d'Alba, Castellón, Spain
Factoría 4 (F4) Ctra. La Pobla Tornesa - Albocásser, Km 3 12192 Villafamés, Castellón, Spain

Les carreaux de céramique inclus dans cette étude sont ceux appartenant au groupe d'absorption d'eau BIa, classés selon la norme EN 14411, c'est-à-dire les carreaux de céramique ayant une absorption d'eau ≤ 0,5%, formé par la pression (habituellement appelé grès porcelanique).

Le grès cérame inclus dans cette étude comprend tous modèles avec différents formats, en particulier, les formats du produit considérés dans le cadre de cette FDES ont une épaisseur qui varie entre 8,5mm-11mm (18,6kg/m^2 -23,6kg/m^2 en poids). Les résultats indiqués présentent la performance environnementale du Carreau de grès cérame moyenne.

1.4. Description de l'usage du produit et autres caractéristiques

La fonction du produit est de revêtement et décoration de surfaces. Dans cette étude, il a été analysé le comportement environnemental du cycle de vie du grès cérame utilisé comme revêtement de sol à l'intérieur d'une maison. Cependant, la polyvalence de la céramique permet l'installation de ce type de

carreaux céramique dans d'autres endroits tels que bureaux, magasins, hôpitaux, etc. Le produit peut être utilisé aussi bien dans des environnements intérieurs que extérieurs.

Table 1 Spécifications techniques du produit.

SPÉCIFICATION TECHNIQUE	VALEUR	MÉTHODE DE CALCUL
ABSORPTION DE L'EAU	Eb≤0,5%	EN 14411
RÉACTION AU FEU	$A1_{FL}$/A1	
CHARGE DE RUPTURE	>1300 N	
GLISSEMENT	NPD	
PROPIETES TACTILES	NPD	
ADHÉSION :	>1N/mm²	
- **CIMENT-COLLE TYPE C2**		
RÉSISTANCE AUX CHOCS THERMIQUES	Conformé	
LA DURABILITÉ POUR :	Conformé	
- APPLICATIONS INTÉRIEURES		
- APPLICATIONS EXTÉRIEURES : RÉSISTANCE AU GEL		

1.5. Preuves d'aptitude à l'usage

Conformes à la norme EN 14411 :2016.

1.6. Composition du produit, de l'emballage et carbone biogénique

Le produit est formé par le support (97% du poids total) et l'émail et encres (3% du poids total). Le support est composé par des argiles, feldspaths et des sables. L'émail est formé par feldspaths, borates, silicates, kaolin, oxydes de zirconium, argiles, alumine, oxydes de zinc et autres additives.

Le poids total du produit final est de 21 Kg/m², avec une variation de poids entre 18,6 kg/m²et 23,6 kg/m².

Table 2 Quantité de l'emballage, matériaux dans l'installation et composition du produit.

DESCRIPTION	QUANTITE	UNIT/UF
PRODUIT SANS EMBALLAGE		
ARGILLE	40-50	%
FELDSPATHS/SABLES	40-50	%
REJETS CRUS ET CUITS (BOUCLE FERMEE)	10-15	%
EMBALLAGE		
CARTON	0,169	Kg/m²
PLASTIC	0,035	Kg/m²
PALETTE BOIS	0,686	Kg/m²
MATERIAUX UTILISES DANS L'INSTALLATION		
MORTIER	4	Kg/m²
EAU	2	Kg/m²

Le produit Carreau de grès cérame BIa 8,5 mm-11mm est conforme à la législation REACH car aucune substance contenue dans le produit n'est énumérée dans la "Liste des substances très préoccupantes (SVHC) pour une autorisation" (d'un contenu supérieur à 0,1% du poids du produit), ce qui garantit qu'aucune substance nocive soit rejetée dans l'environnement ou proche des utilisateurs.

Comme l'exige la norme EN 15804+A2, la teneur en carbone biogénique du produit et de son emballage est déclarée séparément. Dans le cas du produit étudié, les carreaux de céramique, ses composants sont inorganiques, de sorte que le calcul du carbone biogénique ne s'applique pas.

Quant à l'emballage utilisé pour la distribution des carreaux, sa masse est inférieure à 5 % de la masse totale du produit, de sorte que la déclaration de la teneur en carbone biogénique de l'emballage est omise.

1.7. Description de la durée de vie de référence

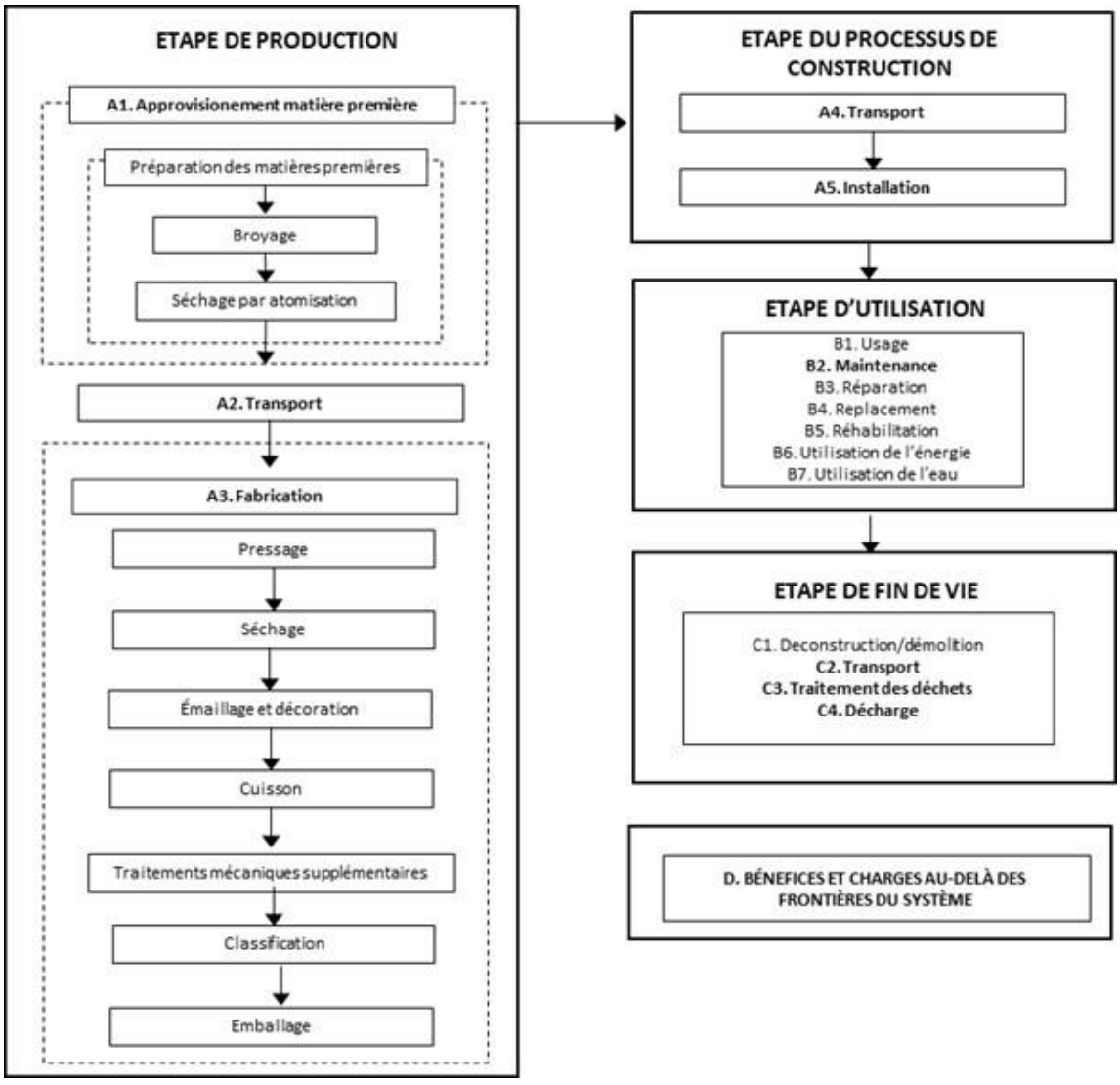
La durée de vie de référence du produit est estimée à 50 ans. Aucune réparation, renouvellement ou remplacement n'est nécessaire pendant cette durée de vie.

Table 3 Durée de vie de référence

PARAMÈTRE	VALEUR/DESCRIPTION (EXPRIMEE PAR UNITE FONCTIONNELLE)
DUREE DE VIE DE REFERENCE	Minimum 50 ans
PROPRIETES DECLAREES DU PRODUIT (A LA SORTIE DE L'USINE) ET FINITIONS, ETC.	Valeurs minimales des caractéristiques pertinentes selon l'annexe G de la norme EN 14411. Pour plus d'informations, demandez les fiches techniques selon le modèle.
PARAMETRES THEORIQUES D'APPLICATION (S'ILS SONT IMPOSES PAR LE FABRICANT), Y COMPRIS LES REFERENCES AUX PRATIQUES APPROPRIEES	Pour plus d'informations, demandez les fiches techniques selon le modèle.
QUALITE PRESUMEE DES TRAVAUX, LORSQUE L'INSTALLATION EST CONFORME AUX INSTRUCTIONS DU FABRICANT	Valeurs minimales des caractéristiques pertinentes selon l'annexe G de la norme EN 14411. Pour plus d'informations, demandez les fiches techniques selon le modèle.
ENVIRONNEMENT EXTERIEUR (POUR LES APPLICATIONS EN EXTERIEUR), PAR EXAMPLE INTEMPERIES, POLLUANTS, EXPOSITION AUX UV ET AU VENT, ORIENTATION DU BATIMENT, OMBRAGE, TEMPERATURE	Valeurs minimales des caractéristiques pertinentes selon l'annexe G de la norme EN 14411. Pour plus d'informations, demandez les fiches techniques selon le modèle.
ENVIRONNEMENT INTERIEUR (POUR LES APPLICATIONS INTERIEURES), PAR EXEMPLE TEMPERATURE, HUMIDITE, EXPOSITION AUX PRODUITS CHIMIQUES.	Valeurs minimales des caractéristiques pertinentes selon l'annexe G de la norme EN 14411. Pour plus d'informations, demandez les fiches techniques selon le modèle.
CONDITIONS D'UTILISATION, PAR EXAMPLE FREQUENCE D'UTILISATION, EXPOSITION MECANIQUE	Pour plus d'informations, demandez les fiches techniques selon le modèle.
MAINTENANCE, PAR EXAPLE FREQUENCE EXIGEE, TYPE ET QUALITE ET REMPLACEMENT DES COMPOSANTS	Pour plus d'informations, demandez les fiches techniques selon le modèle.

2. Etapes du cycle de vie

2.1. Schéma du cycle de vie



2.2. Description des frontières du système

Le tableau ci-dessous décrit la portée de l'inventaire réalisé dans l'ACV selon NF EN 15804 + A2 et son complément NF EN 15804+A2 / CN.

Table 4 Domaine d'application de l'inventaire selon NF EN 15804 + A1 et son complément national NF EN 15804/CN.

Étape de production			Étape du processus de construction		Étape d'utilisation							Étape de fin de vie				Bénéfices et charges au-delà des frontières du système
Approvisionnement de matière	Transport	Fabrication	Transport	Installation	Usage	Maintenance	Réparation	Remplacement	Réhabilitation	Utilisation de l'énergie	Utilisation de l'eau	Déconstruction - Démolition	Transport	Traitement des déchets	Décharge	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X: Module comptabilisé

2.3. Limites du système

Suivant la norme NF EN 15804 + A2 et son complément national NF EN 15804+A2 / CN, les modules inclus sont les suivants :

- **Étape de Production (A1 – A3)**
  Les étapes A1 à A3 comprennent l'extraction des matières premières, son transport jusqu'à l'usine et la fabrication du produit.

- **Étape de Construction (A4 – A5)**
  A4. Transport. Une fois emballé, le produit est envoyé en France (1500km, camion 27t). Le transport des carreaux céramiques de grès cérame est calculé sur la base d'un scénario avec les paramètres décrits dans le tableau suivant.

Table 5 Transport jusqu'au chantier.

PARAMÈTRE	VALEUR/DESCRIPTION
TYPE DE CARBURANT ET CONSOMMATION DU VEHICULE OU TYPE DE VEHICULE UTILISE POUR LE TRANSPORT, PAR EXEMPLE CAMION SUR LONGUE DISTANCE, BATEAU, ETC.	0.3654 l/m^2 diesel (camion Euro 6, 27 t)
DISTANCE MOYENNE JUSQU'AU CHANTIER	1500km (France) : 100%
UTILISATION DE LA CAPACITE	85 % en camion
MASSE VOLUMIQUE EN VRAC DES PRODUITS TRANSPORTES	≈1800Kg/m^3
COEFFICIENT D'UTILISATION DE LA CAPACITE VOLUMIQUE	-

A5. Construction – Installation. Les suivants matériaux sont utilisés pendant l'installation du produit. La gestion des déchets d'emballage a été prise en compte. Pendant le processus d'installation, des pertes de 3 % sont prises en compte aussi. L'installation est conforme aux documents nationaux tels que le DTU 52-1 Pose de carrelage collé.

Table 6 Installation dans le bâtiment

PARAMÈTRE	VALEUR/DESCRIPTION
INTRANTS AUXILIAIRES POUR L'INSTALLATION (SPECIFIES PAR MATERIAU)	Mortier : 4Kg
UTILISATION D'EAU	2 litres
UTILISATION D'AUTRES RESSOURCES	/
DESCRIPTION QUANTITATIVE DU TYPE D'ENERGIE (MELANGE REGIONAL) ET CONSOMMATION DURANT LE PROCESSUS D'INSTALLATION	/
DECHETS PRODUITS SUR LE SITE DE CONSTRUCTION AVANT LE TRAITEMENT DES DECHETS GENERES PAR L'INSTALLATION DU PRODUIT (SPECIFIES PAR TYPE)	Déchets céramiques : 629g Carton : 169 g Plastic : 35g Bois : 686g
MATIERES (SPECIFIEES PAR TYPE) PRODUITES PAR LE TRAITEMENT DES DECHETS SUR LE SITE DE CONSTRUCTION, PAR EXEMPLE COLLECTE EN VUE DU RECYCLAGE, DE La RECUPERATION D'ENERGIE, DE L'ELIMINATION (SPECIFIEES PAR VOIE)	Déchets céramiques enfouissement : 629g Carton incinéré : 2 g Carton recyclé : 167 g Carton pour enfouissement : 0 g Plastique incinéré : 8 g Plastique recyclé : 26 g Plastique pour enfouissement : 2 g Bois incinéré : 356 g Bois recyclé : 327 g Bois pour enfouissement : 3 g
ÉMISSIONS DIRECTES DANS L'AIR AMBIANT, LE SOL ET L'EAU	/

- **Étape d'Utilisation (B1 – B7)**

Une fois installé, le carreau n'a pas besoin d'aucun apport d'énergie pour son utilisation ni a besoin d'aucun entretien après son installation sur site, sauf pour les opérations de nettoyage normales (EN 17160).

Pour cette raison, de tous les modules mentionnés, des impacts sont seulement produits pendant la maintenance du produit (module B2).

Le scénario de nettoyage du sol le plus courant a été supposé, comme indiqué dans la norme EN 17160 une fois par semaine avec de l'eau et toutes les deux semaines avec de l'eau et du détergent.

Table 7 Maintenance

PARAMÈTRE	VALEUR/DESCRIPTION
PROCESSUS DE MAINTENANCE	Selon le RCP pour les carreaux céramiques (UNE-EN17160) scénario de nettoyage des sols résidentiels pendant 50 ans
CYCLE DE MAINTENANCE	Une fois par semaine avec de l'eau (0,1l/m^2) et toutes les deux semaines avec de l'eau et du détergent (utilisation du sol résidentiel) pendant 50 ans
INTRANTS AUXILIAIRES POUR LA MAINTENANCE (PAR EXEMPLE, PRODUIT DE NETTOYAGE, SPECIFIER LES MATERIAUX)	Détergent : 1,34E-04kg/m^2 (per cycle de maintenance) (Cela signifie que 6,70E-05kg/m^2), est utilisé chaque semaine)
DECHETS PRODUITS PENDANT LA MAINTENANCE (SPECIFIER LES MATERIAUX)	-
CONSOMMATION NETTE D'EAU DOUCE PENDANT LA MAINTENANCE	0,1 l/m^2 (per cycle de maintenance)
INTRANT ENERGETIQUE PENDANT LA MAINTENANCE (PAR EXEMPLE NETTOYAGE PAR ASPIRATION), TYPE DE VECTEUR ENERGETIQUE, PAR EXEMPLE ELECTRICITE, ET QUANTITE, SI APPLICABLE ET pertinent	-

- **Étape de Fin de vie (C1 – C4)**

  C1. Déconstruction/démolition : après la fin de sa vie utile, le produit sera retiré, soit dans le cadre d'une réhabilitation du bâtiment, soit lors de sa démolition.
  Comme indiqué dans la norme EN 17160 :2019, les impacts attribuables à l'étape de déconstruction/demolition d'un bâtiment sont négligeables. En tout cas, aucun impact n'est produit pendant la déconstruction.

  C2. Transport jusqu'au traitement des déchets : Les déchets produits sont transportés dans un camion (27 t) conforme aux normes Euro 6 pour être gérés soit par dépôt dans des décharges inertes, soit par recyclage. On considère une distance moyenne de 30 km de l'usine à la destination comme indiqué dans le complément national NF EN15804+A2/CN.

  C3. Traitement des déchets en vue de leur réutilisation, récupération et/ou recyclage : Sans impact puisque le 100% du produit est parti pour enfouissement.

  C4. Élimination des déchets : 100% du produit est destiné à enfouissement.

Table 8 Étape de fin de vie.

PARAMÈTRE	VALEUR/DESCRIPTION
PROCESSUS DE COLLECTE SPECIFIE PAR TYPE	Collecte avec les déchets de construction mélangés : 25 Kg (100%) du produit
SYSTEME DE RECUPERATION SPECIFIE PAR TYPE	0 Kg sont recyclés (0%)
ELIMINATION SPECIFIEE PAR TYPE	25 Kg sont destinés à l'enfouissement (100%)

PARAMÈTRE	VALEUR/DESCRIPTION
HYPOTHESES POUR L'ELABORATION DE SCENARIOS (PAR EXEMPLE TRANSPORT)	Les déchets produits sont transportés dans un camion (27 t) conforme aux normes Euro 6 pour être gérés soit par dépôt dans des décharges inertes, soit par recyclage. On considère une distance moyenne de 30 km de l'usine à la destination.

- **Module D Bénéfices et charges au-delà des frontières du système :** Les charges et les avantages environnementaux de l'obtention de matériaux secondaires à partir des déchets générés au stade de l'installation (déchets d'emballage des tuiles : carton, plastique et bois).

3. Informations pour le calcul de l'analyse de cycle de vie

3.1. Frontières géographiques

Les données d'inventaire primaire ont été fournies par le fabricant et de ses fournisseurs et sont représentatives des procédés de fabrication du produit.

3.2. Période sous revue

Les données recueillies auprès des entreprises concernées par l'étude se réfèrent à la production dans un scénario géographique en l'Espagne pendant l'année 2021.

3.3. Qualité des données

La qualité des données dans l'ACV a suivi les exigences du document RCP référencé. La collecte de données primaires a été fournie par le fabricant, y compris tous les processus et flux d'avant-plan pertinents, et étaient spécifiques pour les sites de production. Les données secondaires ont été sélectionnées en conséquence pour les processus en arrière-plan, avec une représentativité technologique, géographique et temporaire.

3.4. Données secondaires

Les données secondaires pour l'analyse environnementale ont été obtenues à partir de la base de données GaBi database v2023.2. Les procédés les plus semblables à ceux du système de production ont été choisis pour modéliser le système de production.

Le mix de production d'électricité correspond à moyenne nationale du mix électrique résiduel 2021 (nucléaire 35%; renouvelables 6%; fossile 58%). Le potentiel de réchauffement de la planète pour les différents mélanges de production d'électricité est de 0,109 kg-eq CO_2 / MJ. Aussi, une partie de l'électricité utilisée et produite avec cogénération.

3.5. Critères de coupure

L'inventaire a été élaboré en tenant compte de toutes les données disponibles sur les procédés de fabrication, couvrant l'ensemble de l'utilisation des matières premières et la consommation d'énergie. Par conséquent, les données négligées sont inférieures à 1% du total et 5% par module de la masse totale et des entrées d'énergie. Le principe de modularité et le principe du "pollueur-payeur" ont été suivis.

Les données exclues sont les suivantes :

- L'éclairage, le chauffage et le nettoyage des bureaux.

- Le département administratif
- Le transport des employés
- La fabrication de transport (machines, camions, etc.) pour chaque étape.
- La fabrication des consommables des produits et équipements nécessaires au fonctionnement du processus dont leur fréquence de renouvellement total ou partiel est supérieure à un an.

Les émissions à long terme n'ont pas non plus été considérées.

3.6. Allocation

En premier lieu, l'attribution a été évitée en obtenant des données concrètes sur le processus et, lorsque cela n'était pas possible, l'attribution a été faite selon des critères de masse/volume (critères physiques).

Les allocations de matériaux d'emballage, ainsi que les émissions de particules pendant le séchage, l'émaillage et les émissions générales au cours de l'étape de fabrication des carreaux de céramique, ont été attribuées à l'unité fonctionnelle, en supposant un critère de production triée.

3.7. Variabilité

Les 17 références de carreaux de céramique BIa ont des impacts environnementaux différents. Le tableau suivant montre les écarts du format ayant l'impact environnemental le plus élevé et le plus faible par rapport à la moyenne, en fonction de l'étape du produit (A1-A3).

Table 9 Variation de certaines catégories d'impacts environnementaux évalués.

CATEGORIES D'IMPACTS ENVIRONNEMENTAUX	VARIATION
GWP – TOTAL	-13% / +17%
AP	-8%/ +9%
POCP	-5% / +7%

3.8. Méthodes d'évaluation environnementale

Les indicateurs et les catégories d'impact retenus pour l'évaluation environnementale sont ceux indiqués dans la norme NF EN 15804+A2, basé sur EF 3.0 (https://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)

Le logiciel *LCA for Experts (GaBi)* version 10 a été utilisé pour l'évaluation environnementale, avec la base de données GaBi Database v2023.2.

4. Résultats de l'analyse de cycle de vie

Ci-après, les tableaux qui synthétisent les résultats de l'ACV.

En raison des arrondis, les totaux peuvent ne pas correspondre à la somme des arrondis.

Table 10 Indicateurs d'impacts environnementaux de référence.

INDICATEURS D'IMPACTS ENVIRONNEMENTAUX DE REFERENCE																
Impacts Environnementaux	**Unité (per UF)**	**Etape de production**	**Etape de construction**		**Etape d'utilisation**							**Etape de fin de vie**				**D Bénéfices et charges au-delà des frontières du système**
		A1/A2/A3	**A4 Transport**	**A5 Installation**	**B1 Utilisation**	**B2 Maintenance**	**B3 Réparation**	**B4 Remplacement**	**B5 Réhabilitation**	**B6 Utilisation de l'énergie**	**B7 Utilisation de l'eau**	**C1 Déconstruction / démolition**	**C2 Transport**	**C3 Traitement des déchets**	**C4 Elimination**	
Changement climatique - total	**kg CO_2 eq.**	9,4	1,1	1,8	0	3,9E-01	0	0	0	0	0	0	1,0E-01	0	1,1E-01	-1,7E-01
Changement climatique - combustibles fossiles	**kg CO_2 eq.**	9,4	1,1E+00	1,8	0	3,9E-01	0	0	0	0	0	0	1,0E-01	0	1,1E-01	-1,7E-01
Changement climatique - biogénique	**kg CO_2 eq.**	7,5E-02	2,6E-02	-5,8E-03	0	3,2E-03	0	0	0	0	0	0	3,2E-03	0	1,1E-03	-3,2E-04
Changement climatique - occupation des sols et transformation de l'occupation des sols	**kg CO_2 eq.**	4,2E-03	6,1E-03	7,8E-04	0	1,5E-05	0	0	0	0	0	0	5,7E-04	0	4,5E-04	-5,1E-04
Appauvrissement de la couche d'ozone	**kg CFC 11 eq.**	3,0E-08	6,5E-14	9,0E-10	0	1,4E-07	0	0	0	0	0	0	6,1E-15	0	5,9E-14	-4,7E-09
Acidification	**mol H^+ eq.**	3,1E-02	8,8E-04	3,5E-03	0	3,4E-03	0	0	0	0	0	0	8,3E-05	0	7,6E-04	-4,9E-04
Eutrophisation aquatique, eaux douces	**kg P eq.**	8,3E-05	3,3E-06	4,4E-06	0	8,4E-06	0	0	0	0	0	0	3,0E-07	0	2,2E-06	-1,7E-06
Eutrophisation aquatique marine	**kg N eq.**	1,0E-02	2,4E-04	1,2E-03	0	3,7E-04	0	0	0	0	0	0	2,3E-05	0	2,1E-04	-1,8E-04
Eutrophisation terrestre	**mol N eq.**	1,1E-01	3,0E-03	1,3E-02	0	1,4E-02	0	0	0	0	0	0	2,8E-04	0	2,2E-03	-2,0E-03
Formation d'ozone photochimique	**kg NMVOC eq.**	2,9E-02	8,4E-04	3,4E-03	0	2,5E-03	0	0	0	0	0	0	7,8E-05	0	6,1E-04	-4,8E-04
Epuisement des ressources abiotiques (minéraux & métaux)	**kg Sb eq.**	4,6E-05	9,1E-08	1,4E-06	0	1,3E-08	0	0	0	0	0	0	8,5E-09	0	1,1E-08	-5,0E-08
Epuisement des ressources abiotiques (combustibles fossiles)	**MJ**	154,0	14,5	11,6	0	2,0	0	0	0	0	0	0	1,4	0	1,4	-2,4
Besoin en eau	**m^3 de privation equiv dans le monde**	1,7	9,8E-03	2,9E-01	0	21,9	0	0	0	0	0	0	9,1E-04	0	7,9E-03	8,7E-03

Table 11 Indicateurs d'impacts environnementaux additionnels.

INDICATEURS D'IMPACTS ENVIRONNEMENTAUX ADDITIONELS																
Impacts Environnementaux	Unité (per UF)	Etape de production	Etape de construction		Etape d'utilisation							Etape de fin de vie				D Bénéfices et charges au-delà des frontières du système
		A1/A2/A3	A4 Transport	A5 Installation	B1 Utilisation	B2 Maintenance	B3 Réparation	B4 Remplacement	B5 Réhabilitation	B6 Utilisation de l'énergie	B7 Utilisation de l'eau	C1 Déconstruction / démolition	C2 Transport	C3 Traitement des déchets	C4 Elimination	
Emissions de particules fines	[iIndice de maladies]	1,7E-05	6,1E-09	5,4E-07	0	2,2E-08	0	0	0	0	0	0	5,7E-10	0	9,3E-09	-2,1E-09
Rayonnements ionisants (santé humaine)	[kBq U235 eq.]	35,1	10,1	4,6	0	1,3E+00	0	0	0	0	0	0	9,5E-01	0	0,8	-0,9
Ecotoxicité (eaux douces	[CTUe]	3,2E-09	2,0E-10	2,7E-10	0	1,2E-10	0	0	0	0	0	0	1,9E-11	0	1,1E-10	-3,7E-12
Toxicité humaine, effets cancérigènes	[CTUh]	8,8E-08	1,1E-08	2,1E-08	0	3,2E-08	0	0	0	0	0	0	9,8E-10	0	1,2E-08	-1,2E-09
Toxicité humaine, effets non cancérigènes	[CTUh]	4,0E-01	2,6E-03	5,4E-02	0	2,7E-03	0	0	0	0	0	0	2,5E-04	0	1,8E-03	-9,4E-03
Impacts liés à l'occupation des sols / Qualité des sols	Sans dimension	122,0	5,0	14,2	0	362,0	0	0	0	0	0	0	4,7E-01	0	3,2E-01	-1,5

Table 12 Utilisation des ressources.

UTILISATION DES RESSOURCES																
Utilisation des ressources	**Unité (per UF)**	**Etape de production**	**Etape de construction**		**Etape d'utilisation**							**Etape de fin de vie**				**D Bénéfices et charges au-delà des frontières du système**
		A1/A2/A3	**A4 Transport**	**A5 Installation**	**B1 Utilisation**	**B2 Maintenance**	**B3 Réparation**	**B4 Remplacement**	**B5 Réhabilitation**	**B6 Utilisation de l' énergie**	**B7 Utilisation de l' eau**	**C1 Déconstruction / démolition**	**C2 Transport**	**C3 Traitement des déchets**	**C4 Elimination**	
Utilisation de l'énergie primaire renouvelable, à l'exclusion des ressources d'énergie primaire renouvelable utilisées comme matières premières	**MJ**	34,6	8,3E-01	3,0	0	7,4	0	0	0	0	0	0	7,7E-02	0	1,6E-01	-3,8
Utilisation des ressources d'énergie primaire renouvelables en tant que matières premières	**MJ**	0,0	0	0,0E+00	0	0	0	0	0	0	0	0	0	0	0	0
Utilisation totale des Ressources d'énergie primaire renouvelables (énergie primaire et ressources d'énergie primaire utilisées comme matières premières);	**MJ**	34,6	8,3E-01	3,0	0	7,4	0	0	0	0	0	0	7,7E-02	0	1,6E-01	-3,8
Utilisation de l'énergie primaire non renouvelable, à l'exclusion des ressources d'énergie primaire non renouvelables utilisées comme matières premières	**MJ**	154,0	14,6	11,6	0	2,0	0	0	0	0	0	0	1,4	0	1,4	-2,4
Utilisation des ressources d'énergie primaire non renouvelables en tant que matières premières	**MJ.**	0,0	0	0,0E+00	0	0	0	0	0	0	0	0	0	0	0	0
Utilisation totale des ressources d'énergie primaire non renouvelables (énergie primaire et ressources d'énergie primaire utilisées comme matières premières);	**MJ**	154,0	14,6	11,6	0	2,0	0	0	0	0	0	0	1,4	0	1,4	-2,4
Utilisation de matière secondaire	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utilisation de combustibles secondaires renouvelables	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utilisation de combustibles secondaires non renouvelables	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utilisation nette d'eau douce	**m^3**	3,3E-02	9,3E-04	5,6E-03	0	2,8E-01	0	0	0	0	0	0	8,8E-05	0	2,6E-04	-1,5E-03

Table 13 Catégorie de déchets

CATEGORIE DE DECHETS																
Catégorie de déchets	Unité (per UF)	Etape de production	Etape de construction		Etape d'utilisation							Etape de fin de vie				D Bénéfices et charges au-delà des frontières du système
		A1/A2/A3	A4 Transport	A5 Installation	B1 Utilisation	B2 Maintenance	B3 Réparation	B4 Remplacement	B5 Réhabilitation	B6 Utilisation de l' énergie	B7 Utilisation de l' eau	C1 Déconstruction / démolition	C2 Transport	C3 Traitement des déchets	C4 Elimination	
Déchets dangereux	Kg	1,2E-03	7,0E-11	3,7E-05	0	3,1E-11	0	0	0	0	0	0	6,5E-12	0	2,2E-08	-3,2E-08
Déchets non dangereux éliminés	Kg	2,3	2,1E-03	7,1E-01	0	8,0E-02	0	0	0	0	0	0	2,0E-04	0	6,4	-9,2E-04
Déchets radioactifs élimiés	kg	4,6E-03	1,8E-05	4,0E-04	0	2,5E-05	0	0	0	0	0	0	1,7E-06	0	1,9E-05	-2,7E-05

Table 14 Flux sortants

FLUX SORTANTS																
Flux sortants	Unité (per UF)	Etape de production	Etape de construction		Etape d'utilisation							Etape de fin de vie				D Bénéfices et charges au-delà des frontières du système
		A1/A2/A3	A4 Transport	A5 Installation	B1 Utilisation	B2 Maintenance	B3 Réparation	B4 Remplacement	B5 Réhabilitation	B6 Utilisation de l' énergie	B7 Utilisation de l' eau	C1 Déconstruction / démolition	C2 Transport	C3 Traitement des déchets	C4 Elimination	
Composants destiné à la réutilisation	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Matériaux destinés au recyclage	kg	2,2E-02	0	7,2E-01	0	0	0	0	0	0	0	0	0	0	0	0
Matériaux destinés à la récupération d'énergie	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energie Electrique fournie à l'extérieur	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energie gaz et process fournie à l'extérieur	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 15 Résumé des résultats de l'impacte

Impacts/Flux	Unité (per UF)	Etape de production	Etape de construction	Etape d'utilisation	Etape de fin de vie	Total cycle de vie	Etape Bénéfices et charges au-delà des frontières du système
INDICATEURS D'IMPACTS ENVIRONNEMENTAUX DE REFERENCE							
Changement climatique - total	**kg CO_2 eq.**	9,4	2,9	3,9E-01	2,1E-01	12,9	-1,7E-01
Changement climatique - combustibles fossiles	**kg CO_2 eq.**	9,4	2,9	3,9E-01	2,1E-01	12,8	-1,7E-01
Changement climatique - biogénique	**kg CO_2 eq.**	7,5E-02	2,0E-02	3,2E-03	9,5E-04	9,9E-02	-3,2E-04
Changement climatique - occupation des sols et transformation de l'occupation des sols	**kg CO_2 eq.**	4,2E-03	6,8E-03	1,5E-05	1,0E-03	1,2E-02	-5,1E-04
Appauvrissement de la couche d'ozone	**kg CFC 11 eq.**	3,0E-08	9,0E-10	1,4E-07	6,5E-14	1,7E-07	-4,7E-09
Acidification	**mol H^+ eq.**	3,1E-02	4,4E-03	3,4E-03	8,5E-04	4,0E-02	-4,9E-04
º1	**kg P eq.**	8,3E-05	7,6E-06	8,4E-06	2,5E-06	1,0E-04	-1,7E-06
Eutrophisation aquatique marine	**kg N eq.**	1,0E-02	1,4E-03	3,7E-04	2,3E-04	1,2E-02	-1,8E-04
Eutrophisation terrestre	**mol N eq.**	1,1E-01	1,6E-02	1,4E-02	2,5E-03	1,4E-01	-2,0E-03
Formation d'ozone photochimique	**kg NMVOC eq.**	2,9E-02	4,2E-03	2,5E-03	6,9E-04	3,6E-02	-4,8E-04
Epuisement des ressources abiotiques (minéraux & métaux)	**kg Sb eq.**	4,6E-05	1,5E-06	1,3E-08	1,9E-08	4,8E-05	-5,0E-08
Epuisement des ressources abiotiques (combustibles fossiles)	**MJ**	154,0	26,1	2,0	2,7	184,9	-2,4
Besoin en eau	**m^3 de privation equiv dans le monde**	1,7	3,0E-01	21,9	8,8E-03	23,9	8,7E-03
INDICATEURS D'IMPACTS ENVIRONNEMENTAUX ADDITIONNELS							
Emissions de particules fines	**[incidencia de enfermedades]**	1,7E-05	5,5E-07	2,2E-08	9,9E-09	1,7E-05	-2,1E-09
Rayonnements ioisants (santé humaine)	**[kBq U235 eq.]**	35,1	14,7	1,3	1,8	52,9	-0,9
Ecotoxicité (eaux douces	**[CTUe]**	3,2E-09	4,7E-10	1,2E-10	1,3E-10	3,9E-09	-3,7E-12
Toxicité humaine, effets cancérigènes	**[CTUh]**	8,8E-08	3,1E-08	3,2E-08	1,3E-08	1,6E-07	-1,2E-09

Impacts/Flux	Unité (per UF)	Etape de production	Etape de construction	Etape d'utilisation	Etape de fin de vie	Total cycle de vie	Etape Bénéfices et charges au-delà des frontières du système
Toxicité humaine, effets non cancérigènes	[CTUh]	4,0E-01	5,7E-02	2,7E-03	2,1E-03	4,6E-01	-9,4E-03
Impacts liés à l'occupation des sols / Qualité des sols	Sans dimension	122,0	19,2	362,0	0,8	504,0	-1,5
CONSOMMATION DES RESSOURCES							
Utilisation de l'énergie primaire renouvelable, à l'exclusion des ressources d'énergie primaire renouvelable utilisées comme matières premières	MJ	34,6	3,8	7,4	2,4E-01	46,1	-3,8
Utilisation des ressources d'énergie primaire renouvelables en tant que matières premières	MJ	0,0	0,0E+00	0	0	0,0	0
Utilisation totale des Ressources d'énergie primaire renouvelables (énergie primaire et ressources d'énergie primaire utilisées comme matières premières);	MJ	34,6	3,8	7,4	2,4E-01	46,1	-3,8
Utilisation de l'énergie primaire non renouvelable, à l'exclusion des ressources d'énergie primaire non renouvelables utilisées comme matières premières	MJ	154,0	26,2	2,0	2,7	185,0	-2,4
Utilisation des ressources d'énergie primaire non renouvelables en tant que matières premières	MJ.	0,0	0,0E+00	0	0	0,0	0
Utilisation totale des ressources d'énergie primaire non renouvelables (énergie primaire et ressources d'énergie primaire utilisées comme matières premières);	MJ	154,0	26,2	2,0	2,7	185,0	-2,4
Utilisation de matière secondaire	kg	0	0	0	0	0	0
Utilisation de combustibles secondaires renouvelables	MJ	0	0	0	0	0	0
Utilisation de combustibles secondaires non renouvelables	MJ	0	0	0	0	0	0
Utilisation nette d'eau douce	m^3	3,3E-02	6,5E-03	2,8E-01	3,5E-04	3,2E-01	-1,5E-03
CATÉGORIES DE DÉCHETS							
Déchets dangereux	kg	1,2E-03	3,7E-05	3,1E-11	2,2E-08	1,3E-03	-3,2E-08
Déchets non dangereux éliminés	kg	2,3	7,1E-01	8,0E-02	6,4	9,5	-9,2E-04
Déchets radioactifs élimiés	kg	4,6E-03	4,2E-04	2,5E-05	2,1E-05	5,1E-03	-2,7E-05
FLUX SORTANTS							
Composants destiné à la réutilisation	kg	0	0	0	0	0	0
Matériaux destinés au recyclage	kg	2,2E-02	7,2E-01	0	0	7,5E-01	0

Impacts/Flux	Unité (per UF)	Etape de production	Etape de construction	Etape d'utilisation	Etape de fin de vie	Total cycle de vie	Etape Bénéfices et charges au-delà des frontières du système
Matériaux destinés à la récupération d'énergie	**kg**	0	0	0	0	0	0
Energie Electrique fournie à l'extérieur	**MJ**	0	0	0	0	0	0
Energie gaz et process fournie à l'extérieur	**MJ**	0	0	0	0	0	0

5. Résultats et Interprétation de l'Analyse du Cycle de Vie

Les résultats de l'évaluation de l'impact du cycle de vie sont des expressions relatives et ne prédisent pas les impacts finaux par catégorie, les dépassements de seuil, les marges de sécurité ou les risques.

- L'étape de produit (A1-A3) est le module du cycle de vie avec plus d'impact sur l'environnement, principalement à cause de la consommation intensive d'énergie thermique.
- Les opérations associées à l'étape de maintenance (B2) ont été définies selon un scénario résidentiel. Le changement de la fréquence des opérations de nettoyage implique des changements proportionnels de ces impacts.
- La contribution relative de chaque module à l'impact total du cycle de vie est présentée dans la figure 2.

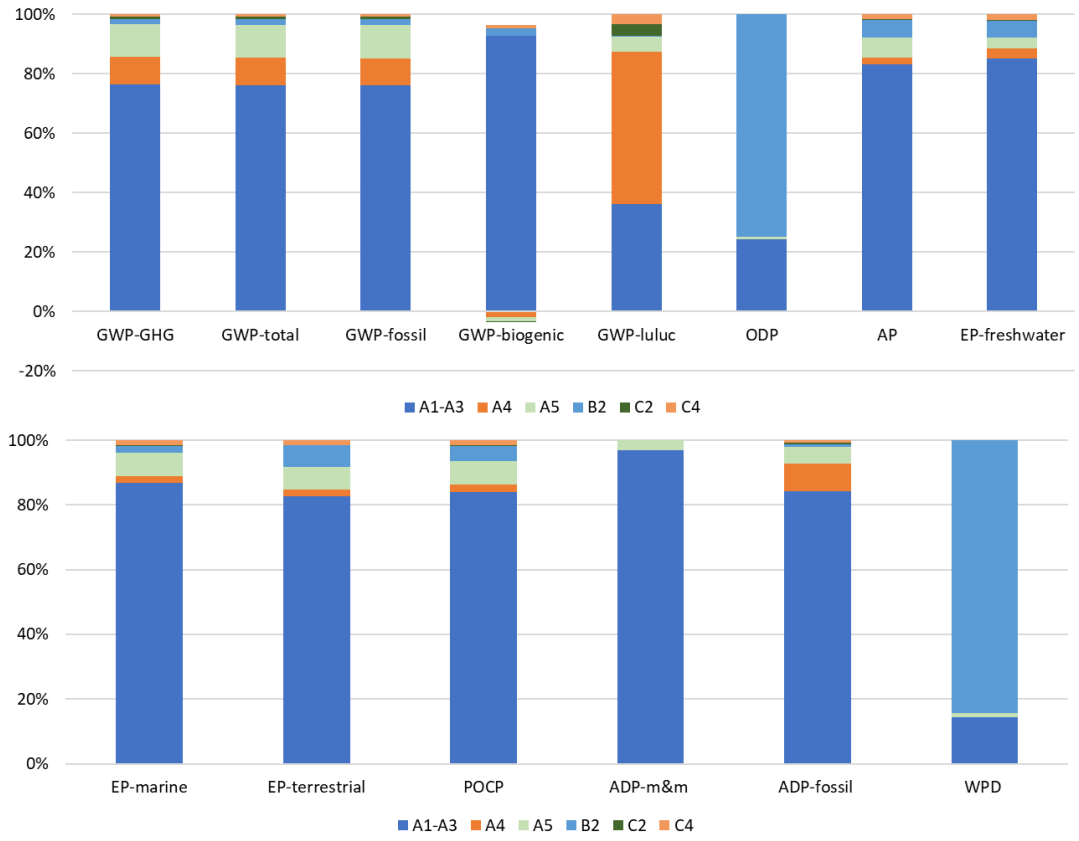


Figure 2. Contributions des différents modules relatifs aux catégories d'impact.

6. Informations additionnelles sur le relargage de substances dangereuses dans l'air intérieur, le sol et l'eau pendant l'étape d'utilisation

6.1. Air intérieur

Émissions de COV, de formaldéhyde et de aldéhydes

Les carreaux céramiques fabriqués par Argenta sont, lors de la fabrication, soumis à un processus thermique atteignant plus de 1000° C. À ces températures, tout composé organique présent dans les compositions se décompose, donnant comme résultant un produit final inerte et exempt de tout composé organique qui pourrait être émis pendant son utilisation. De même, les carreaux fabriqués par Argenta qui ont été soumis à un traitement mécanique en surface ne présentent aucun type de revêtement organique comme des résines ou produits d'obturation qui pourraient générer une quelconque émission. Ces carreaux céramiques sont classés comme A+, en accord avec leur faible niveau d'émissions de substance volatile dans l'air intérieur. Aucun test n'a été réalisé.

Les paramètres techniques des carreaux céramiques fabriqués par Argenta peuvent être consultés dans le paragraphe 3.1.

Résistance au développement des croissances fongiques

La surface émaillée des carreaux fabriqués par Argenta empêche la prolifération des bactéries et des champignons. Contactez Argenta pour obtenir des informations spécifiques en fonction du modèle.

Émissions radioactives

Contactez Argenta pour obtenir des informations spécifiques en fonction du modèle.

Sol et eau

Ceci n'est pas applicable car le produit n'est pas en contact avec l'eau utilisée pour la consommation humaine, ou avec l'eau de ruissellement, l'eau d'infiltration, la nappe phréatique ou l'eau de surface, comme indiqué dans la norme EN 17160.

7. Contribution du produit à la qualité de vie

7.1. Caractéristiques du produit participant à la création des conditions de confort hygrothermique dans le bâtiment

Capacité hygrothermique faible ou nulle. Produit approprié pour son placement dans des pièces humides. La couche d'émail appliquée sur la surface des carreaux fabriqués par Argenta imperméabilise complètement la face exposée et l'application d'une mortier-colle à faible absorption annule la capacité hygroscopique déjà faible des carreaux.

Pour plus d'informations sur les caractéristiques techniques, consulter le paragraphe 3.1, ou demandez plus d'informations sur les caractéristiques techniques du produit.

7.2. Caractéristiques du produit participant à la création des conditions de confort acoustique dans le bâtiment

Non concerné.

7.3. Caractéristiques du produit participant à la création des conditions de confort visuel dans le bâtiment

La versatilité du design des carreaux céramiques permet de créer une multitude d'environnements avec une infinité de designs, couleurs et finitions brillantes et / ou mates.

7.4. Caractéristiques du produit participant à la création des conditions de confort olfactif dans le bâtiment

Il s'agit d'un produit inerte et, par conséquent, ce point n'est pas applicable aux carreaux céramiques fabriqués par Argenta.

8. Informations additionnelles

Argenta possède les certificats suivants :

- ISO14001. Environmental management system (GA-2012/0475)
- ISO 9001. Quality management system (ER-0006/2016)

9. Références

- ISO 14025 :2010 labels and declarations – Type III environmental declarations – Principles and procedures
- EN 17160:2019 Product category rules for ceramic tiles
- EN 15804:2012+A2:2018. Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products. CEN European Commission, Brussels, Belgium
- Complément national à la NF EN 15804+A2 : Contribution des ouvrages de construction au développement durable - Déclarations environnementales sur les produits - Règles régissant les catégories de produits de construction (2022)
- EN 14411:2012. Ceramic tiles. Definitions, classification, characteristics, evaluation of conformity and marking. Brussels, Belgium
- ISO 13006: 2012. Ceramic tiles - Definitions, classification, characteristics and marking, 2nd edn. International Organization for Standardization.
- ISO 14040:2006 Environmental management -- Life cycle assessment -- Principles and framework, 2nd edn. International Organization for Standardization, Geneva
- ISO 14044:2006 Environmental management -- Life cycle assessment -- Requirements and guidelines. International Organization for Standardization, Geneva
- Règlement du programme de vérification INIES (Mars 2021)
- Décret n° 2021-1674 du 16 décembre 2021 relatif à la déclaration environnementale de produits de construction et de décoration ainsi que des équipements électriques, électroniques et de génie climatique
- Arrêté du 14 décembre 2021 relatif à la déclaration environnementale des produits destinés à un usage dans les ouvrages de bâtiment et à la déclaration environnementale des produits utilisée pour le calcul de la performance environnementale des bâtiments
- Arrêté du 15 juillet 2019 modifiant les arrêtés relatifs à la déclaration environnementale des produits de construction et de décoration et les équipements électriques, électroniques et de génie climatique destinés à un usage dans les ouvrages de bâtiment ainsi qu'à leur vérification
- Arrêté du 31 août 2015 relatif à la vérification par tierce partie indépendante des déclarations environnementales des produits de construction, des produits de décoration et des équipements électriques, électroniques et de génie climatique destinés à un usage dans les ouvrages de bâtiment
- Arrêté du 9 juillet 2014 modifiant l'arrêté du 23 décembre 2013 relatif à la déclaration environnementale des produits de construction et de décoration destinés à un usage dans les ouvrages de bâtiment
- Arrêté du 23 décembre 2013 relatif à la déclaration environnementale des produits de construction et de décoration destinés à un usage dans les ouvrages de bâtiment
- Décret n° 2013-1264 du 23 décembre 2013 relatif à la déclaration environnementale de certains produits de construction destinés à un usage dans les ouvrages de bâtiment
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GlobalEPD
A VERIFIED ENVIRONMENTAL DECLARATION

AENOR
Confía

Ceramic tiles. Tile (classification BIII according to UNE-EN 14411: 2016)

Environmental Product Declaration

EN ISO 14025:2010

EN 15804:2012+A1:2013

EN 17160:2019

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ARGENTA
We ♥ friendlytile

ARGENTA CERÁMICA, S.L.

The holder of this Declaration is responsible for its contents and for keeping the records and the documentation that supports data and statements included during the validity period.

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EN 17160:2019 European Standard EN 15804:2012+A1:2013 serves as the basis for PCR
Independent verification of the Declaration and data, according to EN ISO 14025:2010 ☐ Internal ☑ **External**
Verification body AENOR Confía

1 General Information

1.1 The organization

Argenta Cerámica has been gradually developing its own identity, positioning itself worldwide in one of the priority places of the current ceramic scenario.

It all began in 1999 as an entrepreneurial adventure, young, dynamic and eager to develop a concept in ceramics different from the current one and close to people. With the #Friendlytile concept, a long-term project was born, where we want to share ideas and be closer to you. Talk about ceramics working from people and towards people, in a moment where brand values are humanized to give way to a more direct, lively and real communication.

1.2 Scope of the Declaration

This Environmental Product Declaration includes environmental information from a group of products manufactured by a single manufacturer, ARGENTA, in two adjacent production sites of its property located in Onda (Castellón), in a geographical and technological coverage of Spain 2019.

The results shown the environmental behavior of an average tile, weighted by production, as well as the environmental data of the tiles that have a minimum and a maximum impact, thus limiting the results obtained in the ACV. The scope of this Environmental Product Declaration (hereinafter EPD) is from cradle to grave.

1.3 Lifecycle and compliance

This EPD has been developed and verified in accordance to UNE-EN ISO 14025:2010, EN 15804:2012+A1:2013 and EN 17160:2019 (Product category rules for ceramic tiles).

This Declaration may not be comparable to declarations developed in other programs or using different reference documents, especially when such declarations have not been developed and verified in accordance with UNE-EN 15804 +A1. Similarly, EPDs may not be comparable if the source of the data is different (e.g. databases), not all relevant information modules are included, or not based on the same scenarios. The comparison of construction products must be made on the same function, applying the same functional unit and at building level (or architectural or engineering work), that is, including the behavior of the product throughout its life cycle, as well as the specifications of section 6.7.2. of the UNE-EN ISO 14025 Standard.

2 The product

2.1 Product identification

9 commercial formats of the ceramic tiles included in this study belong to BIII group (tile), classification based on UNE-EN 14411:2016 (equivalent to ISO 13006:2018), that is, they have a water absorption greater than 10% and have been formed by pressing. Its common name is tile.

The tiles included in this study have different models with different formats. Specifically, the formats included within the scope of this EPD have a thickness that varies between 7.4 mm to 10.8mm, with an average weight of 15.5 kg / m2.

In the annexes, it can be found the results of the formats included in the scope of this EPD that shown the minimum and maximum environmental impact, corresponding to the formats 25x50cm of 7.4mm thickness and 40x120cm of 10.8mm thickness respectively. The CPC code of the product is 37310.

2.2 Product perfomance

The function of the product is to coat surfaces. In this study, the environmental performance of the stage of use of the tile as wall cladding inside a home, however, the versatility of these pieces allows them to be installed in other places, such as offices, shops, hospitals, etc.

2.3 Product composition

None of the constituents of the final product is included in the Candidate List of Substances of Very High Concern subject to Authorisation.

Table 1. Main components of the product

Substance		Content
SUPPORT	Clay, feldspars, sands, kaolin and ceramic waste (fireed and unfireed)	95%
DECORATION	Feldspars, carbonates, quartz, silicates, kaolins, zirconium oxides, clays, alumina, zinc oxide, etc.	5%

3 LCA Information

3.1 Life-cycle analysis

The Life Cycle Analysis (LCA) on which this EPD is based has been elaborated from data provided directly by the manufacturer ARGENTA CERÁMICA, S.A.

The life cycle assessment (LCA) on which this declaration is based has been carried out following ISO 14040 and ISO 14044 standards as well as PCRs for ceramic tiles (EN 17160).

The ACV has been carried out with the support of the GaBi software 10.0.0.71 (5) and with the database version 2020.1 (SP40.0) (6) (SpheraSolutions). The characterization factors used are those included in the EN 15804:2012+A1:2013.

3.2 Functional or declared unit

The functional unit considered is **"To cover 1 m2 of a surface (cladding) of a house for 50 years with tile".**

3.3 Reference service life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, since it is a long-lasting product and does not require substitution. It has been considered a reference service life of 50 years. (See Table 2).

Table 2 Reference service life

Parameter	Result (expressed by functional unit)
Reference lifespan	Minimum 50 years
Declared properties of the product (at door), finishes, etc.	Minimum values of the relevant characteristics according to Annex L of the UNE-EN 14411. For more information request technical data sheets according to model
Application design parameters (manufacturer's instructions), including references to good practice	For more information request technical data sheets according to model
Estimation of the of work, when installed according to the manufacturer's instructions	For more information request technical data sheets according to model.
Outdoor environment (for outdoor applications), e.g.. weathering, pollutants, UV radiation and wind exposure, building orientation, shading, temperature	Results of the values of the relevant characteristics according to Annex L of the UNE-EN 14411 standards. For more information, click-on technical data sheets according to model.
Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure	Results of the values of the relevant characteristics according to Annex L of the UNE-EN 14411 standards. For more information, request technical data sheets according to model.
Conditions of use, e.g. frequency of use, mechanical exposure	For more information, request technical data sheets according to model.
Maintenance, e.g.. frequency required, type and quality and replacement of replaceable components	For more information, request technical data sheets according to model.

3.4 Allocation and cutt-off criteria

In this cradle-to-grave analysis, a cut-off criterion of 1% has been applied for energy use (renewable and non-renewable) and 1% of the total mass in those unitary processes whose results are insufficient. In total, more than 95% of all matter and energy inputs and outputs the system have been included, excluding those data not available or not quantified.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of raw materials of a powdery nature.
- Atmospheric emissions of pollutants, not regulated, emitted from channeled focus of the combustion steps (spray drying, drying of parts and firing).
- The process of recycling and reuse of the waste generated throughout the life cycle of the ceramic coatings that will be part of another system, based on PCR. However, the waste recycling process and the benefits obtained from this recycling will be accounted in module D.
- The production of some auxiliary materials used in the production of tiles: polishing wheels, etc., representing less than 0.01% in total mass. The management of its waste has not been included either.
- For the manufacturers of atomizing and glazes, it has not been considered: the production of the auxiliary materials used; the management of the waste generated and its transfer to landfill. They represent a % less than the established cut-off rule.
- The production of machinery and industrial equipment due to the difficulty in inventing all the goods involved, and also because the LCA community considers that the environmental impact per unit of product is low in relation to the rest of the products that are included. In addition, the databases used do not include these processes, so their inclusion would require additional effort outside the scope of the study.
- Consumption of auxiliary materials and waste generated by suppliers of glaze and atomized powder.

3.5 Data representativeness, quality and selection

The primary data have been provided directly by the company ARGENTA corresponding to two production centers of its property. The secondary data, the GaBi ts 2020 databases have been used.1. (SP40.0) [6] and modeled with GaBi version 10.0.0.71 [5]. All data belong to a geographical coverage of Spain 2019.

The results presented are representative of ceramic coatings, expressed as a weighted average to produce ceramic coatings belonging to group BIII, limiting this average by the products they present the minimum and maximum environmental impact.

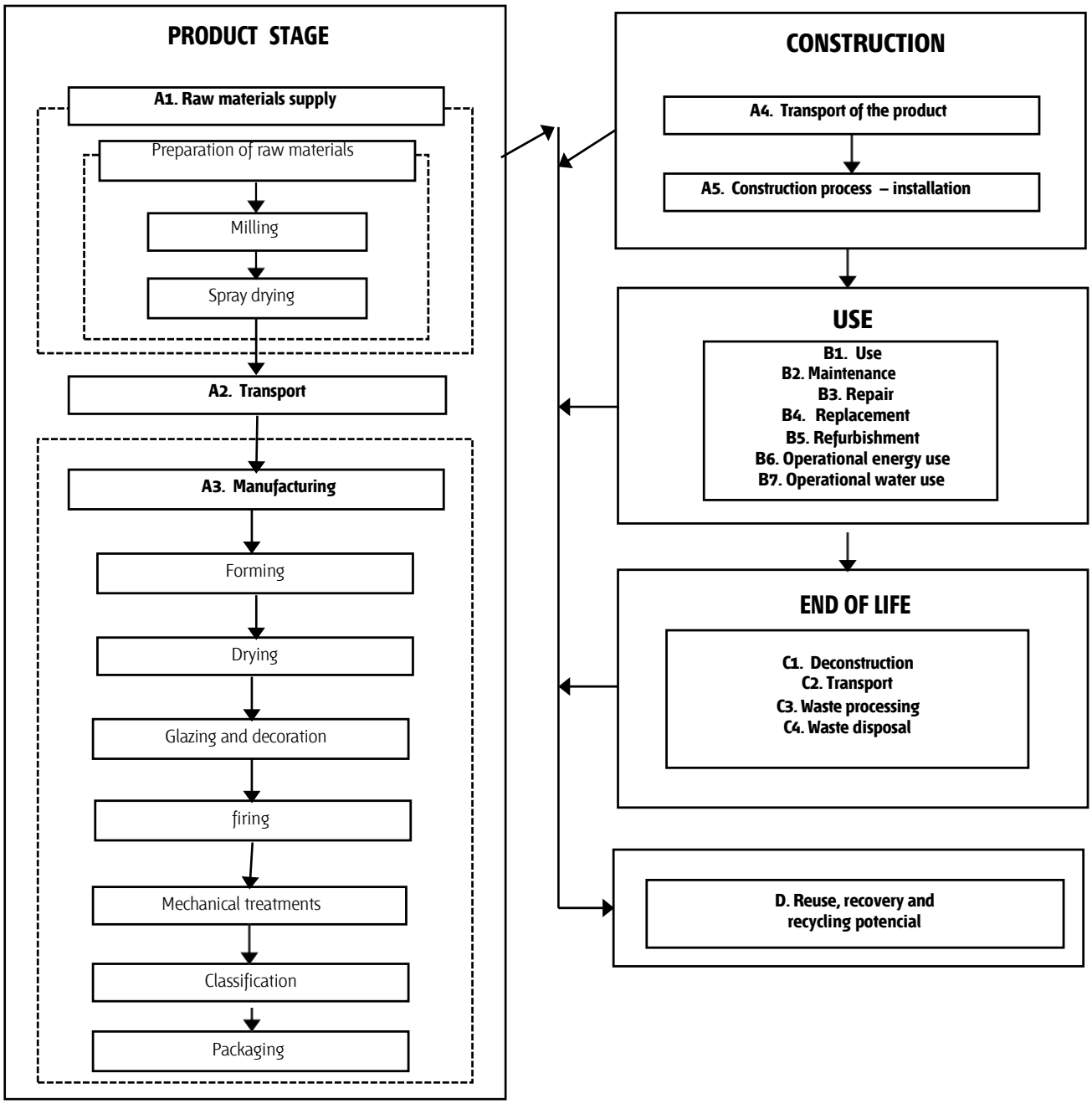
3.6 Other calculation rules and assumptions

The load assignments applied have been the necessary to be able to quantify the specific data for this type of ceramic tiles, as well as the necessary calculations to be able to assign the data associated with the products that have a minimum and maximum environmental impact.

4 System boundaries, scenarios, and additional technical information

All life cycle modules relevant to ceramic coatings according to PCR have been included.

Limits of the system a studied



The included modules are presented in the following table.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		STAGE OF USE							END-OF-LIFE STAGE				D
Extraction of raw materials	Transport	Manufacturing	Transport from factory door to the construction site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction Demolition	Transport	Waste processing	Disposal	Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	NO	X	NO	NO	NO	NO	NO	NO	X	X	X	X

*NR: Module No Relevant.

4.1 Upstream processes and product manufacturing

Raw materials *(A1 and A2)*

Raw materials necessary for the manufacture of ceramic tiles are classified as: plastic raw materials and non-plastic or degreasing raw materials. Specifically, the plastic materials included in the composition of the support are slabs, feldspars and sands, as well as waste from the factory itself, which can be sludge or pieces of raw or fireed pot, being introduced in the milling stage of the raw materials.

For the raw materials of the glazes, the most common used in the formulation are quartz, kaolin, borax, alkaline feldspars, nepheline, calcium carbonate, dolomite, zircon, wollastonite, calcined alumina and ceramic frits.

Ceramic frits are insoluble glasses, previously prepared by complete fusion of their original raw materials, called "frits". It has been estimated on average that 67% of the raw materials used in the glazes applied to the tile sheets are subjected to the "friting" process for the tile.

The raw materials used have different origins, according to their nature and properties. Raw materials from outside Spain are transported by freighter to the port of Castellón, and from there by truck to the production plants of atomized powder. For transport by sea, a type of transoceanic freighter has been chosen, which distance traveled differs in each case depending on the origin, while for road transport a 27t cargo truck has been chosen that complies with the regulation's Euro 6. All raw materials are transported in bulk, i.e. they do not require packaging material, except for decorative materials which are transported in a 17.3 t payload truck directly from the frit and glaze factory to Argenta plants.

The preparation of raw materials for the support of ARGENTA ceramic tiles is carried out in the factories of the suppliers of atomized powder. In this process, the proportion of raw materials is defined and the origin of these are adjusted to the characteristics of the production process and the final performance required.

The atomized powder is obtained by wet grinding of raw materials and subsequent spray drying. Argenta's supplier companies have installed cogeneration systems for heat and electrical energy in the atomization dryers. All the hot gases are used in the spray dryer and the electrical energy generated, part is used in the production process thus reducing the electrical requirements of the network and part is sold to the grid.

4.2 Product manufacturing

Manufacturing (A3)

Once the atomized powder is obtained, it is transported to the forming plants. This process and the subsequent treatments applied to the tile are carried out in the same facilities of ARGENTA. The procedure is as follows: the atomized powder is discharged into storage hoppers and by means of a feeding system with conveyor belts with weighing control, the granule is directed to the stage of forming by unidirectional dry pressing, made with hydraulic or oleodynamic presses. This method is the most suitable to control the pressing cycle and thus be able to obtain large format pieces.

The conformed parts are introduced into a drying room to reduce their humidity, thus doubling or tripling their mechanical resistance, which allows their subsequent processing.

The fresh pieces from the dryer are coated with a thin or several layers of engobe and glaze and applied on the support using curtain techniques (bell). In addition, in some cases, the product is decorated using different types of applications, the majority being inkjet. This treatment is carried out to give on the surface of the fireed product a series of technical and aesthetic properties, such as waterproofness, ease of cleaning, shine, color, surface texture, chemical and mechanical resistance.

Cocking is the most important stage of the production process of ceramic tiles, since it is the moment in which the pieces, previously milled, undergo a fundamental modification in their properties, giving rise to a hard material, resistant to water and chemicals. The cocking of the ceramic pieces is carried out by monocoction in roller monostratum ovens.

After having passed the quality control processes, the classified parts are packed in a private cardboard container and packed on wooden pallets, coated with LDPE film and strapped to avoid cargo movement. On each pallet or on the top of the bulks are placed sheets coverings. On the other hand, in some formats are also used fix pall, side squares to avoid the displacement of the load on the pallet. In the loading of containers, raffia mattress is used, bags that are placed between the gaps between pallet and pallet to protect the load.

4.3 Construction process

Transport of the product (A4)

The product is distributed by 59% in Spain, 17% in Europe and 24% the rest of the world.

For road transport, a 27-t truck classified as Euro 6 has been considered. For trans-continent transport, an average transoceanic freighter has been estimated.

Table 3 Transport to the construction site

Stage of the construction process.	Transportation to the site
Parameter	Result (expressed as functional or declared unit)
Fuel type and consumption	According to destinations in the distribution above, the following are described: 0,1322l l diesel (Euro 6 truck of 27 t) 0,0220l fuel oil (freighter)
Distance	300 km national distribution: 59% 1390 km distribution rest Europe: 17% 6520 km distribution rest of the world: 24%
Capacity utilization (including empty return)	85% in trucks 100% freighter
Bulk density of transported products	415.4 kg/m3
Useful capacity factor (factor: =1 or < 1 or ≥ 1 for products that are packaged compressed or nested)	Not applicable

Product installation and construction process *(A5)*

Once the product is unpacked, it is installed. According to the PCR for ceramic tiles it has been established that for the installation the application of mortar is required.

Glue mortars are cementitious adhesives formed by a mixture of hydraulic binders, mineral fillers and organic additives, which only have to be mixed with water or liquid addition just before its use. They are formed by a mixture of white or gray cement, mineral fillers of siliceous and/or limestone nature and organic additives: water retainers, redispersible polymers in water, rheological modifiers, fibers, etc.

The waste derived from the packaging of the pieces is managed separately according to the geographical location of the place of installation. On the other hand, 3% of product losses have been considered in the installation stage of the tiles.

Table 4 Installation of the product in the building.

TECHNICAL INFORMATION. Stage of the construction process. Installation in the building	
Parameter	**Result *(expressed by functional or declared unit)***
Material 1: Glue cement	3.3kg
Water use	0.8 l
Use of other resources	Not applicable
Quantitative description of the type of energy *(regional mix)* and consumption during the installation process	Not applicable
Waste of materials on site before waste processing, generated by the installation of the product *(specifying type)*	Waste of ceramic parts: 466g Packaging waste: Cardboard: 119.8 g Plastic: 28.4 g Wood: 418.0 g
Output of materials *(specified by type)* as a result of waste processing on the building plot	Recycled ceramic parts: 326 g Ceramic parts to landfill: 140 g Incinerated cardboard : 2 g Recycled cardboard: 21 g Cardboard landfilled: 6 g Incinerated plastic: 2 g Recycled plastic: 21 g Landfilled plastic: 6 g Incinerated wood: 21 g Recycled wood: 333 g Wood landfilled : 64 g
Direct emissions to ambient air, soil and water	Not applicable

4.4 Use related to operation of the building

Usage (B1)

Once installed, the tile does not require any energy input for its use nor do they need maintenance after its commissioning, except for normal cleaning operations. For this reason, of all the modules mentioned above, only the environmental loads attributable to the maintenance of the product (module B2) are contemplated.

Maintenance (B2)

Cleaning is done with a damp cloth and, if the surface has dirt or grease, cleaning agents such as detergents or bleaches can be added. In the present study, the consumption of water and disinfectant for a wall covering installed in a residential use scenario has been considered, that is, cleaning every 3 months with water and detergent during the 50 years of useful life.

Table 5 Use linked the structure of the building.

TECHNICAL INFORMATION. Stage of use related to the building	
Parameter	**Result (expressed by functional or declared unit)**
B2 MAINTENANCE	
Maintenance process	According to PCR for ceramic tiles (UNE-EN 17160) residential scenario for wall cleaning
Maintenance cycle	Wash each month with water and detergent
Auxiliary materials for maintenance (E.g.cleaning products) (specifying each material)	Detergent: 1.34E-04 kg/m2
Waste of material during the maintenance (specifying the type)	Not applicable
Net consumption of running water	0.1 l/m2
Energy input during maintenance (E.g. suction cleaning), type of energy vector (e.g. electricity) and quantity, if applicable and relevant	Not applicable

4.5. End of life

Deconstruction and demolition (C1)

Once its useful life is over, the product will be removed, either as part of a rehabilitation of the building or during its demolition.

In the context of the demolition of a building, the impacts attributable to the uninstallation of the product are negligible.

Transport (C2)

The waste of the product is transported in a large tonnage truck (27 t) that complies with the Euro 6 standard to be managed, either by deposition in landfills of inerts, or recycled.

An average distance of 20km from the building site to the container and treatment plant (by truck) and 30km from the container or treatment plant to the final destination is considered.

It also includes the return trip of the trucks (100% empty return).

Waste processing for reuse, recovery and recycling (C3)

70% of tiles recycling and/or reusing is considered, as indicated in the PCRs.

Final disposal (C4)

It is considered that and 30% of the product is sent to landfill controlled after the end of its useful life.

Table 6. End of life

TECHNICAL INFORMATION. End of life	
Parameter	**Result (expressed by functional or declared unit)**
Collection process, specified by type	18.8 kg/m2
Recovery system, specified by type	13.2 kg recycled as filler material
Deletion, specific by type	5.6 kg to controlled landfill
Assumptions for development of scenario (e.g.. transport)	The waste of the product is transported in a large tonnage truck (27t) that complies with the Euro 6 standard to be managed, either by deposition in inert landfills, or recycled. An average distance of 20km from the building to the container and treatment plant (by truck) and 30km from the container or treatment plant to the final destination is considered. It also includes the return trip of the trucks (100% empty return)

4.6 Benefits and loads beyond the building system boundaries

Module D Benefits and potential environmental from reuse recovery y recycling activities

The environmental loads and benefits obtained of the secondary material from the waste generated at the manufacturing stage (waste such as cardboard, plastic and wood), at the installation stage (waste tiles, residues of the packaging of the tiles: cardboard, plastic and wood) and at the end of life of the product.

5 LCA and LCI enrironmental parameter declaration

The following tables include the data for the LCA and LCI parameters.

The results obtained are expressions and do not foreseen impacts in endpoint categories, the overcoming of some levels, safety margins or risks.

The results associated ceramic tiles that have the minimum and maximum environmental impact are presented in Annexes I and II

Environmental impacts

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO2 eq	8,7	4.4E-01	9.9E-01	N.R.	2.7E-02	N.R.	N.R.	8.0E-02	0	8.2E-02	-2.3E-01
ODP	kg CFC11 eq	2.7E-09	7.0E-17	8.0E-11		1.8E-08			1.3E-17	0	8.4E-14	-3.1E-09
AP	kg SO2 eq	1.4E-02	2.5E-03	1.6E-03		1.9E-04			5.5E-05	0	4.8E-04	-7.8E-04
EP	kg (PO4)3- eq	2.1E-03	3.0E-04	3.0E-04		4.4E-05			9.5E-06	0	6.5E-05	-9.5E-05
POCP	kg ethylene eq	1.2E-03	1.6E-04	1.3E-04		6.3E-05			8.5E-06	0	3.8E-05	-7.5E-05
ADPE	kg Sb eq	5.0E-05	2.9E-08	1.5E-06		1.5E-09			5.9E-09	0	8.7E-09	-5.0E-08
ADPF	MJ	126,5	5,9	7,5		1.5E-01			1,1	0	1,1	-4,2

GWP = Global Warming Potential ; **ODP** = Potential for depletion of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Tropospheric ozone formation potential; **ADPE** = Potential for depletion of abiotic resources for non-fossil resources; **ADPF** = Abiotic Resource Depletion Potential for Fossil Resources **N.R.** = Non-Relevant Modules

Resource Usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	21,5	2.8E-01	1,6	N.R.	7.0E-01	N.R.	N.R.	6.1E-02	0	1.3E-01	-3,1
PERM	MJ	0	0	0		0			0	0	0	0
LAWSUIT	MJ	21,5	2.8E-01	1,6		7.0E-01			6.1E-02	0	1.3E-01	-3,1
PENRE	MJ	135,9	5,9	8,2		1.7E-01			1,1	0	1,1	-4,6
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	135,9	5,9	8,2		1.7E-01			1,1	0	1,1	-4,6
SM	medical history	0	0	0		0			0	0	0	0
RSF	MJ	0	0	0		0			0	0	0	0
NRSF	MJ	0	0	0		0			0	0	0	0
FW	m3	1.9E-02	3.3E-04	2.1E-03		1.3E-02			7.1E-05	0	2.1E-04	-2.4E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy used as a raw material; **PERT** = Total use of renewable primary energy; **PENRE** = Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw material; **PENRM** = Use of non-renewable primary energy used as raw material; **PENRT** = Total non-renewable primary energy use; **SM** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of running water resources. **N.R.** = Non-Relevant Modules

Other outflows and waste categories

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	medical history	1.1E-03	2.3E-07	3.2E-05		9.3E-11			5.1E-08	0	0	-2.6E-08
NHWD	medical history	2,9	8.6E-04	3.3E-01		3.8E-03			1.7E-04	0	5,1	-6.7E-04
RWD	medical history	2.7E-03	7.2E-06	2.3E-04		1.8E-06			1.3E-06	0	1.5E-05	8.0E-06
RAW	medical history	0	0	0	N.R	0	N.R	N.R	0	0	0	0
MFR	medical history	0	0	5.9E-01		0			0	11,9	0	-3.4E-03
MORE	medical history	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed of; **NHWD** = Non-hazardous waste disposed of; **RWD** = Radioactive waste disposed of; **CRU** = Components for reuse; **MFR** = Materials for recycling; **MER** = Materials for energy recovery; **EE** = Energy exported; **N.R.** = Non-Relevant Modules

6 Additional environmental information

6.1 Indoor air emissions

Ceramic coatings, in their manufacturing process, undergo a thermal process that exceeds 1000 ºC. At these temperatures, any organic compound present in the compositions is decomposed, resulting in a final product that is free of volatile organic compounds that can be emitted in its use phase.

6.2 Release to soil and water

Ceramic coatings do not emit any compound to the soil or water in its stage of use, since it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, nor does it react physically or chemically or in any other way, it is not biodegradable, it does not adversely affect other materials which it comes into contact with in such a way as can cause pollution of the environment or harm human health. It is a product that does not leach so it does not supposed to be a risk to the quality surface or groundwater.

ANNEX I LCA and LCI environmental parameter statements for MINIMUM environmental impact format

This annex contains the parameters fo the references with minimum impact value for nthe global warming category, with a variation of more than 10% with respect to the family average.

Environmental impacts

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO2 eq	7,3	4.0E-01	8.7E-01	N.R.	2.4E-02	N.R.	N.R	7.1E-02	0	7.3E-02	-2.0E-01
ODP	kg CFC11 eq	2.1E-09	6.2E-17	6.2E-11		1.6E-08			1.2E-17	0	7.5E-14	-2.7E-09
AP	kg SO2 eq	1.2E-02	2.3E-03	1.4E-03		1.7E-04			4.9E-05	0	4.3E-04	-7.0E-04
EP	kg (PO4)3- eq	1.8E-03	2.7E-04	2.6E-04		3.9E-05			8.5E-06	0	5.8E-05	-8.5E-05
POCP	kg ethylene eq	1.0E-03	1.5E-04	1.1E-04		5.6E-05			7.6E-06	0	3.4E-05	-6.7E-05
ADPE	kg Sb eq	3.2E-05	2.6E-08	9.9E-07		1.4E-09			5.2E-09	0	7.8E-09	-4.5E-08
ADPF	MJ	105,9	5,3	6,5		1.3E-01			9.7E-01	0	9.5E-01	-3,8

GWP = Global Warming Potential ; **ODP** = Potential for depletion of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Tropospheric ozone formation potential; **ADPE** = Potential for abiotic resource depletion for non-fossil resources; **ADPF** = Potential for abiotic resource depletion for fossil resources. **N.R**. = Non-Relevant Modules

Resource Usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	17,6	2.5E-01	1,3	N.R	6.2E-01	N.R	N.R	5.5E-02	0	1.2E-01	-2,7
PERM	MJ	0	0	0		0			0	0	0	0
LAWSUIT	MJ	17,6	2.5E-01	1,3		6.2E-01			5.5E-02	0	1.2E-01	-2,7
PENRE	MJ	113,0	5,3	7,0		1.5E-01			9.7E-01	0	9.8E-01	-4,1
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	113,0	5,3	7,0		1.5E-01			9.7E-01	0	9.8E-01	-4,1
SM	medical history	0	0	0		0			0	0	0	0
RSF	MJ	0	0	0		0			0	0	0	0
NRSF	MJ	0	0	0		0			0	0	0	0
FW	m3	1.6E-02	3.0E-04	1.9E-03		1.2E-02			6.3E-05	0	1.9E-04	-2.2E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy used as a raw material; **LAWSUIT** = Total use of renewable primary energy; **PENRE** = Use of non-renewable primary energy, excluding non-primary energy resources renewable used as raw material; **PENRM** = Use of non-renewable primary energy used as raw material; **PENRT** = Total use of non-renewable primary energy; **SM** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of water stream. **N.R.** = Modules No Relevant

Other outflows and waste categories

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	medical history	1.1E-03	2.1E-07	3.2E-05		8.3E-11			4.5E-08	0	0	-2.3E-08
NHWD	medical history	2,2	7.7E-04	2.8E-01		3.4E-03			1.5E-04	0	4,6	-6.0E-04
RWD	medical history	2.2E-03	6.5E-06	2.0E-04		1.6E-06			1.2E-06	0	1.3E-05	7.3E-06
RAW	medical history	0	0	0	N.R	0	N.R	N.R	0	0	0	0
MFR	medical history	0	0	5.3E-01		0			0	10,6	0	-3.1E-03
MORE	medical history	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed of; **NHWD** = Non-hazardous waste disposed of; **RWD** = Radioactive waste disposed of; **CRU** = Components for reuse; **MFR** = Materials for recycling; MER = Materials for energy recovery; **EE** = Energy exported; **N.R.** = Non-Relevant Modules

ANNEX II LCA and LCI environmental parameter for MAXIMUM environmental impact format

This annex contains the parameters for the references with maximum impact value for the global warning category, with a variation of more that 10% with respect to the family average.

Environmental impacts

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
GWP	kg CO2 eq	10,9	5.5E-01	1,2	N.R.	3.4E-02	N.R.	N.R.	1.0E-01	0	1.0E-01	-2.8E-01
ODP	kg CFC11 eq	3.5E-09	8.7E-17	1.0E-10		2.2E-08			1.6E-17	0	1.1E-13	-3.9E-09
AP	kg SO2 eq	1.7E-02	3.2E-03	2.0E-03		2.4E-04			6.9E-05	0	6.0E-04	-9.8E-04
EP	kg (PO4)3- eq	2.4E-03	3.7E-04	3.7E-04		5.5E-05			1.2E-05	0	8.2E-05	-1.2E-04
POCP	kg ethylene eq	1.5E-03	2.0E-04	1.6E-04		7.8E-05			1.1E-05	0	4.8E-05	-9.4E-05
ADPE	kg Sb eq	6.8E-05	3.6E-08	2.1E-06		1.9E-09			7.3E-09	0	1.1E-08	-6.2E-08
ADPF	MJ	157,9	7,4	9,4		1.8E-01			1,4	0	1,3	-5,3

GWP = Global Warming Potential; **ODP** = Potential for depletion of the stratospheric ozone layer; **AP** = Acidification potential of soil and water resources; **EP** = Eutrophication potential; **POCP** = Tropospheric ozone formation potential; **ADPE** = Abiotic resource depletion potential for non-fossil resources **ADPF** = Abiotic resource depletion potential for fossil resources. **N.R.** = Non-Relevant Modules

Resource Usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3-B7	C1	C2	C3	C4	D
PERE	MJ	27,2	3.5E-01	2,0	N.R	8.7E-01	N.R	N.R	7.6E-02	0	1.6E-01	-3,9
PERM	MJ	0	0	0		0			0	0	0	0
LAWSUIT	MJ	27,2	3.5E-01	2,0		8.7E-01			7.6E-02	0	1.6E-01	-3,9
PENRE	MJ	169,2	7,4	10,2		2.2E-01			1,4	0	1,4	-5,8
PENRM	MJ	0	0	0		0			0	0	0	0
PENRT	MJ	169,2	7,4	10,2		2.2E-01			1,4	0	1,4	-5,8
SM	medical history	0	0	0		0			0	0	0	0
RSF	MJ	0	0	0		0			0	0	0	0
NRSF	MJ	0	0	0		0			0	0	0	0
FW	m3	2.3E-02	4.1E-04	2.6E-03		1.7E-02			8.8E-05	0	2.6E-04	-3.0E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy used as a raw material; **LAWSUIT** = Total use of renewable primary energy; **PENRE** = Use of non-renewable primary energy, excluding non-primary energy resources renewable used as raw material; **PENRM** = Use of non-renewable primary energy used as raw material; **PENRT** = Uso tnon-renewable primary energy; **SM** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of water stream. **N.R.** = Modules No Relevant

Other outflows and waste categories

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3 - B7	C1	C2	C3	C4	D
HWD	medical history	1.1E-03	2.9E-07	3.2E-05	N.R.	1.2E-10	N.R.	N.R.	6.3E-08	0	0	-3.2E-08
NHWD	medical history	2,9	1.1E-03	3.9E-01		4.7E-03			2.1E-04	0	6,4	-8.4E-04
RWD	medical history	3.3E-03	9.0E-06	2.8E-04		2.3E-06			1.7E-06	0	1.9E-05	9.9E-06
RAW	medical history	0	0	0		0			0	0	0	0
MFR	medical history	0	0	7.4E-01		0			0	14,9	0	-4.3E-03
MORE	medical history	0	0	0		0			0	0	0	0
EE	MJ	0	0	0		0			0	0	0	0

HWD = Hazardous waste disposed of; **NHWD** = Non-hazardous waste disposed of; **RWD** = Radioactive waste disposed of; **CRU** = Components for reuse; **MFR** = Materials for recycling; **MER** = Materials for energy recovery; **EE** = Energy exported; **N.R.** = Non-Relevant Modules

References

[1] EN 17160:2019 Product category rules for ceramic tiles

[2] UNE-EN ISO 14025:2010 Environmental labels. Type III environmental declarations. Principles and Procedures (ISO 14025:2006)

[3] EN 15804:2012+A1:2013 Sustainability in construction. Environmental product declarations. Basic product category rules for construction products

[4] Life Cycle Analysis Study of porcelain stoneware and tile – VIVES AZULEJOS Y GRES S.A. Annex I to report C202428; March 2021, version 2 issued by the Institute of Ceramic Technology.

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A VERIFIED **ENVIRONMENTAL** DECLARATION

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Environmental Product Declaration

UNE-EN ISO 14025: 2010
UNE-EN 15804: 2012+A2:2020
UNE-EN 17160 :2019

ARGENTA CERÁMICA S.L.
Porcelain stoneware (BIa)

Date of first issue:	2023-02-02
Expiration date:	2028-02-01

The declared validity is subject to registration and publication in www.aenor.com

Registration code: GlobalEPD EN17160 - 005

ARGENTA

The holder of this Declaration is responsible for its contents and for keeping the records and the documentation that supports data and statements included during the validity period.

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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programmes

Standard UNE-EN 17160: 2019 The European Standard EN 15804:2012+A2:2020 serves as the basis for CPR
Independent verification of the declaration and data in accordance with EN ISO 14025:2010 ☒ Internal External☒
Verification body

1. General Information

1.1. The organization

Argenta Cerámica has gradually developed its own identity, positioning itself worldwide in one of the priority places of the current ceramic scenario.

It all started in 1999 as a business adventure, young, dynamic and eager to develop a ceramic concept different from the current one and close to people. With the concept #Friendlytile a long-term project was born, where we want to share ideas and be closer to you. Talk about ceramics working from people and towards people, at a time when brand values are humanized to give way to a more direct, alive and real communication.

1.2. Scope of the Declaration

This Environmental Product Declaration includes environmental information of a grouping of products manufactured in the Argenta plants (F1 and F4) in a geographical and technological environment of Spain 2021.

The results shown present the environmental performance of the average porcelain stoneware, weighted by production, as well as the environmental data of the tiles that present a minimum and maximum impact, thus limiting the results obtained in the LCA. The scope of this Environmental Product Declaration (hereinafter DAP) is cradle to grave.

1.3. Lifecycle and compliance.

This EPD has been developed and verified in accordance with the UNE-EN ISO 14025:2010, 15804:2012+A2:2020 and UNE-EN 17160:2019 (Product category rules for ceramic tiles).

PRODUCT CATEGORY RULE INFORMATION	
Descriptive title	UNE EN 1760:2019. Product Category Rules for Ceramic Tiles
Registration code and version	EN17160:2019
Date of issue	2019
Conformity	UNE-EN 15804:2012 + A2:2020
Program Administrator	AENOR

This Environmental Declaration includes the following stages of the life cycle:

System limits. Information modules considered.

Product stage	A1	Supply of raw materials	X
	A2	Factory transport	X
	A3	Manufacturing	X
Construction	A4	Transport to construction site	X
	A5	Installation/construction	X
Stage d use	B1	Use	X
	B2	Maintenance	X
	B3	Reparation	X
	B4	Replacement	X
	B5	Rehabilitation	X
	B6	In-service energy use	X
	B7	Use of water in service	X
End of life	C1	Deconstruction/demolition	X
	C2	Transport	X
	C3	Waste treatment	X
	C4	Elimination	X
	D	Potential for reuse, recovery and/or recycling	X

X = Module included in the LCA; NR = Module no relevant; MNE = Module not evaluated

This DAP may not be comparable with those developed in other Programs or according to different reference documents, particularly it may not be comparable with DAP not developed in accordance with the UNE-EN 15804+A2 Standard.

Similarly, DAPs may not be comparable if the data source is different (e.g. databases), not all relevant information modules are included, or are not based on the same scenarios.

The comparison of construction products must be made on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), that is, including the behavior of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the UNE-EN ISO 14025 Standard.

2. The product

2.1. Product identification

The ceramic tiles included in this study belong to group BIa (porcelain stoneware), classification based on the UNE-EN 14411: 2016 standard (equivalent to ISO 13006: 2018), i.e. they have a water absorption of less than 0.5% and their forming is by pressing. Its common name is Porcelain Stoneware.

The porcelain stoneware tiles included in this study include 17 commercial formats, with enamel, with and without mechanical treatment, of thicknesses ranging from 8.5mm to 11.0 mm, with an average weight of 21.0 kg/^{m2}.

In the annexes, you can find the results of the formats included in the scope of this EPD that present the minimum and maximum environmental impact, corresponding to the formats: 30x60 SL of 18.6 kg / m 2 and 75x150 RC of 23.6kg / m^2 weight in cooked respectively.

The CPC code of the product is 37370.

2.2. Product composition

The manufacturer declares the following information on the technical specifications of the product:

Product features

Essential features	Benefits	Harmonized specification
Reaction to fire1	Class A1FL/A1	EN 14411
Breaking force	>1300 N	
Touch properties	PND	
Slide	PND	
Adhesion with cementitious adhesives type C2	>1N/mm^2	
Resistance to thermal shock	Meets	
Durability- indoor uses- outdoor uses: frost resistance	Meets	

2.3. Product composition

The composition declared by the manufacturer is as follows:

Product composition

Composition	Content
Support (clays, feldspars, sands, etc.)	97%
Decoration materials (feldspars, carbonates, zirconium, etc.)	3%

The substances contained in the product listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" do not exceed 0.1% by weight of the product.

3. LCA Information

3.1. Life cycle assessment

The LCA has been performed with the support of GaBi software 10.6.0.110 [7] and with database version 2021.2. (SP40.0) [8]) (SpheraSolutions). The characterization factors used are those included in the UNE EN 15804:2012+A2:2020 standard.

3.2. Declared unit

The Declared Unit considered is ***"Cover 1 m2*** of a ***surface (interior floors) of a house with ceramic tiles of the BIa group for 50 years".***

3.3. Reference Service Life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, since it is a long-lasting product that does not require replacement. It has been considered a useful life of 50 years.

Reference shelf life

Parameter	Unit (expressed per functional unit)
Reference service life	Minimum 50 years
Declared properties of the product (at the door), finishes, etc.	Minimum values of the relevant characteristics according to Annex G of the UNE-EN 14411 standard. For more information request technical sheets according to model.
Application design parameters (manufacturer's instructions), including references to good practices	For more information request technical sheets according to model.
Estimation of the quality of work, when installed according to the manufacturer's instructions	For more information request technical sheets according to model.
Outdoor environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading or temperature	Results of the values of the relevant characteristics according to Annex G of the UNE-EN 14411 standard. For more information, request technical sheets according to model.
Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure	Results of the values of the relevant characteristics according to Annex G of the UNE-EN 14411 standard. For more information, request technical sheets according to model.
Conditions of use, e.g. frequency of use, mechanical exposure	For more information, request technical sheets according to model.
Maintenance, e.g. required frequency, type and quality and replacement of replaceable components	For more information, request technical sheets according to model.

3.4. Allocation Criteria

In accordance with the standards and PCR, whenever possible, the principle of causality has been applied when assigning inputs and outputs in processes with multiple inputs and/or outputs. Therefore, an attempt has been made to establish the physical relationship between the inputs and outputs of the system and its different products. Where this has not been possible, the criterion of mass and volume has been used.

In general, in the assignments of inputs and outputs to the declared unit, production-weighted averages have been made, both in mass and m^2, as shown below.

- To assign to the declared unit the consumption of raw materials, water, thermal energy and electrical energy, as well as the generation of waste, and atmospheric emissions of the stage of preparation of raw materials for the support, a criterion of processed mass has been considered according to each type of ceramic tile.
- The consumption of thermal energy in the manufacturing stage of the ceramic pieces, as well as the atmospheric emissions in the combustion processes have been assigned to the declared unit considering a criterion of mass of the product classified according to each type of ceramic tile.

3.5. Cut-Off Criteria

In this cradle-to-grave LCA study, a cut-off criterion of 1% has been applied for the use of energy (renewable and non-renewable) and 1% of the total mass in those unit processes whose data are insufficient. In total, more than 95% of all inputs and outputs of matter and energy from the system have been included, excluding those data not available or not quantified.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of raw materials of a powdery nature.
- Air emissions of pollutants, unregulated, emitted from piped sources of the combustion stages (spray drying, drying of parts and cooking).
- The production of machinery and industrial equipment.

3.6. Representativeness, quality and selection of data

The primary data have been provided directly by the company Argenta located in Vilafamés and Vall d'Alba (Castellón). The secondary data have been used the most updated databases of GaBi ts [8] and modeled with the version of GaBi 10.6.0.110. [7]. All data belong to a geographical scenario of Spain 2021.

The results presented are representative of the ceramic coatings, expressed as a weighted average for the production of ceramic coatings belonging to the range to the BIa group, limiting this average by the products that present the minimum and maximum environmental impact.

3.7. Other calculation criteria and hypotheses

The assigned loads applied have been those necessary to quantify the specific data of the ceramic tile tiles, as well as the necessary calculations to be able to assign the data associated with the products that present a minimum and maximum environmental impact.

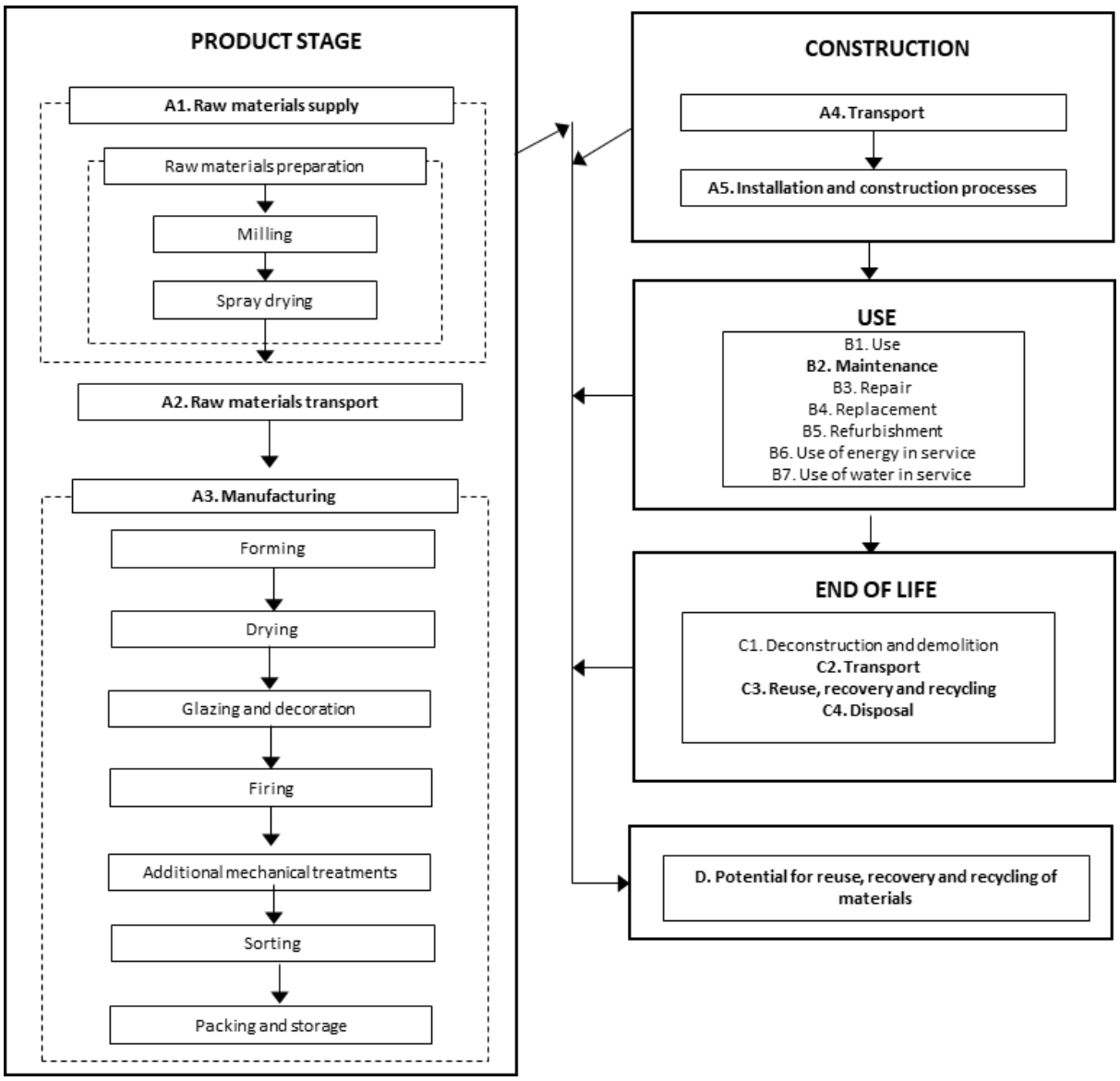
3.8. Deviations from impact outcomes

The 17 references of ceramic coatings have different environmental impacts. The following table shows the deviations that present the format of greater and lesser environmental impact with respect to the average, in relation to the product stage (A1-A3). Annex I and Annex II show the environmental impact results of the reference with minimum impact values and maximum values respectively.

Impact category	Deviation from the average scenario
GWP-total	-13%/+14%
AP	-7%/+8%
POCP	-5%/+6%

4. System boundaries, scenarios and additional technical information.

All life cycle modules relevant to ceramic coatings according to PCR have been included:



4.1. Pre-manufacturing processes (upstream)

Raw materials (A1) and Transport (A2)

The raw materials necessary for the manufacture of ceramic tiles are classified as: plastic raw materials and non-plastic or degreasing raw materials. Specifically, the raw materials included in the composition of the support are clays, feldspars and sands, as well as waste from the factory itself, which can be sludge or ceramic pieces generated before the firing stage, being introduced in the milling stage of the raw materials.

As for the raw materials of enamels, the most common used in the formulation are: quartz, kaolin, borax, alkali feldspars, nepheline, calcium carbonate, dolomite, zircon, wollastonite, calcined alumina and ceramic frits.

Ceramic frits are insoluble glasses, previously prepared by complete melting of their original raw materials, called "frits". It has been estimated on average that 41% of the raw materials used in the enamels applied on porcelain stoneware tiles are subjected to the "friting" process.

The raw materials used have different origins, according to their nature and properties. The raw materials from outside Spain are transported with freighter to the port of Castellón, and from there by truck to the atomized granule production plants. For sea transport, a type of transoceanic freighter has been chosen, whose distance traveled differs in each case depending on the origin, while for road transport a 27t cargo truck that complies with Euro 6 regulations has been chosen. All raw materials are transported in bulk, i.e. they do not require packaging material, except decorative materials that are transported in a 17.3 t payload truck directly from the frit and enamels factory to the Argenta plants.

The preparation of raw materials for the support of Argenta tiles is carried out in the plants of external suppliers. In this process, the proportion of raw materials is defined and the origin of these are adjusted to the characteristics of the production process and final benefits required.

The atomized granule is obtained by wet milling of the raw materials and subsequent spray drying. Argenta's suppliers have installed heat and electrical energy systems in the atomized dryers. All hot gases are used in the atomized dryer and the electrical energy generated is sold to the grid.

4.2. Manufacture of the product.

Manufacturing (A3)

This process and the following treatments applied are carried out in Argenta's plants. The procedure is as follows: the atomized granule is unloaded into storage hoppers and through a feeding system with conveyor belts with weighing control, the granule is directed to the forming stage by unidirectional dry pressing, carried out with hydraulic or oleodynamic presses. This method is the most suitable to control the pressing cycle and thus be able to obtain large format pieces.

The formed parts are introduced in a continuous dryer to reduce their humidity, thus doubling or tripling their mechanical resistance, which allows their subsequent processing.

The pieces just out of the dryer are coated with a thin or several layers of engobe and enamel and are applied on the support by using curtain and spraying techniques. In addition, in some cases, the product is decorated using different types of applications, the majority being inkjet. This treatment is carried out to give the surface of the cooked product a series of

technical and aesthetic properties, such as impermeability, ease of cleaning, gloss, color, surface texture, chemical and mechanical resistance.

Firing is the most important stage of the production process of ceramic tiles, since it is the moment in which the pieces, previously molded, undergo a fundamental modification in their properties, giving rise to a hard material, resistant to water and chemicals. The firing of the ceramic pieces is done by single firing in monostrata roller ovens.

After passing the quality control processes, the sorted parts are packed in a primary cardboard container and packed on wooden pallets, coated with LDPE film and strapping to prevent cargo movement.

4.3. Construction process

Product transport (A4)

The product is distributed 73% in Spain, 10% in Europe and 17% to the rest of the world.

For road transport, a 27 t truck classified Euro 6 (national and European transport, average distance of 300 km and 1,390 km, respectively) has been considered. For transcontinental transport, a medium transoceanic freighter has been estimated (transport to the rest of the world, 6,250 km), as indicated in UNE EN 17160.

Module A4 Transport to the construction site

Scenario information	Transport to the construction site
Parameter	Result (expressed per functional unit)
Type and fuel consumption of the vehicle	According to destinations in the distribution previously exposed: 0.1544l diesel (Euro 6 truck, 27 t) 00.0087 l fuel oil (freighter)
Distance	300 km National distribution: 73% 1390 km distribution rest Europe: 10% 6520 km distribution Rest of the world: 17%
Capacity utilization (including idle return)	85% in trucks 100% freighter
Bulk density of transported products	≈1800 kg/m^3
Useful capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packaged compressed or nested)	Not applicable

Product Installation and Construction Process (A5)

Once the product is unpacked, it is installed. According to the RCP for ceramic tiles it has been established that for the installation the application of mortar is required.

Glue mortars are cementitious adhesives formed by a mixture of hydraulic binders, mineral fillers and organic additives, which only have to be mixed with water or liquid addition just before use. They are formed by a mixture of white or gray cement, mineral fillers of siliceous nature and / or limestone and organic additives: water retainers, water-redispersible polymers, rheological modifiers, fibers, etc.

The waste derived from the packaging of the pieces is managed separately depending on the geographical location of the installation site. On the other hand, it has been considered as a hypothesis a 3% of losses in the stage of installation of the tiles.

Module A5 - Installation

Scenario information	Quantity per declared unit
Auxiliary materials for installation (specifying each material)	3.3 kg
Water use	0.8 l
Use of other resources	Not applicable
Quantitative description of the type of energy (regional mix) and consumption during the installation process	Not applicable
Waste of materials on site before waste treatment, generated by the installation of the product	Waste ceramic parts: 629g Packaging waste: Carton: 169 g Plastic: 35g Wood: 686 g
Output of materials as a result of waste treatment on the building plot, e.g. collection for recycling, energy recovery, disposal (specified by route)	Ceramic pieces to be recycled 440g Ceramic pieces to landfill: 189g Incinerated cardboard: 0g Recycled cardboard: 169g Cardboard deposited in landfill: 0 g Incinerated plastic: 2 g Recycled plastic: 27g Landfill plastic:5g Incinerated wood: 98g Recycled wood: 568g Landfill wood 20 g
Direct emissions to ambient air, soil and water	Not applicable

4.4. Use linked to the structure of the building

B1 Usage

Once installed, the tile does not require any energy input for its use nor do they need maintenance after its commissioning, except for normal cleaning operations. For this reason, only the environmental loads attributable to the maintenance of the product (module B2) are considered.

B2 Maintenance

Cleaning is done with a damp cloth and, if the surface has dirt or grease, cleaning agents such as detergents or bleaches can be added. In the present study, the consumption of water and disinfectant has been considered for a wall covering installed in a residential use scenario, that is, cleaning once a week with water and every two with detergent during the 50 years of useful life.

Module B2 – Maintenance

Scenario information	Quantity per declared unit
Maintenance process	According to RCP for ceramic tiles (UNE-EN17160) residential scenario for floor cleaning
Maintenance cycle	Wash 1 time a week with water and 1 every two with detergent
Auxiliary materials for maintenance (e.g. cleaning products) (specifying each material)	Detergent: 1,34E-04 kg/m^2
Material waste during maintenance (specifying type)	Not applicable
Net tap water consumption	0.1 l/m^2
Energy input during maintenance (e.g. suction cleaning), type of energy carrier (e.g. electricity) and quantity, if applicable and relevant	Not applicable

B3-B4-B5 Repair, Replacement and Rehabilitation

Ceramic tiles do not require repair, replacement or rehabilitation.

4.5. Use linked to the operation of the building

B6-B7 Use of energy and water for operation

These modules are not relevant for ceramic tiles.

4.6. End of life stage

C1 Deconstruction and demolition

Once its useful life has ended, the product will be removed, either as part of a rehabilitation of the building or during its demolition. In the context of the demolition of a building, the impacts attributable to the uninstallation of the product are negligible.

C2 Transport

To be managed, the waste of the product is transported by large tonnage truck (27 t) that complies with the Euro 6 standard, either by deposition in inert landfills, or recycled. An average distance of 50 km from the building site to the final destination is considered. The return trip of the trucks (100% empty return) is also included.

C3 Waste management for reuse, recovery and recycling

It has been considered that 70% of tiles are recycled and/or reused, as indicated in the CPR.

C4 Final elimination

It is considered that 30% of the product is sent to controlled landfill after the end of its useful life.

End of life

Parameter	Unit (expressed per functional unit)
Collection process, specified by type	24,3kg total
	17.0 kg for recycling
Delete, specified by type	7.3 kg product or material for final disposal
Scenarios for scenario development (e.g. transport)	The waste of the product is transported in a large tonnage truck (27 t) that complies with the Euro 6 standard to be managed, either by deposition in inert landfills, or recycled. An average distance of 50km from the building site to the final destination is considered. The return trip of the trucks (100% empty return) is also included.

4.7. Benefits and loads beyond the system

Module D

The environmental loads and benefits of obtaining secondary material from the waste generated at the installation stage (tile waste, tile packaging waste: cardboard, plastic and wood) and at the end of life of the product have been considered.

4.8. Information on biogenic carbon content

As indicated by the UNE EN 15804+A2 standard, the biogenic carbon content in the packaging can be omitted if the materials containing biogenic carbon in the packaging/product are less than 5% of the total mass of the product.

5. LCA and LCI Environmental Parameter Declaration.

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	**kg CO_2** eq.	8,91	3,1E-01	1,0	0	2,0E-01	0	0	0	0	0	0	8.6E-02	0	8.8E-02	-2,1E-01
GWP-fossil	**kg CO_2** eq.	9,0	3,1E-01	1,0	0	2,6E-01	0	0	0	0	0	0	8.7E-02	0	8.9E-02	-2,2E-01
GWP-biogenic	**kg CO_2** eq.	7.4E-02	-3.5E-04	1,4E-02	0	2,1E-03	0	0	0	0	0	0	-1,2E-04	0	9.3E-04	-3,1E-04
GWP-luluc	**kg CO_2** eq.	4,6E-03	1,6E-03	4,6E-04	0	9.8E-06	0	0	0	0	0	0	4.9E-04	0	3.8E-04	-4.5E-04
GWP-total	**kg CO_2** eq.	9,1	3,1E-01	1,1	0	2,6E-01	0	0	0	0	0	0	8.8E-02	0	9,1E-02	-2,2E-01
ODP	**kg CFC 11 eq.**	3.0E-08	1,9E-14	9.0E-10	0	9.3E-08	0	0	0	0	0	0	5,2E-15	0	5,1E-14	-5,2E-09
AP	**mole H^+** eq.	3,1E-02	1,4E-03	2,4E-03	0	2,2E-03	0	0	0	0	0	0	7.1E-05	0	6.5E-04	-7.8E-04
EP-freshwater	**kg P eq.**	8.5E-05	8.4E-07	3.7E-06	0	5.5E-06	0	0	0	0	0	0	2,6E-07	0	1,9E-06	-1.6E-06
EP-freshwater	**kg PO_4^{3-}** eq.	2,6E-04	2,6E-06	1,1E-05	0	1,7E-05	0	0	0	0	0	0	8.0E-07	0	5.7E-06	-4.9E-06
EP-marine	**kg N eq.**	1,0E-02	3.7E-04	8.0E-04	0	2.5E-04	0	0	0	0	0	0	2.0E-05	0	1,8E-04	-2,3E-04
EP-terrestrial	**mol N eq.**	1,1E-01	4,1E-03	8.7E-03	0	9.0E-03	0	0	0	0	0	0	2,4E-04	0	1,9E-03	-2.5E-03
POCP	**kg NMVOC eq.**	2,9E-02	1,1E-03	2,3E-03	0	1,6E-03	0	0	0	0	0	0	6.7E-05	0	5,2E-04	-6.4E-04
ADP-minerals&metals*	**kg Sb eq.**	4,7E-05	2.5E-08	1,4E-06	0	8.4E-09	0	0	0	0	0	0	7.3E-09	0	9,2E-09	-2.0E-08
ADP-fossil*	**MJ**	145,0	4,1	8,3	0	1,3	0	0	0	0	0	0	1,2	0	1,2	-3,5
WDP	**m^3**	2,5	2,6E-03	1,5E-01	0	14,4	0	0	0	0	0	0	7.8E-04	0	6.7E-03	1,5E-02

GWP - total: Global warming potential; **GWP -** fossil: Global warming potential of fossil fuels; **GWP - biogenic**: Biogenic global warming potential; **GWP - luluc** : Global warming potential of land use and land use change; **ODP**: Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater**: Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; **EP-marine**: Eutrophication potential, fraction of nutrients reaching the final seawater compartment; **EP-terrestrial**: Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources; **APD-fossil**: Abiotic resource depletion potential for fossil resources; **WDP**: Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Environmental impact parametersl

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	1,7E-05	2,1E-08	5.3E-07	0	1,5E-08	0	0	0	0	0	0	4.9E-10	0	7.9E-09	-4.6E-09
IRP [1]	**kBq U235 eq**	33,6	2,9	3,0	0	8.5E-01	0	0	0	0	0	0	8,1E-01	0	7,2E-01	-1,1
ETP-fw [2]	**CTUe**	3,3E-09	5.7E-11	1,9E-10	0	7.8E-11	0	0	0	0	0	0	1,6E-11	0	9.0E-11	-2.6E-12
HTP-c [2]	**CTUh**	9.0E-08	2,9E-09	1,3E-08	0	2,1E-08	0	0	0	0	0	0	8.4E-10	0	1.0E-08	-1,1E-09
HTP-nc [2]	**CTUh**	2,9E-01	7.4E-04	3,3E-02	0	1,8E-03	0	0	0	0	0	0	2,1E-04	0	1,6E-03	-1,1E-02
SQP [2]	**-**	130,0	1,3	10,0	0	238,0	0	0	0	0	0	0	4.0E-01	0	2,8E-01	-7.3E-01

PM: Potential incidence of diseases due to emissions of particulate matter (PM); **IRP** : Human potential exposure efficiency relative to U235; **ETP-fw** : Comparative potential of toxic unit for ecosystems - freshwater; **HTP-c** : Comparative potential of toxic unit for ecosystems - carcinogenic effects; **HTP-nc** : Comparative potential of toxic unit for ecosystems - non-carcinogenic effects; **SQP** : Soil quality potential index; **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	45,9	2,1E-01	2,5	0	4,9	0	0	0	0	0	0	6.6E-02	0	1,4E-01	-6,1
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	45,9	2,1E-01	2,5	0	4,9	0	0	0	0	0	0	6.6E-02	0	1,4E-01	-6,1
PENRE	**MJ**	146,0	4,13	8,3	0	1,3	0	0	0	0	0	0	1,2	0	1,2	-3,5
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	146,0	4,13	8,3	0	1,3	0	0	0	0	0	0	1,2	0	1,2	-3,5
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	4,4E-02	2,4E-04	3.0E-03	0	1,9E-01	0	0	0	0	0	0	7.5E-05	0	2,2E-04	-1.5E-03

PERE : Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as raw material; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of tap water resources; **NR:** Not relevant

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	2.0E-11	3,7E-05	0	2.0E-11	0	0	0	0	0	0	5.6E-12	0	1.86E-08	-2.8E-08
NHWD	**kg**	2,3	5.7E-04	0,3	0	5,2E-02	0	0	0	0	0	0	1,7E-04	0	5,5	-9.7E-04
RWD	**kg**	3.0E-03	5,1E-06	2,4E-04	0	1,6E-05	0	0	0	0	0	0	1,4E-06	0	1,6E-05	-5.6E-05

HWD: Hazardous waste disposed of; **NHWD**: Non-hazardous waste disposed of; **RWD**: Radioactive waste disposed of

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	**kg**	2,2E-02	0	3,3E-01	0	0	0	0	0	0	0	0	0	12,7	0	0
MER	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EE:** Energy exported

6. Additional Environmental Information

Indoor air emissions

Ceramic tiles, in their manufacturing process, undergo a thermal process that exceeds 1000 ºC. At these temperatures, any organic compound present in the compositions decomposes, resulting in an inert end product free of volatile organic compounds that may be emitted in its use phase.

Release to soil and water

Ceramic tiles do not emit any compound to the floor or water in its stage of use, since it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble or combustible, does not react physically or chemically or in any other way, is not biodegradable, does not adversely affect other materials with which it comes into contact in a way that may lead to contamination of the environment. environment or harm human health. It is a product that does not leach so it does not pose a risk to the quality of surface or groundwater.

Annex I. Declaration of environmental parameters for the MINIMUM environmental impact format

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	**kg CO_2** eq.	7,9	0,3	0,9	0	1,7E-01	0	0	0	0	0	0	7.3E-02	0	7.5E-02	-1.8E-01
GWP-fossil	**kg CO_2** eq.	8,0	0,3	0,9	0	2,2E-01	0	0	0	0	0	0	7.5E-02	0	7.6E-02	-1.9E-01
GWP-biogenic	**kg CO_2** eq.	6.6E-02	-3.0E-04	1,2E-02	0	1,8E-03	0	0	0	0	0	0	-1.0E-04	0	8.0E-04	-2.7E-04
GWP-luluc	**kg CO_2** eq.	4.0E-03	1,3E-03	4.0E-04	0	8.3E-06	0	0	0	0	0	0	4,1E-04	0	3,3E-04	-3.8E-04
GWP-total	**kg CO_2** eq.	8,1	2,7E-01	9,1E-01	0	2,2E-01	0	0	0	0	0	0	7.5E-02	0	7.8E-02	-1.9E-01
ODP	**kg CFC 11 eq.**	2.7E-08	1,6E-14	8.2E-10	0	7.9E-08	0	0	0	0	0	0	4.5E-15	0	4,3E-14	-4,4E-09
AP	**mole H^+** eq.	2,9E-02	1,2E-03	2,1E-03	0	1,9E-03	0	0	0	0	0	0	6.0E-05	0	5.6E-04	-6.7E-04
EP-freshwater	**kg P eq.**	7.7E-05	7.2E-07	3,3E-06	0	4,7E-06	0	0	0	0	0	0	2,2E-07	0	1,6E-06	-1,4E-06
EP-freshwater	**kg PO_4^{3-}** eq.	2,4E-04	2,2E-06	1,0E-05	0	1,5E-05	0	0	0	0	0	0	6.8E-07	0	4.9E-06	-4.2E-06
EP-marine	**kg N eq.**	9.9E-03	3,2E-04	7,1E-04	0	2,1E-04	0	0	0	0	0	0	1,7E-05	0	1,5E-04	-2.0E-04
EP-terrestrial	**mol N eq.**	1,1E-01	3.5E-03	7.8E-03	0	7.7E-03	0	0	0	0	0	0	2,1E-04	0	1,6E-03	-2,1E-03
POCP	**kg NMVOC eq.**	2.7E-02	9,2E-04	2,0E-03	0	1,4E-03	0	0	0	0	0	0	5.7E-05	0	4.5E-04	-5.5E-04
ADP-minerals&metals*	**kg Sb eq.**	4,8E-05	2,1E-08	1,5E-06	0	7.2E-09	0	0	0	0	0	0	6,2E-09	0	7.9E-09	-1.7E-08
ADP-fossil*	**MJ**	130,0	3,5	7,1	0	1,1	0	0	0	0	0	0	1,0	0	1,0	-3,0
WDP	**m^3**	2,6	2,2E-03	1,4E-01	0	12,3	0	0	0	0	0	0	6.7E-04	0	5.8E-03	1,2E-02

GWP - total: Global warming potential; **GWP - fossil:** Global warming potential of fossil fuels; **GWP - biogenic**: Biogenic global warming potential; **GWP - luluc** : Global warming potential of land use and land use change; **ODP**: Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater**: Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; **EP-marine**: Eutrophication potential, fraction of nutrients reaching the final seawater compartment; **EP-terrestrial**: Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources; **APD-fossil**: Abiotic resource depletion potential for fossil resources; **WDP**: Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	1,4E-05	1,8E-08	4.5E-07	0	1,3E-08	0	0	0	0	0	0	4,2E-10	0	6,8E-09	-3.9E-09
IRP [1]	**kBq U235 eq**	30,7	2,5	2,6	0	7,2E-01	0	0	0	0	0	0	6.9E-01	0	6,2E-01	-9.2E-01
ETP-fw [2]	**CTUe**	3.0E-09	4,9E-11	1,7E-10	0	6,6E-11	0	0	0	0	0	0	1,4E-11	0	7.7E-11	-2,2E-12
HTP-c [2]	**CTUh**	8.4E-08	2.5E-09	1,1E-08	0	1,8E-08	0	0	0	0	0	0	7,2E-10	0	8.6E-09	-9.7E-10
HTP-nc [2]	**CTUh**	2,8E-01	6.3E-04	2,9E-02	0	1,5E-03	0	0	0	0	0	0	1,8E-04	0	1,3E-03	-9.2E-03
SQP [2]	**-**	120,0	1,1	8,7	0	204,0	0	0	0	0	0	0	3,4E-01	0	2,4E-01	-6.3E-01

PM: Potential incidence of diseases due to emissions of particulate matter (PM); **IRP** : Human potential exposure efficiency relative to U235; **ETP-fw** : Comparative potential of toxic unit for ecosystems - freshwater; **HTP-c** : Comparative potential of toxic unit for ecosystems - carcinogenic effects; **HTP-nc** : Comparative potential of toxic unit for ecosystems - non-carcinogenic effects; **SQP** : Soil quality potential index; **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	44,4	1,8E-01	2,2	0	4,2	0	0	0	0	0	0	5.7E-02	0	1,2E-01	-5,2
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	44,4	1,8E-01	2,2	0	4,2	0	0	0	0	0	0	5.7E-02	0	1,2E-01	-5,2
PENRE	**MJ**	130,0	3,53	7,1	0	1,1	0	0	0	0	0	0	1,0	0	1,0	-3,0
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	130,0	3,53	7,1	0	1,1	0	0	0	0	0	0	1,0	0	1,0	-3,0
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	4,4E-02	2,1E-04	2.7E-03	0	1,6E-01	0	0	0	0	0	0	6.4E-05	0	1,9E-04	-1,3E-03

PERE : Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as raw material; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of tap water resources; **NR:** Not relevant

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	1,7E-11	3,7E-05	0	1.75E-11	0	0	0	0	0	0	4.8E-12	0	1.59E-08	-2,4E-08
NHWD	**kg**	2,0	4.9E-04	2,6E-01	0	4,48E-02	0	0	0	0	0	0	1,4E-04	0	4,67	-8.3E-04
RWD	**kg**	3,1E-03	4,3E-06	2,1E-04	0	1,38E-05	0	0	0	0	0	0	1,2E-06	0	1,4E-05	-4.8E-05

HWD: Hazardous waste disposed; **NHWD**: Non-hazardous waste disposed; **RWD**: Radioactive waste disposed of

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	**kg**	1,9E-02	0	2,8E-01	0	0	0	0	0	0	0	0	0	10,9	1,9E-02	0
MER	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EE:** Energy exported

Annex II. Declaration of environmental parameters for the MAXIMUM environmental impact format

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	**kg CO_2** eq.	10,4	0,354	1,2	0	2,3E-01	0	0	0	0	0	0	9.9E-02	0	1,0E-01	-2.5E-01
GWP-fossil	**kg CO_2** eq.	10,6	0,36	1,2	0	3.0E-01	0	0	0	0	0	0	1,0E-01	0	1,0E-01	-2.5E-01
GWP-biogenic	**kg CO_2** eq.	8.4E-02	-4.0E-04	1,6E-02	0	2,4E-03	0	0	0	0	0	0	-1.4E-04	0	1,1E-03	-3.6E-04
GWP-luluc	**kg CO_2** eq.	5,3E-03	1,8E-03	5.3E-04	0	1,1E-05	0	0	0	0	0	0	5.6E-04	0	4,4E-04	-5,1E-04
GWP-total	**kg CO_2** eq.	10,7	3,6E-01	1,21583	0	3.0E-01	0	0	0	0	0	0	1,0E-01	0	1,0E-01	-2.5E-01
ODP	**kg CFC 11 eq.**	3.4E-08	2,1E-14	1,0E-09	0	1,1E-07	0	0	0	0	0	0	6.0E-15	0	5.8E-14	-5.9E-09
AP	**mole H^+** eq.	3,4E-02	1,6E-03	2.7E-03	0	2.5E-03	0	0	0	0	0	0	8.1E-05	0	7.5E-04	-9.0E-04
EP-freshwater	**kg P eq.**	9.6E-05	9.7E-07	4,2E-06	0	6.4E-06	0	0	0	0	0	0	3.0E-07	0	2,2E-06	-1,9E-06
EP-freshwater	**kg PO_4^{3-}** eq.	2.9E-04	3.0E-06	1,3E-05	0	2.0E-05	0	0	0	0	0	0	9.2E-07	0	6,6E-06	-5.7E-06
EP-marine	**kg N eq.**	1,1E-02	4,3E-04	8.9E-04	0	2,8E-04	0	0	0	0	0	0	2,2E-05	0	2,1E-04	-2.6E-04
EP-terrestrial	**mol N eq.**	1,2E-01	4,8E-03	9.7E-03	0	1,0E-02	0	0	0	0	0	0	2,8E-04	0	2,2E-03	-2.9E-03
POCP	**kg NMVOC eq.**	3,1E-02	1,2E-03	2.5E-03	0	1,9E-03	0	0	0	0	0	0	7.7E-05	0	6.0E-04	-7.3E-04
ADP-minerals&metals*	**kg Sb eq.**	4.9E-05	2,8E-08	1,5E-06	0	9.7E-09	0	0	0	0	0	0	8.4E-09	0	1,1E-08	-2.3E-08
ADP-fossil*	**MJ**	170,0	4,8	9,5	0	1,5	0	0	0	0	0	0	1,3	0	1,4	-4,0
WDP	**m^3**	2,9	3.0E-03	1,7E-01	0	16,6	0	0	0	0	0	0	9.0E-04	0	7.8E-03	1,7E-02

GWP - total: Global warming potential; **GWP -** fossil: Global warming potential of fossil fuels; **GWP - biogenic**: Biogenic global warming potential; **GWP - luluc** : Global warming potential of land use and land use change; **ODP**: Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater**: Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; **EP-marine**: Eutrophication potential, fraction of nutrients reaching the final seawater compartment; **EP-terrestrial**: Eutrophication potential, accumulated surplus; **POCP:** Ozone Formation Potential tropospheric; **ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources; **APD-fossil**: Abiotic resource depletion potential for fossil resources; **WDP**: Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM [1]	**Incidence of diseases**	1.94E-05	2.5E-08	6,1E-07	0	1,7E-08	0	0	0	0	0	0	5.6E-10	0	9.1E-09	-5.3E-09
IRP [1]	**kBq U235 eq**	3,82E01	3,3	3,4	0	1,0	0	0	0	0	0	0	9.3E-01	0	8,3E-01	-1,2E+00
ETP-fw [2]	**CTUe**	3.72E-09	6,6E-11	2,2E-10	0	8.9E-11	0	0	0	0	0	0	1,9E-11	0	1,0E-10	-3.0E-12
HTP-c [2]	**CTUh**	1.02E-07	3,4E-09	1,5E-08	0	2,4E-08	0	0	0	0	0	0	9.7E-10	0	1,2E-08	-1,3E-09
HTP-nc [2]	**CTUh**	3,38E-01	8.5E-04	3,7E-02	0	2,1E-03	0	0	0	0	0	0	2,4E-04	0	1,8E-03	-1,2E-02
SQP [2]	**-**	1,47E02	1,5	11,4	0	274,0	0	0	0	0	0	0	4,6E-01	0	3,2E-01	-8.4E-01

PM: Potential incidence of diseases due to emissions of particulate matter (PM); **IRP** : Human potential exposure efficiency relative to U235; **ETP-fw** : Comparative potential of toxic unit for ecosystems - freshwater; **HTP-c** : Comparative potential of toxic unit for ecosystems - carcinogenic effects; **HTP-nc** : Comparative potential of toxic unit for ecosystems - non-carcinogenic effects; **SQP** : Soil quality potential index; **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	53,1	2.5E-01	2,8	0	5,6	0	0	0	0	0	0	7.6E-02	0	1,6E-01	-7,0
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	53,1	2.5E-01	2,8	0	5,6	0	0	0	0	0	0	7.6E-02	0	1,6E-01	-7,0
PENRE	**MJ**	170,0	4,8	9,5	0	1,5	0	0	0	0	0	0	1,3	0	1,4	-4,0
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	171,0	4,8	9,5	0	1,5	0	0	0	0	0	0	1,3	0	1,4	-4,0
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	0,05	2,8E-04	3,4E-03	0	2,1E-01	0	0	0	0	0	0	8.6E-05	0	2,6E-04	-1,8E-03

PERE : Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as raw material; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of tap water resources; **NR:** Not relevant

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	2,3E-11	3,7E-05	0	2,4E-11	0	0	0	0	0	0	6,4E-12	0	2,2E-08	-3,2E-08
NHWD	**kg**	2,7	6.6E-04	3.5E-01	0	6.0E-02	0	0	0	0	0	0	1,9E-04	0	6,3	-1,1E-03
RWD	**kg**	3,3E-03	5.8E-06	2,7E-04	0	1,9E-05	0	0	0	0	0	0	1,7E-06	0	1,9E-05	-6.5E-05

HWD: Hazardous waste disposed **NHWD**: Non-hazardous waste disposed; **RWD**: Radioactive waste disposed

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	**kg**	2,6E-02	0	3.8E-01	0	0	0	0	0	0	0	0	0	14,7	0	0
MER	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EE:** Energy exported

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Contenido

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A VERIFIED **ENVIRONMENTAL** DECLARATION

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Environmental Product Declaration

UNE-EN ISO 14025: 2010
UNE-EN 15804: 2012+A2:2020
UNE-EN 17160 :2019

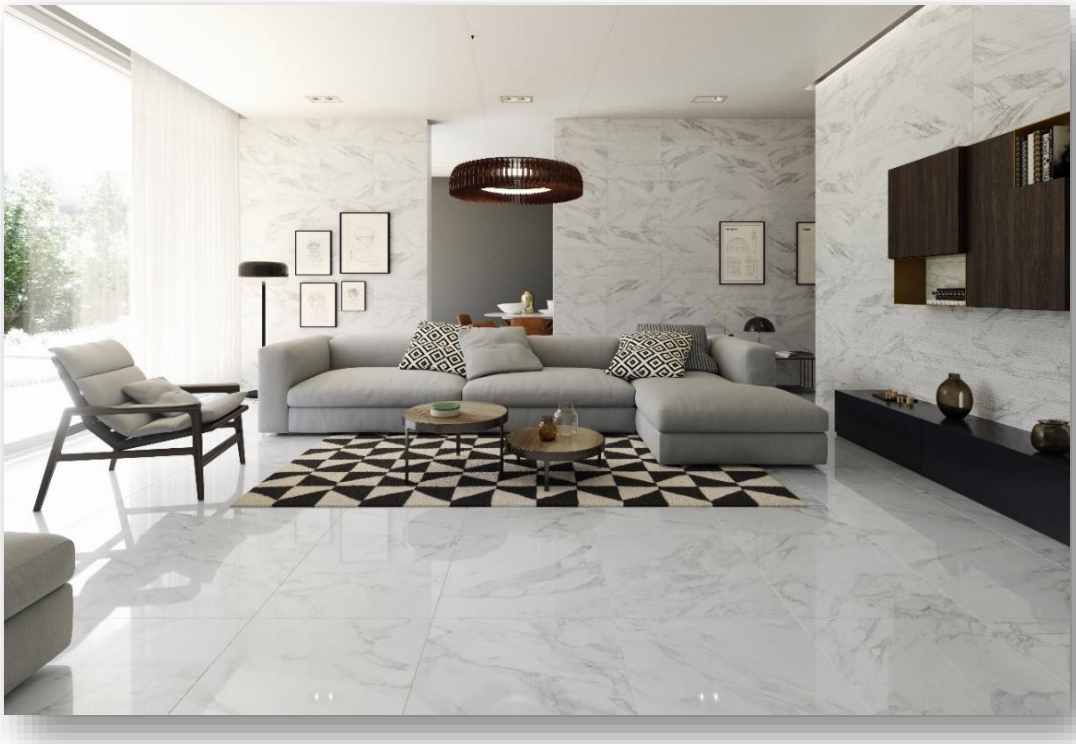
ARGENTA CERÁMICA S.L.
Glazed stoneware (BIb)

Date of first issue:	2023-0 2-02
Expiration date:	2028-0 2-01

The declared validity is subject to registration and publication in www.aenor.com

GlobalEPD registration code EN17160 - 006

ARGENTA



The holder of this Declaration is responsible for its contents and for keeping the records and the documentation that supports data and statements included during the validity period.

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AENOR is a founding member of ECO Platform, the European Association of Environmental Product Declaration Verification Programs

Standard UNE-EN 17160: 2019 The European Standard EN 15804:2012+A2:2020 serves as the basis for CPR
Independent verification of the declaration and data in accordance with EN ISO 14025:2010 ☐ Internal ☒ External
Verification body

1. General Information

1.1. The organization

Argenta Cerámica has gradually developed its own identity, positioning itself worldwide in one of the priority places of the current ceramic scenario.

It all started in 1999 as a business adventure, young, dynamic and eager to develop a ceramic concept different from the current one and close to people. With the concept #Friendlytile a long-term project was born, where we want to share ideas and be closer to you. Talk about ceramics working from people and towards people, at a time when brand values are humanized to give way to a more direct, alive and real communication.

1.2. Scope of the Declaration

This Environmental Product Declaration includes environmental information of a grouping of products manufactured in the Argenta plants (F1 and F4) in a geographical and technological environment of Spain 2021.

The results shown present the environmental behavior of the average glazed stoneware, weighted by production, as well as the environmental data of the tiles that present a minimum and maximum impact, thus limiting the results obtained in the LCA. The scope of this Environmental Product Declaration (hereinafter DAP) is cradle to grave.

1.3. Lifecycle and compliance.

This EPD has been developed and verified in accordance with the UNE-EN ISO 14025:2010, 15804:2012+A2:2020 and UNE-EN 17160:2019 (Product category rules for ceramic tiles).

PRODUCT CATEGORY RULE INFORMATION	
Descriptive title	UNE EN 1760:2019. Product Category Rules for Ceramic Tiles
Registration code and version	UNE EN 1760:2019
Date of issue	2019
Conformity	UNE-EN 15804:2012 + A2:2020
Program Administrator	AENOR

This Environmental Declaration includes the following stages of the life cycle:

System limits. Information modules considered.

Product stage	A1	Supply of raw materials	X
	A2	Factory transport	X
	A3	Manufacturing	X
Construction	A4	Transport to construction site	X
	A5	Installation/construction	X
Stage d use	B1	Use	X
	B2	Maintenance	X
	B3	Reparation	X
	B4	Replacement	X
	B5	Rehabilitation	X
	B6	In-service energy use	X
	B7	Use of water in service	X
End of life	C1	Deconstruction/demolition	X
	C2	Transport	X
	C3	Waste treatment	X
	C4	Elimination	X
	D	Potential for reuse, recovery and/or recycling	X

X = Module included in the LCA; NR = Module no relevant; MNE = Module not evaluated

This DAP may not be comparable with those developed in other Programs or according to different reference documents, particularly it may not be comparable with DAP not developed in accordance with the UNE-EN 15804+A2 Standard.

Similarly, DAPs may not be comparable if the data source is different (e.g. databases), not all relevant information modules are included, or are not based on the same scenarios.

The comparison of construction products must be made on the same function, applying the same functional unit and at the level of the building (or architectural or engineering work), that is, including the behavior of the product throughout its life cycle, as well as the specifications of section 6.7.2 of the UNE-EN ISO 14025 Standard.

2. The product

2.1. Product identification

The ceramic tiles included in this study belong to the BIb group (glazed stoneware), classification based on the UNE-EN 14411: 2016 standard (equivalent to ISO 13006: 2018), i.e. they have a water absorption between 0.5% and 3% and their forming is by pressing. Its common name is Glazed stoneware.

The glazed stoneware tiles included in this study include 7 commercial formats, with enamel, with and without mechanical treatment, of thicknesses between 9mm to 10.5 mm, with an average weight of 20.5 kg / m^2.

In the annexes, you can find the results of the formats included in the scope of this EPD that present the minimum and maximum environmental impact, corresponding to the formats: 30x60 SL of 18.6 kg / m 2 and 90x90 RC of 23.7kg / m^2 weight in cooked respectively.

The CPC code of the product is 37370.

2.2. Product features

The manufacturer declares the following information on the technical specifications of the product:

Product features

Essential features	Benefits	Harmonized specification
Reaction to fire1	Class A1/A1FL	EN 14411
Breaking force	>1100 N	
Touch properties	PND	
Slide	PND	
Adhesion with cementitious adhesives type C2	>1N/mm^2	
Emission of hazardous substances	PND	
Durability- indoor uses- outdoor uses: frost resistance	Meets	

2.3. Product composition

The composition declared by the manufacturer is as follows:

Product composition

Composition	Content
Support (clays, feldspars, sands, etc.)	95%
Decoration materials (feldspars, carbonates, zirconium, etc.)	5%

The substances contained in the product listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" do not exceed 0.1% by weight of the product.

3. LCA information

3.1. Life cycle assessment

The LCA has been performed with the support of GaBi software 10.6.0.110 [7] and with database version 2021.2. (SP40.0) [8]) (SpheraSolutions). The characterization factors used are those included in the UNE EN 15804:2012+A2:2020 standard.

3.2. Declared unit

The Declared Unit considered is ***"Cover 1m^2*** of a ***surface (interior floors) of a house with ceramic tiles of group BIb for 50 years".***

3.3. Reference Service Life (RSL)

The reference service life of the product is the same as that of the building where it is installed, provided that it is installed correctly, since it is a long-lasting product that does not require replacement. It has been considered a useful life of 50 years.

Reference shelf life

Parameter	Unit (expressed per functional unit)
Reference service life	Minimum 50 years
Declared properties of the product (at the door), finishes, etc.	Minimum values of the relevant characteristics according to Annex H of the UNE-EN 14411 standard. For more information request technical sheets according to model.
Application design parameters (manufacturer's instructions), including references to good practices	For more information request technical sheets according to model.
Estimation of the quality of work, when installed according to the manufacturer's instructions	For more information request technical sheets according to model.
Outdoor environment (for outdoor applications), e.g. weathering, pollutants, UV radiation and wind exposure, building orientation, shading or temperature	Results of the values of the relevant characteristics according to Annex H of the UNE-EN 14411 standard. For more information, request technical sheets according to model.
Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure	Results of the values of the relevant characteristics according to Annex H of the UNE-EN 14411 standard. For more information, request technical sheets according to model.
Conditions of use, e.g. frequency of use, mechanical exposure	For more information, request technical sheets according to model.
Maintenance, e.g. required frequency, type and quality and replacement of replaceable components	For more information, request technical sheets according to model.

3.4. Assignment rule.

In accordance with the standards and PCR, whenever possible, the principle of causality has been applied when assigning inputs and outputs in processes with multiple inputs and/or outputs. Therefore, an attempt has been made to establish the physical relationship between the inputs and outputs of the system and its different products. Where this has not been possible, the criterion of mass and volume has been used.

In general, in the assignments of inputs and outputs to the declared unit, production-weighted averages have been made, both in mass and m^2, as shown below.

- To assign to the declared unit the consumption of raw materials, water, thermal energy and electrical energy, as well as the generation of waste, and atmospheric emissions of the stage of preparation of raw materials for the support, a criterion of processed mass has been considered according to each type of ceramic tile.
- The consumption of thermal energy in the manufacturing stage of the ceramic pieces, as well as the atmospheric emissions in the combustion processes have been assigned to the declared unit considering a criterion of mass of the product classified according to each type of ceramic tile.

3.5. Cutting rule.

In this cradle-to-grave LCA study, a cut-off criterion of 1% has been applied for the use of energy (renewable and non-renewable) and 1% of the total mass in those unit processes whose data are insufficient. In total, more than 95% of all inputs and outputs of matter and energy from the system have been included, excluding those data not available or not quantified.

The excluded data are the following:

- Diffuse emissions of particles into the atmosphere generated during the transport and storage of raw materials of a powdery nature.
- Air emissions of pollutants, unregulated, emitted from piped sources of the combustion stages (spray drying, drying of parts and cooking).
- The production of machinery and industrial equipment.

3.6. Representativeness, quality and selection of data

The primary data have been provided directly by the company Argenta located in Vilafamés and Vall d'Alba (Castellón). The secondary data have been used the most updated databases of GaBi ts [8] and modeled with the version of GaBi 10.6.0.110. [7]. All data belong to a geographical scenario of Spain 2021.

The results presented are representative of the ceramic coatings, expressed as a weighted average by the production of ceramic coatings belonging to the range to the BIb group, limiting this average by the products that present the minimum and maximum environmental impact.

3.7. Other calculation rules and hypotheses

The assigned loads applied have been those necessary to quantify the specific data of the ceramic tile tiles, as well as the necessary calculations to be able to assign the data associated with the products that present a minimum and maximum environmental impact.

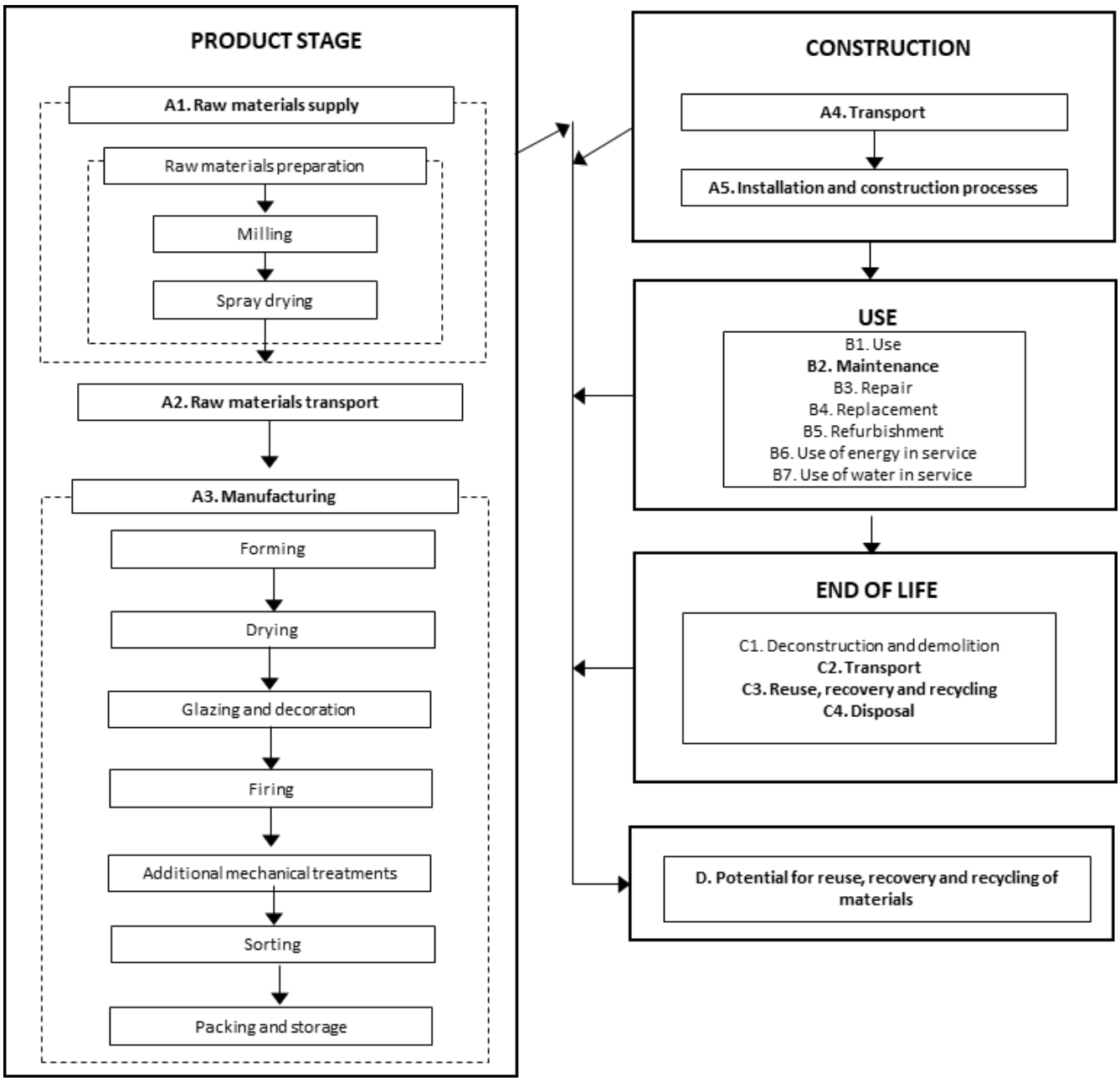
3.8. Deviations from impact outcomes

The 7 references of ceramic coatings have different environmental impacts. The following table shows the deviations that present the format of greater and lesser environmental impact with respect to the average, in relation to the product stage (A1-A3). Annex I and Annex II show the environmental impact results of the reference with minimum impact values and maximum values respectively.

Impact category	Deviation from the average scenario
GWP-total	-11%/+20%
AP	-6%/+12%
POCP	-4%/+9%

4. System boundaries, scenarios, and additional technical information.

All life cycle modules relevant to ceramic coatings according to PCR have been included:



4.1. Pre-manufacturing processes (upstream)

Raw materials (A1) and Transport (A2)

The raw materials necessary for the manufacture of ceramic tiles are classified as: plastic raw materials and non-plastic or degreasing raw materials. Specifically, the raw materials included in the

Composition of the support are clays, feldspars and sands, as well as waste from the factory itself, which can be sludge or ceramic pieces generated before the firing stage, entering the milling stage of raw materials.

As for the raw materials of enamels, the most common used in the formulation are: quartz, kaolin, borax, alkali feldspars, nepheline, calcium carbonate, dolomite, zircon, wollastonite, calcined alumina and ceramic frits.

Ceramic frits are insoluble glasses, previously prepared by complete melting of their original raw materials, called "frits". It has been estimated on average that 22% of the raw materials used in the enamels applied on glazed stoneware tiles are subjected to the "friting" process.

The raw materials used have different origins, according to their nature and properties. The raw materials from outside Spain are transported with freighter to the port of Castellón, and from there by truck to the atomized granule production plants. For sea transport, a type of transoceanic freighter has been chosen, whose distance traveled differs in each case depending on the origin, while for road transport a 27t cargo truck that complies with Euro 6 regulations has been chosen. All raw materials are transported in bulk, i.e. they do not require packaging material, except decorative materials that are transported in a 17.3 t payload truck directly from the frit and enamels factory to the Argenta plants.

The preparation of raw materials for the support of Argenta tiles is carried out in the plants of external suppliers. In this process, the proportion of raw materials is defined and the origin of these are adjusted to the characteristics of the production process and final benefits required.

The atomized granule is obtained by wet milling of the raw materials and subsequent atomized drying. Argenta's suppliers have installed heat and electrical energy systems in the spray dryers. All hot gases are used in the atomized dryer and the electrical energy generated is sold to the grid.

4.2. Manufacture of the product.

Manufacturing (A3)

This process and the following treatments applied are carried out in Argenta's plants. The procedure is as follows: the atomized granule is unloaded into storage hoppers and through a feeding system with conveyor belts with weighing control, the granule is directed to the forming stage by unidirectional dry pressing, carried out with hydraulic or oleodynamic presses. This method is the most suitable to control the pressing cycle and thus be able to obtain large format pieces.

The formed parts are introduced in a continuous dryer to reduce their humidity, thus doubling or tripling their mechanical resistance, which allows their subsequent processing.

The pieces just out of the dryer are coated with a thin or several layers of engobe and enamel and are applied on the support by using curtain and spraying techniques. In addition, in some cases, the product is decorated using different types of applications, the majority being inkjet. This treatment is carried out to give the surface of the cooked product a series of technical and aesthetic properties, such as impermeability, ease of cleaning, gloss, color, surface texture, chemical and mechanical resistance.

Firing is the most important stage of the production process of ceramic tiles, since it is the moment in which the pieces, previously molded, undergo a fundamental modification in their properties, giving rise to a hard material, resistant to water and chemicals. The firing of the ceramic pieces is done by single firing in monostrata roller ovens.

After passing the quality control processes, the sorted parts are packed in a primary cardboard container and packed on wooden pallets, coated with LDPE film and strapping to prevent cargo movement.

4.3. Construction process

Product transport (A4)

The product is distributed 73% in Spain, 10% in Europe and 17% to the rest of the world.

For road transport, a 27-t truck classified Euro 6 (national and European transport, average distance of 300 km and 1,390 km, respectively) has been considered. For transcontinental transport, a medium transoceanic freighter has been estimated (transport to the rest of the world, 6,250 km), as indicated in UNE EN 17160.

Module A4 Transport to the construction site

Scenario information	Transport to the construction site
Parameter	Result (expressed per functional unit)
Type and fuel consumption of the vehicle	According to destinations in the distribution previously exposed: 0,1840 l diesel (Euro 6 truck, 27 t) 0.0104 l fuel oil (freighter)
Distance	300 km National distribution: 73% 1390 km distribution rest Europe: 10% 6520 km distribution Rest of the world: 17%
Capacity utilization (including idle return)	85% in trucks 100% freighter
Bulk density of transported products	≈1800 kg/m^3
Useful capacity factor (factor: = 1 or < 1 or ≥ 1 for products that are packaged compressed or nested)	Not applicable

Product Installation and Construction Process (A5)

Once the product is unpacked, it is installed. According to the RCP for ceramic tiles it has been established that for the installation the application of mortar is required.

Glue mortars are cementitious adhesives formed by a mixture of hydraulic binders, mineral fillers and organic additives, which only have to be mixed with water or liquid addition just before use. They are formed by a mixture of white or gray cement, mineral fillers of siliceous nature and / or limestone and organic additives: water retainers, water-redispersible polymers, rheological modifiers, fibers, etc.

The waste derived from the packaging of the pieces is managed separately depending on the geographical location of the installation site. On the other hand, it has been considered as a hypothesis a 3% of losses in the stage of installation of the tiles.

A5 - Installation

Scenario information	Quantity per declared unit
Auxiliary materials for installation (specifying each material)	3.3 kg
Water use	0.8 l
Use of other resources	Not applicable
Quantitative description of the type of energy (regional mix) and consumption during the installation process	Not applicable
Waste of materials on site before waste treatment, generated by the installation of the product	Waste ceramic parts: 629g Packaging waste: Carton: 169 g Plastic: 35g Wood: 686 g
Output of materials as a result of waste treatment on the building plot, e.g. collection for recycling, energy recovery, disposal (specified by route)	Ceramic pieces to be recycled 440g Ceramic pieces to landfill: 189g Incinerated cardboard: 0g Recycled cardboard: 169g Cardboard deposited in landfill: 0 g Incinerated plastic: 2 g Recycled plastic: 27g Landfill plastic:5g Incinerated wood: 98g Recycled wood: 568g Landfill wood 20 g
Direct emissions to ambient air, soil and water	Not applicable

4.4. Use linked to the structure of the building.

B1 Usage

Once installed, the tile does not require any energy input for its use nor do they need maintenance after its commissioning, except for normal cleaning operations. For this reason, only the environmental loads attributable to the maintenance of the product (module B2) are considered.

B2 Maintenance

Cleaning is done with a damp cloth and, if the surface has dirt or grease, cleaning agents such as detergents or bleaches can be added. In the present study, the consumption of water and disinfectant has been considered for a wall covering installed in a residential use scenario, that is, cleaning once a week with water and every two with detergent during the 50 years of useful life.

Module B2 – Maintenance

Scenario information	Quantity per declared unit
Maintenance process	According to RCP for ceramic tiles (UNE-EN17160) residential scenario for floor cleaning
Maintenance cycle	Wash 1 time a week with water and 1 every two with detergent
Auxiliary materials for maintenance (e.g. cleaning products) (specifying each material)	Detergent: 1,34E-04 kg/m^2
Material waste during maintenance (specifying type)	Not applicable
Net tap water consumption	0.1 l/m^2
Energy input during maintenance (e.g. suction cleaning), type of energy carrier (e.g. electricity) and quantity, if applicable and relevant	Not applicable

B3-B4-B5 Repair, Replacement and Rehabilitation

Ceramic tiles do not require repair, replacement or rehabilitation.

4.5. Use linked to the operation of the building.

B6-B7 Use of energy and water for operation

These modules are not relevant for ceramic tiles.

4.6. End of life stage

C1 Deconstruction and demolition

Once its useful life has ended, the product will be removed, either as part of a rehabilitation of the building or during its demolition. In the context of the demolition of a building, the impacts attributable to the uninstallation of the product are negligible.

C2 Transport

To be managed, the waste of the product is transported by large tonnage truck (27 t) that complies with the Euro 6 standard, either by deposition in inert landfills, or recycled. An average distance of 50 km from the building site to the final destination is considered. The return trip of the trucks (100% empty return) is also included.

C3 Waste management for reuse, recovery and recycling

It has been considered that 70% of tiles are recycled and/or reused, as indicated in the CPR.

C4 Final elimination

It is considered that 30% of the product is sent to controlled landfill after the end of its useful life.

End of life

Parameter	Unit (expressed per functional unit)
Collection process, specified by type	23,8kg total
	16.7 kg for recycling
Delete, specified by type	7.1 kg product or material for final disposal
Scenarios for scenario development (e.g. transport)	The waste of the product is transported in a large tonnage truck (27 t) that complies with the Euro 6 standard to be managed, either by deposition in inert landfills, or recycled. An average distance of 50km from the building site to the final destination is considered. The return trip of the trucks (100% empty return) is also included.

4.7. Benefits and loads beyond the system

Module D

The environmental loads and benefits of obtaining secondary material from the waste generated at the installation stage (tile waste, tile packaging waste: cardboard, plastic and wood) and at the end of life of the product have been considered.

4.8. Information on biogenic carbon content

As indicated by the UNE EN 15804+A2 standard, the biogenic carbon content in the packaging can be omitted if the materials containing biogenic carbon in the packaging/product are less than 5% of the total mass of the product.

5. LCA and LCI Environmental Parameter Declaration

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	**kg CO_2** eq.	8,9	3,1E-01	1,0	0	2,0E-01	0	0	0	0	0	0	8.6E-02	0	8.8E-02	-2,1E-01
GWP-fossil	**kg CO_2** eq.	9,01	3,1E-01	1,0	0	2,6E-01	0	0	0	0	0	0	8.7E-02	0	8.9E-02	-2,2E-01
GWP-biogenic	**kg CO_2** eq.	8.8E-02	-3.5E-04	1,4E-02	0	2,1E-03	0	0	0	0	0	0	-1,2E-04	0	9.3E-04	-3.2E-04
GWP-luluc	**kg CO_2** eq.	4,8E-03	1,6E-03	4,7E-04	0	9.8E-06	0	0	0	0	0	0	4.9E-04	0	3.8E-04	-4.5E-04
GWP-total	**kg CO_2** eq.	9,1	3,1E-01	1,1	0	2,6E-01	0	0	0	0	0	0	8.8E-02	0	9,1E-02	-2,2E-01
ODP	**kg CFC 11 eq.**	3,8E-08	1,9E-14	1,1E-09	0	9.3E-08	0	0	0	0	0	0	5,2E-15	0	5,1E-14	-5,2E-09
AP	**mole H^+** eq.	3,3E-02	1,4E-03	2,4E-03	0	2,2E-03	0	0	0	0	0	0	7.1E-05	0	6.5E-04	-7.8E-04
EP-freshwater	**kg P eq.**	1,0E-04	8.4E-07	4,3E-06	0	5.5E-06	0	0	0	0	0	0	2,6E-07	0	1,9E-06	-1.6E-06
EP-freshwater	**kg PO_4^{3-}** eq.	3,2E-04	2,6E-06	1,3E-05	0	1,7E-05	0	0	0	0	0	0	8.0E-07	0	5.7E-06	-4.9E-06
EP-marine	**kg N eq.**	1,1E-02	3.7E-04	8.1E-04	0	2.5E-04	0	0	0	0	0	0	2.0E-05	0	1,8E-04	-2,3E-04
EP-terrestrial	**mol N eq.**	1,2E-01	4,1E-03	8.8E-03	0	9.0E-03	0	0	0	0	0	0	2,4E-04	0	1,9E-03	-2.5E-03
POCP	**kg NMVOC eq.**	2,9E-02	1,1E-03	2,3E-03	0	1,6E-03	0	0	0	0	0	0	6.7E-05	0	5.3E-04	-6.4E-04
ADP-minerals&metals*	**kg Sb eq.**	8.8E-05	2.5E-08	2,7E-06	0	8.4E-09	0	0	0	0	0	0	7.3E-09	0	9,2E-09	-2.0E-08
ADP-fossil*	**MJ**	145,0	4,1	8,3	0	1,3E+00	0	0	0	0	0	0	1,2	0	1,2	-3,5
WDP	**m^3**	2,5	2,6E-03	1,6E-01	0	14,4	0	0	0	0	0	0	7.8E-04	0	6.8E-03	1,5E-02

GWP - total: Global warming potential; **GWP -** fossil: Global warming potential of fossil fuels; **GWP - biogenic**: Biogenic global warming potential; **GWP - luluc** : Global warming potential of land use and land use change; **ODP**: Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater**: Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; **EP-marine**: Eutrophication potential, fraction of nutrients reaching the final seawater compartment; **EP-terrestrial**: Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources; **APD-fossil**: Abiotic resource depletion potential for fossil resources; **WDP**: Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	1,6E-05	2,1E-08	5.0E-07	0	1,5E-08	0	0	0	0	0	0	4.9E-10	0	7.9E-09	-4.6E-09
IRP [1]	**kBq U235 eq**	38,9	2,9	3,2	0	8.5E-01	0	0	0	0	0	0	8,1E-01	0	7,2E-01	-1,1E+00
ETP-fw [2]	**CTUe**	3,8E-09	5.7E-11	2,1E-10	0	7.8E-11	0	0	0	0	0	0	1,6E-11	0	9.0E-11	-2.6E-12
HTP-c [2]	**CTUh**	1,1E-07	2,9E-09	1,3E-08	0	2,1E-08	0	0	0	0	0	0	8.4E-10	0	1.0E-08	-1,1E-09
HTP-nc [2]	**CTUh**	3,1E-01	7.4E-04	3,3E-02	0	1,8E-03	0	0	0	0	0	0	2,1E-04	0	1,6E-03	-1,1E-02
SQP [2]	**-**	158,0	1,3	10,8	0	238,0	0	0	0	0	0	0	4.0E-01	0	2,8E-01	-7.3E-01

PM: Potential incidence of diseases due to emissions of particulate matter (PM); **IRP :** Human potential exposure efficiency relative to U235; **ETP-fw** : Comparative potential of toxic unit for ecosystems - freshwater; **HTP-c** : Comparative potential of toxic unit for ecosystems - carcinogenic effects; **HTP-nc** : Comparative potential of toxic unit for ecosystems - non-carcinogenic effects; **SQP** : Soil quality potential index; **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.
Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	51,1	2,1E-01	2,6	0	4,9	0	0	0	0	0	0	6.6E-02	0	1,4E-01	-6,1
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	51,1	2,1E-01	2,6	0	4,9	0	0	0	0	0	0	6.6E-02	0	1,4E-01	-6,1
PENRE	**MJ**	145,0	4,14	8,3	0	1,3	0	0	0	0	0	0	1,2	0	1,2	-3,5
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	145,0	4,14	8,3	0	1,3	0	0	0	0	0	0	1,2	0	1,2	-3,5
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m3**	4.5E-02	2,4E-04	3,1E-03	0	1,9E-01	0	0	0	0	0	0	7.5E-05	0	2,2E-04	-1.5E-03

PERE : Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as raw material; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of tap water resources; **NR:** Not relevant

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	2.0E-11	3,7E-05	0	2.04E-11	0	0	0	0	0	0	5.6E-12	0	1.86E-08	-2.8E-08
NHWD	**kg**	2,3	5.7E-04	0,3	0	5.24E-02	0	0	0	0	0	0	1,7E-04	0	5,46	-9.7E-04
RWD	**kg**	3,1E-03	5,1E-06	2.5E-04	0	1,61E-05	0	0	0	0	0	0	1,4E-06	0	1,6E-05	-5.7E-05

HWD: Hazardous waste disposed of; **NHWD**: Non-hazardous waste disposed of; **RWD**: Radioactive waste disposed of

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	**kg**	2,2E-02	0	3,3E-01	0	0	0	0	0	0	0	0	0	12,7	0	0
MER	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EE:** Energy exported

6. Additional Environmental Information

Indoor air emissions

Ceramic tiles, in their manufacturing process, undergo a thermal process that exceeds 1000 ºC. At these temperatures, any organic compound present in the compositions decomposes, resulting in an inert end product free of volatile organic compounds that may be emitted in its use phase.

Release to soil and water

Ceramic tiles do not emit any compound to the floor or water in its stage of use, since it is a totally inert product, which does not undergo physical, chemical or biological transformations, is not soluble.

Neither fuel, nor does it react physically, chemically or in any other way, it is not biodegradable, it does not adversely affect other materials with which it comes into contact in a way that could lead to pollution of the environment or harm human health. It is a product that does not leach so it does not pose a risk to the quality of surface or groundwater.

Annex I. Declaration of environmental parameters for the MINIMUM environmental impact format

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	**kg CO_2** eq.	8,1	2,7E-01	9,2E-01	0	1,7E-01	0	0	0	0	0	0	7.6E-02	0	7.8E-02	-1.9E-01
GWP-fossil	**kg CO_2** eq.	8,2	2,8E-01	9,2E-01	0	2,3E-01	0	0	0	0	0	0	7.7E-02	0	7.9E-02	-1.9E-01
GWP-biogenic	**kg CO_2** eq.	8.0E-02	-3,1E-04	1,3E-02	0	1,9E-03	0	0	0	0	0	0	-1,1E-04	0	8.2E-04	-2.8E-04
GWP-luluc	**kg CO_2** eq.	4,3E-03	1,4E-03	4,2E-04	0	8.6E-06	0	0	0	0	0	0	4,3E-04	0	3,4E-04	-3.9E-04
GWP-total	**kg CO_2** eq.	8,3	2,8E-01	9.4E-01	0	2,3E-01	0	0	0	0	0	0	7.7E-02	0	8.0E-02	-2.0E-01
ODP	**kg CFC 11 eq.**	3.4E-08	1,6E-14	1,0E-09	0	8.2E-08	0	0	0	0	0	0	4,6E-15	0	4.5E-14	-4.6E-09
AP	**mole H^+** eq.	3,1E-02	1,2E-03	2,2E-03	0	2,0E-03	0	0	0	0	0	0	6,2E-05	0	5.8E-04	-6.9E-04
EP-freshwater	**kg P eq.**	9.4E-05	7.4E-07	3.9E-06	0	4.9E-06	0	0	0	0	0	0	2.3E-07	0	1,7E-06	-1,4E-06
EP-freshwater	**kg PO_4^{3-}** eq.	2.9E-04	2,3E-06	1,2E-05	0	1,5E-05	0	0	0	0	0	0	7.0E-07	0	5,1E-06	-4.3E-06
EP-marine	**kg N eq.**	1,0E-02	3,3E-04	7.4E-04	0	2,2E-04	0	0	0	0	0	0	1,7E-05	0	1,6E-04	-2.0E-04
EP-terrestrial	**mol N eq.**	1,1E-01	3,7E-03	8,1E-03	0	8.0E-03	0	0	0	0	0	0	2,1E-04	0	1,7E-03	-2,2E-03
POCP	**kg NMVOC eq.**	2,8E-02	9.5E-04	2,1E-03	0	1,4E-03	0	0	0	0	0	0	5.9E-05	0	4,6E-04	-5.6E-04
ADP-minerals&metals*	**kg Sb eq.**	8.3E-05	2,2E-08	2.5E-06	0	7.5E-09	0	0	0	0	0	0	6.4E-09	0	8,2E-09	-1,8E-08
ADP-fossil*	**MJ**	132,0	3,6	7,3	0	1,2E+00	0	0	0	0	0	0	1,0	0	1,0	-3,1
WDP	**m^3**	2,4	2,3E-03	1,4E-01	0	12,7	0	0	0	0	0	0	6.9E-04	0	6.0E-03	1,3E-02

GWP - total: Global warming potential; **GWP -** fossil: Global warming potential of fossil fuels; **GWP - biogenic**: Biogenic global warming potential; **GWP - luluc** : Global warming potential of land use and land use change; **ODP**: Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater**: Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; **EP-marine**: Eutrophication potential, fraction of nutrients reaching the final seawater compartment; **EP-terrestrial**: Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources; **APD-fossil**: Abiotic resource depletion potential for fossil resources; **WDP**: Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	**Incidence of diseases**	1,4E-05	1,9E-08	4,4E-07	0	1,3E-08	0	0	0	0	0	0	4,3E-10	0	7.0E-09	-4,1E-09
IRP [1]	**kBq U235 eq**	35,6	2,5	2,8	0	7.5E-01	0	0	0	0	0	0	7,1E-01	0	6,4E-01	-9.5E-01
ETP-fw [2]	**CTUe**	3.5E-09	5,1E-11	1,9E-10	0	6.9E-11	0	0	0	0	0	0	1,4E-11	0	8.0E-11	-2,3E-12
HTP-c [2]	**CTUh**	1,1E-07	2,6E-09	1,2E-08	0	1,8E-08	0	0	0	0	0	0	7.4E-10	0	8.9E-09	-1.0E-09
HTP-nc [2]	**CTUh**	2,8E-01	6.5E-04	3.0E-02	0	1,6E-03	0	0	0	0	0	0	1,9E-04	0	1,4E-03	-9.5E-03
SQP [2]	**-**	144,0	1,1	9,7	0	210,0	0	0	0	0	0	0	3.5E-01	0	2,4E-01	-6.5E-01

PM: Potential incidence of diseases due to emissions of particulate matter (PM); **IRP** : Human potential exposure efficiency relative to U235; **ETP-fw** : Comparative potential of toxic unit for ecosystems - freshwater; **HTP-c** : Comparative potential of toxic unit for ecosystems - carcinogenic effects; **HTP-nc** : Comparative potential of toxic unit for ecosystems - non-carcinogenic effects; **SQP** : Soil quality potential index; **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	47,1	1,9E-01	2,4	0	4,3	0	0	0	0	0	0	5.8E-02	0	1,2E-01	-5,4
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	47,1	1,9E-01	2,4	0	4,3	0	0	0	0	0	0	5.8E-02	0	1,2E-01	-5,4
PENRE	**MJ**	130,0	3,65	7,3	0	1,2	0	0	0	0	0	0	1,0	0	1,0	-3,1
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	130,0	3,65	7,3	0	1,2	0	0	0	0	0	0	1,0	0	1,0	-3,1
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	4,3E-02	2,1E-04	2,8E-03	0	1,6E-01	0	0	0	0	0	0	6.6E-05	0	2.0E-04	-1.4E-03

PERE : Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as raw material; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of tap water resources; **NR:** Not relevant

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	1,7E-11	3,7E-05	0	1.81E-11	0	0	0	0	0	0	4,9E-12	0	1.65E-08	-2,4E-08
NHWD	**kg**	2,1	5,1E-04	2,7E-01	0	4,63E-02	0	0	0	0	0	0	1,5E-04	0	4,82	-8.6E-04
RWD	**kg**	3.0E-03	4.5E-06	2,2E-04	0	1,42E-05	0	0	0	0	0	0	1,3E-06	0	1,4E-05	-5.0E-05

HWD: Hazardous waste disposed; **NHWD**: Non-hazardous waste disposed; **RWD**: Radioactive waste disposed of

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	1,2E-03	1,7E-11	3,7E-05	0	1.81E-11	0	0	0	0	0	0	4,9E-12	0	1.65E-08	-2,4E-08
MFR	**kg**	2,1	5,1E-04	2,7E-01	0	4,63E-02	0	0	0	0	0	0	1,5E-04	0	4,82	-8.6E-04
MER	**kg**	3.0E-03	4.5E-06	2,2E-04	0	1,42E-05	0	0	0	0	0	0	1,3E-06	0	1,4E-05	-5.0E-05
USA	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EE:** Energy exported

Annex II. Declaration of environmental parameters for the MAXIMUM environmental impact format

The results obtained are relative expressions and do not predict impacts in endpoint categories, the exceeding of some levels, safety margins or risks.

Environmental impacts.

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	**kg CO_2** eq.	10,9	3,7E-01	1,3	0	2,4E-01	0	0	0	0	0	0	1,0E-01	0	1,1E-01	-2.6E-01
GWP-fossil	**kg CO_2** eq.	11,0	3.8E-01	1,3	0	3,1E-01	0	0	0	0	0	0	1,1E-01	0	1,1E-01	-2.7E-01
GWP-biogenic	**kg CO_2** eq.	1,0E-01	-4,2E-04	1,7E-02	0	2,6E-03	0	0	0	0	0	0	-1.5E-04	0	1,1E-03	-3.8E-04
GWP-luluc	**kg CO_2** eq.	5.8E-03	1,9E-03	5.7E-04	0	1,2E-05	0	0	0	0	0	0	5.9E-04	0	4,6E-04	-5.4E-04
GWP-total	**kg CO_2** eq.	11,1	0,381	1,27943	0	3,2E-01	0	0	0	0	0	0	1,1E-01	0	1,1E-01	-2.7E-01
ODP	**kg CFC 11 eq.**	4,3E-08	2,3E-14	1,3E-09	0	1,1E-07	0	0	0	0	0	0	6.3E-15	0	6,2E-14	-6,3E-09
AP	**mole H^+** eq.	3,7E-02	1,7E-03	2,9E-03	0	2.7E-03	0	0	0	0	0	0	8.6E-05	0	7.9E-04	-9.5E-04
EP-freshwater	**kg P eq.**	1,2E-04	1,0E-06	5.0E-06	0	6.7E-06	0	0	0	0	0	0	3,2E-07	0	2,3E-06	-2.0E-06
EP-freshwater	**kg PO_4^{3-}** eq.	3.7E-04	3,1E-06	1,5E-05	0	2,1E-05	0	0	0	0	0	0	9.7E-07	0	7.0E-06	-6.0E-06
EP-marine	**kg N eq.**	1,1E-02	4.5E-04	9.4E-04	0	3.0E-04	0	0	0	0	0	0	2,4E-05	0	2,2E-04	-2.8E-04
EP-terrestrial	**mol N eq.**	1,2E-01	5.0E-03	1,0E-02	0	1,1E-02	0	0	0	0	0	0	2.9E-04	0	2,3E-03	-3.0E-03
POCP	**kg NMVOC eq.**	3,2E-02	1,3E-03	2.7E-03	0	2,0E-03	0	0	0	0	0	0	8.1E-05	0	6,4E-04	-7.7E-04
ADP-minerals&metals*	**kg Sb eq.**	9.3E-05	3.0E-08	2,8E-06	0	1.0E-08	0	0	0	0	0	0	8.8E-09	0	1,1E-08	-2.5E-08
ADP-fossil*	**MJ**	177,0	5,0	10,0	0	1,6	0	0	0	0	0	0	1,4	0	1,4	-4,2
WDP	**m^3**	2,7	3,1E-03	1,8E-01	0	17,5	0	0	0	0	0	0	9.5E-04	0	8,2E-03	1,8E-02

GWP - total: Global warming potential; **GWP -** fossil: Global warming potential of fossil fuels; **GWP - biogenic**: Biogenic global warming potential; **GWP - luluc** : Global warming potential of land use and land use change; **ODP**: Stratospheric ozone depletion potential; **AP:** Acidification potential, accumulated surplus; **EP-freshwater**: Eutrophication potential, fraction of nutrients reaching the final freshwater compartment; **EP-marine**: Eutrophication potential, fraction of nutrients reaching the final seawater compartment; **EP-terrestrial**: Eutrophication potential, accumulated surplus; **POCP:** Tropospheric ozone formation potential; **ADP-minerals&metals:** Potential for depletion of abiotic resources for non-fossil resources; **APD-fossil**: Abiotic resource depletion potential for fossil resources; **WDP**: Water deprivation potential (user), weighted water deprivation consumption. **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Environmental impact parameters

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM [1]	**Incidence of diseases**	2.0E-05	2,6E-08	6,1E-07	0	1,8E-08	0	0	0	0	0	0	5.9E-10	0	9.6E-09	-5.6E-09
IRP [1]	**kBq U235 eq**	45,1	3,5	3,8	0	1,0	0	0	0	0	0	0	9.8E-01	0	8.8E-01	-1,3E+00
ETP-fw [2]	**CTUe**	4,4E-09	7.0E-11	2.5E-10	0	9,4E-11	0	0	0	0	0	0	2.0E-11	0	1,1E-10	-3.2E-12
HTP-c [2]	**CTUh**	1,3E-07	3,6E-09	1,6E-08	0	2.5E-08	0	0	0	0	0	0	1,0E-09	0	1,2E-08	-1,4E-09
HTP-nc [2]	**CTUh**	3.5E-01	9.0E-04	4.0E-02	0	2,2E-03	0	0	0	0	0	0	2,6E-04	0	1,9E-03	-1,3E-02
SQP [2]	**-**	182,0	1,6	12,9	0	289,0	0	0	0	0	0	0	4,9E-01	0	3,4E-01	-8.9E-01

PM: Potential incidence of diseases due to emissions of particulate matter (PM); **IRP** : Human potential exposure efficiency relative to U235; **ETP-fw** : Comparative potential of toxic unit for ecosystems - freshwater; **HTP-c** : Comparative potential of toxic unit for ecosystems - carcinogenic effects; **HTP-nc** : Comparative potential of toxic unit for ecosystems - non-carcinogenic effects; **SQP** : Soil quality potential index; **NR:** Not relevant

Notice 1. This impact category deals mainly with the eventual impacts of low doses of ionizing radiation on human health from the nuclear fuel cycle. It does not consider the effects due to possible nuclear accidents or occupational exposure due to the disposal of radioactive waste in underground facilities. The potential for ionizing radiation of the soil, due to radon or some building materials is not measured in this parameter either.

Notice 2. The results of this environmental impact indicator should be used with caution since the uncertainties of the results are high and experience with this parameter is limited.

Resource usage

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	**MJ**	58,1	2,6E-01	3,1	0	5,9	0	0	0	0	0	0	8.0E-02	0	1,7E-01	-7,4
PERM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	**MJ**	58,1	2,6E-01	3,1	0	5,9	0	0	0	0	0	0	8.0E-02	0	1,7E-01	-7,4
PENRE	**MJ**	174,0	5,02	10,0	0	1,6	0	0	0	0	0	0	1,4	0	1,4	-4,2
PENRM	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	**MJ**	174,0	5,02	10,0	0	1,6	0	0	0	0	0	0	1,4	0	1,4	-4,2
SM	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	**m^3**	5.0E-02	3.0E-04	3,6E-03	0	2,3E-01	0	0	0	0	0	0	9,1E-05	0	2,7E-04	-1.9E-03

PERE : Use of renewable primary energy excluding renewable primary energy resources used as feedstock; **PERM:** Use of renewable primary energy used as raw material; **PERT:** Total use of renewable primary energy; **PENRE:** Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock; **PENRM:** Use of non-renewable primary energy used as feedstock; **PENRT:** Total use of non-renewable primary energy; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of tap water resources; **NR:** Not relevant

Outflows and waste categories

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	**kg**	1,2E-03	2,4E-11	3,7E-05	0	2.5E-11	0	0	0	0	0	0	6.8E-12	0	2.26E-08	-3.4E-08
NHWD	**kg**	5,1	7.0E-04	4,4E-01	0	6,4E-02	0	0	0	0	0	0	2.0E-04	0	6,64	-1,2E-03
RWD	**kg**	3.5E-03	6,1E-06	2.9E-04	0	2.0E-05	0	0	0	0	0	0	1,7E-06	0	2.0E-05	-6.9E-05

HWD: Hazardous waste disposed; **NHWD**: Non-hazardous waste disposed; **RWD**: Radioactive waste disposed

Parameter	Units	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CRU	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MFR	**kg**	2.7E-02	0	4.0E-01	0	0	0	0	0	0	0	0	0	15,5	0	0
MER	**kg**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA	**MJ**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CRU: Components for reuse; **MFR**: Materials for recycling; **MER**: Materials for energy recovery; **EE:** Energy exported

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