tecnalia
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Área Anardi 5,
E-20730 Azpeitia
Gipuzkoa-Spain
Tel: +34 946 430 850
Lab_services@tecnalia.com
www.tecnalia.com

Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA

www.eota.eu

# European Technical Assessment ETA 23/1027 of 08/07/2024

## General part

| | |
|---|---|
| **Technical Assessment Body issuing the ETA:** | **TECNALIA RESEARCH & INNOVATION** |
| **Trade name of the construction product** | **BERTAKO** |
| **Product family to which the construction product belongs** | Aggregates. |
| **Manufacturer** | **Gipuzkoa Ingurumena Bi S.A.**<br>Pol. Ind. Zubiondo nº 5<br>20120 Hernani<br>Guipúzcoa (SPAIN). |
| **Manufacturing plant** | Pol. Arrapabide, C/Eskutzaitzeta nº1<br>20160 Donostia (Zubieta).<br>Guipúzcoa (SPAIN). |
| **This European Technical Assessment contains** | 12 pages. |
| **This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of** | EAD 240002-00-0108 Processed bottom ashes from municipal solid waste incinerators as aggregates for unbound materials for use in road construction. |

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body – Tecnalia Research & Innovation. Any partial reproduction has to be identified as such.

**Table of contents**

## SPECIFIC PARTS

### 1. Technical description of the product

The subject of this European Technical Assessment (ETA) is BERTAKO, a processed bottom ash from municipal solid waste incinerators intended to be used as aggregates for unbound materials for road construction.

After a first drying phase to facilitate the subsequent processes, the ash is subjected to a mechanical treatment, that includes crushing and sieving, separation of ferric and non-ferric materials and a covered natural maturation at least for two months. This treatment, only mechanical, will allow to recover a bottom ash with a declared overall aggregated content of silica ($SiO_2$), CaO, $FeO_3$; $Al_2O_3$; $Na_2O$; MgO of 85-95% in weight, a maximum value of loss on ignition value (LOI at 950±25 ºC) below 8,5 % in weight. The processed bottom ash may have other minor inorganic components (e.g., $P_2O_5$, $SO_3$, $K_2O$, $TiO_2$, MnO...), without exceeding 6% in weight, considering all the minor components as a whole.

BERTAKO is supplied as aggregates with a grain size about 0 mm to 10 mm, 10 mm to 30 mm, or a mix of these two grain sizes.

Typically, for the final application or use, this processed bottom ash may be mixed with other natural or artificial aggregates.

# 2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

## 2.1 Intended use

BERTAKO is intended for use as aggregates for structural unbound materials in road construction.

## 2.2 Working life

The provisions made in this European Technical Assessment are based on an assumed working life of 50 years as minimum when installed in the works, provided that the structural unbound layers are subject to appropriate use and maintenance.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 2.3 Manufacturing

The European Technical Assessment is issued for the processed bottom ashes from municipal solid waste incinerators as aggregates for unbound materials for use in road construction, on the basis of agreed data/information, deposited at Tecnalia Research & Innovation, which identifies the product that has been assessed and judged.

Changes to the product or production process, which could result in this deposited data/information being incorrect, shall be notified to Tecnalia Research & Innovation before the changes are introduced. Tecnalia Research & Innovation will decide whether or not such changes affect the ETA and consequently, the validity of the CE marking on the basis of the ETA; and if so, whether further assessment or alterations to the ETA shall be necessary.

## 2.4 Design and installation

The installation instructions including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical dossier.

Design, installation and execution of BERTAKO is to be in conformity with national documents. Such documents and the level of their implementation in Member States' legislation are different. Therefore, the assessment is done taking into account the general assumptions introduced in EAD 240002-00-0108, which summarizes how information introduced in the ETA and related documents is intended to be used in the construction process and gives advice to all parties interested when normative documents are missing.

## 2.4 Packaging, transport and storage

The information on packaging, transport and storage is given in the manufacturer's technical dossier. It is the responsibility of the manufacturer(s) to ensure that this information is effectively communicated to the concerned people.

### 2.5 Use, maintenance and repair

The information on use, maintenance and repair is to be in conformity with national documents. The information on use, maintenance and repair is given in the manufacturer's technical dossier. It is the responsibility of the manufacturer(s) to ensure that this information is effectively communicated to the concerned people.

## 3 Performance of the product and references to the methods used for its assessment

The identification tests and the assessment for the intended use of BERTAKO according to the Basic Requirements (BWR) were carried out in compliance with EAD 240002-00-0108 "*Processed bottom ashes from municipal solid waste incinerators as aggregates for unbound materials for use in road construction*".

| Basic Works Requirement | Essential characteristic | ETA section | Performance |
|---|---|---|---|
| **BWR 1** **Mechanical resistance and stability** | Aggregates sizes | 3.1 | 0/32 |
| | Grading | 3.2 | $G_A85$ |
| | Shape of coarse aggregates | 3.3 | $FI_{35}$ |
| | Particle density | 3.4 | 2,52 Mg/m$^3$ |
| | Fines content | 3.5 | $f_7$ |
| | Assessment of fines (sand equivalent) | 3.6 | $SE_{(10)}$=63% |
| | Assessment of fines (methylene blue) | 3.7 | $MB$=0,7 g/kg |
| | Percentage of crushed or broken particles and totally rounded particles in coarse aggregates | 3.8 | $C_{90/3}$ |
| | Resistance to fragmentation of coarse aggregates | 3.9 | $LA_{40}$ |
| | Volume stability | 3.10 | $V_5$ |
| | Water absorption | 3.11 | 8,1% |
| | Water-soluble sulphates | 3.12 | $SS_{0,7}$ |
| | Total sulphur | 3.13 | $S_1$ |
| | Resistance to wear of coarse aggregates | 3.14 | $M_{DE}30$ |
| | Resistance to freezing and thawing | 3.15 | $MS_{18}$ |
| | Free lime | 3.16 | <0,2% |

| Basic Works Requirement | Essential characteristic | ETA section | Performance |
|---|---|---|---|
| **BWR 3 Hygiene, health and the environment** | Content, emission and/or release of dangerous substances | 3.17 | See Table 2 and Table 3 |

**Table 1:** BERTAKO performance summary (see also the performance details in the relevant sections of the ETA).

### 3.1 Aggregates sizes

Aggregates sizes of BERTAKO is determined according to EN 13242 Clause 4.2. The aggregates sizes of BERTAKO is tested according to EN 933-1 and the result is 0/32.

### 3.2 Grading

Grading of BERTAKO is determined according to EN 13242 Clause 4.3. The grading of BERTAKO is tested according to EN 933-1 and the result is $G_A85$.

### 3.3 Shape of coarse aggregates

Shape of coarse aggregates of BERTAKO is determined according to EN 13242 Clause 4.4. The shape of coarse aggregates of BERTAKO is $FI_{35}$.

### 3.4 Particle density

Particle density of BERTAKO is determined according to EN 13242 Clause 5.4. The particle density of BERTAKO is 2,52 Mg/m$^3$.

### 3.5 Fines content

Fines content of BERTAKO is determined according to EN 13242 Clause 4.6. The fines content of BERTAKO is $f_7$.

### 3.6 Assessment of fines (sand equivalent)

Assessment of fines (sand equivalent) of BERTAKO is determined according to EN 13242 Clause 4.6 and Annex A. The Assessment of fines (sand equivalent) of BERTAKO is $SE_{(10)}$=63%.

### 3.7 Assessment of fines (methylene blue)

Assessment of fines (methylene blue) of BERTAKO is determined according to EN 13242 Clause 4.6 and Annex A. The Assessment of fines (methylene blue) of BERTAKO is *MB*=0,7 g/kg.

### 3.8 Percentage of crushed or broken particles and totally rounded particles in coarse aggregates

Percentage of crushed or broken particles and totally rounded particles in coarse aggregates of BERTAKO is determined according to EN 13242 Clause 4.5. Percentage of crushed or broken particles and totally rounded particles in coarse aggregates of BERTAKO is $C_{90/3}$.

### 3.9 Resistance to fragmentation of coarse aggregates

Resistance to fragmentation of coarse aggregates of BERTAKO is determined according to EN 13242 Clause 5.2. Resistance to fragmentation of coarse aggregates of BERTAKO is $LA_{40}$.

### 3.10 Volume stability

Volume stability of coarse aggregates of BERTAKO is determined according to EN 13242 Clause 6.5.2. Volume stability of coarse aggregates of BERTAKO is $V_5$.

### 3.11 Water absorption

Water absorption of coarse aggregates of BERTAKO is determined according to EN 13242 Clause 5.5 and EN 1097-6 Clause 8. Water absorption of coarse aggregates of BERTAKO is 8,1%.

### 3.12 Water-soluble sulphates

Water-soluble sulphates of coarse aggregates of BERTAKO is determined according to § 2.2.1 of EAD 240002-00-0108. Water-soluble sulphates of coarse aggregates of BERTAKO is $SS_{0,7}$.

### 3.13 Total sulphur

Total sulphur of coarse aggregates of BERTAKO is determined according to EN 13242 Clause 6.3. Total sulphur of coarse aggregates of BERTAKO is $S_1$.

### 3.14 Resistance to wear of coarse aggregates

Resistance to wear of coarse aggregates of BERTAKO is determined according to EN 13242 Clause 5.3. Resistance to wear of coarse aggregates of BERTAKO is $M_{DE}30$

### 3.15 Resistance to freezing and thawing

Resistance to freezing and thawing of coarse aggregates of BERTAKO is determined according to EN 13242 Clause 7.3. Resistance to freezing and thawing of coarse aggregates of BERTAKO is tested and reported according to EN 1367-2. Resistance to freezing and thawing of coarse aggregates of BERTAKO is $MS_{18}$.

### 3.16 Free lime

Free lime of coarse aggregates of BERTAKO is determined according to § 2.2.2 of EAD 240002-00-0108. The free lime content [%] is tested and reported according to EN 1744-1 Clause 18.2. The free lime content of BERTAKO is <0,2%.

### 3.17 Content, emission and/or release of dangerous substances

Content, emission and/or release of dangerous substances of coarse aggregates of BERTAKO is determined according to § 2.2.3 of EAD 240002-00-0108. See Table 2 and Table 3 for results.

| Nº | Parameter | Test method | Performance (mg/kg) |
|---|---|---|---|
| **1** | Arsenic (As) | EN 16170 | 4,4 |
| **2** | Lead (Pb) | EN 16170 | 541 |
| **3** | Cadmium (Cd) | EN 16170 | 3,8 |
| **4** | Chromium (total) (Cr) | EN 16170 | 322 |
| **5** | Copper (Cu) | EN 16170 | 7.948 |
| **6** | Nickel (Ni) | EN 16170 | 537 |
| **7** | Mercury (Hg) | EN 16175-2 | 0,4 |
| **8** | Molybdenum (Mo) | EN 16170 | 29,9 |
| **9** | Vanadium (V) | EN 16170 | 21,9 |
| **10** | Zinc (Zn) | EN 16170 | 4.768 |

**Table 2**: Measured values for each parameter of the solid material analysis of BERTAKO after digestion of processed bottom ash according to EN 13657 (aqua regia digestion).

| Nº | Parameter | Test method | Performance (mg/kg) |
|---|---|---|---|
| **1** | Arsenic (As) | EN ISO 11885 | 0,05 |
| **2** | Barium (Ba) | EN ISO 11885 | 1,72 |
| **3** | Lead (Pb) | EN ISO 11885 | 0,77 |
| **4** | Cadmium (Cd) | EN ISO 11885 | 0,01 |
| **5** | Chromium (VI) (Cr) | EN ISO 11083 | 0,66 |
| **6** | Chromium (total) (Cr) | EN ISO 11885 | 0,91 |
| **7** | Copper (Cu) | EN ISO 11885 | 0,26 |
| **8** | Nickel (Ni) | EN ISO 11885 | 0,20 |
| **9** | Mercury (Hg) | EN ISO 17852 | 0,01 |
| **10** | Molybdenum (Mo) | EN ISO 11885 | 1,47 |
| **11** | Antimony (Sb) | EN ISO 11885 | 0,16 |
| **12** | Selenium (Se) | EN ISO 11885 | 0,08 |
| **13** | Chloride (Cl) | EN ISO 10304-1 | 2.830 |
| **14** | Fluoride (F) | EN ISO 10304-1 | 4,40 |
| **15** | Sulphates ($SO_4$) | EN ISO 10304-1 | 955,40 |
| **16** | Vanadium (V) | EN ISO 11885 | 0,20 |
| **17** | Zinc (Zn) | EN ISO 11885 | 1,48 |

**Table 3:** Analysis of the elution test of BERTAKO expressed in mg/kg (dry weight). According to Annex A of EN 16192.

## 4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

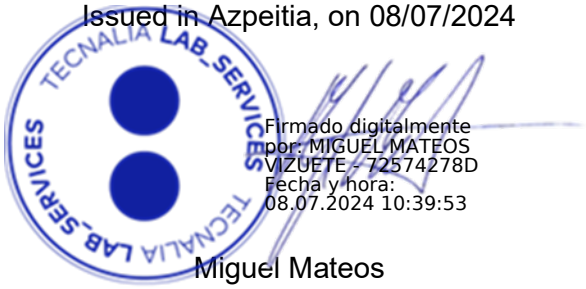
According to the European Commission decision 1998/598/EC, as amended by Commission Decision 2002/592/EC, AVCP system 2+ (further described in Annex V to Regulation (EU) No 305/2011 as amended) applies.

## 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the Assessment and Verification of Constancy of Performance (AVCP) system are laid down in the control plan deposited at Tecnalia Research & Innovation.

The Control Plan is a confidential part of the ETA and is only handed over to the notified body involved in the assessment and verification of constancy of performance.

Issued in Azpeitia, on 08/07/2024




Miguel Mateos
Innovation and Conformity Assessment Point
Tecnalia Research & Innovation