Guidelines ceramics

1. Scope

Ceramic materials that come into contact with food are subject to specific European requirements concerning the release of lead and cadmium. These European requirements are set out in Directive 84/500/EEC and have remained unchanged over the last four decades, even though it has become clear that they are no longer sufficient to ensure adequate protection of human health. Given that an amendment to these European requirements is not expected in the short term and that current scientific knowledge demonstrates their inadequacy, the Benelux countries wish to make use of the possibilities offered by current European law to replace the European requirements in question within their territories with stricter requirements. Decision M (2024) 5 of the Benelux Committee of Ministers aims to achieve this jointly amongst the three Benelux countries, which not only ensures the free movement of the ceramic articles concerned within the Benelux Union, but also promotes an update of these requirements at European Union level.

Ceramics are defined as a mixture of inorganic materials, generally with a high clay or silicate content, to which small quantities of organic materials may be added. Ceramic objects are first shaped and then permanently fixed by firing. They may be vitrified, glazed and/or decorated.

This description refers, among other things, to pottery, earthenware, stoneware, porcelain, and terracotta.

The current guidelines do not cover glass, crystal and enamel applied on glass or metal.

Please note that all ceramic materials and articles intended to come into contact with food must be safe and fully compliant with Article 3 of Regulation (EC) No 1935/2004. Any other metals or substances used in such products must equally comply with the safety requirements laid down in Article 3 of Regulation (EC) No 1935/2004.

2. Categories and limits

Directive 84/500/EEC establishes three distinct categories according to which ceramic articles shall be classified for the purpose of assessing compliance. These categories are set out below :

- Category 1 : Articles which cannot be filled and articles which can be filled, the internal depth of which, measured from the lowest point to the horizontal plane passing through the upper rim, does not exceed 25 mm
- Category 2 : All other articles which can be filled
- Category 3 : Cooking ware ; packaging and storage vessels having a capacity of more than three litres.
  The following food contact ceramic articles are also considered as cookingware and have to comply with the requirements of category 3:
    - Items intended for use in ovens, including microwave ovens, which bear labelling information (logo or instructions for use for the consumer) indicating that they are suitable for use in conventional ovens or microwave ovens.

- Objects that consumers can reasonably be expected to use in microwave ovens: these include fillable kitchenware such as mugs, bowls and plates.

It should be noted that the same interpretation is applied by the French competent authorities.[1]

The following limits apply in Benelux and importation into the Benelux.

	Pb	Cd
Category 1	6 µg/dm^2	4 µg/dm^2
Category 2	30 µg/l	20 µg/l
Category 3	10 µg/l	7 µg/l

3. Compliance work

The results of specific migration testing obtained in food shall prevail over the results obtained in food simulant. The results of specific migration testing obtained in food simulant shall prevail over the results obtained by worst-case calculation, modelling and estimation approaches

3.1. Worst-case calculation

Glaze:

- C: Concentration of a Cadmium or Lead in a glaze in mg/kg glaze
- G: Weight of the glaze after the firing in g/dm^2
  = Weight after the application of glazes and the firing - weight before applying the glazes
- S: surface area of the article in dm^2
- F: Food weight if not defined 1 kg
- R = concentration of cadmium or lead in food in mg/kg food

Formula:

$R = C * \frac{G}{1000} * S * \frac{1}{F}$

If R < limit for Cadmium or Lead = compliant

If R > limit for Cadmium or Lead → other way to verify compliance can be used such as analytical control or the composition can be changed.

Clay:

- C: Concentration of a Cadmium or Lead in the clay in mg/kg
- G: Weight of the Clay without glazes after the firing in g/dm^2
- S: surface area of the article in dm^2
- F: Food weight if not defined 1 kg
- R = concentration of cadmium or lead in food in mg/kg food

[1] https://www.economie.gouv.fr/fileart 2 s/files/directions_services/dgccrf/securite/produits_alimentaires/materiaux_contact/doc_pdf/Fiches-materiaux-inorganiques.pdf?v=1622793638

Formula:

$R = C * \frac{G}{1000} * S * \frac{1}{F}$

If R < limit for Cadmium or Lead = compliant

If R > limit for Cadmium or Lead → other way to verify compliance can be used such as analytical control or the composition can be changed.

3.2. Calculation via migrationmodelling and estimation,

Different types of migration modelling approaches exist. When such a model is used, it is essential that the chosen model be scientifically justified and validated. Model assumptions, input parameters, and boundary conditions should therefore be transparent, evidence-based, and demonstrably appropriate for the specific material and use scenario.

3.3. Calculation via similar materials

Migration values may be calculated or estimated while taking into account tests carried out on similar materials or articles, including tests to determine the maximum release per unit surface area when certain decorative techniques or materials are used, or tests performed on a batch of the same material or article. However, when incorporating such data into a calculation or modelling approach, the worst-case surface-to-volume ratio (S/V) applicable to the intended use of the article must always be applied.

Convertion factor needed??

3.4. Migration testing

The rules for determining the migration of lead and cadmium can be found in annex I and Annex II of Directive 84/500/EEC

3.4.1. Basic Rules for determining the migration of lead and cadmium

3.4.1.1. Test liquid (simulant')

4 % (v/v) acetic acid, in a freshly prepared aqueous solution.

3.4.1.2. Test conditions

Carry out the test at a temperature of 22 ± 2°C for a duration of 24 ± 0,5 hours.
When the migration of lead is to be determined, cover the sample by an appropriate means of protection and expose it to the usual lighting conditions in a laboratory.
When the migration of cadmium or of lead and cadmium is to be determined, cover the sample so as to ensure that the surface to be tested is kept in total darkness.

3.4.1.3. Filling

3.4.1.3.1. Samples which can be filled

Fill the article with a 4 % (v/v) acetic acid solution to a level no more than 1 mm from the overflow point ; the distance is measured from the upper rim of the sample.
Samples with a flat or slightly sloping rim should be filled so that the distance between the surface of the liquid and the overflow point is no more than 6 mm measured along the sloping rim.

3.4.1.3.2. Samples which cannot be filled

The surface of the sample which is not intended to come into contact with foodstuffs is first

covered with a suitable protective layer able to resist the action of the 4 % (v/v) acetic acid solution. The sample is then immersed in a recipient containing a known volume of acetic acid solution in such a way that the surface intended to come into contact with foodstuffs is completely covered by the test liquid.

3.4.1.4. Determination of the surface area

The surface area of the articles in category 1 is equal to the surface area of the meniscus formed by the free liquid surface obtained by complying with the filling requirements set out in section 3 above.

3.4.2. Methods of analysis for determination of the migration of lead and cadmium

The state-of the art analytical method is ICP-MS (= Inductively Coupled Plasma Mass Spectrometry) for the determination of Plomb, Cadmium and Arsenic. The older analytical method Atomic Absorption Spectroscopy (AAS) is not capable of achieving sufficiently low detection limits. ICP-OES (=Inductively Coupled Plasma Optical Emission Spectroscopy) might be used for other metals (such as Zinc, Cupper, Iron).

Testing can still be done as mentioned in directive 84/500/EEC but the LOD and LOQ should be less or equal to

LOD Pb <	LOD Cd <	LOQ Pb <	LOQ Cd <
0.6 µg/dm$_2$	0.4 µg/dm$_2$	1.2 µg/dm^2	0.8 µg/dm^2
3 µg/l	2 µg/l	6 µg/l	4 µg/l
1 µg/l	0.7 µg/l	2 µg/l	1.4 µg/l

More information can be found in annex II of Directive 84/500/EEC:

3.4.2.1. Reagents

— All reagents must be of analytical quality, unless otherwise specified.

— Where reference is made to water, this always means distilled water or water of equivalent quality.

3.4.2.1.1. 4 % (v/v) acetic acid, in aqueous solution

Add 40 ml of glacial acetic acid to water and make up to 1 000 ml.

3.4.2.1.2. Stock solutions

Prepare stock solutions containing 1 000 mg/litre of lead and at least 500 mg/litre of cadmium respectively in a 4 % acetic acid solution (3.1).

3.4.2.2. Instruments

3.4.2.2.1. ICP-MS

The instrument's detection limit for lead and cadmium must be equal to or lower than :

LOD < 0.1 × SRL or SML
LOQ < 0.2 × SRL or SML

LOD Pb <	LOD Cd <	LOQ Pb <	LOQ Cd <
0.6 µg/dm$_2$	0.4 µg/dm$_2$	1.2 µg/dm^2	0.8 µg/dm^2
3 µg/l	2 µg/l	6 µg/l	4 µg/l
1 µg/l	0.7 µg/l	2 µg/l	1.4 µg/l

3.4.2.3. Method

3.4.2.3.1. Preparation of the sample

The sample must be clean and free from grease or other matter likely to affect the test. Wash the sample in a solution containing a household liquid detergent at a temperature of approximately 40 °C. Rinse the sample first in tapwater and then in distilled water or water of equivalent quality. Drain and dry so as to avoid any stain. The surface to be tested should not be handled after it has been cleaned .

3.4.2.3.2. Determination of lead and/or cadmium

— The sample thus prepared is tested under the conditions laid down in Annex I.

— Before taking the test solution for determining lead and/or cadmium, homogenize the content of the sample by an appropriate method which avoids any loss of solution or abrasion of the surface being tested.

— Carry out a blank test on the reagent used for each series of determinations.

— Carry out determinations for lead and/or cadmium under appropriate conditions by atomic absorption spectrophotometry.

3.4.3. Results

Where the migration of lead, cadmium from a tested article exceeds the limits set out in Decision M(2024)5 of the Benelux Committee of Ministers, without exceeding the limit by more than 50%, that article shall nevertheless be considered to comply if the quantities of lead or cadmium extracted from at least three other articles, identical in shape, dimensions, decoration and glaze, and tested under the conditions laid down in paragraph 5 of Article 2 of directive 84/500/EC or this guideline, do not exceed the limits set on average and if, for each of those articles, the limits are not exceeded by more than 50% .

For items that cannot be filled, the actual surface area/volume ratio should be used to express the results, provided it can be determined.

3.4.4. Analytical report

The following information should be included in the report

- easy identification of the analysed material or object
- identification of the contractee
- identification of the lab
- version or reference number of the report
- used method of analysis
- limit of detection (LOD) and/or Limit of quantification (LOQ)
- measurement Uncertainties

- unities
- analytical result
- number of samples analyzed

The following information can be useful to add

- Volume/ratio or volume
- …

4. Supporting Documentation

Manufacturers placing ceramic articles intended to come into contact with food on the market shall comply with the principles of good manufacturing practice (GMP), as laid down in Regulation (EC) No 2023/2006. GMP requires the establishment of appropriate documentation demonstrating the compliance of the ceramic articles. However, that Regulation allows a certain degree of flexibility for micro and small enterprises, such as individual ceramic artists. Accordingly, such business operators are required to establish only a minimum level of documentation sufficient to demonstrate compliance with the Regulation.

The following information can be used in case the migration values are calculated or estimated.

- List of raw materials used for the manufacturing of the FCM article
- Flow chart of the production process if multiple articles are made in a similar way
- Reference documentation for traceability, including lists of different raw material compositions and techniques, as well as invoices from FCM suppliers
- Documentation demonstrating the compliance for the FCM manufacture
    - Declaration of compliance or similar statement that the raw material is free of Pb & Cd
    - Analytical reports
    - Estimation
    - Worst-case calculation
- Specification for the selection of raw materials which should be fulfilled by the supplier.
    - Intended for food contact material applications
    - Lead LOD < 0,0001 mg/kg material
    - Cadmium LOD < 0,0002 mg/kg material

5. Declaration of compliance

Article 4 of the Benelux Decision M (2024) 5 requires that ceramic articles intended to come into contact with food, and not yet in contact with food at the marketing stages, be accompanied by a written Declaration of Compliance.

5.1. When is the Declaration required?

- For ceramic articles not yet in contact with food, in order to distinguish them from decorative articles
- At all marketing stages up to and including retail

5.2. Who must issue the Declaration?

- The manufacturer, or
- A seller/importer established within the EU

5.3. What must the Declaration contain?

The Declaration of Compliance must include the following information:

- Identity and address of the manufacturer (and importer, if applicable)
- Identification of the ceramic article
- Date of issue of the declaration
- A statement confirming compliance with:
    - the national provisions on Ceramics[2]
    - Regulation (EC) No 1935/2004 on food contact materials

6. Import of raw materials

The importer is responsible for proving compliance with the provisions adopted by the Benelux countries in application of Decision M(2024)5 of the Benelux Committee of Ministers.

When a raw material is imported for the first time, it is essential to verify its compliance and assess the reliability of the supplier, as standards may differ between countries. Claims such as lead free, cadmium free or food safe, dinnerware safe does not necessarily mean the complete absence of lead and cadmium in the raw material. If the limit of detection is not sufficiently low, lead or cadmium may remain undetected.

The combination of different raw materials containing cadmium and lead can increase their concentration in the final article. It does not necessarily imply that cadmium and lead migrate into the food if the manufacturing process fixes them in the matrix. Compliance can be demonstrated by worst-case calculation or analytical testing (see the decision tree in the annex → to be added).

7. Importation of finished articles

Finished articles imported from outside the European Union (or from outside the European Economic Area, Turkey or any other country covered by article 5 of Decision M(2024)5 of the Benelux Committee of Ministers) for the Benelux market have to comply with the Benelux decision.

---

[2] Belgium: Royal Decree of 1 May 2006 https://www.health.belgium.be/nl/organisatie-beleid/regelgeving-beleidsdocumenten/koninlijk-besluit-1-mei-2006
The Netherlands: Staatscourant 2026, 16308 Staatscourant 2026, 16308 | Overheid.nl > Officiële bekendmakingen
Grand Duchy of Luxembourg:

8. Labelling

Article 15 of regulation (CE) n°1935/2004 is applicable for articles intended to come into contact with food.

It should be noted that ceramic articles have to be labelled as food contact materials as there are decorative articles such as mugs, bowls and plates on the market with no other purposes. These articles should not be used as food contact materials. Therefore, the symbol shown below, the wording “for food contact” or a specific description have to be provided.

In addition, adequate labelling or identification is required to ensure traceability of the article. For example, a reference could be linked to the raw material composition and the manufacturing technique.

9. Date of application

Ceramic materials and articles that comply with the provisions of Directive 84/500/EEC and that were placed on the market for the first time before 29 May 2026 may remain on the market until stocks are exhausted.

Ceramic materials and articles that comply with the provisions of Directive 84/500/EEC and that were bought on the marked before 29 May 2026 (or before stocks were exhausted) may continue to be used until the end of their lifetime.

N.B. For the Netherlands ceramic articles that were first placed on the market before 1 December 2026 and comply with the Commodities Act Regulation on Packaging and Consumer Articles as it read on 28 May 2026 may continue to be marketed until stocks are exhausted.