10th March 2021

Recommendations for migration testing of non-stick coated metal kitchenware

With Commission Regulation (EU) 2020/1245 amending regulation 10/2011 from March 24th, 2021, a stability criterion for the migration values of food contact testing from repeated use plastic materials and articles has been introduced.

This stability demand requires, that a migration test shall be carried out three times on a single sample using another portion of food simulant on each occasion. The migration in the second test shall not exceed the level observed in the first test, and the migration in the third test shall not exceed the level observed in the second test.

Due to a missing harmonized regulation for coatings at EU level, the migration test conditions of the plastic regulation are sometimes applied to coatings, especially for overall migration limit (OML) tests. However the stability criterion is not appropriate for organic coated metal articles, if a release of substrate metals caused by corrosion occurs, which interferes with the decreasing value demand.

Most appropriately, Resolution AP (2013) 9 of the Council of Europe already accounts for such corrosion effects of the metal substrate and defines limits for 21 metals. It does not set such a stability demand for these. The test methods of this resolution have successfully been applied for many years, ensuring safety of coated metal articles.

Nevertheless for OML test conditions European test recommendations are missing and therefore conditions of the plastic regulation are usually adopted. For organic coated metal articles the stability of migration values cannot be expected. In addition they are not in the scope of the plastic regulation EU 10/2011.

It is important to distinguish between migration from the organic coating and metal release from the substrate. While the coating itself can withstand the stability demand, the release of the metal from the substrate may lead to increased migration values.

FEC recommends the conditions showed in the table to ensure safe consumer products.

National law comparison

In all EU countries which already address coatings in their food contact legislation, these national rules apply for OML and SML (specific migration limit) testing (Belgium, France, Netherlands).

In EU countries where coatings are addressed through regulation 10/2011, we recommend the utilization of the exception rules Annex V 2.1.3. (SML), and 3.1 (OML) of the said regulation. These rules allow modified test conditions to avoid physical or other changes of the tested article if such changes are caused by the testing conditions. FEC recommends suitable modified test conditions.

In countries where legislation for coating migration testing is lacking, it is the responsibility of each company to choose the most appropriate test design. In so doing they might be assisted by external expert or laboratories. We recommend to use the stated test conditions.

This recommendations are also a suggestion for any new national or EU harmonized legislation.

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OML test conditions for coated metal kitchenware

Having no harmonized EU legislation for coatings, FEC advices to use the limit of the appropriate EDQM Resolution AP (2004) 1, 3.3:
10 mg/dm2 article surface (in special cases: 60 mg/kg food).

However, no migration conditions are specified in this resolution thus FEC recommends, for acidic food simulant in all EU countries, with or without a national legal link to the plastic regulation.

Test conditions

3% acetic acid, 4 hours, 100 °C, evaluation of 3rd migrate only
(as common before 2020/1245 and yet in-law in Belgium, Italy, France)

For all non-acidic food simulants we recommend to apply the test conditions and limits of plastic regulation 10/2011, as there is no substrate influence.

Test conditions for metal release from coated metal kitchenware

FEC advices not to use the SML test provisions for plastics, but to apply for coated metals the SRL (specific release limits) of EDQM Resolution AP (2013) 9.
Usage of citric acid as acid food simulant is recommend to avoid corrosion of the metal substrate.

Test conditions

0.5 % citric acid, 2 hours, 100 °C. The sum of the 1st and the 2nd migrates should lead to a value less then seven times the limit. In addition, the 3rd migrate value shall fulfil the limit.

SML test conditions of organic substances from coated metal kitchenware

Due to the lack of a specific harmonized regulation for coated articles, we recommend to apply the test conditions and limits of plastic regulation for SML of organic substances (Annex V and I of EU regulation 10/2011).

FEC represents the majority of the European formulators of non-stick coatings and also many worldwide selling brand owner of kitchenware. It operates an expert team for food and chemical legislation, which offers consulting services to FEC members and non-members.

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