

JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT

Testing conditions for kitchenware articles in contact with foodstuffs - Part 1: Plastics

The EURL-FCM harmonised approach series

G. Beldi; N. Jakubowska;
P. Robouch; E. Hoekstra

2019



This publication is a Validated Methods, Reference Methods and Measurements report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The scientific output expressed does not imply a policy position of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication.

Contact information

Name: Eddo Hoekstra
Address: Joint Research Centre, European Commission,
Via Enrico Fermi, 2749, TP260, 21021 Ispra (VA), Italy
e-mail: JRC-EURL-FCM@ec.europa.eu

EU Science Hub

<https://ec.europa.eu/jrc>

JRC116750

© European Union 2019

The reuse policy of the European Commission is implemented by Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Reuse is authorised, provided the source of the document is acknowledged and its original meaning or message is not distorted. The European Commission shall not be liable for any consequence stemming from the reuse. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All content © European Union 2019, except:

Front page image by © Fredy Sujono. Image # 182207536. Source stock.adobe.com

How to cite this report: G. Beldi; N. Jakubowska; P. Robouch; E. Hoekstra; *Testing conditions for kitchenware articles in contact with foodstuffs – Part 1: Plastics*, JRC116750.

Introduction

The European Union Reference Laboratory for Food Contact Materials (EURL-FCM) and the National Reference Laboratories (NRLs) of the network have agreed on a set of test conditions to ensure the comparability of measurement results reported in the frame of the implementation of official controls for FCM.

The comprehensive tables included in this report replace the "*JRC's Guidelines on Testing Conditions for Articles In Contact With Foodstuffs (With a Focus on Kitchenware) of 2009*" (<https://europa.eu/RH66Bd>). The testing conditions presented will allow the harmonised implementation of **Regulation (EU) No 10/2011**^(#) when testing kitchen and tableware made of plastic or containing plastic parts that potentially come in contact with food.

A range of conditions in terms of contact temperature (cold, ambient and hot) and contact time (short or long term storage) are to be taken into account when selecting the article preparation for testing and the suitable migration test to be performed.

The first table provides examples of items clustered in different classes and subclasses of kitchen and tableware.

The second table presents the relevant testing conditions for each class, including food simulants, testing conditions (i) based on the foreseeable worst case use of the article (e.g. contact time and contact temperature) or (ii) according to the instructions on the label, together with the surface-to-volume (s/v) ratios to be applied when calculating the final migration result.

The selection of food simulants is based on the foods expected to be used for a particular item (class/subclass). Often the food simulants are for all foods (cf. A, B, D2). When the article is used only in contact with specific foods, the food simulant is to be selected from Annex III of the Regulation^(#).

These harmonised tables drafted by the Task Force on Kitchenware have been thoroughly reviewed by the National Reference Laboratories and Official Control Laboratories dealing with food contact materials, in accordance with Article 94 (2)(a) of Regulation (EU) 2017/625.

The authors wish to acknowledge their valuable contribution.

(#) Commission Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food (<https://europa.eu/fm68fy>)

Article 17: Expression of migration test results

Annex III – Food simulants

Table 1: List of food simulants

Table 2: Food category specific assignment of food simulants

Table 3: Food simulant assignment for demonstrating compliance with the overall migration (OM) limit

Annex V – Compliance testing

Table 1: Selection of test time

Table 2: Selection of test temperature

Table 3: Standardised conditions for testing the overall migration (OM)

Kitchenware examples

Main Class	Subclass	Examples
Food Preparation Wear	FPW/CA1	Aprons, Bibs
	FPW/CA2	Gloves
	FPW/CA3	Towels, Wipes, Napkins, Tablecloth, Placemats
	FPW/CA4	Cheese cloth (dairy product), Plastic mat for cheese draining
Food Preparation Utensil for Cold/Ambient use (FPU/CA)	FPU/CA1	Utensils use in ambient temperature for short time: Rolling pin, Lattice cutter, Grater, Garlic press, Zester, Vegetable peeler, Apple peeler, Food scales, Apple corer, Apple cutter, Biscuit press, Cherry pitter, Egg separator, Fish scaler, Flour sifter, Herb chopper, Squeezer, Reamer, Mandolin, Wires, Meat tenderiser, Fruit baller, Nutmeg grater, Pastry blender, Mortar and pestle, Roller docker, Pasta cutter, Salad spinner, Julienne peeler, Avocado slicer, Ravioli maker, Vegetable cutter with container, Hamburger press, Coconut scraper, Empanadilla mould type, Meat grinder, Vegetable brush, Cake measuring tape, Cocktail shaker, Coffee measuring spoon
Food Preparation Utensils for Cold/Ambient or Hot use	FPU/CAH1	Utensils use in ambient or hot temperature for short time: Baster, Bottle Top Baster, Pastry spatula, Pastry scraper, Pastry brush, Pastry bag, Egg piercer, Pastry mat, Salad/omelette/fitness shaker, Whisk, Marinade Syringe, Funnel, Potatoes slicer, Dessert/appetizers rings, Measuring spoon, Measuring cup, Tea net, Ricer, Food mill, Chocolate thermometer, Chocolate forms
	FPU/CAH2	Cutting boards (not for storage)
	FPU/CAH3	Kitchen countertop, Worktop, Bench
	FPU/CAH4	Colander, Drum sieve, Chinois, Gravy strainer, Cooling rack
	FPU/CAH5	Bowls
	FPU/CAH6	Microwave materials (only warming up or defrosting)
	FPU/CAH7	Puree masher, Potato masher, Tongs-not foreseeable use at temperatures above 100 °C
Food Preparation Utensils for Hot use	FPU/H1	Articles that could be used during cooking/frying/grilling: Spoon, Ladle, Spatula, Tongs
	FPU/H2	Cookware , cooking items, microwave cookware: Steamer basket, lids (sold alone), Spice/fragrance bags, Boil over preventer, Frying pan splatter screens, Fondue forks, bourguignon fork, Cooking rings, Susceptor, microwave cooker
	FPU/H3	Bakeware and Ovenware items: Cake pan, Gratin dish, Cookie sheet, Muffin pan, Cooking tray, Oven liners
	FPU/H4	Roasting bags
Food Serving Utensils for Cold/Ambient use	FSU/CA1	Bread Bag, Basket (not for storage)
	FSU/CA2	Decanters, Fitness/bicycle bottles, Baby food pouches
	FSU/CA3	Dispenser: Candy dispenser, Honey dispenser, Oil dispenser, Sauce dispenser
Food Serving Utensils for Cold/Ambient or Hot use	FSU/CAH1	Cup, Glasses, Drinkware
	FSU/CAH2	Open flask, Carafe, Cans, Jugs
	FSU/CAH3	Bottles without caps
	FSU/CAH4	Baby bottles
	FSU/CAH5	Tableware, Plates, Dishware, Serving stand
	FSU/CAH6	Food trays, Serving board, French fries box, Finger food bags, Snack box, Popcorn box
	FSU/CAH7	Thermos flask, Isothermic drinking beaker

Food Serving Implements for Cold/Ambient use	FSI/CA1	Ice cream scoop, Ice tongues, Ice cube tray
	FSI/CA2	Specific use Cutlery and wine accessories: Cheese knife, Cheese slicer, Grapefruit knife, Salad cutlery, Tomato knife, Oyster knife, Butter curler, Honey dipper, Bar pestle, Wine tester, Bottle pourer, Wine chiller
	FSI/CA3	Bottle stopper, Caps
	FSI/CA4	Salt mill, Spice mill, Pepper mill, Herb mill
Food Serving Implements for Cold/Ambient or Hot use	FSI/CAH1	Cutlery: Forks, Knives , Spoons, Rice spoon, Sauce spoon, Lobster cracker, Lobster pick, Chopsticks, Teabag squeezer, Pizza cutter, Bread knife, Fillet knife, Pie knife, Cake and pie server, Party picks, Straws
Food Containers for Cold/Ambient or Hot use	FC/CAH1	Lunchboxes, Takeaway boxes
	FC/CAH2	Container: Pasta container, Cheese cellar, Butter cellar, Can covers, Garlic/onion keeper, Egg to go box, Bread box, Biscuit box, Storage box, Bags for storage, Foils, Jars
Kitchen Small Appliances for Cold/Ambient use	KSA/CA1	Fridges, coolers: Koolatron cooler, Frozen Beverage Maker, Mini fridges, Ice box, Kegeators
	KSA/CA2	Grater, grinders: Coffee grinder, Electric graters, Vegetable chopper, Mini chopper, Peanut and nut butter maker, Wet grinder, Potato peeler
	KSA/CA3	Meat grinder and slicers: Sausage stuffer, Meat slicers, Meat grinders, Slicers
	KSA/CA4	Butter churner, milk shake maker
	KSA/CA5	Pasta maker, noodles maker, Electric or manual Roller, Strip Cutter
	KSA/CA6	Squeezers, juicers, Juice Extractors, smoothie maker
	KSA/CA7	Yogurt maker
	KSA/CA8	Ice cream maker
Kitchen Small Appliances for Cold/Ambient or Hot use	KSA/CAH1	Water dispenser, water purifier, water filters, Beverage dispenser, Soda makers, Spare carbonator
	KSA/CAH2	Baby formula makers/warmer, milk frothers
	KSA/CAH3	Electric blade
	KSA/CAH4	Still spirit
	KSA/CAH5	Blenders, Agitators, Hand blenders, Drink mixer, Mixers, Hand mixers, Electric mill
	KSA/CAH6	Melting pot, food warmers, chocolate maker
	KSA/CAH7	Heated and Bain-Marie dispensers: Chocolate fountain, Heated sauce dispenser, Soup kettle, Buffet server, Chafing dishes, Wet bain marie
	KSA/CAH8	Dehydrators
Kitchen Small Appliances for Hot use	KSA/H1	Coffee makers, Moka
	KSA/H2	Immersion heater (used for water)
	KSA/H3	Tea pots and boilers: Kettle, Teapot, Eggs Boiler, Water boiler, Tea maker, Samovar, Soy milk maker, Boiler
	KSA/H4	Sous vide cooker
	KSA/H5	Popcorn maker, cotton candy machine, Gummy and candy maker
	KSA/H6	Steamers, Baby food makers
	KSA/H7	Toaster, Hot dog grillers, Waffle makers, Mini cupcake makers, Crepe/pancake makers, Quesadilla Maker
	KSA/H8	Fryers, Deep fryer, Fondue set
	KSA/H9	Cookers and food processor: Slow cookers, Stirrer, Pressure cooker, Cheese maker, Bread machine, Soup maker, Food processor
	KSA/H10	Grills and ovens: Indoor/Outdoor Grill, Infrared oven, Air Fryer, Electric skillet, Electric Griddles , Hotplates, Contact grills, Roster, Combi steamer, Halogen cooking pot, Rotisserie, Electric woks
KSA/part	parts of assembled Kitchen Small Appliances; Note: parts of the equipment used for storage should be tested separately as containers under appropriate conditions (e.g. FSU/CA2 or FC/CA1)	

Testing conditions for plastic kitchenware

Main Class	Subclass	Use			Sample prep	Test type				Food simulant						Specific Migration Conditions			S/V					Overall Migration conditions	Note			
		cold (< 20 °C)	Room Temperature	hot (> 40 °C)		storage (in months)	cut test specimen	intact article	part of it	actual use	article fill	migration cell	total immersion	food	A	B	C	D1	D2	E	time	Temp (°C)	label/instructions			Real	Real (infant/young)	6 (V < 0.5L)
Food Preparation Wear	FPW/CA1	x	x			x	x		x	x	x	x	x	x					0.5 h	40		x				x	3	[1]
	FPW/CA2	x	x					x [#]	x		x	x	x					x	0.5 h	40						x	3	[1] # or turn inside out
	FPW/CA3	x	x			x				x	x	x						x	0.5 h	40		x				x	3	[1]
	FPW/CA4	x	x		x	x	x					x				x			10 d	40		x		x	x	x	2	if used to cook herbs goto FPU/H2
Food Preparation Utensils	FPU/CA1	x	x			x	x		x		x	x	x					x	0.5 h	40		x		x	x	x	3	[1]
	FPU/CAH1	x	x	x		x	x		x		x	x	x					x	0.5 h	70		x		x	x	x	3	
	FPU/CAH2	x	x	x		x	x			x	x	x						x	2 h	70						x	3	
	FPU/CAH3	x	x	x		x	x				x	x	x					x	2 h	70						x	3	
	FPU/CAH4	x	x	x		x	x					x	x	x				x	2 h	70		x		x	x	x	3	
	FPU/CAH5		x	x			x		x			x	x	x				x	2 h	70		x		x	x		3	
	FPU/CAH6	x	x	x	x		x			x		x	x	x				x	10 d	40		x		x	x		2	
	FPU/CAH7	x	x	x			x	x				x	x	x				x	2 h	100 or Reflux		x		x	x	x	5	[2] time set as 4*0.5 h
	FPU/H1			x			x	x				x	x	x					2 h	100 or Reflux						x	6	[2] time set as 4*0.5 h
	FPU/H2			x			x	x				x							0.5 h	175						x	7	
	FPU/H3			x			x	x				x	x	x					2 h	100 or Reflux		x		x	x	x	6	[2] time set as 4*0.5 h
	FPU/H4			x			x	x				x	x	x					0.5 h	175		x		x	x	x	7	
					x		x	x				x	x	x					4 h	100 or Reflux		x		x	x	x	6	[2] time set as 4*1 h
					x		x	x				x	x	x					1 h	200		x		x	x	x	7	
				x		x	x				x	x	x					8 h	100 or Reflux		x		x	x	x	6	[2] time set as 4*2 h	
				x		x	x				x							2 h	200		x		x	x	x	7		
Food Serving Utensils	FSU/CA1	x	x			x	x		x		x	x	x					x	24 h	40		x		x	x	x	2	
	FSU/CA2	x	x			x	x		x		x							x	24 h	40		x		x	x		2	if hot fill goto FSU/CAH2
	FSU/CA3	x	x		< 6	y	x		y;x		x	x	x					x	10 d	50		x		x	x		2	[3]
	FSU/CAH1	x	x		> 6	y	x		y;x		x	x	x					x	10 d	60		x		x	x		2	[3]
	FSU/CAH2		x	x		y	x		y;x		x	x	x					x	24 h	40		x		x	x		2	
	FSU/CAH3		x	x			x					x							2 h	70		x		x	x		3	if storage goto 24h/40 °C [OM2]
	FSU/CAH4		x	x			x					x							24 h	40		x		x	x		2	if storage goto 24h/40 °C [OM2]
	FSU/CAH5		x	x			x					x	x	x					2 h	70		x		x	x		3	
	FSU/CAH6		x	x			x					x	x	x					2 h	70		x		x	x	x	3	
	FSU/CAH7		x	x			x					x	x	x					24 h	100		x		x	x		4	fill with simulant @ 100 °C & keep container closed for 24 h

Food Serving Implements	FSI/CA1	x		x	x	x	x	x	x	x	0.5 h	20	x	1								
	FSI/CA2	x	x		x	x	x	x	x	x	0.5 h	40	x	3	[1]							
		x	x	x	x	x	x	x	x	x	24 h	40	x	3								
	FSI/CA3	x		x	x	x	x	x	x	x	10 d	40	x	x	x	2	Refer to Art. 17 § 3 and 4					
		x	x	< 6	x	x	x	x	x	x	10 d	50	x	x	x	2	[3], Refer to Art. 17 § 3 and 4					
		x	x	> 6	x	x	x	x	x	x	10 d	60	x	x	x	2	[3], Refer to Art. 17 § 3 and 4					
	FSI/CA4	x	x	< 6	x	x	x	x		x	10 d	50	x	x	x		[3]					
x		x	> 6	x	x	x	x		x	10 d	60	x	x	x		[3]						
FSI/CAH1	x	x	x		x	x		x	x	0.5 h	70			x	3							
	x	x	x		x	x		x	x	2 h	70			x	3	spoon						
Food Containers	FC/CAH1	x	x	x	x	y	x	y	x	x	x	x	x	10 d	40	x	x	x	2			
	FC/CAH2	x	x		x	y	x	y	x	x	x	x	x	10 d	40	x	x	x	2			
		x	x	x	< 6	y	x	y	x	x	x	x	x	10 d	50	x	x	x	2	[3]		
		x	x	x	> 6	y	x	y	x	x	x	x	x	10 d	60	x	x	x	2	[3]		
Kitchen Small Appliances	KSA/CA1	x	x		x	x		x	x	x	x	x										
	KSA/CA2	x	x		x	x		x	x	x												
	KSA/CA3	x	x		x	x		x	x													
	KSA/CA4	x	x		x	x		x	x	x	x											
	KSA/CA5	x	x		x	x		x		x	x											
	KSA/CA6	x	x		x	x		x	x	x												
	KSA/CA7	x	x		x	x		x	x	x												
	KSA/CA8	x	x		x	x		x	x	x	x											
	KSA/CAH1	x	x	x		x	x	x	x	x												
	KSA/CAH2	x	x	x		x	x	x	x	x												
	KSA/CAH3	x	x	x		x	x		x	x	x	0.5 h	70			x	3	cf. FSI/CAH1				
	KSA/CAH4	x	x	x		x	x		x	x*	x									* if pH less than 4.5		
	KSA/CAH5	x	x	x		x	x		x	x	x											
	KSA/CAH6	x	x	x		x	x		x	x	x											
	KSA/CAH7	x	x	x		x	x		x	x	x											
	KSA/CAH8	x	x	x		x	x		x	x	x											
	KSA/H1			x		x	x		H ₂ O		x										H ₂ O: artificial tap water	
	KSA/H2			x		x	x		H ₂ O		x											H ₂ O: artificial tap water
	KSA/H3			x		x	x		H ₂ O		x											H ₂ O: artificial tap water
	KSA/H4			x		x	x		x	x	x											
KSA/H5			x		x	x		x	x	x												
KSA/H6			x		x	x		x	x	x												
KSA/H7			x		x	x		x	x	x												
KSA/H8			x		x	x		x														
KSA/H9			x		x	x		x	x	x												
KSA/H10			x		x	x		x	x	x												
KSA/part	x	x	x		x			x	x	x											[4]	

[1] OM0 (new): 0.5 h at 40 °C, proposal of future amendment of Reg. 10/2011

[2] cf. Table 2 of Annex V

[3] use (10d, 40°C) if equilibrium is reached [cf. Reg. 10/2011 Annex V, Chapter 2 § 2.1.4.e & Amendment 2016/1416]

[4] select test time and temperature according to worst foreseeable condition use (described in the instructions when available)

SM, OM: Specific migration, Overall Migration

s/v: surface-to-volume ratio to calculate final migration result

Notes ...

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by electronic mail via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from EU Bookshop at: <https://publications.europa.eu/en/publications>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).



The European Commission's science and knowledge service

Joint Research Centre

JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



EU Science Hub

ec.europa.eu/jrc



@EU_ScienceHub



EU Science Hub - Joint Research Centre



Joint Research Centre



EU Science Hub