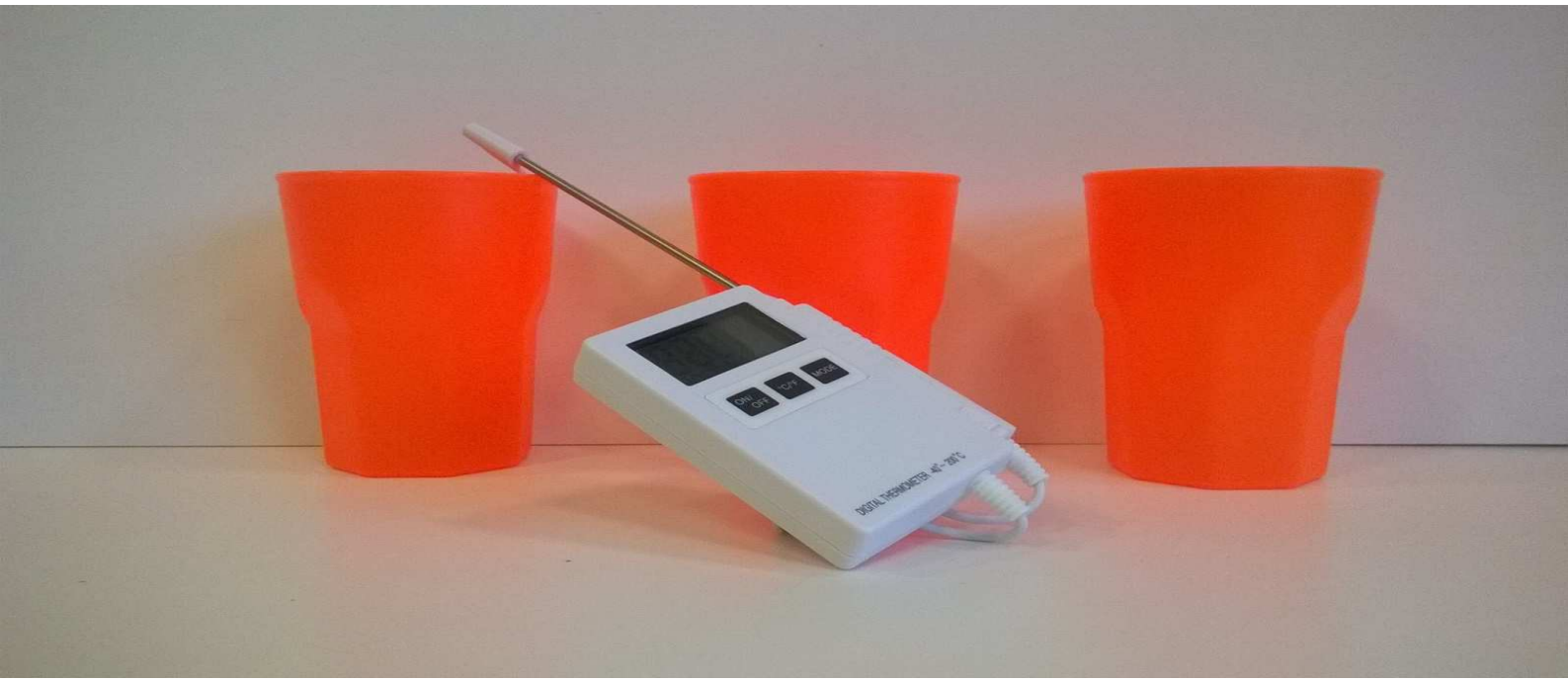
European Commission

JRC VALIDATED METHODS, REFERENCE METHODS AND MEASUREMENTS REPORT



Report of an inter-laboratory comparison from the European Union Reference Laboratory for Food Contact Materials

ILC01 2015 – Temperature control during migration tests by article filling

Emmanouil Tsochatzis, Anja Mieth, Catherine Simoneau and Eddo Hoekstra

2016

Report EUR 27826 EN

Joint Research Centre

European Commission
Joint Research Centre
Institute for Health and Consumer Protection

Contact information
Catherine Simoneau
Address: Joint Research Centre, Via Enrico Fermi 2749, TP 260, 21027 Ispra (VA) Italy
E-mail: JRC-FCM@ec.europa.eu
Tel.: +39 0332 78 5889

JRC Science Hub
https://ec.europa.eu/jrc

JRC100836
EUR 27826 EN

ISBN 978-92-79-57669-0 (PDF)

ISSN 1831-9424 (online)

doi:10.2788/536852

Luxembourg: Publications Office of the European Union, 2016

Printed in Italy

Abstract

This report presents the results of an inter-laboratory comparison (ILC) on the temperature control during migration tests by article filling organised by the EURL-FCM, Ispra (Italy). Participants carried out a migration test by article filling in provided polypropylene cups (volume 0.3 L) with food simulant D1 (ethanol 50 %, v/v) at 70°C for 2 h and monitored the temperature of the food simulant inside one of the test specimen during the contact phase and provide details for the operating procedure. The participation to the ILC was satisfactory. The results show that 30% of the 53 migration experiments performed by the 45 laboratories were successful (scoring 100%) meaning that the temperature of the food simulant was in the desired range during the full contact time. It is clear that this result will trigger further discussion to improve the temperature control during a migration test. The information provided by the laboratories through the questionnaire gives a first insight in the factors that can be important to reach a satisfactory score. This discussion should lead to the selection of one or more methods for temperature control during migration testing. These selected methods need to be compared in a future ILC.

Report of the inter-laboratory comparison

ILC 01 2015 – Temperature control during migration tests by article filling

EC-JRC-IHCP, CAT Unit

2016

No SANTE/ AA SI2.701410

Emmanouil Tsochatzis, Anja Mieth, Catherine Simoneau and Eddo Hoekstra

Table of contents

1. *Summary*

The Institute of Health and Consumer Protection (IHCP) of the Directorate-General Joint Research Centre of the European Commission hosts the EU Reference Laboratory for Food contact material (EURL-FCM). One of its main tasks it to organize interlaboratory comparisons (ILCs) among appointed National Reference Laboratories (NRLs).

The report presents the results of an ILC which focused on the temperature control during migration tests by article filling and on a root-cause-analysis for the identification of the best-practice approaches concerning the preheating, filling and contact phase which can ensure that migration tests by article filling are performed at the correct temperature according to EU Reg. 10/2011 [1] .

The general aim of the present exercise was to assess the best practices of laboratories to ensure that required contact temperature for migration during testing is reached within acceptable range. The exercise was designed as a proficiency testing and consequently the participants were free to use any experimental approach corresponding to the best of their expertise.

In the present exercise, the participants received polypropylene cups (volume 0.3 L) and were asked to perform a migration test by article filling with food simulant D1 (ethanol 50%, v/v) at 70°C for 2 h. The participants were required to monitor the temperature inside one of the test specimens during the contact phase and provide details of their operating procedure. There were no requirements to identify or quantify any migrating substances at that stage due to the insufficient homogeneity of test articles of that nature (article filling) for the scope of the exercise.

Samples were sent to 45 laboratories (26 NRLs, 10 German Official Control laboratories, 4 Spanish Official Control Laboratories, 4 Belgian Official Control Laboratories and 1 Italian Offical Control Laboratory) and all the participating laboratories submitted results.

Results showed that 30% of the 53 migration experiments performed by the 45 laboratories obtained a scoring of 100% success meaning that the temperature of the food simulant was in the tolerance range of ± 2°C during the entire contact time of 2 h at the contact tempature of 70°C chosen for the exercise [2].

The laboratories were also asked to provide their experimental procedure of the migration experiment by answering a questionnaire in order to identify different factors that potentially could have an effect on the contact temperature during migration tests by article filling as rot cause for variations.

The results indicated that the main factors that have a direct or an indirect, individual or combined effect in the temperature of the food simulant during the migration experiment by article filling, were the initial temperature of the food simulant, the volume of the thermostatic oven, preheating of the test specimen, the operation of fan and the interval air exchange, the filling time, the material of the filling place, the persons required for the experiment, the covering of the test specimen during migration and finally the food simulant volume loss.

2. Introduction

ILC studies are important for the laboratory quality assurance and allow individual laboratories to check their performance.

It is one of the core duties of the European Union Reference Laboratories to organise ILCs, as stipulated in Regulation (EC) 882/2004 of the European Parliament and of the Council [3].

In accordance with the above requirements, the European Union Reference Laboratory for Food contact Materials (EURL-FCM) organised ILCs for the network of National Reference Laboratories (NRLs) in 2015.

3. Scope

The objectives of this ILC were:

1. To assess the ability of the NRLs to perform a specific migration test by article filling with food simulant D1 (i.e. ethanol 50% v/v) for 2 h at 70±2°C [2] inside a thermostatic oven or incubator with a focus on temperature control protocols.
2. To perform a root-cause analysis as to be set up recommendations for migration tests by article filling.

The assessment of all measurement results was undertaken on the basis of requirements laid down in international standards ([4]). Some national official control laboratories also participated.

4. Time frame

Invitation letters were sent by e-mail to all NRLs and interested national official control laboraories on the 8th of October 2015 (see Annex 12.1, Figure 12). Laboratories were asked to fill in a letter of confirmation of their participation (see Annex 12.1, Figure 13).

The samples were dispatched to the participants on the19th of October 2015 together with a sample receipt letter, their lab code, a shipping kit letter, instructions for the compilation of the results (see Annex 12.1, Figures 14, 15, 16, 17), a print copy for the compilation of the results and a questionnaire form to be filled (see Annex 12.1, Figures 18, 19).

The deadline to report results was set on the 30th of November 2015.

5. Test material

Polypropylene cups (0.3 L) were purchased. All participants received five cups, wrapped in alumium foils, the test specimens.

Figure 1. Polypropylene (PP) cups (left) as prepared for shipment (right)

6. *Instruction to participants and requested results*

Instruction were given to all participants in the letter that accompanied the samples (see Annex, Figure 16).

The laboratories were asked to perform a specific migration test by article filling with food simulant D1 (i.e. ethanol 50% (v/v)) at 70°C for 2 h inside a thermostatic oven or incubator by filling three of the provided test specimens to within 0.5 cm from the top, expose them simultaneously and monitor the temperature of the food simulant inside the third test specimen, i.e. the one filled last and/or placed into the thermostatic oven/incubator last. The NRLs were instructed to use a calibrated thermometer to carry out the temperature measurements. The EURL-FCM also provided to the participating laboratories a digital probe, in case they did not have a suitable calibrated thermometer to monitor the temperature of the food simulant. Additionally, the laboratories were asked, if possible, to record also the temperature displayed at the thermostatic oven/incubator itself.

The temperature values were requested to be recorded in specific timeframes. The first value was to be recorded immediately after the third test specimen was placed into the thermostatic oven/incubator and it was set as t = 0 min. Subsequently, the temperature measurements were set every 1 min (until t = 10 min), every 5 min from t = 10 min to t = 30 min and 15 min from t = 30 min to t = 120 min. Additionally, the laboratories were asked to record the temperature of the preheated food simulant, before it was filled into the test specimens, during the preheat (inside the oven/liquid bath, on a hotplate) or immediately after having removed the food simulant from the heating source.

The participants were asked to monitor the food simulant temperature only during one migration test. There was no need to perform a second test and also there were no requirements to identify or quantify any migrating substances at that stage due to an inherent lesser homogeneity of the type of test articles (article filling).

As the exercise aimed at a proficiency testing, the participants were free to use any suitable method or instrumentation of their own choice for the realization of the specific migration by article filling while making sure that the food simulant reaches the desired test temperature of 70°C ± 2°C [2] as soon as possible after placing the filled test specimens inside the thermostatic oven.

7. Evaluation of results

7.1. Performance scores

As described in ISO/IEC 17043:2010 Annex B, B.3.3 [4], the performance of a laboratory can be evaluated "on the basis of more than one result in a single proficiency testing round". Based on this, a combined performance score was calculated to assess the overall laboratory performance.

Performance scores were defined based on the general concept described in ISO/IEC 17043:2010 Annex B [4]. To assess the laboratory performance for qualitative data, ISO/IEC 17043 states "to compare a participant's result with the assigned value. If they are identical, then performance is acceptable. If they are not identical, then expert judgement is needed to determine if the result is fit for its intended use" (see [4] Annex B, B.3.2.1). Due to the temperature control during the migration experiment by article filling, a "passed/failed"-decision based on the fact whether all measured temperatures were located inside the acceptable range (70°C ± 2°C) [2], was appropriate and could be characterised as "satisfactory".

7.2. *Applied scoring and evaluation system*

The scoring system was based on "yes/no"-decisions. For each requested subtask, i.e. measurement of the food simulant temperature in specific timeframes, a result was either correct and the participant obtained 1 point or it was incorrect and the participant obtained 0 points, which in the present exercise meant reporting a temperature outside the acceptable temperature range of the contact temperature of $70^{o}C \pm 2^{o}C$ (acceptable were from $68^{o}C$-$72^{o}C$) [2]. Similar scoring system has also been applied for the ILC 02 2013 and ILC 02 2014 [5, 6]. No penalty scores were given [6].

In the present exercise, the percentage of achieved points (i.e. the sum of points achieved in the analysis of temperatures, max. 21, was used as a parameter to evaluate the overall performance of a laboratory. No threshold was set as all the points, which were temperature measurements in specific timeframe, must be inside the target temperature range of $70^{o}C \pm 2^{o}C$ [2]. The overall laboratory performance

was regarded as "satisfactory" when the participant obtained 100% of the total achievable points. Therefore the percentage of achieved points other than 100% does not say anything about the relative performance of the laboratory and is only used for root-cause analysis.

8. Results and Conclusions

8.1. Participation

Samples were sent to 45 laboratories (26 NRLs, 10 German Official Control laboratories, 4 Spanish Official Control Laboratories, 4 Belgian Official Control Laboratories and 1 Italian Offical Control Laboratory) and all the participating laboratories submitted results. This corresponded to a 100 % participation.

8.2. Results from the participants

The rounded results of the participants are presented in Annex 12.2, in Table 1. Additionally the results of the participating laboratories are visualised in Annex 12.2, Figure 20.

The total achieved points of each laboratory in the exercise are listed in Annex 12.3, Table 2 (Annex 12.3) and visualised in Figure 2. This figure also shows which result is obtained by either a constant or gradient temperature programme.

In some cases, some participating laboratories reported results for different configurations of the migration method. Those results were taken into account and will be also used for a further root-cause analysis.

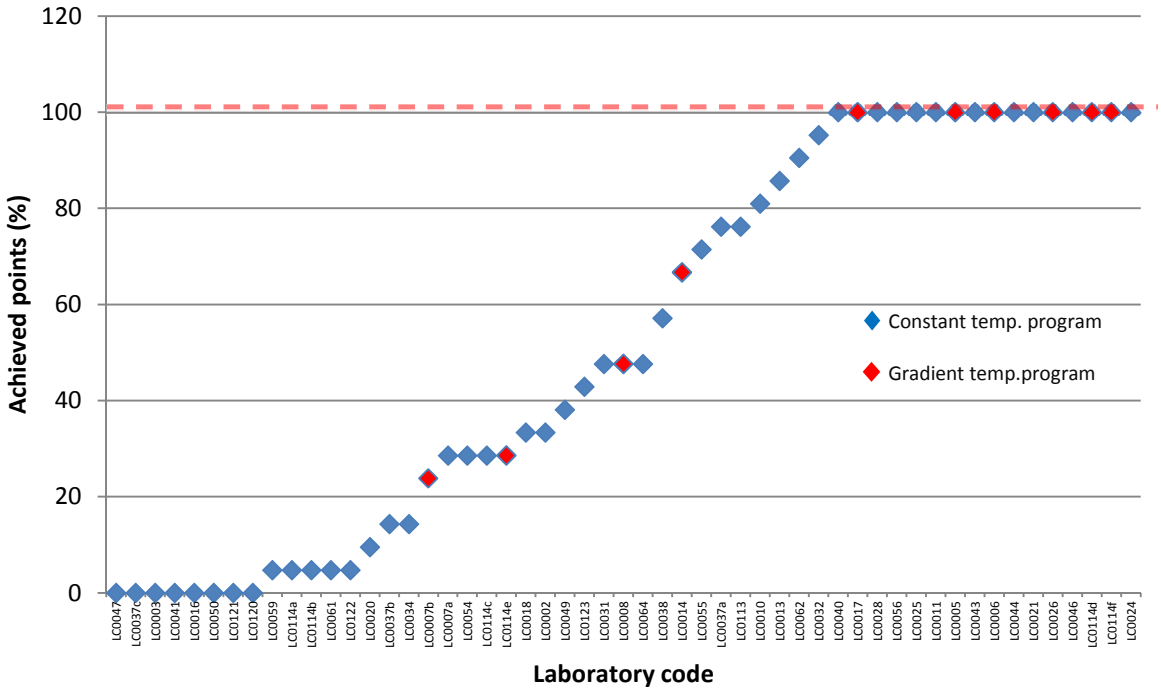


Figure 2. Achieved point per laboratory depending on applied temperature program

Fifteen out of 53 migration experiments (30%) reached a 100 % performance score of satisfactory result.

8.2.1. Oven temperature

The participating laboratories used mainly 2 types of oven temperature programs for the realisation of the specific migration by article filling. Those were the ***constant*** temperature program, where the incubator temperature was kept constant throughout the migration experiment and the ***gradient*** temperature program, where the temperature was changed, based on a time-temperature program (see Figure 3). In the latter case, different approaches were followed and reported by the participating laboratories.

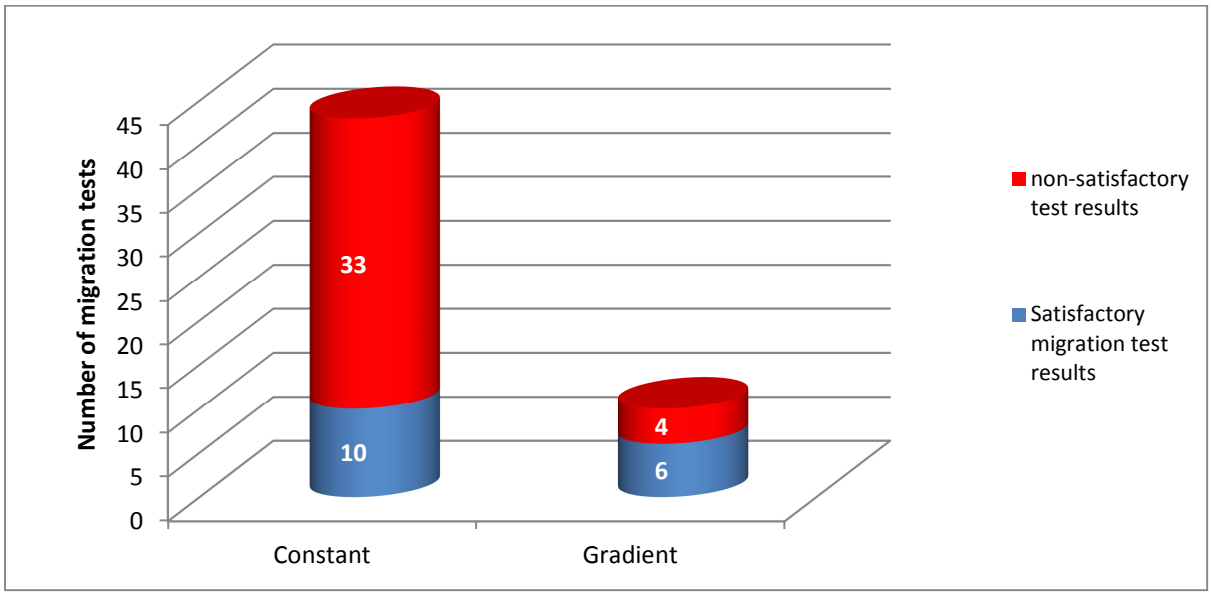


Figure 3. Temperature programs applied and indicating the number of laboratories and their scoring performance

In 81% of the migration experiments (43) a constant temperature was used and 10 of them reached satisfactory results. In 19% of the migration experiments (10) a gradient temperature program was used and 6 of them reached satisfactory results.

8.2.2. Food simulant preheating

For the initial food simulant temperature, the results for constant and gradient temperature programs can be categorised in 3 main groups. In case of constant temperature programs, the food simulant was preheated in a temperature lower ($T_{simulant}<T_{oven}$), equal ($T_{simulant}=T_{oven}$) or higher ($T_{simulant}>T_{oven}$) than the oven temperature. In case of gradient temperature programs, the food simulant was preheated in a temperature lower than the minimum temperature of the program ($T_{simulant}<T_{min,\ oven\ program}$), in a temperature inside the range of the temperature

program ($T_{simulant}$=$T_{oven\ temp.\ program}$), or in a temperature higher than the maximum temperature of the program ($T_{simulant}$>$T_{max,\ oven\ program}$).

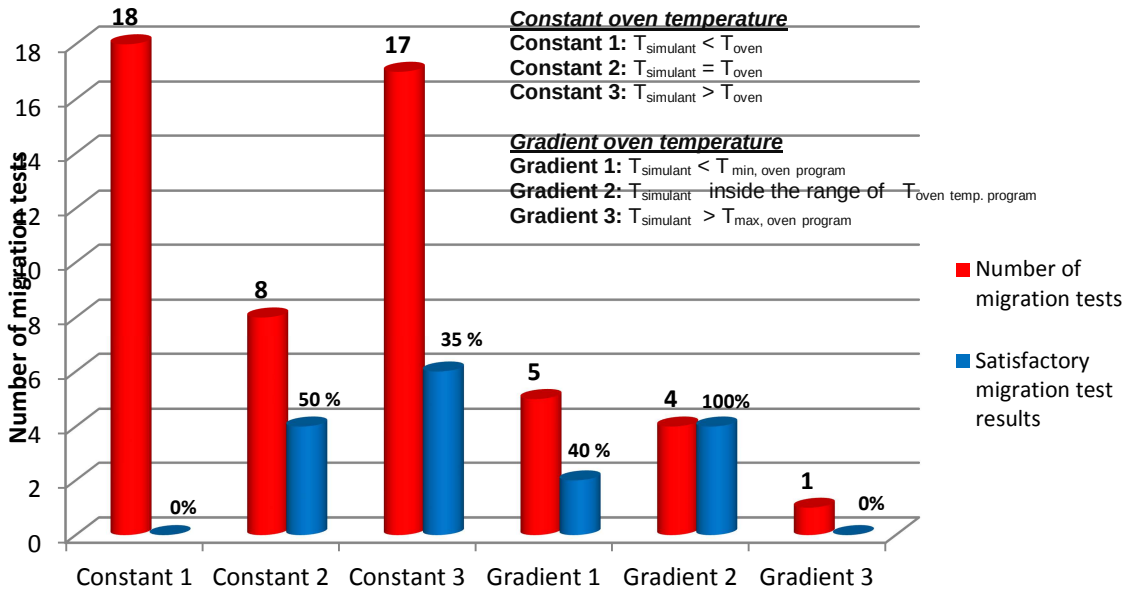


Figure 4. Food simulant preheating temperature options and scoring performance

Figure 4 shows the total number of migration experiments for the different initial food simulant temperature options and the number of migration experiments that were satisfactory. In the case of migration experiments with a constant temperature program, the preheating of food simulant to a temperature lower than the oven temperature appeared not to lead to a 100% performance score. The preheating of food simulant to a temperature equal (8 migration experiments) or higher (17 migration experiments) than the oven temperature seemed to be more effective, where the 100% performance scores was reached by 50% and 35% respectively of the respective migration experiments. The participating laboratories applied different patterns of preheating the food simulant.

In the case of migration experiments using a gradient temperature program, the initial food simulant temperature within the minimum and maximum of the temperature oven programs seemed most effective in reaching the 100% performance score. However the number of migration experiments with these conditions was low. In the other cases where the temperature was inside oven temperature program ($T_{simulant}$<$T_{min,\ oven\ temp.\ program}$) or higher than the maximum temperature of the oven program ($T_{simulant}$>$T_{max,\ oven\ program}$), not all laboratories reached 100% performance score. The participating laboratories also applied different patterns of preheating the food simulant.

8.2.3. Test specimen preheating

Some participating laboratories preheated the test specimens prior to the migration by article filling. The preheating included preheating contact times that ranged from 15 min up to 300 min and contact temperatures that ranged from 40°C up to 90°C.

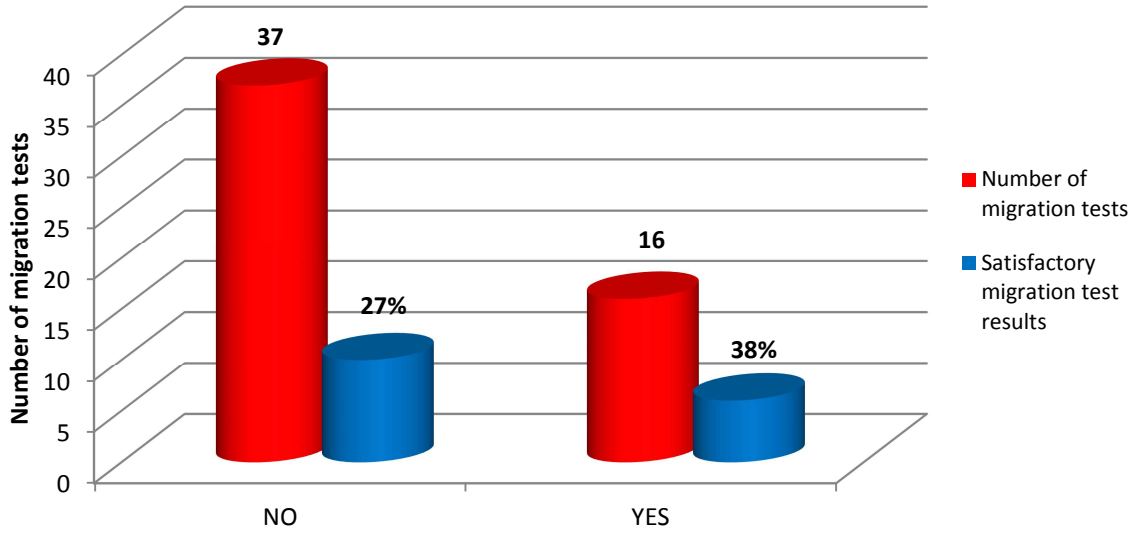


Figure 5. Application of specimen preheat and scoring performance

Figure 5 shows how satisfactory the preheating of the test specimen was. In 37 migration experiments the test specimen was not preheated, while in 16 migration experiments the test specimen was preheated. The results indicated that test specimen preheating led to satisfactory results for 6 migration experiments (38%), whilst no preheating led to satisfactory results for 10 migration experiments (27%).

8.2.4. Oven/incubator volume

The participants used different types of incubators with a variety of volumetric capacities. The volumes ranged from 49 up to 1333 L. Eleven laboratories used oven's with a volume of 108 L and ten laboratories used oven's with 53 L volume. The majority of the volume of the thermostatic ovens was below 100 L (36%), followed by 100-200 L (32%) and more than 200 L (23%). Additionally, 2 of the participating laboratories (4%) did the migration in a water bath and 3 of the laboratories (6%) did not gave any details regarding the volume of their oven.

Based on the obtained results of the participating laboratories, it seemed that the increment of the oven volume had a positive effect on the temperature control, though the participating laboratories had operated and realised migration in different oven's volumes following different experimental conditions. It should be noted that apart from the volume, the contact temperature could be also affected by other factors such as the opening and the closing time of door of the oven and the angle of door opening.

8.2.5. Oven fan and interval air exchange operation

Figure 6 shows the effect of the fan speed on the performance score of the migration experiments. In 15 migration experiments an oven without a fan was used or the fan was switched off. In 3 migration experiments the fan was operated at low level, in 14 migration experiments at medium level and in 19 migration experiments at maximum level. In 2 migration experiments a water bath was used.

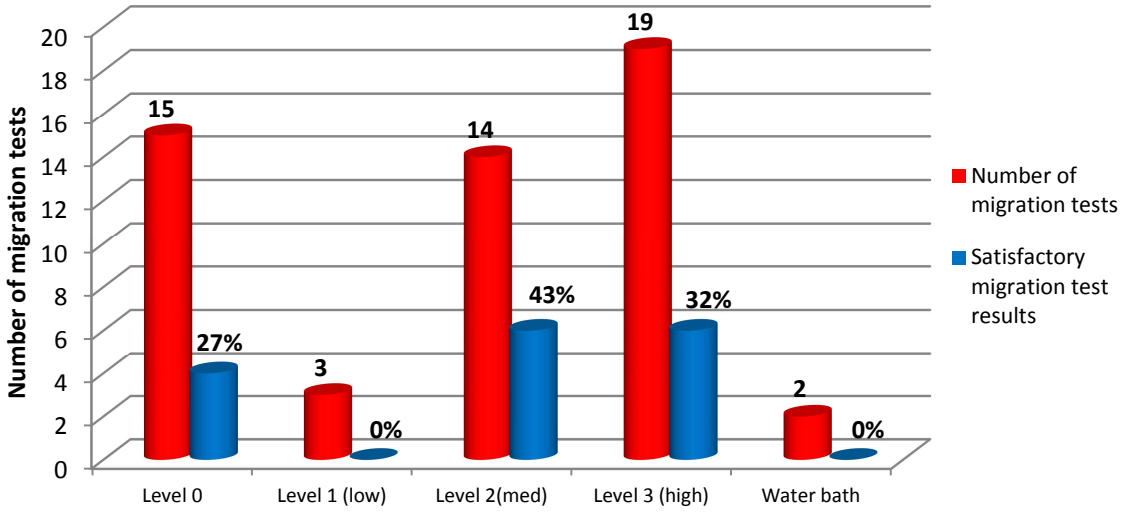


Figure 6. Application of fan operation speed (Level 0 = no fan; Level 1 = low; Level 2 = medium; Level 3 = Maximum) and scoring performance

Fan operation at medium or high level exhibited a relatively higher satisfactory scoring percentages of 43% and 32% respectively. The absence of use of fan or a use in low speed resulted in relatively low satisfactory scoring percentages.

Apart from the fan operation on the oven, the participating laboratories were asked to provide information as to whether they applied any air exchange of the oven during the migration experiment. The results indicated that in most migration experiments (43) no air exchange was applied (Figure 7). In the remaining 10 migration experiments air exchange was applied. The satisfactory scoring percentage without interval air exchange was 28%, while with interval air exchange a 40% had satisfactory scoring.

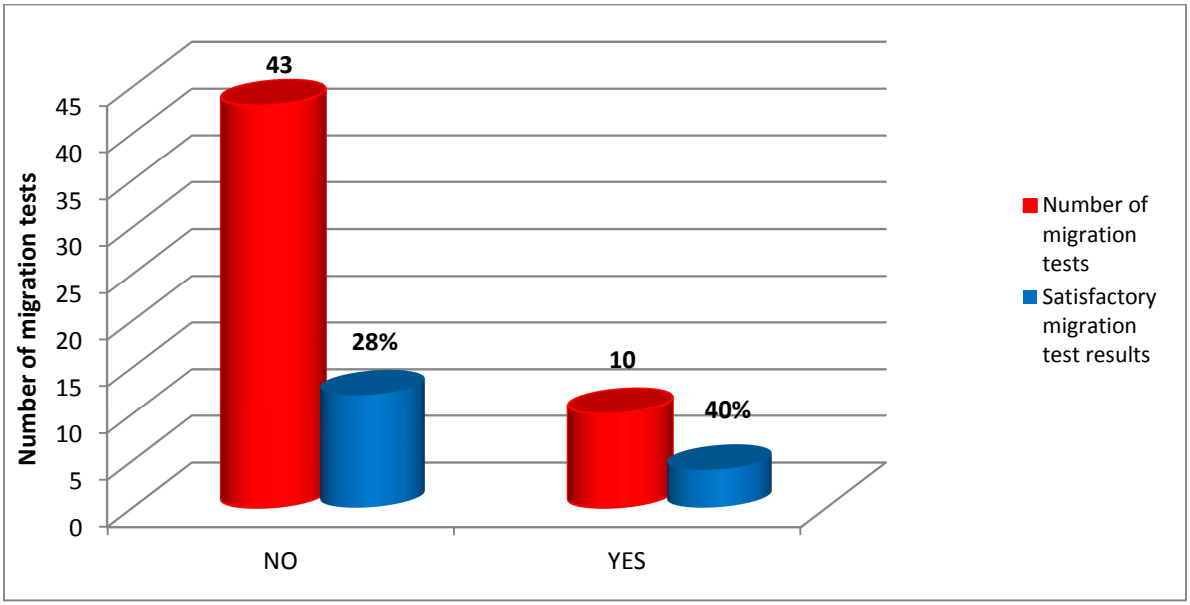


Figure 7. Application of fan interval air exchange (YES) or not (NO) and scoring performance

8.2.6. Specimen filling

Figure 8 shows the effect of the place where the test specimen was filled. In 15 migration experiments the test specimens were filled inside a thermostatic oven, and 33% of them had a satisfactory scoring. In 37 migration experiments the test specimens were filled outside the thermostatic oven/incubator, where 30% of them had satisfactory scoring. In one migration experiment the test specimen was filled inside a water bath with no satisfactory scoring.

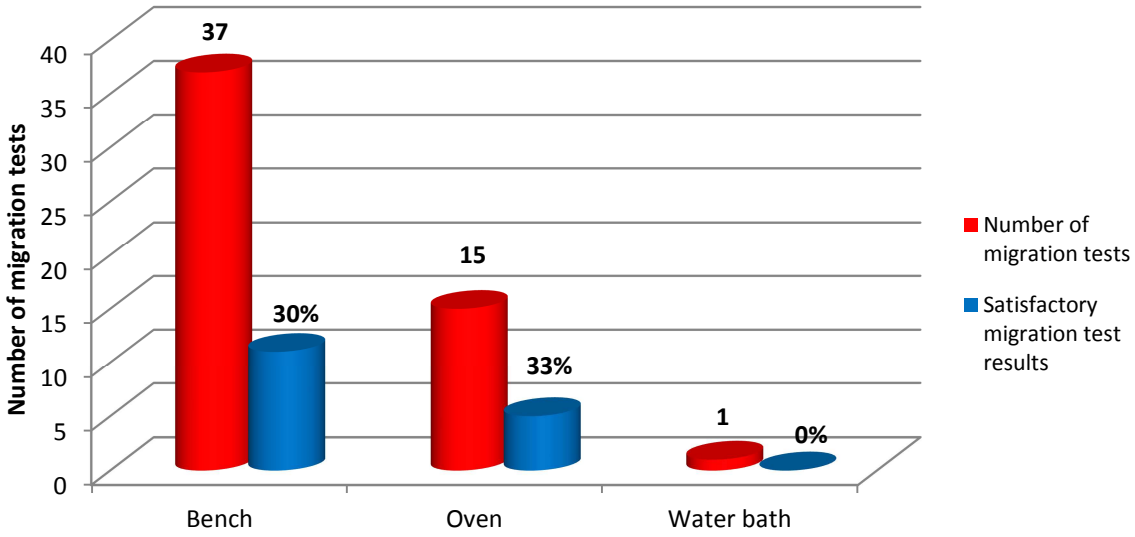


Figure 8. Different filling places and scoring performance

Apart from the different filling places, the participating laboratories were asked to indicate the different types of materials on which the test specimen was placed for filling outside the oven and the distance from the filling place to the oven. They reported 7 different surface materials, i.e. ceramic (insulated, non-insulated, + paper

or + metal) plastic, metal, wood) and distances varying from 0.1 up to 6.5 m, from the filling place to the thermostatic oven.

The different filling place surface materials, along with their relative scoring percentages results, are presented in Figure 9.

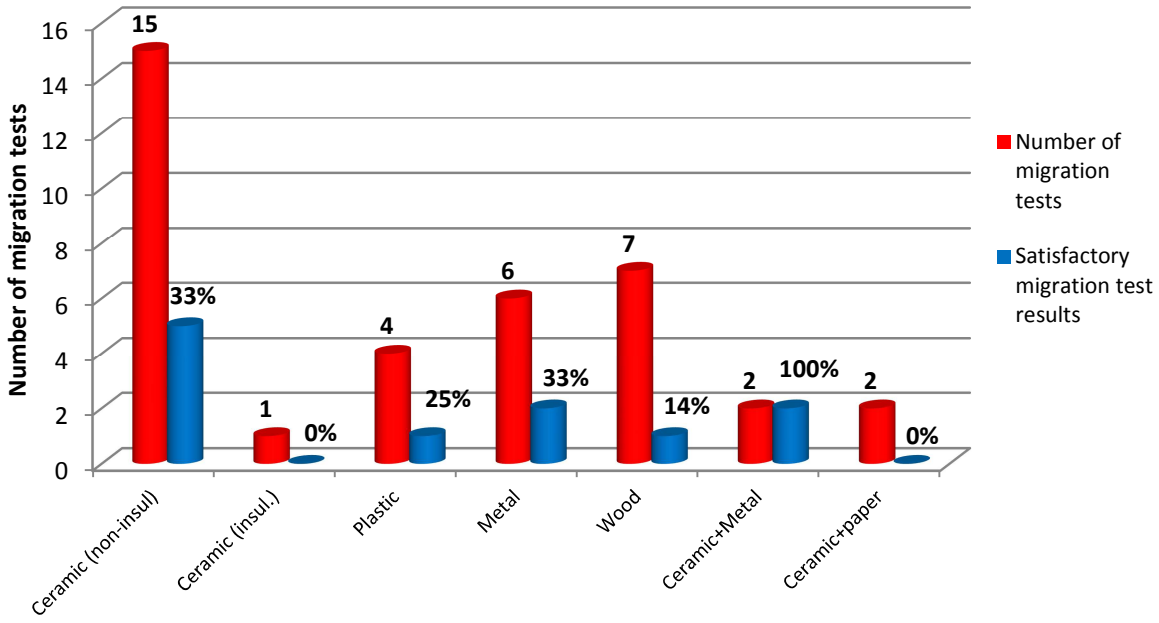


Figure 9. Different types of filling place materials and scoring performance

The participating laboratories were asked to report the time between starting of fillling each test specimen and placing it into the oven or the time of filling and closing the door of the oven, in the case where the test specimens were filled inside the oven. The results showed large time variability ranging from 0.5 min up to 5 min.

An additional feedback from the participants, was the indication of intentional breaks/intervals between the filling of the test specimens. Only 4 laboratories reported intentional time breaks between the filling of 2 test specimens, either outside or inside the oven/incubator. Those intentional time breaks varied from 0.16 min up to 3 min.

Laboratories reported different numbers of persons that they required during the filling procedure of the specimen and the realisation of the migration experiment (Figure 10). 38 migration experiments used one person of which 32% had a satisfactory scoring percentage, 13 migration experiments used 2 persons of which 15% had a satisfactory scoring percentage and 2 migration experiments used 3 persons of which 100% had a satisfactory scoring percentage.

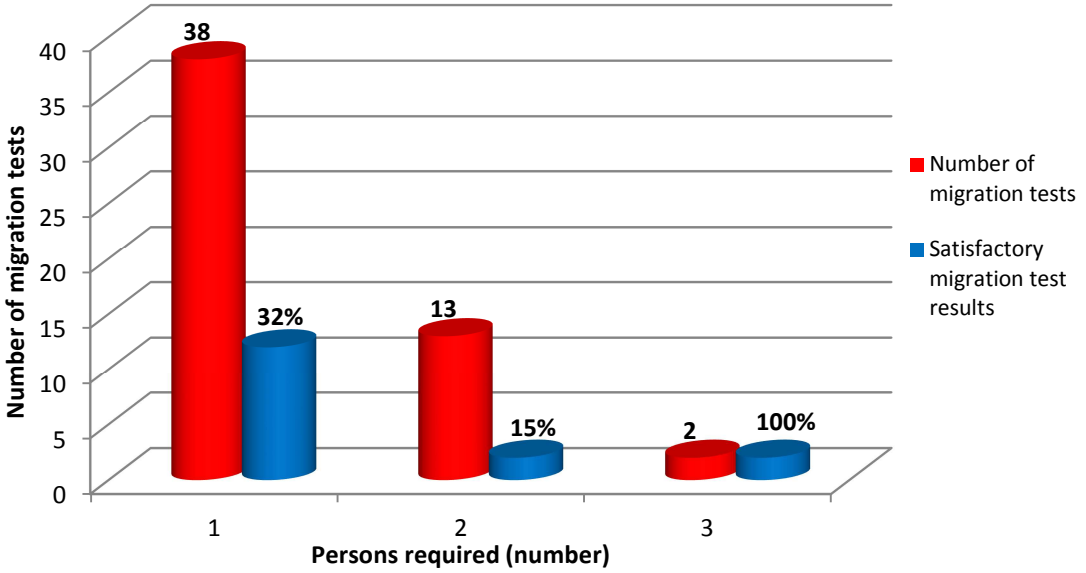


Figure 10. Different types of personnel required and scoring performance

8.2.7. Covering of test specimen during migration

During the migration experiment, the test specimens were covered by 9 different materials or combinations thereof (Figure 11). Aluminium foil was mainly used in 51% of the migration experiments, followed by glass plate (28%), silicon lid (1.9%), cling film (3.8%) and combination of the aforementioned materials such as aluminun foil-glass (5.7%) and aluminium foil-metal plate (1.9%). No covering of the test specimen was reported for one migration experiment.

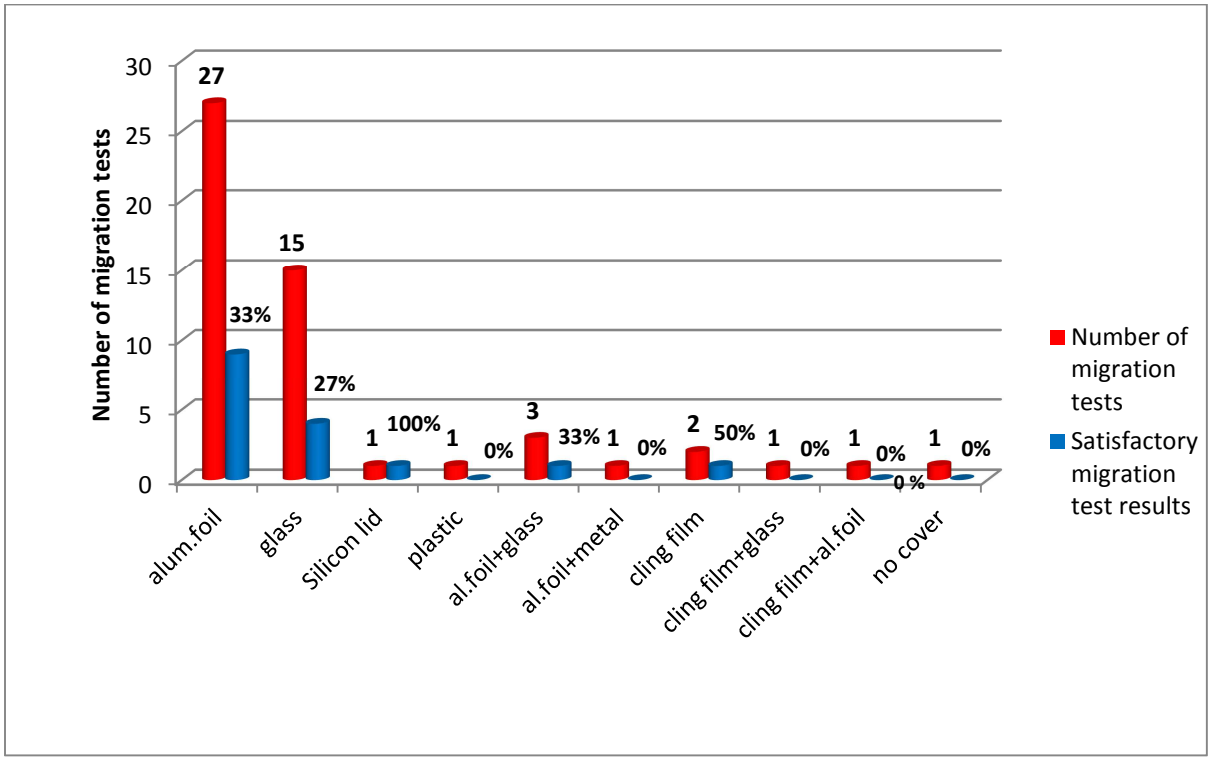


Figure 11. Materials used for covering the specimen and scoring performance

8.2.8. Food simulant loss during migration

The initial food simulant temperature, the temperature program and the covering of the test specimen during the migration experiment had a combined effect on the food simulant losses. In general increased temperatures and the use of specific glass cover led to higher losses of food simulant. The results indicated great variations in food simulant losses, ranging from 0 mL up to 60 mL. Among the applications no similar test specimen's trends could be identified in food simulant loss results.

It should be noted that significant loss of food simulant D1 can lead to the change of the composition of the food simulant. So it must be controled and loss of the food simulant during the migration testing should be minimised.

9. Conclusions

The participation in the ILC 01 2015 was satisfactory. The results showed that 30% of the 53 migration experiments performed by the 45 laboratories were successful (scoring 100%) meaning that the temperature of the food simulant was in the tolerance range constantly during the entire contact time. It is clear that these results trigger further discussion to improve the temperature control during a migration test. The information provided by the laboratories through the questionnaire gave a first insight in the factors that are of relevance to reach satisfactory score and optimal tempature control during higher tempature testing such as the "hot fill" conventional testing conditions. This discussion should lead to the selection of one or more methods for temperature control during migration testing. These selected methods will need to be further assessed in a future ILC.

10. Acknowledgements

The NRLs and OCLs who participated in this exercise (see the list below) are kindly acknowledged.

NRLs

Austria	Österreichische Agentur für Gesundheit und Ernährungssicherheit (AGES) Abt. Gebrauch-sgegenstände, Vienna
Belgium	Scientific Institute of Public Health, Consumer Safety, Bruxelles
Bulgaria	National Center of Public Health and Analyses, Chemical Substances and Mixtures & Food Contact Materials, Sofia

Croatia	Croatian National Institute of Public Health Food Contact Materials and Articles, Zagreb
Czech republic	National Institute of Public Health, Unit for Chemical Safety of Products, Prague
Denmark	Technical University of Denmark, National Food Institute Analytical Food Chemistry, Søborg
Denmark	Danish Veterinary and Food Administration Laboratory Århus, Lystrup
Estonia	Health Board Central Chemistry Laboratory, Tallinn
Finland	Finnish Customs Laboratory, Espoo
France	LNE (Laboratoire National de Metrologie et d'Essais), Trappes
France	SCL Service Commun des Laboratoires, Pessac
Germany	Bundesinstitut für Risikobewertung (BfR) (Federal Institute for Risk Assessment), Berlin
Greece	General Chemical State Laboratory, Laboratory of Articles and Materials in Contact with Foodstuffs, Athens
Hungary	National Food Chain Safety Office Food and Feed Safety Directorate Food Toxicological NRL, Budapest
Ireland	Public Analyst Laboratory, Sir Patrick Dun's, Dublin
Italy	Istituto Superiore di Sanità, Laboratorio Esposizione e rischio da materiali, c/o Dipartimento ambiente e connessa prevenzione primaria, Roma
Lithuania	National Public Health Surveillance Laboratory of Chemistry Department, Vilnius
Luxembourg	Laboratoire National de Santé Service de Surveillance Alimentaire, Luxembourg
Poland	National Institute of Public Health - National Institute of Hygiene, Laboratory of Department of Food Safety, Warsaw
Portugal	Escola Superior de Biotecnologia Universidade Católica Portuguesa CINATE, Porto

Romania	National Institute of Public Health Environment and food chemical and microbiological laboratory, Bucharest
Slovakia	National Reference Centre and Laboratory for materials and articles intended to come into contact with food, Regional Public Health Authority In Poprad (RUVZ), Poprad
Slovenia	National Laboratory of Health, Environment and Food Center for Environment and Health Laboratory for Consumer Products, Ljubljana
Spain	Agencia Espanola de Seguridad Alimentaria y Nutrición (AECOSAN) Centro Nacional Alimentación, Madrid
Sweden	National Food Agency Department of Chemistry Division of Science, Uppsala
United Kingdom	The Food and Environment Research Agency (FERA), York

OCLs

Belgium	Belgisch Verpakkingsinstituut (BVI), Zellik
Belgium	SGS Belgium N.V. - Division IAC , Antwerpen
Belgium	Federaal Laboratorium voor de Voedselveiligheid (FLVVG), Gentbrugge
Belgium	Laboratoire Fédéral pour la Sécurité Alimentaire Liège (LFSAL), Wandre
Germany	Chemisches und Veterinäruntersuchungsamt Fellbach Abt. Bedarfsgegenstände, Fellbach
Germany	Landeslabor Schleswig-Holstein, Neumünster
Germany	Landesamt für Verbraucherschutz (LAV) FB 2.4 Bedarfsgegenstände, Saarbrücken
Germany	Bayerisches Landesamt für Gesundheit und Lebens-mittelsicherheit R 5 Bedarfsgegenstände, Erlangen
Germany	Landesuntersuchungsanstalt für das Gesundheits-und Veterinärwesen Sachsen, Dresden

Germany	Landesuntersuchungsamt Rheinland-Pfalz, Institut für Lebensmittelchemie, Koblenz
Germany	Chemisches und Veterinäruntersuchungsamt MEL (CVUA-MEL), Bedarfsgegenstände, Muenster
Germany	Thüringer Landesamt für Verbraucherschutz, Dezernat 46, Bedarfsgegenstände, Kosmetische Mittel, Kontaminanten, Bad Langesalza
Germany	LAVES -Institut für Bedarfsgegenstände, Lüneburg
Germany	Zentrales Institut des Sanitätsdienstes der Bundeswehr KOBLENZ Laborabteilung III, Lebensmittelchemie und Ökochemie, Koblenz
Italy	Istituto Zooprofilattico Sperimentale LER, Laborario chimico, Bologna
Spain	Centro de salud publica de Alicante, Alicante
Spain	Hospital Monte San Isidro, 1ª planta Servicio Territorial Bienestar Social Salud Pública León, León
Spain	Ministerio de Economía y Competitividad, Laboratorio Cental Soivre, Madrid
Spain	Centro de Salud Pública de Valencia, Laboratorio de Salud Pública, Valencia

11. References

[1] Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food. OJ L 12, 15.1.2011, p. 1–89. Last amended by Commission Regulation (EU) No 202/2014 of 3 March 2014. OJ L 62, 04.03.2014, p. 13

[2] EN 13130-1:2004. Materials and articles in contact with foodstuffs. Plastics substances subject to limitation. Guide to test methods for the specific migration of substances from plastics to foods and food simulants and the determination of substances in plastics and the selection of conditions of exposure to food simulants

[3] Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules. Last amended by Regulation (EU) No 652/2014 of the European Parliament and of the Council of 15 May 2014. OJ L 189, 27.06.2014, p. 1

[4] ISO/IEC 17043:2010(E). Conformity assessment – General requirements for proficiency testing

[5] Report of an inter-laboratory comparison from the European Reference Laboratory for Food Contact Materials: ILC02 2014 – Identifying the composition of multilayer plastic packaging films. EUR 27172 EN, Luxembourg: Publications Office of the European Union, 2015

[6] Report of an inter-laboratory organised by the European Reference Laboratory for Food Contact Materials. ILC002 2013 – Identification of polymeric materials. EUR 26467 EN, Luxembourg: Publication Office of the European Union, 2013.

12. Annexes

12.1. Invitation letter and documents sent to the participants

Ref. Ares(2015)4179416 - 08/10/2015

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL European Union Reference Laboratory for Food Contact Materials

INVITATION LETTER

Inter-laboratory Comparison (ILC) Exercise on Temperature Control during Migration Tests by Article Filling – ILC01-2015

Dear Sir or Madam,

On behalf of the EURL for Food Contact Materials, I would like to invite you to participate in a comparative trial/inter-laboratory comparison (ILC) exercise on temperature control during migration tests by article filling.

Studies by national reference laboratories and the EURL-FCM indicated that the required contact temperature when performing migration tests by article filling is often reached only after an (unacceptably) long period of time or even not at all. As the contact temperature affects migration results, it may also affect the decision about compliance or non-compliance of samples. This ILC therefore aims at identifying best-practice approaches concerning the preheating, filling and exposure phase which can ensure that migration tests by article filling are performed at the correct test temperature.

In the present ILC, participants will be asked to carry out a migration test by article filling of provided polypropylene cups (volume 0.3 l) with food simulant D1 (ethanol 50%, v/v) for 2 h at 70°C to the best of their knowledge, monitor the temperature of the food simulant inside one of the test specimens during the exposure phase and provide details of their operating procedure by answering a questionnaire. There will be no requirements to identify or quantify any of the migrating substances. Based on the obtained data, the EURL-FCM will perform a root-cause-analysis. The results will be used to set up recommendations for migration tests by article filling.

I would like to remind you that it is a duty for you as an NRL-FCM to participate in the ILCs organised by the EURL-FCM since the work programme is decided with your agreement. For this reason we encourage all of you to actively participate in this exercise. There is no charge for participation. Feel free to involve your local controls.

Please confirm your participation until **16th October 2015** by sending back the completed participation form to Emmanouil TSOCHATZIS (Emmanouil.TSOCHATZIS@ec.europa.eu). Once we have received your confirmation of participation, we will send a sample kit to you. The shipment of the sample kits is foreseen for 19th October 2015. You will find detailed instructions concerning the requested results in the sample kits (and ex ante in the attached documents). The **deadline** for submission of results is **30th November 2015**. For further information, please contact Emmanouil TSOCHATZIS (Emmanouil.TSOCHATZIS@ec.europa.eu, phone: +39 0332 78 9548).

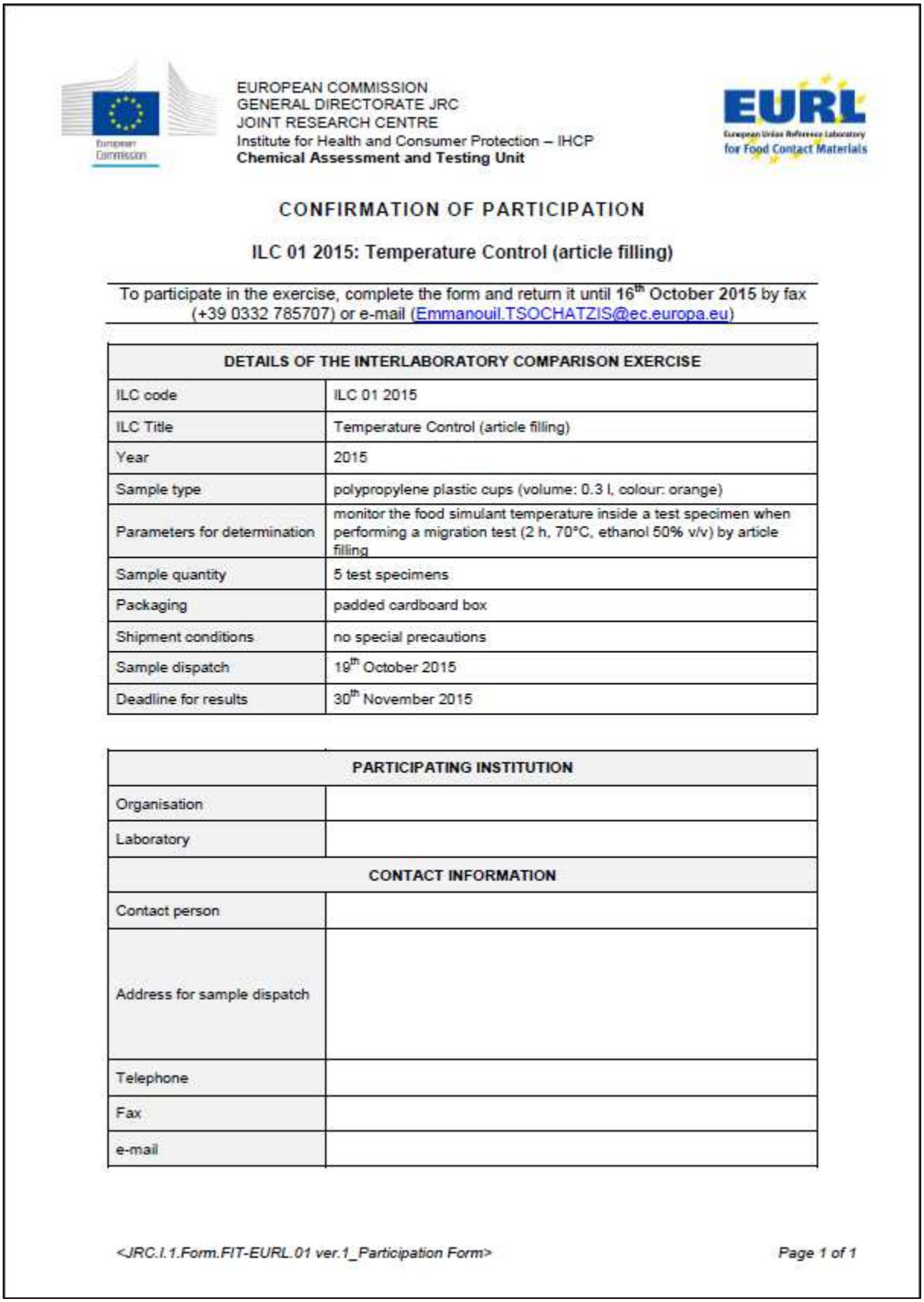
Sincerely yours,

Dr. Catherine Simoneau
Operating Manager, EU Reference Laboratory for Food Contact Materials
European Commission, DG-Joint Research Centre
Institute for Health and Consumer Protection
Chemical Assessment and Testing Unit, T.P. 260
Ispra (VA) 21020, Italy

Cc: P. Aguar (JRC), D. Rembges (JRC), B. Schupp (SANTE)

<JRC.I.1.Form.FIT-EURL.08 ver.1_Invitation letter> *Page 1 of 1*

Figure 12. Invitation letter



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL European Union Reference Laboratory for Food Contact Materials

CONFIRMATION OF PARTICIPATION

ILC 01 2015: Temperature Control (article filling)

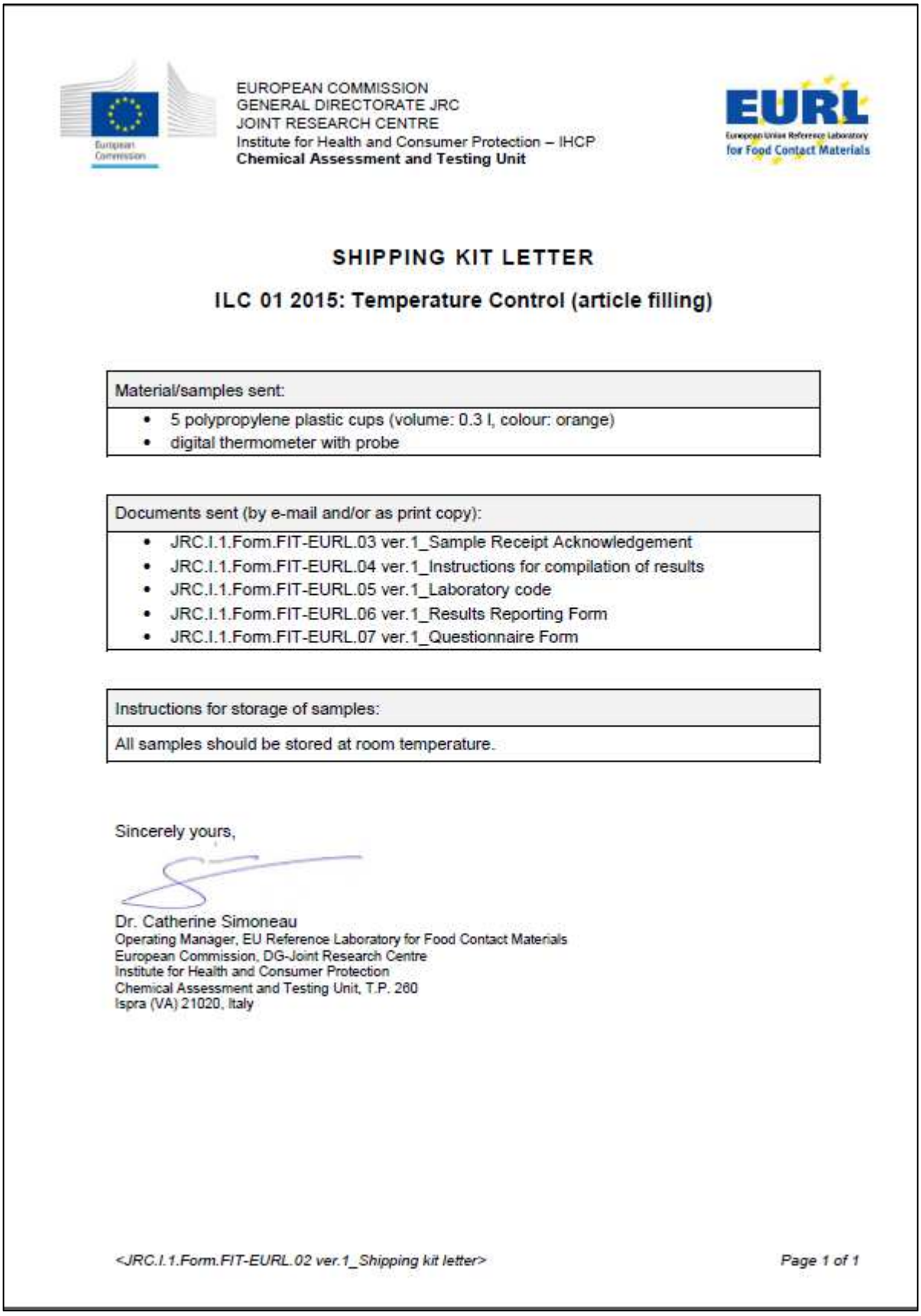
To participate in the exercise, complete the form and return it until 16th October 2015 by fax (+39 0332 785707) or e-mail (Emmanouil.TSOCHATZIS@ec.europa.eu)

DETAILS OF THE INTERLABORATORY COMPARISON EXERCISE	
ILC code	ILC 01 2015
ILC Title	Temperature Control (article filling)
Year	2015
Sample type	polypropylene plastic cups (volume: 0.3 l, colour: orange)
Parameters for determination	monitor the food simulant temperature inside a test specimen when performing a migration test (2 h, 70°C, ethanol 50% v/v) by article filling
Sample quantity	5 test specimens
Packaging	padded cardboard box
Shipment conditions	no special precautions
Sample dispatch	19th October 2015
Deadline for results	30th November 2015

PARTICIPATING INSTITUTION	
Organisation	
Laboratory	
CONTACT INFORMATION	
Contact person	
Address for sample dispatch	
Telephone	
Fax	
e-mail	

<JRC.I.1.Form.FIT-EURL.01 ver.1_Participation Form> *Page 1 of 1*

Figure 13. Confirmation of participation



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL
European Union Reference Laboratory
for Food Contact Materials

SHIPPING KIT LETTER

ILC 01 2015: Temperature Control (article filling)

Material/samples sent:
• 5 polypropylene plastic cups (volume: 0.3 l, colour: orange) • digital thermometer with probe

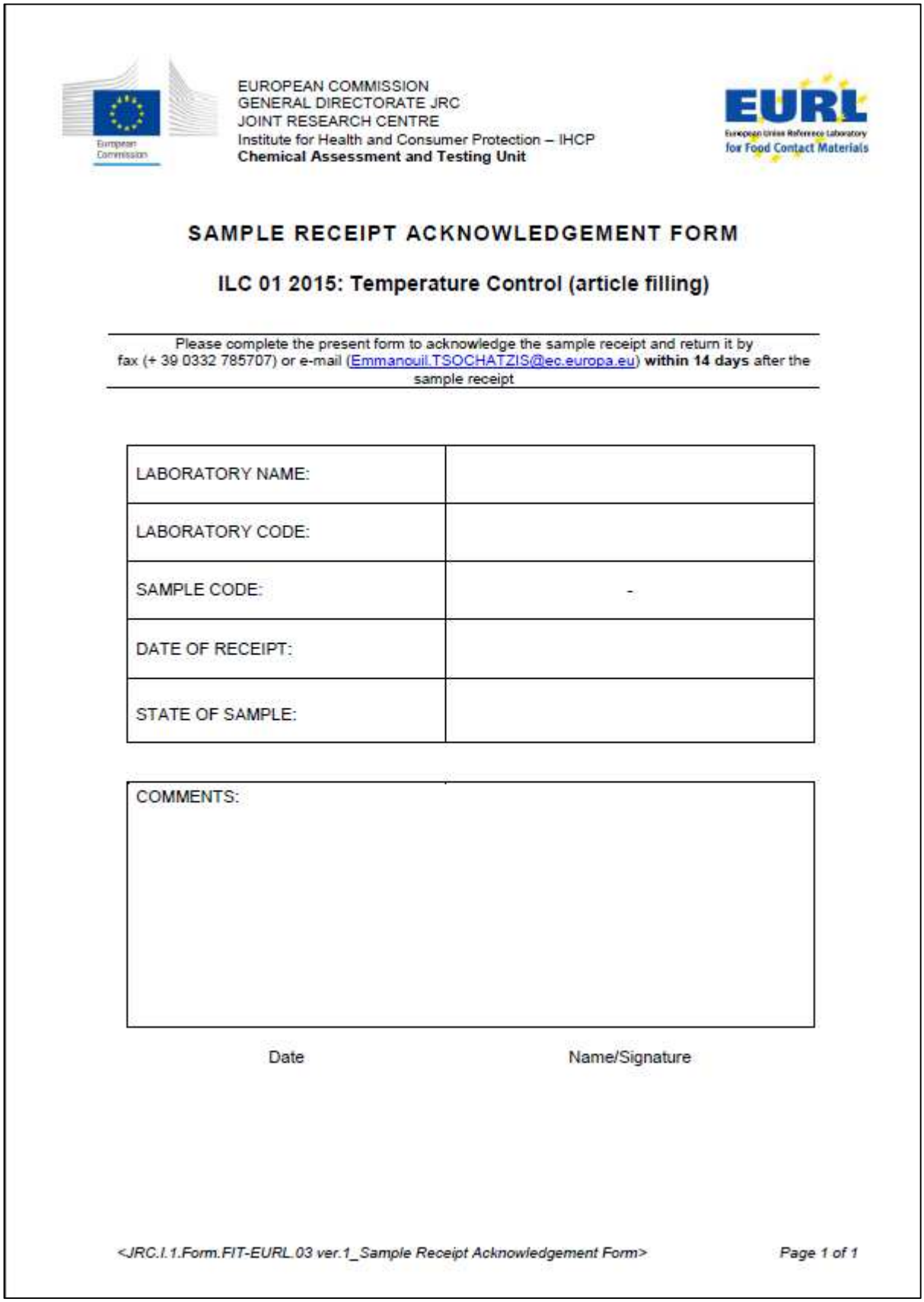
Documents sent (by e-mail and/or as print copy):
• JRC.I.1.Form.FIT-EURL.03 ver.1_Sample Receipt Acknowledgement • JRC.I.1.Form.FIT-EURL.04 ver.1_Instructions for compilation of results • JRC.I.1.Form.FIT-EURL.05 ver.1_Laboratory code • JRC.I.1.Form.FIT-EURL.06 ver.1_Results Reporting Form • JRC.I.1.Form.FIT-EURL.07 ver.1_Questionnaire Form

Instructions for storage of samples:
All samples should be stored at room temperature.

Sincerely yours,

Dr. Catherine Simoneau
Operating Manager, EU Reference Laboratory for Food Contact Materials
European Commission, DG-Joint Research Centre
Institute for Health and Consumer Protection
Chemical Assessment and Testing Unit, T.P. 260
Ispra (VA) 21020, Italy

Figure 14. Shipping kit information



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL
European Union Reference Laboratory
for Food Contact Materials

SAMPLE RECEIPT ACKNOWLEDGEMENT FORM

ILC 01 2015: Temperature Control (article filling)

Please complete the present form to acknowledge the sample receipt and return it by fax (+ 39 0332 785707) or e-mail (Emmanouil.TSOCHATZIS@ec.europa.eu) **within 14 days** after the sample receipt

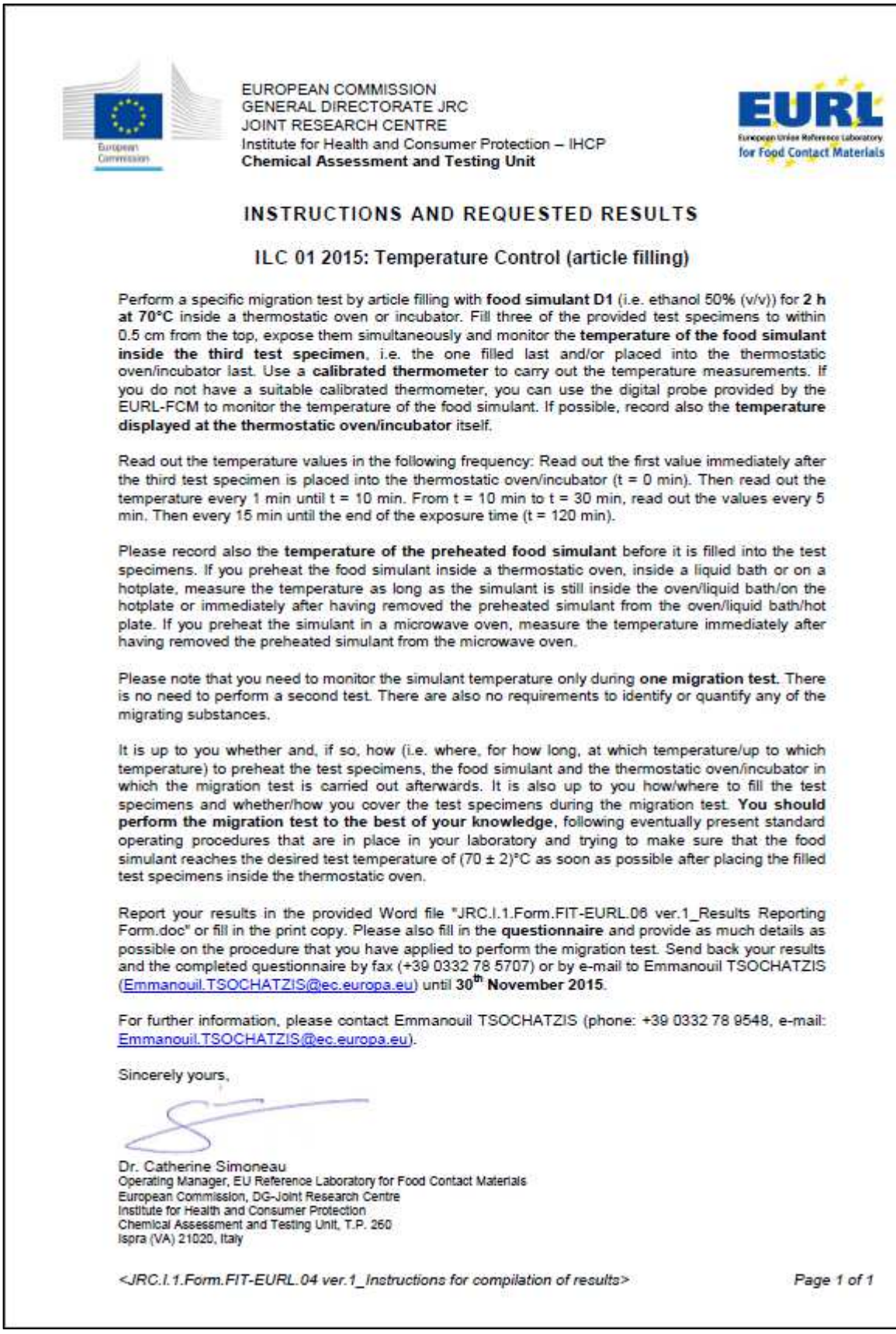
LABORATORY NAME:	
LABORATORY CODE:	
SAMPLE CODE:	-
DATE OF RECEIPT:	
STATE OF SAMPLE:	

COMMENTS:

Date Name/Signature

<JRC.I.1.Form.FIT-EURL.03 ver.1_Sample Receipt Acknowledgement Form> *Page 1 of 1*

Figure 15. Sample receipt acknowledgement form



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL
European Union Reference Laboratory
for Food Contact Materials

INSTRUCTIONS AND REQUESTED RESULTS

ILC 01 2015: Temperature Control (article filling)

Perform a specific migration test by article filling with **food simulant D1** (i.e. ethanol 50% (v/v)) for **2 h at 70°C** inside a thermostatic oven or incubator. Fill three of the provided test specimens to within 0.5 cm from the top, expose them simultaneously and monitor the **temperature of the food simulant inside the third test specimen**, i.e. the one filled last and/or placed into the thermostatic oven/incubator last. Use a **calibrated thermometer** to carry out the temperature measurements. If you do not have a suitable calibrated thermometer, you can use the digital probe provided by the EURL-FCM to monitor the temperature of the food simulant. If possible, record also the **temperature displayed at the thermostatic oven/incubator** itself.

Read out the temperature values in the following frequency: Read out the first value immediately after the third test specimen is placed into the thermostatic oven/incubator (t = 0 min). Then read out the temperature every 1 min until t = 10 min. From t = 10 min to t = 30 min, read out the values every 5 min. Then every 15 min until the end of the exposure time (t = 120 min).

Please record also the **temperature of the preheated food simulant** before it is filled into the test specimens. If you preheat the food simulant inside a thermostatic oven, inside a liquid bath or on a hotplate, measure the temperature as long as the simulant is still inside the oven/liquid bath/on the hotplate or immediately after having removed the preheated simulant from the oven/liquid bath/hot plate. If you preheat the simulant in a microwave oven, measure the temperature immediately after having removed the preheated simulant from the microwave oven.

Please note that you need to monitor the simulant temperature only during **one migration test.** There is no need to perform a second test. There are also no requirements to identify or quantify any of the migrating substances.

It is up to you whether and, if so, how (i.e. where, for how long, at which temperature/up to which temperature) to preheat the test specimens, the food simulant and the thermostatic oven/incubator in which the migration test is carried out afterwards. It is also up to you how/where to fill the test specimens and whether/how you cover the test specimens during the migration test. **You should perform the migration test to the best of your knowledge**, following eventually present standard operating procedures that are in place in your laboratory and trying to make sure that the food simulant reaches the desired test temperature of (70 ± 2)°C as soon as possible after placing the filled test specimens inside the thermostatic oven.

Report your results in the provided Word file "JRC.I.1.Form.FIT-EURL.06 ver.1_Results Reporting Form.doc" or fill in the print copy. Please also fill in the **questionnaire** and provide as much details as possible on the procedure that you have applied to perform the migration test. Send back your results and the completed questionnaire by fax (+39 0332 78 5707) or by e-mail to Emmanouil TSOCHATZIS (Emmanouil.TSOCHATZIS@ec.europa.eu) until **30th November 2015**.

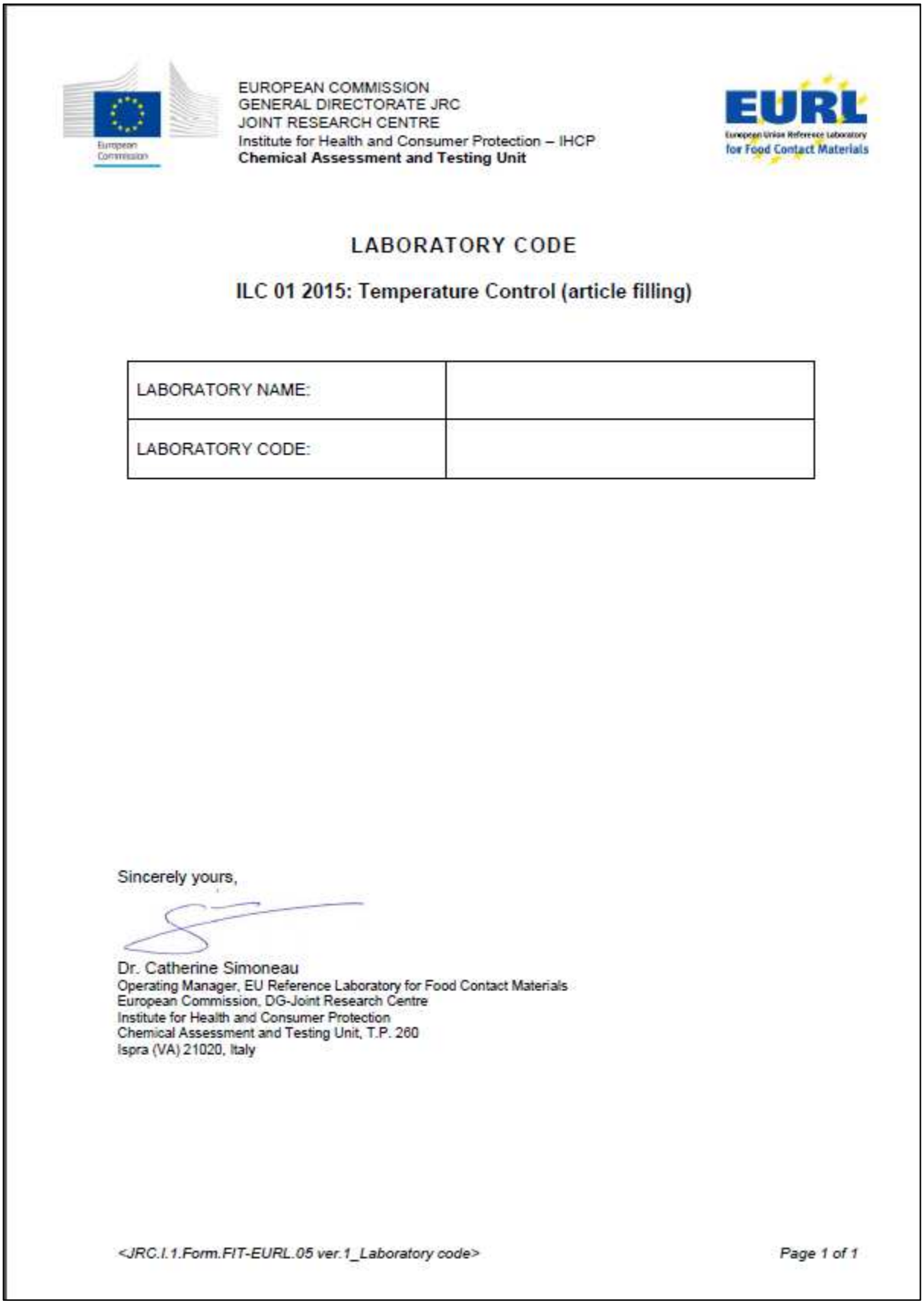
For further information, please contact Emmanouil TSOCHATZIS (phone: +39 0332 78 9548, e-mail: Emmanouil.TSOCHATZIS@ec.europa.eu).

Sincerely yours,

Dr. Catherine Simoneau
Operating Manager, EU Reference Laboratory for Food Contact Materials
European Commission, DG-Joint Research Centre
Institute for Health and Consumer Protection
Chemical Assessment and Testing Unit, T.P. 260
Ispra (VA) 21020, Italy

<JRC.I.1.Form.FIT-EURL.04 ver.1_Instructions for compilation of results> *Page 1 of 1*

Figure 16. Instructions for the compilation of results



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL
European Union Reference Laboratory
for Food Contact Materials

LABORATORY CODE

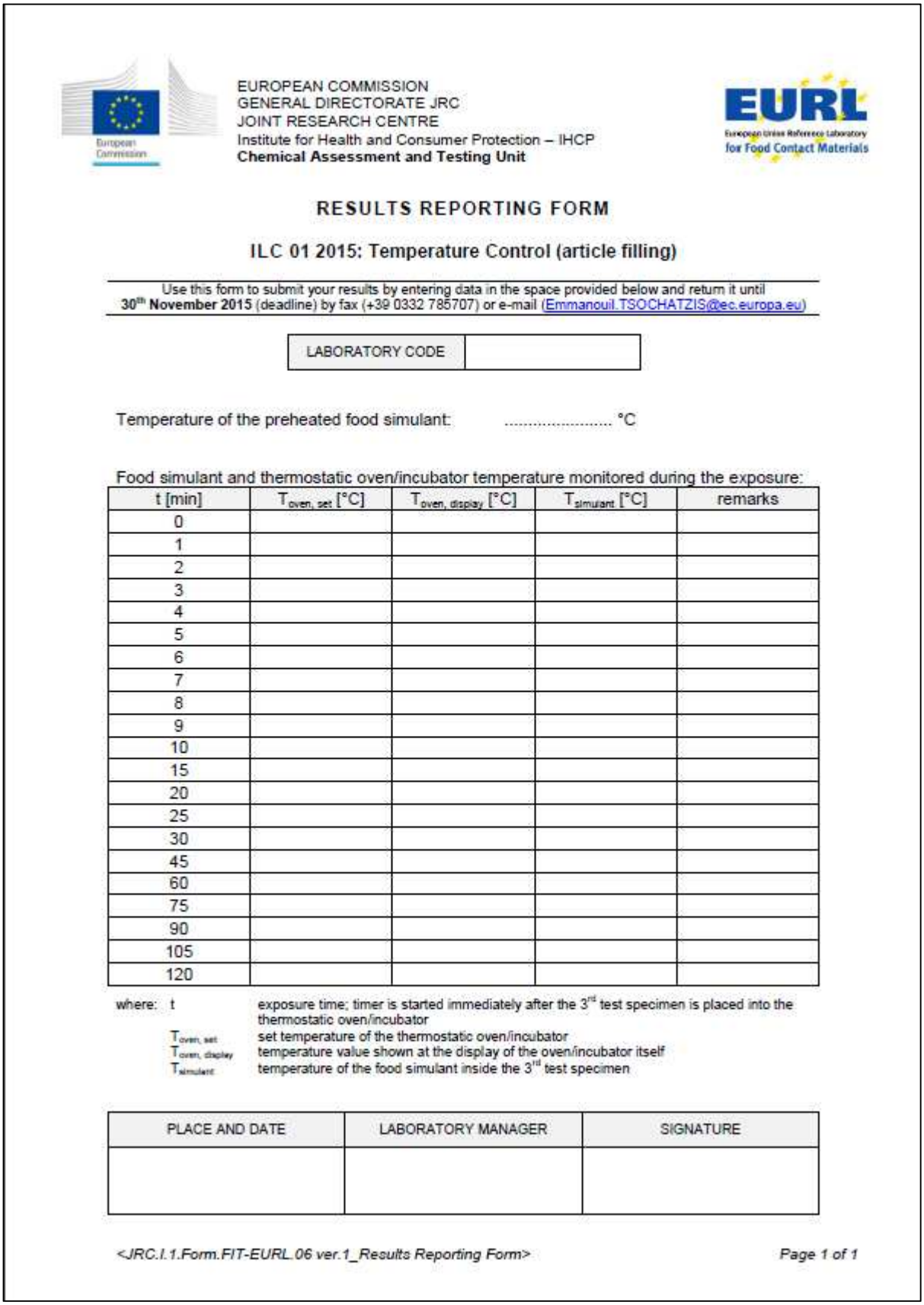
ILC 01 2015: Temperature Control (article filling)

LABORATORY NAME:	
LABORATORY CODE:	

Sincerely yours,

Dr. Catherine Simoneau
Operating Manager, EU Reference Laboratory for Food Contact Materials
European Commission, DG-Joint Research Centre
Institute for Health and Consumer Protection
Chemical Assessment and Testing Unit, T.P. 260
Ispra (VA) 21020, Italy

Figure 17. Laboratory code



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL
European Union Reference Laboratory
for Food Contact Materials

RESULTS REPORTING FORM

ILC 01 2015: Temperature Control (article filling)

Use this form to submit your results by entering data in the space provided below and return it until **30th November 2015** (deadline) by fax (+39 0332 785707) or e-mail (Emmanouil.TSOCHATZIS@ec.europa.eu)

LABORATORY CODE	

Temperature of the preheated food simulant: ..... °C

Food simulant and thermostatic oven/incubator temperature monitored during the exposure:

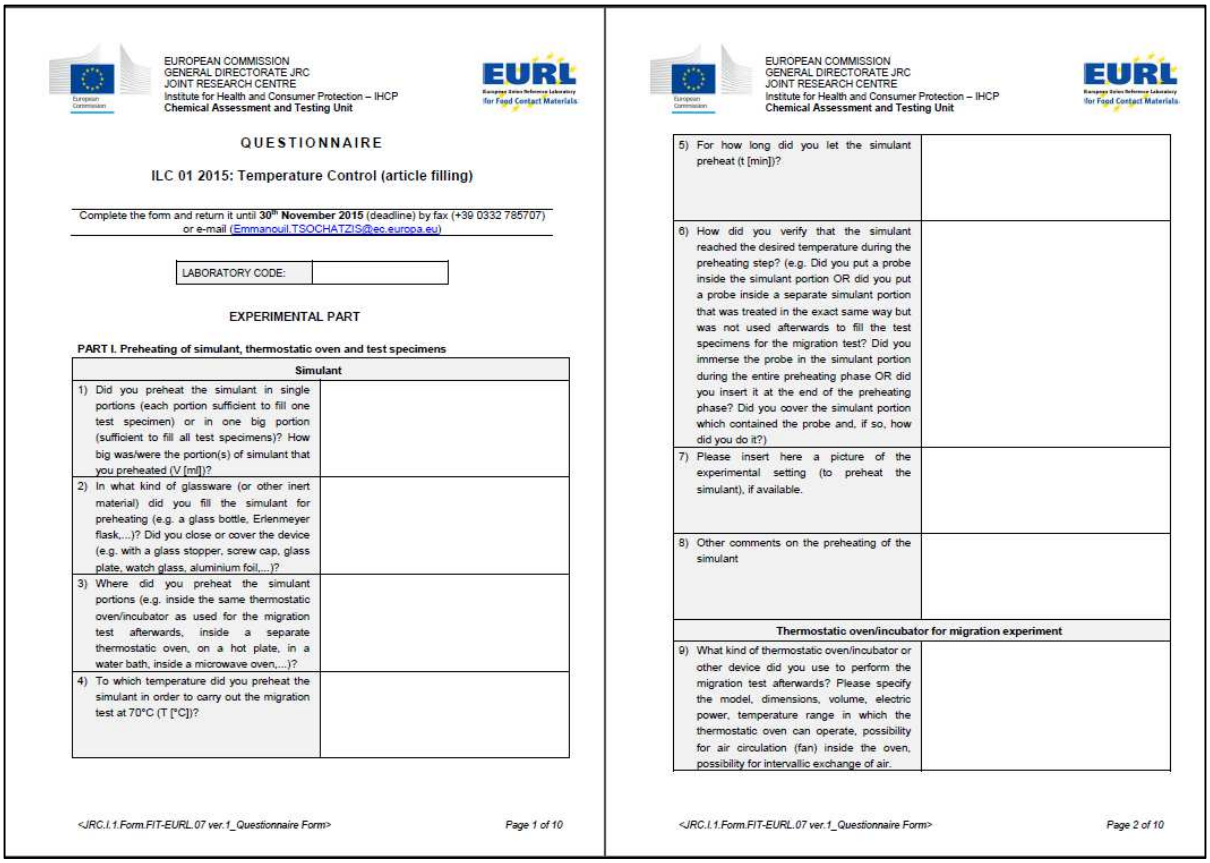
t [min]	$T_{oven, set}$ [°C]	$T_{oven, display}$ [°C]	$T_{simulant}$ [°C]	remarks
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
15				
20				
25				
30				
45				
60				
75				
90				
105				
120				

where: t exposure time; timer is started immediately after the 3rd test specimen is placed into the thermostatic oven/incubator
$T_{oven, set}$ set temperature of the thermostatic oven/incubator
$T_{oven, display}$ temperature value shown at the display of the oven/incubator itself
$T_{simulant}$ temperature of the food simulant inside the 3rd test specimen

PLACE AND DATE	LABORATORY MANAGER	SIGNATURE

<JRC.I.1.Form.FIT-EURL.06 ver.1_Results Reporting Form> *Page 1 of 1*

Figure 18. Results reporting form



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL European Union Reference Laboratory for Food Contact Materials

QUESTIONNAIRE

ILC 01 2015: Temperature Control (article filling)

Complete the form and return it until **30th November 2015** (deadline) by fax (+39 0332 785707) or e-mail (Emmanouil.TSOCHATZIS@ec.europa.eu)

LABORATORY CODE:	

EXPERIMENTAL PART

PART I. Preheating of simulant, thermostatic oven and test specimens

Simulant	
1) Did you preheat the simulant in single portions (each portion sufficient to fill one test specimen) or in one big portion (sufficient to fill all test specimens)? How big was/were the portion(s) of simulant that you preheated (V [ml])?	
2) In what kind of glassware (or other inert material) did you fill the simulant for preheating (e.g. a glass bottle, Erlenmeyer flask,...)? Did you close or cover the device (e.g. with a glass stopper, screw cap, glass plate, watch glass, aluminium foil,...)?	
3) Where did you preheat the simulant portions (e.g. inside the same thermostatic oven/incubator as used for the migration test afterwards, inside a separate thermostatic oven, on a hot plate, in a water bath, inside a microwave oven,...)?	
4) To which temperature did you preheat the simulant in order to carry out the migration test at 70°C (T [°C])?	

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL European Union Reference Laboratory for Food Contact Materials

5) For how long did you let the simulant preheat (t [min])?	
6) How did you verify that the simulant reached the desired temperature during the preheating step? (e.g. Did you put a probe inside the simulant portion OR did you put a probe inside a separate simulant portion that was treated in the exact same way but was not used afterwards to fill the test specimens for the migration test? Did you immerse the probe in the simulant portion during the entire preheating phase OR did you insert it at the end of the preheating phase? Did you cover the simulant portion which contained the probe and, if so, how did you do it?)	
7) Please insert here a picture of the experimental setting (to preheat the simulant), if available.	
8) Other comments on the preheating of the simulant	
Thermostatic oven/incubator for migration experiment	
9) What kind of thermostatic oven/incubator or other device did you use to perform the migration test afterwards? Please specify the model, dimensions, volume, electric power, temperature range in which the thermostatic oven can operate, possibility for air circulation (fan) inside the oven, possibility for intervallic exchange of air.	

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

EURL European Union Reference Laboratory for Food Contact Materials

10) To which temperature did you preheat the thermostatic oven/incubator in which you carried out the migration test afterwards (T [°C])?	
11) For how long did you let the thermostatic oven/incubator preheat (t [min])?	
12) Did you verify the temperature of the preheated thermostatic oven/incubator? If yes, how did you do it (e.g. probe placed in an empty beaker inside the thermostatic oven/incubator to measure the air temperature)?	
13) Did you check whether the heat inside the thermostatic oven/incubator was homogeneously distributed? If yes, how did you do it (e.g. several probes placed in different spots inside the thermostatic oven/incubator - close to the bottom/ceiling/side walls, in the centre,...)?	
14) In case your thermostatic oven/incubator is equipped with a fan to enable air circulation inside, did you turn it on during the preheating phase? If so, at which level (low/medium/high)? Did you notice effects on the homogeneity of the temperature distribution inside the thermostatic oven/incubator?	
15) In case your thermostatic oven/incubator provides the possibility for an automated intervallic exchange of air, did you enable it during the preheating phase? If so, at which frequency? Did you notice effects on the temperature constancy inside the oven/incubator?	

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

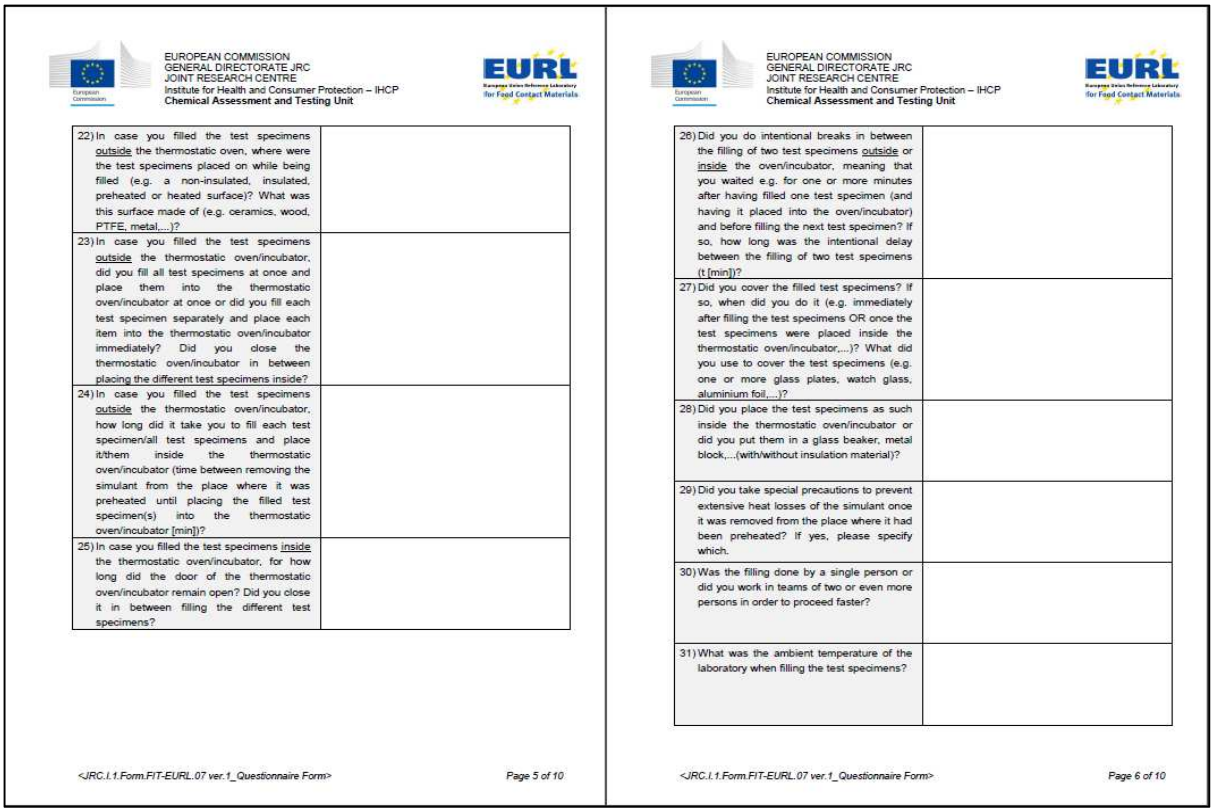
EURL European Union Reference Laboratory for Food Contact Materials

16) Other comments on the preheating of the thermostatic oven/incubator	
Test specimen	
17) Did you preheat the test specimens? If so, how did you do it, meaning at which temperature (T [°C]), for how long (t [min]) and where (e.g. inside the same thermostatic oven/incubator as used for the migration test afterwards, inside a separate thermostatic oven, in a heated/preheated metal block, inside a microwave oven,...)?	
18) Please insert here a picture of the experimental setting (to preheat the test specimens), if available.	
19) Other comments on the preheating of test specimens	

PART II. Filling procedure

20) Where did you fill the test specimens (e.g. under the fume hood, inside the thermostatic oven/incubator, on a work bench,...)?	
21) In case you filled the test specimens outside the thermostatic oven/incubator, how long was the approximate distance to the thermostatic oven/incubator (d [m])?	

Figure 19. Questionnaire form (continued)



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

22) In case you filled the test specimens outside the thermostatic oven, where were the test specimens placed on while being filled (e.g. a non-insulated, insulated, preheated or heated surface)? What was this surface made of (e.g. ceramics, wood, PTFE, metal,...)?	
23) In case you filled the test specimens outside the thermostatic oven/incubator, did you fill all test specimens at once and place them into the thermostatic oven/incubator at once or did you fill each test specimen separately and place each item into the thermostatic oven/incubator immediately? Did you close the thermostatic oven/incubator in between placing the different test specimens inside?	
24) In case you filled the test specimens outside the thermostatic oven/incubator, how long did it take you to fill each test specimen/all test specimens and place it/them inside the thermostatic oven/incubator (time between removing the simulant from the place where it was preheated until placing the filled test specimen(s) into the thermostatic oven/incubator [min])?	
25) In case you filled the test specimens inside the thermostatic oven/incubator, for how long did the door of the thermostatic oven/incubator remain open? Did you close it in between filling the different test specimens?	

<JRC.I.1.Form.FIT-EURL.07 ver.1_Questionnaire Form> Page 5 of 10

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

26) Did you do intentional breaks in between the filling of two test specimens outside or inside the oven/incubator, meaning that you waited e.g. for one or more minutes after having filled one test specimen (and having it placed into the oven/incubator) and before filling the next test specimen? If so, how long was the intentional delay between the filling of two test specimens (t [min])?	
27) Did you cover the filled test specimens? If so, when did you do it (e.g. immediately after filling the test specimens OR once the test specimens were placed inside the thermostatic oven/incubator,...)? What did you use to cover the test specimens (e.g. one or more glass plates, watch glass, aluminium foil,...)?	
28) Did you place the test specimens as such inside the thermostatic oven/incubator or did you put them in a glass beaker, metal block,...(with/without insulation material)?	
29) Did you take special precautions to prevent extensive heat losses of the simulant once it was removed from the place where it had been preheated? If yes, please specify which.	
30) Was the filling done by a single person or did you work in teams of two or even more persons in order to proceed faster?	
31) What was the ambient temperature of the laboratory when filling the test specimens?	

<JRC.I.1.Form.FIT-EURL.07 ver.1_Questionnaire Form> Page 6 of 10

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

32) Please insert here a picture of the experimental setting (to fill the test specimens), if available.	
33) Other comments on the filling procedure	

PART III. Exposure phase

34) What kind of data logger/thermometer did you use to monitor the simulant temperature during the migration test? In case you did not use the digital thermometer provided by the JRC or in case you used an additional data logger/thermometer, please specify the model, shape/dimensions of the probe, temperature range in which the probe can operate, accuracy, whether it is externally calibrated and, if so, the frequency of the periodical control.	
35) In order to monitor the temperature of the simulant during the exposure phase of the present migration test, did you insert a probe in one of the filled test specimens (first/second or third replicate?) or did you insert a probe in a separate portion of simulant (e.g. in a glass bottle) not in contact with a test specimen but treated in the exact same way?	
36) Did you cover the item where the probe was inside? If so, what did you use to cover it (e.g. with one or more glass plates, a watch glass, aluminium foil, a special closure with a drilled hole where the probe fits in,...)?	

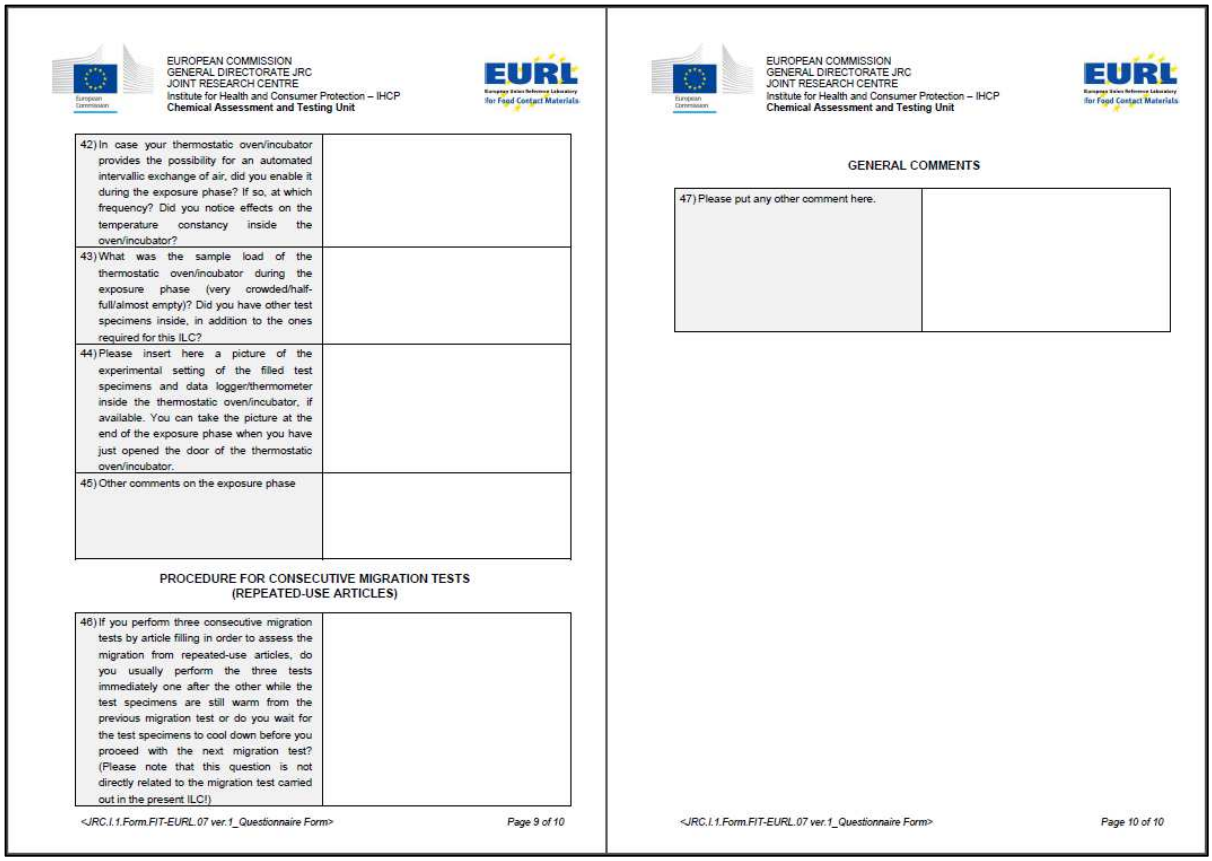
<JRC.I.1.Form.FIT-EURL.07 ver.1_Questionnaire Form> Page 7 of 10

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

37) How much simulant evaporated approximately from the filled test specimens during the migration test (V [ml])?	
38) Did you set a constant temperature for the thermostatic oven/incubator throughout the exposure or did you set a higher temperature at the beginning of the exposure and then lowered the set value once the oven/incubator or the simulant reached again the desired temperature? What was/were the set temperature(s) for the thermostatic oven/incubator during the exposure phase (T [°C])? If you changed the set temperature, when did you change it? Do you know to which air temperature inside the thermostatic oven your set values correspond?	
39) Did you verify the temperature of the thermostatic oven/incubator during the exposure phase? If yes, how did you do it (e.g. probe placed in an empty beaker inside the thermostatic oven/incubator to measure the air temperature)?	
40) Did you check whether the heat inside the thermostatic oven/incubator was homogeneously distributed during the exposure phase? If yes, how did you do it (e.g. several probes placed in different spots inside the thermostatic oven/incubator - close to the bottom/ceiling/side walls, in the centre)?	
41) In case your thermostatic oven/incubator is equipped with a fan to enable air circulation inside, did you turn it on during the exposure phase? If so, at which level (low/medium/high)? Did you notice effects on the homogeneity of the temperature distribution inside the thermostatic oven/incubator?	

<JRC.I.1.Form.FIT-EURL.07 ver.1_Questionnaire Form> Page 8 of 10

Figure 19. Questionnaire form (continued)



EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

42) In case your thermostatic oven/incubator provides the possibility for an automated intervallic exchange of air, did you enable it during the exposure phase? If so, at which frequency? Did you notice effects on the temperature constancy inside the oven/incubator?	
43) What was the sample load of the thermostatic oven/incubator during the exposure phase (very crowded/half-full/almost empty)? Did you have other test specimens inside, in addition to the ones required for this ILC?	
44) Please insert here a picture of the experimental setting of the filled test specimens and data logger/thermometer inside the thermostatic oven/incubator, if available. You can take the picture at the end of the exposure phase when you have just opened the door of the thermostatic oven/incubator.	
45) Other comments on the exposure phase	

PROCEDURE FOR CONSECUTIVE MIGRATION TESTS (REPEATED-USE ARTICLES)

46) If you perform three consecutive migration tests by article filling in order to assess the migration from repeated-use articles, do you usually perform the three tests immediately one after the other while the test specimens are still warm from the previous migration test or do you wait for the test specimens to cool down before you proceed with the next migration test? (Please note that this question is not directly related to the migration test carried out in the present ILC!)	

<JRC.I.1.Form.FIT-EURL.07 ver.1_Questionnaire Form> Page 9 of 10

EUROPEAN COMMISSION
GENERAL DIRECTORATE JRC
JOINT RESEARCH CENTRE
Institute for Health and Consumer Protection – IHCP
Chemical Assessment and Testing Unit

GENERAL COMMENTS

47) Please put any other comment here.	

<JRC.I.1.Form.FIT-EURL.07 ver.1_Questionnaire Form> Page 10 of 10

Figure 19. Questionnaire form

12.2. Results reported by the participants

Table 1. Rounded results and achieved points

Lab code	Time (min)																					Achieved points	Achieved points [%]
	0	1	2	3	4	5	6	7	8	9	10	15	20	25	30	45	60	75	95	105	120		
	Temperature (^oC)																						
LC0040	70	70	70	70	70	70	70	70	70	70	70	70	70	71	71	71	71	71	71	71	71	21	100
LC0018	70	69	69	68	68	68	68	67	67	67	67	66	65	64	63	62	61	60	60	60	60	5	24
LC0007a	68	69	68	68	68	68	67	67	67	66	66	65	64	64	63	63	62	62	62	63	63	5	24
LC0007b	76	76	76	75	74	73	73	72	71	71	70	68	66	65	65	63	63	62	62	62	62	4	19
LC0055	69	72	71	71	71	71	70	70	70	70	70	69	69	68	68	67	66	66	65	65	65	14	67
LC0017	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	21	100
LC0047	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	62	62	64	66	67	67	0	0
LC0028	68	68	68	68	68	68	69	69	69	69	69	69	69	69	70	70	70	70	71	71	71	21	100
LC0056	71	70	69	69	69	70	70	70	70	70	71	71	71	71	71	71	71	71	71	71	71	21	100
LC0037a	67	67	67	67	67	68	68	68	68	68	68	68	68	69	69	69	69	70	70	70	70	10	48
LC0037b	68	68	68	67	67	67	67	67	67	67	67	67	67	66	66	66	66	66	66	66	66	0	0
LC0037c	60	60	61	61	62	63	63	63	64	64	64	64	64	64	64	65	65	65	65	65	65	0	0
LC0013	66	66	67	68	69	69	69	70	70	70	70	71	71	71	71	71	71	71	71	71	71	17	81
LC0025	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	21	100
LC0003	66	65	63	62	62	61	60	60	59	59	58	57	55	54	53	52	51	51	51	52	52	0	0
LC0041	63	63	63	63	63	63	63	63	63	63	63	63	63	63	64	64	64	64	65	65	65	0	0
LC0113	66	67	67	67	67	68	68	68	68	68	68	68	68	68	68	68	69	69	69	69	69	8	38
LC0020	61	63	63	63	63	64	64	64	64	64	64	64	65	65	65	66	66	67	67	68	68	0	0
LC0031	64	64	65	65	65	66	66	66	67	67	67	68	69	69	69	70	70	70	70	70	70	10	48
LC0016	64	63	64	64	64	64	64	65	65	65	65	65	65	65	65	65	65	65	66	66	66	0	0
LC0011	68	69	69	69	68	68	68	68	68	68	68	69	69	69	69	70	70	70	70	70	70	21	100
LC0050	65	65	65	65	65	65	65	65	65	64	64	64	63	63	63	62	62	62	62	62	62	0	0
LC0005	70	69	69	69	70	70	70	71	71	71	71	72	72	71	71	70	70	70	70	70	69	21	100
LC0049	63	64	64	65	65	65	65	66	66	66	66	67	67	68	68	69	70	70	71	71	71	7	33
LC0034	63	63	62	61	62	61	62	62	62	62	62	63	63	64	65	66	67	67	68	69	70	3	14
LC0043	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	21	100
LC0006	71	71	71	72	72	71	71	71	71	71	71	71	70	69	69	69	70	70	70	70	70	21	100
LC0010	66	67	67	67	68	68	68	68	68	68	68	69	69	69	69	69	69	69	70	70	70	13	62
LC0044	72	72	72	72	72	72	72	71	71	71	71	71	70	71	70	71	71	71	71	71	71	20	95
LC0008	65	65	66	66	66	66	66	67	67	67	67	68	69	70	70	70	69	69	69	68	68	10	48
LC0021	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	21	100

Table 1. Rounded results and achieved points (continued)

Lab code	Time (min) 0	1	2	3	4	5	6	7	8	9	10	15	20	25	30	45	60	75	95	105	120	Achieved points	Achieved points [%]
	Temperature (°C)																						
LC0038	73	72	72	71	71	70	70	70	70	69	69	68	67	67	66	65	64	63	63	63	63	12	57
LC0026	70	70	69	70	68	69	71	69	68	70	70	72	71	70	69	69	70	70	69	71	70	21	100
LC0064	57	57	58	58	58	59	59	60	60	60	60	68	68	68	68	69	69	69	69	69	69	9	43
LC0054	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	68	68	68	68	68	68	2	10
LC0062	67	67	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	69	69	69	69	6	29
LC0032	67	68	68	69	69	69	69	69	70	70	70	70	70	70	70	70	70	70	71	71	71	19	91
LC0059	68	63	63	63	63	63	63	63	63	64	64	64	64	65	65	65	66	66	67	67	67	1	5
LC0014	69	68	68	68	68	68	68	68	68	68	68	67	67	67	67	66	67	67	68	68	68	5	24
LC0046	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	21	100
LC0114a	68	67	66	66	66	66	65	65	65	65	65	65	65	64	64	64	63	63	63	63	63	1	5
LC0114b	68	67	66	66	65	65	65	65	65	65	65	64	64	64	64	64	65	65	66	66	67	1	5
LC0114c	68	67	67	66	66	66	66	66	66	66	66	66	66	66	67	68	69	70	71	72	75	5	24
LC0114d	69	69	69	69	69	69	69	69	69	69	69	70	70	70	70	70	69	69	70	70	70	21	100
LC0114e	69	69	68	68	68	68	67	67	67	67	67	66	66	65	65	65	65	66	66	67	67	3	14
LC0114f	70	70	70	70	69	69	69	69	69	69	69	70	70	70	70	70	69	69	69	69	69	21	100
LC0061	67	66	66	66	66	65	65	65	65	65	65	65	65	65	65	65	66	66	67	67	68	0	0
LC0024	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	70	70	70	70	71	71	21	100
LC0002	61	61	62	62	62	63	63	63	63	64	64	64	65	66	66	68	69	69	70	70	71	5	24
LC0121	64	63	63	62	62	61	61	61	60	60	59	58	58	57	57	57	58	58	57	56	55	0	0
LC0122	56	55	56	57	57	58	59	59	60	60	60	61	62	62	63	64	66	66	67	67	68	0	0
LC0120	64	65	n/a	64	64	n/a	64	63	63	63	63	62	62	61	61	60	60	59	59	59	59	0	0
LC0123	64	65	65	66	66	66	66	66	67	67	67	67	68	68	68	68	69	69	69	69	69	6	29

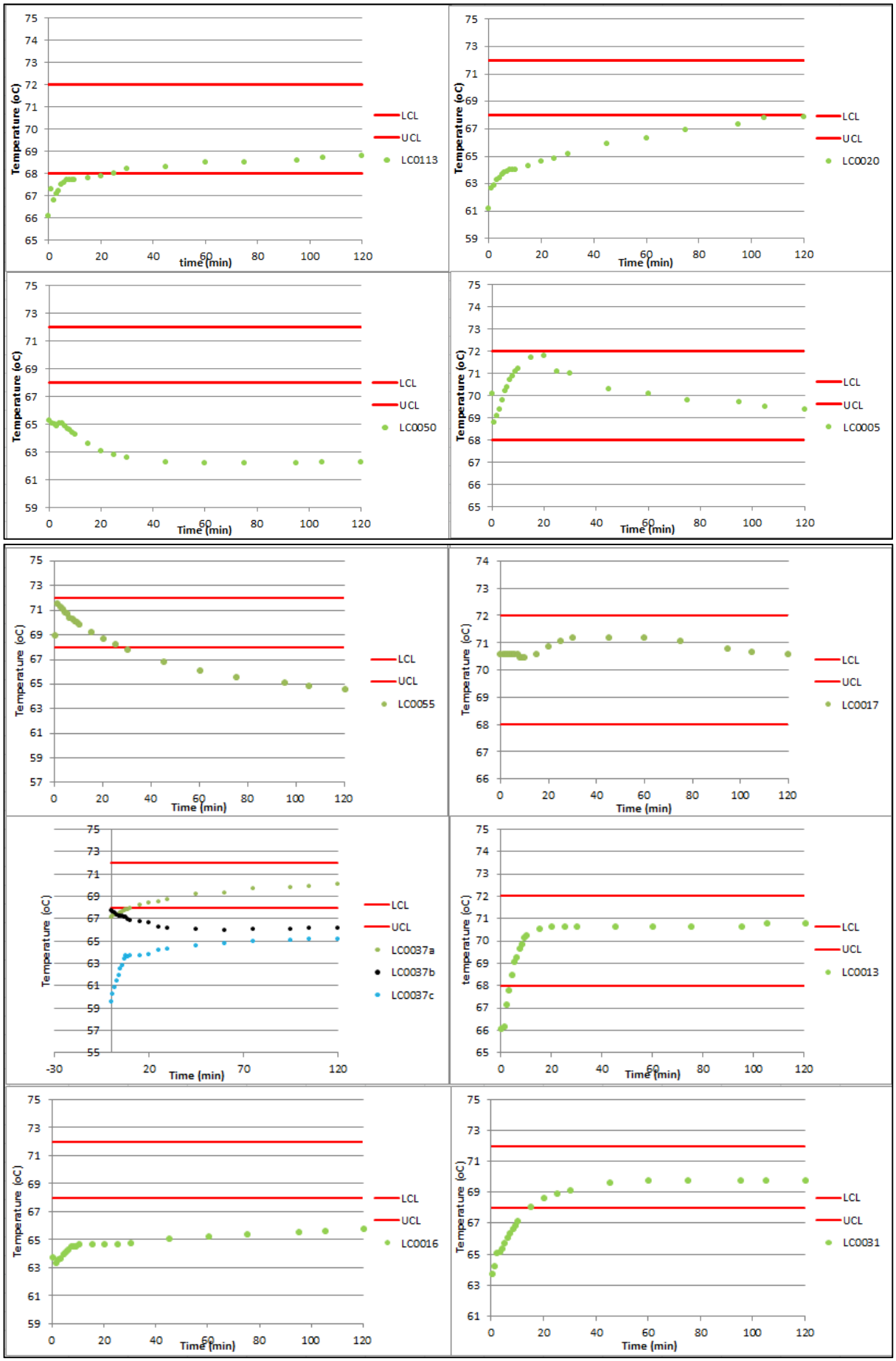


Figure 20 Graphical representation of participant's results (continued)

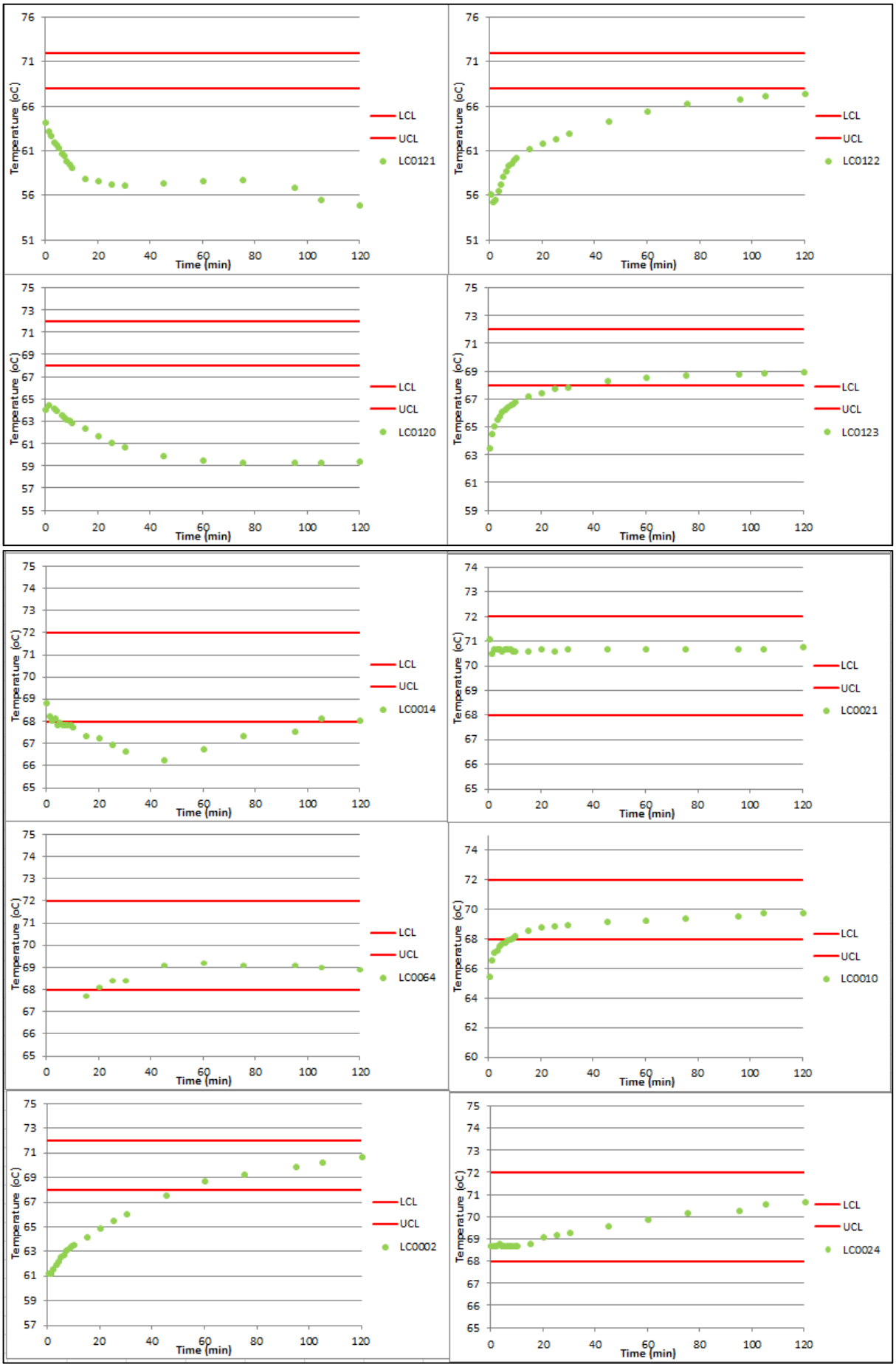


Figure 20 Graphical representation of participant's results (continued)

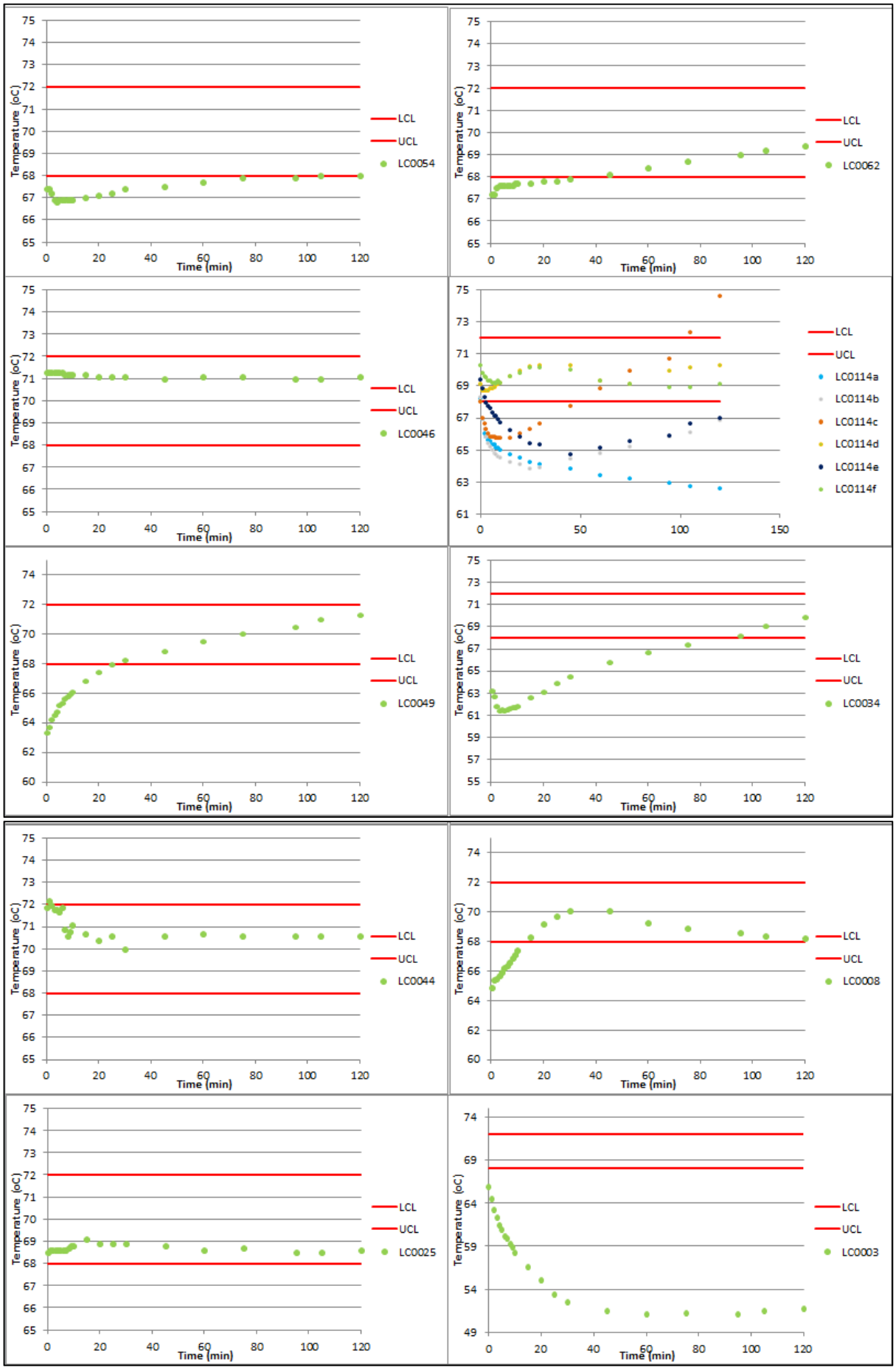


Figure 20 Graphical representation of participant's results (continued)

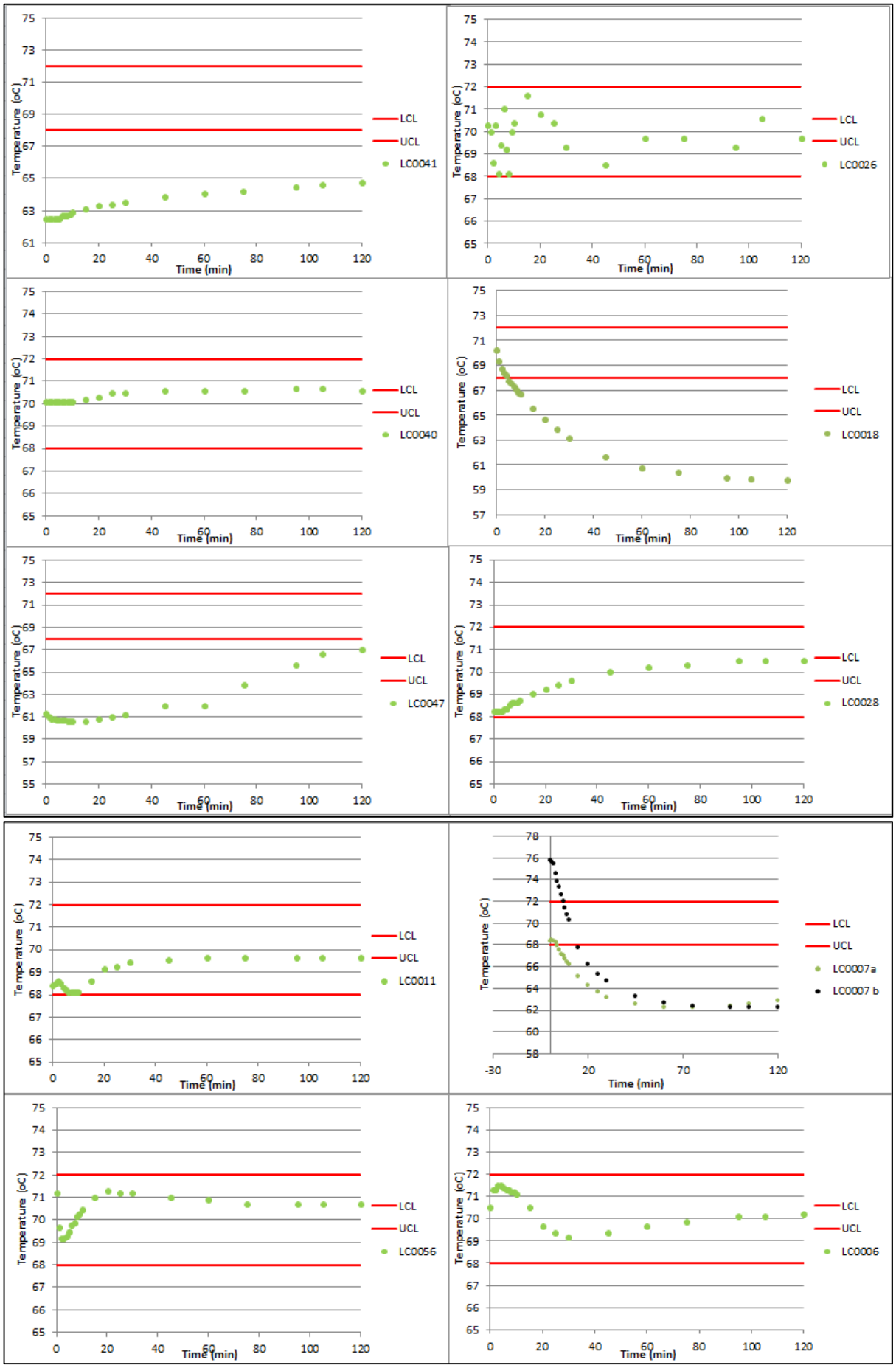


Figure 20 Graphical representation of participant's results (continued)

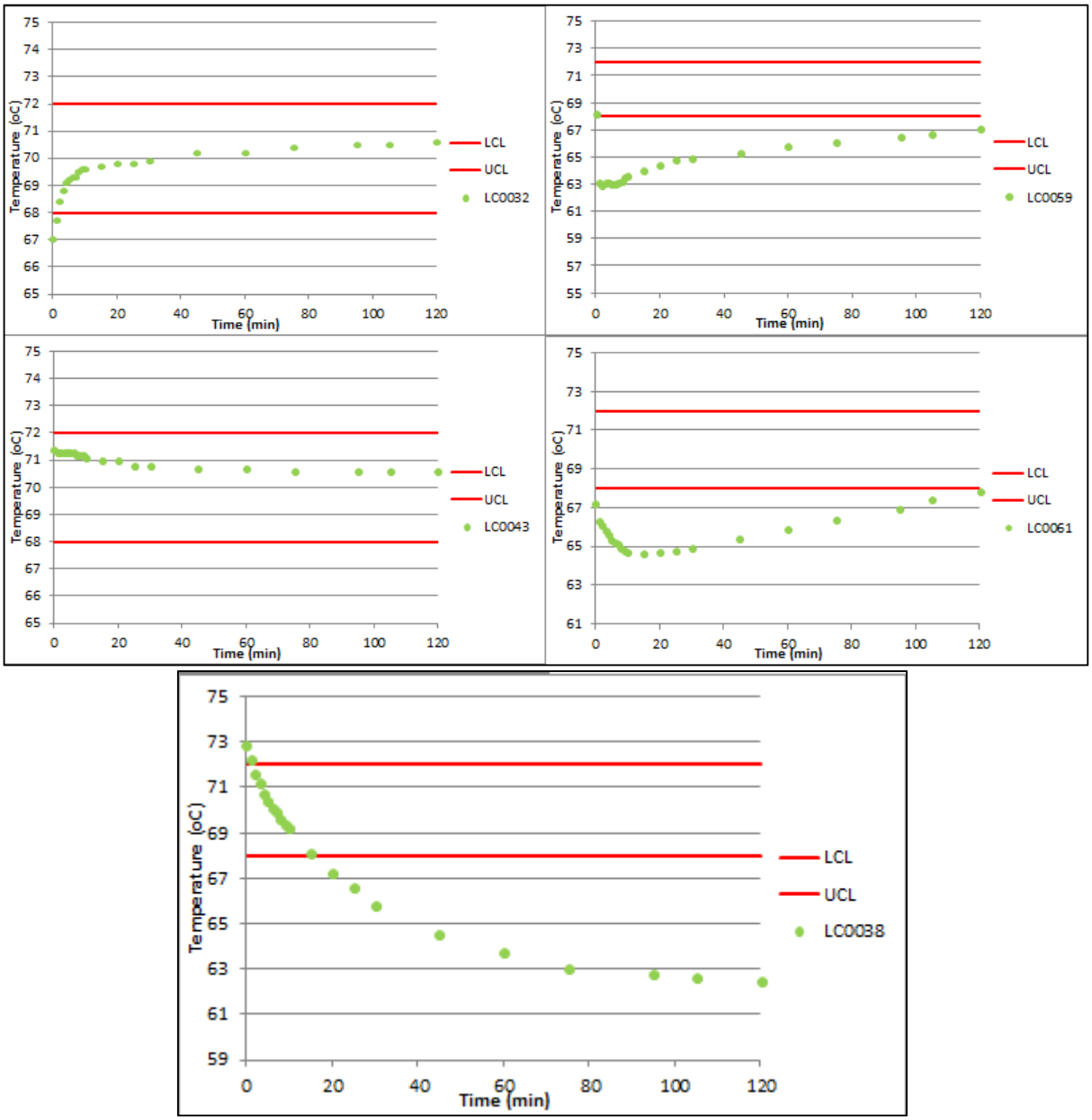


Figure 20 Graphical representation of participant's results

12.3. Achieved points

Table 2 Total of achieved points

Lab code	total of achieved points (max. 21 points)	total achieved points [%]	Lab code	total of achieved points (max. 21 points)	total achieved points [%]	Lab code	total of achieved points (max. 21 points)	total achieved points [%]
LC0040	21	100	**LC0031**	10	48	**LC0032**	20	95
LC0018	7	33	**LC0016**	0	0	**LC0059**	1	5
LC0007a	6	29	**LC0011**	21	100	**LC0014**	14	67
LC0007b	5	24	**LC0050**	0	0	**LC0046**	21	100
LC0055	15	71	**LC0005**	21	100	**LC0114a**	1	5
LC0017	21	100	**LC0049**	8	38	**LC0114b**	1	5
LC0047	0	0	**LC0034**	3	14	**LC0114c**	6	29
LC0028	21	100	**LC0043**	21	100	**LC0114d**	21	100
LC0056	21	100	**LC0006**	21	100	**LC0114e**	6	29
LC0037a	16	76	**LC0010**	17	81	**LC0114f**	21	100
LC0037b	3	14	**LC0044**	21	100	**LC0061**	1	5
LC0037c	0	0	**LC0008**	10	48	**LC0024**	21	100
LC0013	18	86	**LC0021**	21	100	**LC0002**	6	33
LC0025	21	100	**LC0038**	12	57	**LC0121**	0	0
LC0003	0	0	**LC0026**	21	100	**LC0122**	1	5
LC0041	0	0	**LC0064**	10	48	**LC0120**	0	0
LC0113	16	76	**LC0054**	6	29	**LC0123**	9	43
LC0020	2	10	**LC0062**	19	90			

European Commission
EUR 27826 EN – Joint Research Centre – Institute for Health and Consumer Protection

Title: **Report of an inter-laboratory comparison from the European Union Reference Laboratory for Food Contact Materials: ILC01 2015 – Temperature control during migration tests by article filling**

Author(s): Emmanouil Tsochatzis, Anja Mieth, Catherine Simoneau and Eddo Hoekstra

Luxembourg: Publications Office of the European Union

2016 – 40 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424 (online)
ISBN 978-92-79-57669-0 (PDF)
doi:10.2788/536852

LB-NA-27826-EN-N

JRC Mission

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

Serving society
Stimulating innovation
Supporting legislation

doi:10.2788/536852

ISBN 978-92-79-57669-0

Publications Office