

# TEST REPORT

N° **2016TM0408**

DATE OF RECEPTION

DATE TEST

APPLICANT  
S.T. CORPORATION  
4-6, 2-chome, Shimo-ochiai, Shinjuku-ku  
JP-1010024 TOKIO  
  
Att. MR. MIKIO TSUJI

DESCRIPTION AND IDENTIFICATION OF SAMPLES

SAMPLES REFERENCED:  
-“NBR COTTON KNIT GLOVES G-630W”.  
-“NBR COTTON KNIT GLOVES G-630”.  
-“NBR COTTON KNIT GLOVES G-600”.  
-“NBR COTTON KNIT GLOVES G-640”.  
-“NBR COTTON KNIT GLOVES G-636”.  
-“NBR COTTON KNIT GLOVES G-901”.  
-“NBR COTTON KNIT GLOVES G-901W”.

TESTS CARRIED OUT

- DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)
- DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)
- DETERMINATION OF THE OVERALL MIGRATION IN VEGETAL OIL\*
- DETERMINATION OF PRIMARY AROMATIC AMINES IN ACETIC ACID 3 % (w/v)\*
- DETERMINATION OF SPECIFIC MIGRATION OF METALS\*
- DETERMINATION OF SPECIFIC MIGRATION OF FORMALDEHYDE\*
- DETERMINATION OF SPECIFIC MIGRATION OF ACRYLONITRILE MONOMER\*
- DETERMINATION OF SPECIFIC MIGRATION OF 1,3-BUTADIENE MONOMER\*
- DETERMINATION OF SPECIFIC MIGRATION OF MALEIC ACID\*
- DETERMINATION OF SPECIFIC MIGRATION OF ZINC DIBUTYLDITHIOCARBAMATE (CAS 136-23-2)\*
- DETERMINATION OF ZINC AND LEAD CONTENT\*
- DETERMINATION OF REALEASE OF N-NITROSAMINES\*
- DETERMINATION OF COLOUR FASTNESS\*
- DETERMINATION OF THE TRANSFER OF ANTIMICROBIAL CONSTITUENTS\*

ENAC is a signatory to the Multilateral Agreement (MLA), (MRA Mutual Recognition Agreement) of the European Cooperation for Accreditation (EA) and the International Laboratory Accreditation Cooperation (ILAC), in testing.

ATTACHED

SAMPLE(S) SEALED

PAGE

OF



## DESCRIPTION OF SAMPLES



**Reference:** NBR COTTON KNIT GLOVES G-630W

**Lot n°:** ---

**Description according to the customer:**

Samples are blue reusable lined gloves. The outer layer is nitrile rubber and inner face is a support made of cotton knitted fabric in white and lining made of cotton knitted napped fabric in white. Model G-630W supplied by S.T. Corporation.

**Remarks:**

According to customer samples are taken at random from a production batch.

Tests were performed on the outside face, palm zone of the glove because it is the area intended for contact with food in normal use.

The test conditions are agreed with the client: 2 hours at 40°C, following the recommendations of the European Commission EUR 23814 EN 2009 'Guidelines for articles on testing conditions in contact with foodstuffs' as severe the foreseeable conditions of use.



## DESCRIPTION OF SAMPLES



**Reference:** NBR COTTON KNIT GLOVES G-630

**Lot n°:** ---

**Description according to the customer:**

Samples are blue reusable lined gloves. The outer layer is nitrile rubber and inner face is a support made of cotton knitted fabric in white. Model G-630 supplied by S.T. Corporation.

**Remarks:**

According to customer samples are taken at random from a production batch.

Tests were performed on the outside face, palm zone of the glove because it is the area intended for contact with food in normal use.

The test conditions are agreed with the client: 2 hours at 40°C, following the recommendations of the European Commission EUR 23814 EN 2009 'Guidelines for articles on testing conditions in contact with foodstuffs' as severe the foreseeable conditions of use.



## DESCRIPTION OF SAMPLES



**Reference:** NBR COTTON KNIT GLOVES G-600

**Lot n°:** ---

**Description according to the customer:**

Samples are blue reusable lined gloves. The outer layer is nitrile rubber and inner face is a support made of cotton knitted fabric in white. Model G-600 supplied by S.T. Corporation.

**Remarks:**

According to customer samples are taken at random from a production batch.

Tests were performed on the outside face, palm zone of the glove because it is the area intended for contact with food in normal use.

The test conditions are agreed with the client: 2 hours at 40°C, following the recommendations of the European Commission EUR 23814 EN 2009 'Guidelines for articles on testing conditions in contact with foodstuffs' as severe the foreseeable conditions of use.



## DESCRIPTION OF SAMPLES



**Reference:** NBR COTTON KNIT GLOVES G-640

**Lot n°:** ---

**Description according to the customer:**

Samples are blue reusable lined gloves. The outer layer is nitrile rubber and inner face is a support made of cotton knitted fabric in white. Model G-640 supplied by S.T. Corporation.

**Remarks:**

According to customer samples are taken at random from a production batch.

Tests were performed on the outside face, palm zone of the glove because it is the area intended for contact with food in normal use.

The test conditions are agreed with the client: 2 hours at 40°C, following the recommendations of the European Commission EUR 23814 EN 2009 'Guidelines for articles on testing conditions in contact with foodstuffs' as severe the foreseeable conditions of use.



## DESCRIPTION OF SAMPLES



**Reference:** NBR COTTON KNIT GLOVES G-636

**Lot n°:** ---

**Description according to the customer:**

Samples are blue reusable lined gloves. The outer layer is nitrile rubber and inner face is a support made of cotton knitted fabric in white. Model G-636 supplied by S.T. Corporation.

**Remarks:**

According to customer samples are taken at random from a production batch.

Tests were performed on the outside face, palm zone of the glove because it is the area intended for contact with food in normal use.

The test conditions are agreed with the client: 2 hours at 40°C, following the recommendations of the European Commission EUR 23814 EN 2009 'Guidelines for articles on testing conditions in contact with foodstuffs' as severe the foreseeable conditions of use.



## DESCRIPTION OF SAMPLES



**Reference:** NBR COTTON KNIT GLOVES G-901

**Lot n°:** ---

**Description according to the customer:**

Samples are blue reusable lined gloves. The outer layer is nitrile rubber and inner face is a support made of cotton knitted fabric in white. Model G-901 supplied by S.T. Corporation.

**Remarks:**

According to customer samples are taken at random from a production batch.

Tests were performed on the outside face, palm zone of the glove because it is the area intended for contact with food in normal use.

The test conditions are agreed with the client: 2 hours at 40°C, following the recommendations of the European Commission EUR 23814 EN 2009 'Guidelines for articles on testing conditions in contact with foodstuffs' as severe the foreseeable conditions of use.



## DESCRIPTION OF SAMPLES



**Reference:** NBR COTTON KNIT GLOVES G-901W

**Lot n°:** ---

**Description according to the customer:**

Samples are blue reusable lined gloves. The outer layer is nitrile rubber and inner face is a support made of cotton knitted fabric in white and lining made of cotton knitted napped fabric in white. Model G-901W supplied by S.T. Corporation.

**Remarks:**

According to customer samples are taken at random from a production batch.

Tests were performed on the outside face, palm zone of the glove because it is the area intended for contact with food in normal use.

The test conditions are agreed with the client: 2 hours at 40°C, following the recommendations of the European Commission EUR 23814 EN 2009 'Guidelines for articles on testing conditions in contact with foodstuffs' as severe the foreseeable conditions of use.





## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)

Standard: UNE-EN 1186-5:2002

Date: 05.04.16 – 06.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G-630W	5,3	4,7 ± 0,6
	4,6	
	4,2	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)

Standard: UNE-EN 1186-5:2002

Date: 12.07.16 – 13.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G630	4.6	<b>4.4 ± 0.6</b>
	4.6	
	3.9	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)

Standard: UNE-EN 1186-5:2002

Date: 20.07.16 – 21.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G600	4.5	<b>3.7 ± 0.4</b>
	2.9	
	3.7	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)

Standard: UNE-EN 1186-5:2002

Date: 20.07.16 – 21.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G640	3.1	3.1 ± 0.4
	2.8	
	3.3	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)

Standard: UNE-EN 1186-5:2002

Date: 12.07.16 – 13.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G636	3.5	3.3 ± 0.4
	3.0	
	3.2	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)

Standard: UNE-EN 1186-5:2002

Date: 12.07.16 – 13.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G901	2.5	3.1 ± 0.4
	3.5	
	3.5	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ACETIC ACID 3 % (w/v)

Standard: UNE-EN 1186-5:2002

Date: 12.07.16 – 13.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G901W	2.7	<b>2.4 ± 0.3</b>
	2.1	
	2.3	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)

Standard: UNE-EN 1186-5:2002

Date: 05.04.16 – 06.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Ethanol 50 % (v/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G-630W	4,4	5,0 ± 0,6
	5,1	
	5,4	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.





## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)

Standard: UNE-EN 1186-5:2002

Date: 14.07.16 – 15.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Ethanol 50 % (v/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G630	5.8	5.3 ± 0.6
	4.5	
	5.5	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)

Standard: UNE-EN 1186-5:2002

Date: 20.07.16 – 21.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Ethanol 50 % (v/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G600	3.6	3.7 ± 0.4
	4.1	
	3.3	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)

Standard: UNE-EN 1186-5:2002

Date: 20.07.16 – 21.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Ethanol 50 % (v/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G640	3.5	3.4 ± 0.4
	3.5	
	3.2	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)

Standard: UNE-EN 1186-5:2002

Date: 14.07.16 – 15.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Ethanol 50 % (v/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G636	4.0	4.5 ± 0.5
	5.0	
	4.5	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)

Standard: UNE-EN 1186-5:2002

Date: 14.07.16 – 15.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Ethanol 50 % (v/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G901	2.7	3.4 ± 0.4
	3.5	
	3.9	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN ETHANOL 50 % (v/v)

Standard: UNE-EN 1186-5:2002

Date: 14.07.16 – 15.07.16

Contact form: Cell

Exposition time: 2 hours

Temperature: 40 °C

Simulant: Ethanol 50 % (v/v)

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Sample reference	Individual values of Overall Migration (mg/dm <sup>2</sup> )	Average value Overall Migration <sup>(1)</sup> (mg/dm <sup>2</sup> )
NBR COTTON KNIT GLOVES G901W	3.6	3.7 ± 0.4
	4.1	
	3.3	

Remarks:

- Article intended for repeat use. The compliance of the material is checked on the basis of the level of the migration found in the third test.

- <sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011: 60 ± 6 mg/Kg or 10 ± 1 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF THE OVERALL MIGRATION IN VEGETAL OIL \*

Standard: UNE-EN 1186-4:2002

Date: 11.04.16 – 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Vegetal oil

Number of samples tested: 3

Reference: NBR COTTON KNIT GLOVES G-630W

Results:

	Results 2 <sup>nd</sup> Overall Migration M2	Global Results 3 <sup>rd</sup> Overall Migration M3
Individual values (mg/dm <sup>2</sup> )	<1	<1
	<1	<1
	<1	<1
Average value (mg/dm <sup>2</sup> )	<1	<1
Final value Migration (M3-M2) (mg/dm <sup>2</sup> )	<1	

Remarks:

- Limit of Detection (LOD) = 1 mg/dm<sup>2</sup>

- Maximum overall migration limit according to Regulation (EU) no 10/2011 of the Commission of 14 January 2011: 60 ± 20 mg/Kg or 10 ± 3 mg/dm<sup>2</sup>.



## RESULTS

### DETERMINATION OF PRIMARY AROMATIC AMINES IN ACETIC ACID 3 % (w/v)\*

Method: Spectrophotometry (Based on LMGB § 35 L 00.00-6:1995/Cor:2002)

Date: 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 70 °C

Simulant: Acetic acid 3 % (w/v)

Number of samples tested: 3

1<sup>st</sup> Migration Results:

Reference	Result (mg/Kg)
NBR COTTON KNIT GLOVES G-630W	< 0.01

Remarks:

- The maximum limit of specific migration of primary aromatic amines is 0.01 mg / kg, according to Regulation (EU) n° 10/2011 of the Commission of 14 January 2011 (10 µg/Kg).





## RESULTS

### DETERMINATION OF SPECIFIC MIGRATION OF METALS\*

Standard: In-house method by ICP-MS

Simulant: Acetic acid 3 % (w/v)

Date: 11.04.16 – 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Reference: NBR COTTON KNIT GLOVES G-630W

3<sup>rd</sup> Migration Results:

Heavy metals	Result <sup>(1)</sup> (mg/Kg)	Maximum Limits <sup>(2)</sup> (mg/Kg)
<b>Barium</b>	< 0.02	1
<b>Cobalt</b>	< 0.02	0.05
<b>Copper</b>	< 1	5
<b>Iron</b>	< 1	48
<b>Lithium</b>	< 0.02	0.6
<b>Manganese</b>	< 0.02	0.6
<b>Zinc</b>	10.3 ± 0.6	25

Remarks:

-<sup>(1)</sup> Average value (n = 3) ± U (extended uncertainty)

-<sup>(2)</sup> Maximum limits according to the annex II of Regulation (EU) No. 10/2011 about the specific migration of metals.



## RESULTS

### DETERMINATION OF SPECIFIC MIGRATION OF FORMALDEHYDE\*

Method: Based on UNE-CEN/TS 13130-23:2007 EX (Spectrophotometric analysis UV/VIS)

Date: 11.04.16 - 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Olive oil

Number of samples tested: 3

3<sup>rd</sup> Migration Results:

Reference	Individual values of Specific Migration (mg/Kg)	Average value of Specific Migration (mg/Kg)
NBR COTTON KNIT GLOVES G-630W	<1	< 1
	<1	
	<1	

Remark:

- Based on BfR Recommendation XXI. 'Commodities based on Natural and Synthetic Rubber' the limit value is 3 mg/Kg.



## RESULTS

### DETERMINATION OF SPECIFIC MIGRATION OF ACRYLONITRILE MONOMER\*

Method: Based on CEN/TS 13130-3:2005 Head Space GC-MS

Date: 11.04.16 - 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Olive oil

Number of samples tested: 2

3<sup>rd</sup> Migration Results:

Reference	Individual values of Specific Migration (mg/Kg)	Average value of Specific Migration (mg/Kg)
NBR COTTON KNIT GLOVES G-630W	< 0.01	< 0.01
	< 0.01	

Remark:

- Based on Regulation 10/2011 the limit value is Not detected, that is Limit of Detection (LOD) = 0.01 mg/Kg.



## RESULTS

### DETERMINATION OF SPECIFIC MIGRATION OF 1,3-BUTADIENE MONOMER\*

Method: Method based on CEN/TS 13130-15:2005 Head Space GC-MS

Date: 11.04.16 – 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Olive oil

Number of samples tested: 2

3<sup>rd</sup> Migration Results:

Reference	Individual values of Specific Migration (mg/Kg)	Average value of Specific Migration (mg/Kg)
NBR COTTON KNIT GLOVES G-630W	< 0.01	< 0.01
	< 0.01	

Remark:

- Based on BfR Recommendation XXI. 'Commodities based on Natural and Synthetic Rubber' and Regulation 10/2011 the limit value is Not detected, that is Limit of Detection (LOD) = 0.01 mg/Kg.



## RESULTS

### DETERMINATION OF SPECIFIC MIGRATION OF MALEIC ACID\*

Method: In-house method by LC-MS

Date: 11.04.16 - 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Olive oil

Number of samples tested: 2

3<sup>rd</sup> Migration Results:

Reference	Individual values of Specific Migration (mg/Kg)	Average value of Specific Migration (mg/Kg)
NBR COTTON KNIT GLOVES G-630W	< 5	< 5
	< 5	

Remark:

- According to the Regulation (EU) No 10/2011 of the Commission of 14 January 2011, the maximum limit of specific migration of maleic acid is 30 mg/Kg.



## RESULTS

### DETERMINATION OF SPECIFIC MIGRATION OF ZINC DIBUTYLDITHIOCARBAMATE (CAS 136-23-2)\*

Method: In-house method by LC-MS

Date: 11.04.16 – 28.04.16

Contact form: Single-sided cell, repeated contact

Exposure time: 2 hours

Exposure temperature: 40 °C

Simulant: Olive oil

Number of samples tested: 2

3<sup>rd</sup> Migration Results:

Reference	Individual values of Specific Migration (mg/Kg)	Average value of Specific Migration (mg/Kg)
NBR COTTON KNIT GLOVES G-630W	< 0.05	< 0.05
	< 0.05	

Remark:

- Based on BfR Recommendation XXI. 'Commodities based on Natural and Synthetic Rubber' the limit value is 0.1 mg/Kg.



## RESULTS

### DETERMINATION OF ZINC AND LEAD CONTENT\*

Method: Acid digestion and determination by ICP-MS

Date: 02.05.16

Reference: NBR COTTON KNIT GLOVES G-630W

Metals	Result (%)	Maximum Limits <sup>(1)</sup> (%)
Zinc	0.67	3
Lead	< 0.0025	0.003

Remarks:

- <sup>(1)</sup> Maximum limits according to the BfR Recommendation XXI. 'Commodities based on Natural and Synthetic Rubber', Categories 3.



## RESULTS

### DETERMINATION OF RELEASE OF N-NITROSAMINES\*

Standard: UNE-EN 12868:2002 (GC-MS)

Date: 11.04.16 – 28.04.16

Exposure time: 24 hours

Exposure temperature: 40 °C

Simulant: Saliva solution

Number of samples tested: 2

Results:

Reference	Substances	Value of Specific Migration (mg/Kg)
NBR COTTON KNIT GLOVES G-630W	N-Nitrosamines	< 0.01
	N-Nitrosables	< 0.1

Remarks:

- N-Nitrosamines determined: N-Nitrosodimethylamine (NDMA), N-Nitrosodiethylamine (NDEA), N-Nitrosodipropylamine (NDPA), N-Nitrosodibutylamine (NDBA), N-Nitrosopiperidine (NPIP), N-Nitrosopyrrolidone (NPYR), N-Nitrosomorpholine (NMOR), N-Nitrosobenzylamine (NDBzA), N-Nitrosodiisononylamine (NDiNA)
- Based on Directive 93/11/EEC and BfR Recommendation XXI. 'Commodities based on Natural and Synthetic Rubber' the limit value of release is Not detected, that is Limit of Detection; N-Nitrosamines LOD = 0.01 mg/Kg, and N-Nitrosables LOD = 0.1 mg/Kg.





## RESULTS

### DETERMINATION OF COLOUR FASTNESS\*

Standard: Based on the standard UNE-EN 646:2006

Method Procedure: B (Brief contact)

Exposure time: 10 minutes

Exposure temperature: 23 ± 2 °C

Date test: 28.04.16

Reference: NBR COTTON KNIT GLOVES G-630W

Results: The colour fastness is given in contact with all test simulants.

Staining in Distilled water	Staining in Ethanol 10 % (v/v)	Staining in acetic acid 3 % (w/v)	Staining in olive oil
5	5	5	5

Remarks:

- Meaning of colour fastness appraisal:

STAINING
5.- VERY GOOD - EXCELLENT 4.- GOOD 3.- FAIR 2.- POOR 1.- POOR

- Based on BfR Recommendation XXXVI. No migration of colorants to foodstuff is Grade 5 according grey scale.



## RESULTS

### DETERMINATION OF THE TRANSFER OF ANTIMICROBIAL CONSTITUENTS\*

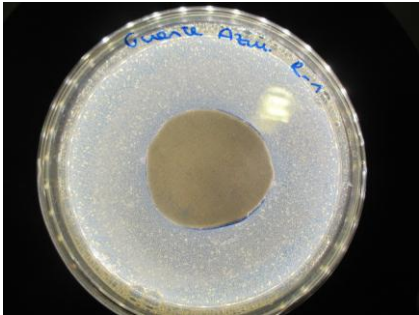
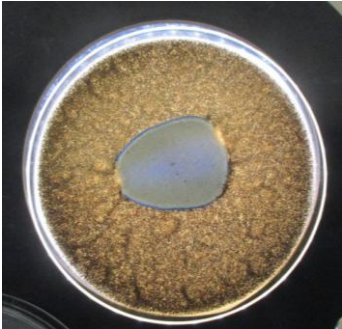
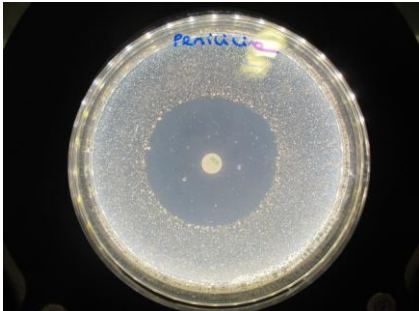
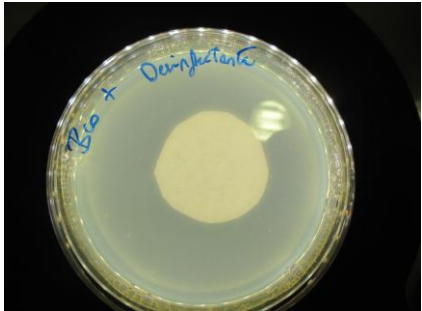
Method: Based on the standard UNE-EN 1104:2006.

Date test: 27.04.16 – 02.05.16

Diameter of the tested sample: 4,8 cm

Reference: NBR COTTON KNIT GLOVES G-630W

Results:

With <i>Bacillus subtilis</i> (ATCC 6633)	With <i>Aspergillus niger</i> (ATCC 6275)
No inhibition zone	No inhibition zone
 <p><i>Bacillus subtilis</i> tested sample</p>	 <p><i>Aspergillus niger</i> tested sample</p>
 <p><i>Bacillus subtilis</i> Positive control</p>	 <p><i>Aspergillus niger</i> Positive control</p>

Remarks:

- Based on BfR Recommendation XXI. 'Commodities based on Natural and Synthetic Rubber', Categories 3. Finished products must not contained substances to obtain an intended antimicrobial proofing.



## CONCLUSIONS\*

The following table summarizes the results obtained for sample: **NBR COTTON KNIT GLOVES G-630W**

<b>Overall Migration Test (OM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/dm<sup>2</sup>)</b>	
Simulant B_ Overall migration in Acetic acid 3% (w/v)	UNE-EN 1186:9-2002	4,7 ± 0,6	
Simulant D1_ Overall migration in ethanol 50% (v/v)	UNE-EN 1186:9-2002	5,0 ± 0,6	
Simulant D2_ Overall migration in vegetal oil*	UNE-EN 1186:8-2002	< 1	
<b>Specific Migration Test (SM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/Kg)</b>	
Primary aromatic amines*	Based on LMGB § 35 L 00.00-6:1995/Cor:2002)	< 0.01	
Metals*	In-house method by ICP-MS	Ba	< 0.02
		Co	< 0.02
		Cu	< 1
		Fe	<1
		Li	<0.02
		Mn	< 0.02
		Zn	10,3 ± 0,6
Formadehyde*	Based on UNE-CEN/TS 13130-23:2007 EX	< 1	
Acrylonitrile monomer*	Based on UNE-CEN/TS 13130-3:2005	< 0.01	
1,3-Butadiene monomer*	Based on CEN/TS 13130-15 :2005	< 0.01	
Maleic acid*	In-house method by LC-MS	< 5	
Zn-Dibutyldithiocarbamate*	In-house method by LC-MS	< 0.05	
<b>Other Tests</b>	<b>Standard</b>	<b>Results</b>	
Release of N-nitrosamines and n-nitrosables*	UNE-EN 12868:2002	N-nitrosamines	< 0.01 mg/Kg
		N-nitrosables	< 0.1 mg/Kg
Colour fastness*	Based on UNE-EN 646:2006	Very good – excelent in all food simulants	
Zinc and Lead total content*	In-house method (acid digestion and ICP-MS)	Zinc	0.67%
		Lead	< 0.0025%
Transfer antimicrobial constituents*	Based on UNE-EN 1104:2006	<i>Bacillus subtilis</i>	No inhibition zone
		<i>Aspergillus niger</i>	No inhibition zone



## CONCLUSIONS\*

The following table summarizes the results obtained for sample: **NBR COTTON KNIT GLOVES G-630**

<b>Overall Migration Test (OM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/dm<sup>2</sup>)</b>
Simulant B_ Overall migration in Acetic acid 3% (w/v)	UNE-EN 1186:9-2002	4,4 ± 0,6
Simulant D1_ Overall migration in ethanol 50% (v/v)	UNE-EN 1186:9-2002	5,3 ± 0,6

The following table summarizes the results obtained for sample: **NBR COTTON KNIT GLOVES G-600**

<b>Overall Migration Test (OM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/dm<sup>2</sup>)</b>
Simulant B_ Overall migration in Acetic acid 3% (w/v)	UNE-EN 1186:9-2002	3,7 ± 0,6
Simulant D1_ Overall migration in ethanol 50% (v/v)	UNE-EN 1186:9-2002	3,7 ± 0,6

The following table summarizes the results obtained for sample: **NBR COTTON KNIT GLOVES G-640**

<b>Overall Migration Test (OM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/dm<sup>2</sup>)</b>
Simulant B_ Overall migration in Acetic acid 3% (w/v)	UNE-EN 1186:9-2002	3,1 ± 0,4
Simulant D1_ Overall migration in ethanol 50% (v/v)	UNE-EN 1186:9-2002	3,4 ± 0,4

The following table summarizes the results obtained for sample: **NBR COTTON KNIT GLOVES G-636**

<b>Overall Migration Test (OM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/dm<sup>2</sup>)</b>
Simulant B_ Overall migration in Acetic acid 3% (w/v)	UNE-EN 1186:9-2002	3,3 ± 0,4
Simulant D1_ Overall migration in ethanol 50% (v/v)	UNE-EN 1186:9-2002	4,5 ± 0,5

The following table summarizes the results obtained for sample: **NBR COTTON KNIT GLOVES G-901**

<b>Overall Migration Test (OM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/dm<sup>2</sup>)</b>
Simulant B_ Overall migration in Acetic acid 3% (w/v)	UNE-EN 1186:9-2002	3,1 ± 0,4
Simulant D1_ Overall migration in ethanol 50% (v/v)	UNE-EN 1186:9-2002	3,4 ± 0,4

The following table summarizes the results obtained for sample: **NBR COTTON KNIT GLOVES G-901W**

<b>Overall Migration Test (OM)</b>	<b>Standard</b>	<b>3rd Migration results (mg/dm<sup>2</sup>)</b>
Simulant B_ Overall migration in Acetic acid 3% (w/v)	UNE-EN 1186:9-2002	2,4 ± 0,3
Simulant D1_ Overall migration in ethanol 50% (v/v)	UNE-EN 1186:9-2002	3,7 ± 0,4



## CONCLUSIONS\*

### Notes:

- Reference values from the Regulation 10/2011, are used for the samples evaluation for being suitable to come in contact with foodstuff. According to the test conditions, the results obtained are below the maximum overall migration limit according to Regulation (EU) No 10/2011 of the Commission of 14 January 2011: 60 mg/Kg or 10 mg/dm<sup>2</sup>.
- Specific migration test and other tests have been carried out according to BfR Recommendation XXI Commodities based on Natural and Synthetic Rubber and Recommendation XXXVI Paper and board for food contact.
- In accordance with Regulation 10/2011, the assignment of these simulants is according to the following food categories: see Annex.



## ANNEX

### 01 Beverages

01.01 Non-alcoholic beverages or alcoholic beverages of an alcoholic strength lower than or equal to 6 % vol.:

A. Clear drinks: Water, ciders, clear fruit or vegetable juices of normal strength or concentrated, fruit nectars, lemonades, syrups, bitters, infusions, coffee, tea, beers, soft drinks, energy drinks and the like, flavoured water, liquid coffee extract

B. Cloudy drinks: juices and nectars and soft drinks containing fruit pulp, musts containing fruit pulp, liquid chocolate

01.02 Alcoholic beverages of an alcoholic strength of between 6 %vol and 20 %.

01.03 Alcoholic beverages of an alcoholic strength above 20 % and all cream liquors

01.04 Miscellaneous: undenaturated ethyl alcohol

### 02 Cereals, cereal products, pastry, biscuits, cakes and other bakers' wares

02.01 Starches

02.02 Cereals, unprocessed, puffed, in flakes (including popcorn, corn flakes and the like)

02.03 Cereal flour and meal

02.04 Dry pasta e.g. macaroni, spaghetti and similar products and fresh pasta

02.05 Pastry, biscuits, cakes, bread, and other bakers' wares, dry:

A. With fatty substances on the surface

B. Other

02.06 Pastry, cakes, bread, dough and other bakers' wares, fresh:

A. With fatty substances on the surface

B. Other



## ANNEX

### 03 Chocolate, sugar and products thereof Confectionery products

03.01 Chocolate, chocolate-coated products, substitutes and products coated with substitutes

03.02 Confectionery products:

A. In solid form:

- I. With fatty substances on the surface
- II. Other

B. In paste form:

- I. With fatty substances on the surface
- II. Moist

03.03 Sugar and sugar products

A. In solid form: crystal or powder

B. Molasses, sugar syrups, honey and the like

### 04 Fruit, vegetables and products thereof

04.01 Whole fruit, fresh or chilled, unpeeled

04.02 Processed fruit:

A. Dried or dehydrated fruits, whole, sliced, flour or powder

B. Fruit in the form of purée, preserves, pastes or in its own juice or in sugar syrup (jams, compote, and similar products)

C. Fruit preserved in a liquid medium:

- I. In an oily medium
- II. In an alcoholic medium

04.03 Nuts (peanuts, chestnuts, almonds, hazelnuts, walnuts, pine kernels and others):

A. Shelled, dried, flaked or powdered

B. Shelled and roasted

C. In paste or cream form

04.04 Whole vegetables, fresh or chilled, unpeeled

04.05 Processed vegetables:

A. Dried or dehydrated vegetables whole, sliced or in the form of flour or powder

B. Fresh vegetables, peeled or cut

C. Vegetables in the form of purée, preserves, pastes or in its own juice (including pickled and in brine)

D. Preserved vegetables:

- I. In an oily medium
- II. In an alcoholic medium



## ANNEX

### 05 Fats and oils

05.01 Animals and vegetable fats and oils, whether natural or treated (including cocoa butter, lard, resolidified butter)

05.02 Margarine, butter and other fats and oils made from water emulsions in oil

### 06 Animal products and eggs

06.01 Fish:

A. Fresh, chilled, processed, salted or smoked including fish eggs

B. Preserved fish:

I. In an oily medium

II. In an aqueous medium

06.02 Crustaceans and molluscs (including oysters, mussels, snails)

A. Fresh within the shell

B. Shell removed, processed, preserved or cooked with the shell

I. In an oily medium

II. In an aqueous medium

06.03 Meat of all zoological species (including poultry and game):

A. Fresh, chilled, salted, smoked

B. Processed meat products (such as ham, salami, bacon, sausages, and other) or in the form of paste, creams

C. Marinated meat products in an oily medium

06.04 Preserved meat:

A. In an fatty or oily medium

B. In an aqueous medium

06.05 Whole eggs, egg yolk, egg white

A. Powdered or dried or frozen

B. Liquid and cooked





## ANNEX

### 07 Milk products

#### 07.01 Milk

- A. Milk and milk based drinks whole, partly dried and skimmed or partly skimmed
- B. Milk powder including infant formula (based on whole milk powder)

#### 07.02 Fermented milk such as yoghurt, buttermilk and similar products

#### 07.03 Cream and sour cream

#### 07.04 Cheeses:

- A. Whole, with not edible rind
- B. Natural cheese without rind or with edible rind (gouda, camembert, and the like) and melting cheese
- C. Processed cheese (soft cheese, cottage cheese and similar)
- D. Preserved cheese:
  - I. In an oily medium
  - II. In an aqueous medium (feta, mozzarella, and similar)

### 08 Miscellaneous products

#### 08.01 Vinegar

#### 08.02 Fried or roasted foods:

- A. Fried potatoes, fritters and the like
- B. Of animal origin

#### 08.03 Preparations for soups, broths, sauces, in liquid, solid or powder form (extracts, concentrates); homogenised composite food preparations, prepared dishes including yeast and raising agents

##### A. Powdered or dried:

- I. With fatty character
- II. Other

##### B. any other form than powdered or dried:

- I. With fatty character
- II. Other

#### 08.04 Sauces:

- A. With aqueous character
- B. With fatty character e.g. mayonnaise, sauces derived from mayonnaise, salad creams and other oil/water mixtures e.g. coconut based sauces

#### 08.05 Mustard (except powdered mustard under heading 08.14)



## ANNEX

08.06 Sandwiches, toasted bread pizza and the like containing any kind of foodstuff

A. With fatty substances on the surface

B. Other

08.07 Ice-creams

08.08 Dried foods:

A. With fatty substances on the surface

B. Other

08.09 Frozen or deep-frozen foods

08.10 Concentrated extracts of an alcoholic strength equal to or exceeding 6 % vol.

08.11 Cocoa:

A. Cocoa powder, including fat-reduced and highly fat reduced

B. Cocoa paste

08.12 Coffee, whether or not roasted, decaffeinated or soluble, coffee substitutes, granulated or powdered

08.13 Aromatic herbs and other herbs such as camomile, mallow, mint, tea, lime blossom and others

08.14 Spices and seasonings in the natural state such as cinnamon, cloves, powdered mustard, pepper, vanilla, saffron, salt and other

08.15 Spices and seasoning in oily medium such as pesto, curry paste



Judit Sisternes  
Head of Health and Hygiene products  
Depart.

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