



# mini Anion Exchange Centrifugation Technique (mAECT) Model IMT – INRB



## For separation of trypanosomes from venous blood

### I. PRINCIPLE

mAECT (mini Anion Exchange Centrifugation Technique, Lumsden et al. 1979) is based on a technique developed by Lanham and Godfrey (1970). It consists of separating the trypanosomes from venous blood by anion exchange chromatography and concentrating them in the bottom of a transparent tube by low speed centrifugation (3000 rpm). After centrifugation, the tip of the transparent tube is examined under the microscope for the presence of mobile trypanosomes. The large blood volume (350 µl) allows detection of less than 100 trypanosomes/ml resulting in high sensitivity.

**References:** Lanham et al. (1970) Exp. Parasitol. 26: 521-534  
Lumsden et al. (1979) Trans. R. Soc. Trop. Med. Hyg. 73: 312-317

### II. STORAGE

Columns should be stored preferably at 4°C. **DO NOT FREEZE.**

### III. PRECAUTIONS

Carefully read these instructions before using the mAECT kit.

Tubes are sterilized. Only open them just before use.  
Trypanosomes are fragile. Blood should be examined as soon as possible, no later than 30 minutes after collection.  
Trypanosomes can be human infective. Use latex gloves for blood sampling and test execution.  
Destroy waste material properly after use.  
Clean non-disposable materials with disinfectant liquids after use.

### IV. AVAILABLE FROM

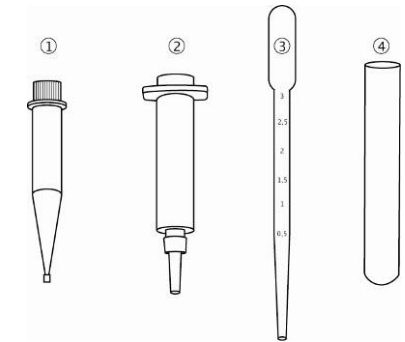
Dr. Dieudonné Mumba  
Institut National de Recherche Biomédicale (INRB)  
Avenue de la Démocratie, Kinshasa, R.D. Congo  
Email: [mumbadieudonne@yahoo.fr](mailto:mumbadieudonne@yahoo.fr) Tél.: +243 81 81 18 511  
CONTACT THIS PERSON FOR ANY COMPLAINTS

### V. MATERIALS & TEST SAMPLE

#### 1. MATERIALS INCLUDED IN THE KIT

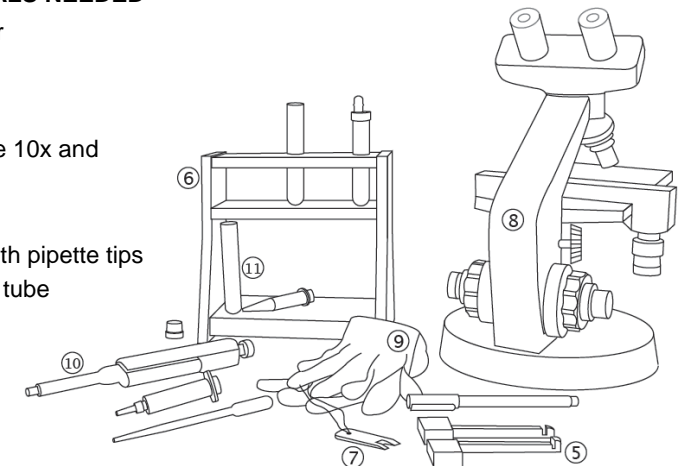
Instruction leaflet

- ① Plastic collector tube with blue stopper
- ② Plastic mini-column with green upper stopper and white lower stopper
- ③ Graduated plastic transfer pipette
- ④ 14 ml round bottom centrifugation tube



#### 2. ACCESSORY MATERIALS NEEDED

- ⑤ mAECT viewing chamber
  - ⑥ mAECT tube rack
  - ⑦ mAECT column opener
  - ⑧ Microscope with objective 10x and ocular 10x or 15x
  - ⑨ Latex gloves
  - ⑩ Micropipette for 350 µl with pipette tips
  - ⑪ 14 ml round bottom waste tube
- Absorbent paper  
Waste container  
Disinfectant liquid  
Table centrifuge



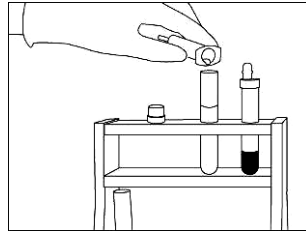
#### 3. TEST SAMPLE

Blood freshly taken on heparin (350 µl). Do not use EDTA or citrate as anticoagulant.

## VI. PROTOCOL

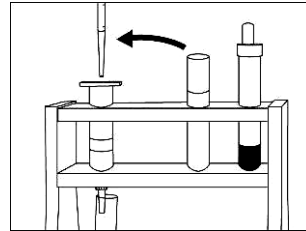
### 1 PREPARATION OF THE COLUMN:

- 1.1 Place one 14 ml round bottom tube in the upper tray (back line) and one in the lower tray (front line) of the mAECT tube rack.
- 1.2 Remove the green upper stopper from the column.
- 1.3 Pour the supernatant buffer into the 14 ml tube in the upper tray.
- 1.4 Number the column (e.g. with the identification number of the blood sample) and place it in the tube rack above the waste tube.

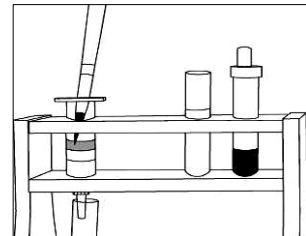


### 2 APPLICATION OF BLOOD SAMPLE:

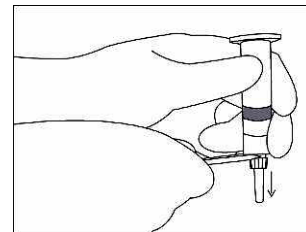
- 2.1 With the transfer pipette, dispense 500 µl of the buffer on the gel in the column.



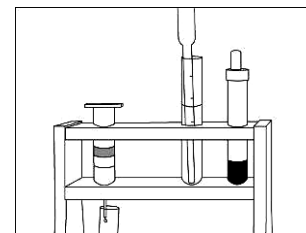
- 2.2 With a micropipette, carefully mix 350 µl of heparinised blood with the buffer in the column.



- 2.3 Remove the lower stopper of the column by pushing the column opener between the white stopper and the column bottom. The column will start to drip. Immediately, put the column back in the rack.



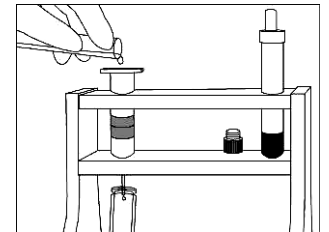
- 2.4 Let the column drain until the blood has completely entered the gel (upper filter is dry).



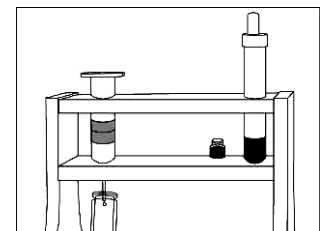
### 3 ELUTION:

- 3.1 Open the collector tube and keep the blue stopper aside. Mark this collector tube with an identification number on the writing surface provided.

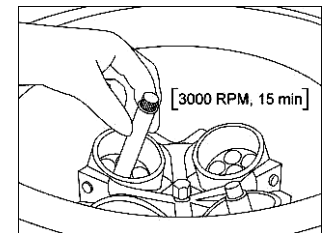
*Note: Avoid any dust from entering the collector tube, since this will hamper the detection of the parasites in the collector tube after centrifugation.*



- 3.2 Replace the waste tube with the collector tube inserted in a 14 ml round bottom centrifugation tube. Make sure that the column tip fits into the collector tube.

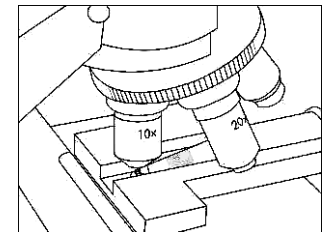


- 3.3 Pour the rest of the buffer on top of the column and collect all the eluate from the column in the collector tube.



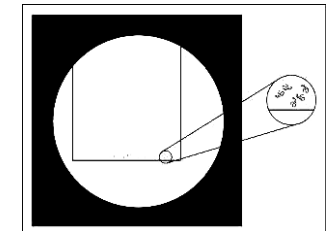
### 4 CENTRIFUGATION OF THE COLLECTOR TUBE:

- 4.1 Put the blue stopper back on the collector tube, still inserted in the centrifugation tube.
- 4.2 Centrifuge for 10-15 minutes at 3000 rpm.



### 5 EXAMINATION OF THE SEDIMENT:

- 5.1 Place the mAECT viewing chamber under the objective 10 of the microscope.
- 5.2 Mount the collector tube in the viewing chamber with its rim in the upper groove and its tip above the hole. The broad sides of tip should face up- and downward.
- 5.3 Trypanosomes can be seen as small wiggling organisms in the tip of the tube. Focus through the whole depth of the tip.
- 5.4 Cellulose or other particles may have passed through the column and may somewhat hinder the examination.





**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only  
STORE COLUMNS AT 4-8°C

## **Packaging tray quality control**

**Intended use:** The packaging tray is used to hold the columns in the package. This SOP describes the procedure to control the quality of the trays provided by the supplier.

**Storage:** No particular recommendation

**Material**

Ruler with graduation in mm

**Procedure**

1. Note the receipt date
2. Note the batch number
3. Check packaging integrity
4. Control that the number of trays received corresponds to what was ordered
5. Check the following parameters on 50 trays
  - Note: put aside each tray that does not correspond to specifications and group them according to problems*
  - number of available spaces (10)
  - plastic color and thickness
  - external dimensions (11 x 168 x 236 mm)  $\pm$  1 mm
  - internal dimensions (insert 10 collector tubes and check their position and any tray deformation)
6. Count the number of defective trays
7. Return defective trays to supplier for replacement
8. Store trays for columns packaging



**QUALITY CONTROL SHEET**

**Packaging tray quality control**

<b>DATE</b>	
<b>CONTROLLER NAME</b>	

RECEIPT DATE	
BATCH NUMBER	
PACKAGING INTEGRITY	
NUMBER OF TRAYS ORDERED	
NUMBER OF TRAYS DELIVERED	

**NUMBER OF OBSERVED FLAWS**

NUMBER OF SPACES FOR COLUMNS OR TUBES (10)	
PLASTIC COLOR AND THICKNESS	
EXTERNAL DIMENSIONS (11 X 168 X 236 MM) $\pm$ 1 MM	
INTERNAL DIMENSIONS (CORRECT POSITIONING OF 10 COLUMNS WITHOUT DEFORMATION)	

<b>NUMBER OF DEFECTIVE TRAYS</b>	
----------------------------------	--

**Preparation of labels for boxes of with accessories**

**Intended use:** Labels indicate box content, storage conditions.

**Storage:** None

**Safety measures:** None

**Material**

File: labels-mAECT-accessories-box.doc

Computer with MS-Word software

Printer

Paper

Copy machine

Labels: Avery labels, ref. L7163, 99.1 mm x 38.1 mm, 14 labels per sheet (2 columns x 7 rows)

**Reagents** None

**Composition** None



**Procedure**

1. Control that all materials are available.
2. Open the required file: **labels-mAECT-accessories-box.doc**  
Check that the document is open. The document contains a table with 2 columns and 7 rows. Each cell contains the following text

<p><b>mAECT Model INRB/IMT</b></p> <p><b>ACCESSORIES</b></p> <p><b>STORE AT AMBIENT TEMPERATURE</b></p>	<p><b>mAECT Model INRB/IMT</b></p> <p><b>ACCESSORIES</b></p> <p><b>STORE AT AMBIENT TEMPERATURE</b></p>
---	---

3. Print this page on an ordinary A4 paper sheet
4. Close the document without saving. Normally, the document is "read-only" so cannot be changed
5. Copy the printed sheet on as many label sheets as needed, taking into account that each sheet contains 14 labels.
6. Stick the labels on the boxes containing the accessory materials
7. Stick one label on the production sheet below.

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**mAECT Model INRB/IMT  
ACCESSORIES**

**STORE AT AMBIENT TEMPERATURE**

**Preparation of labels for boxes of 20 mAECT tests**

**Intended use:** Labels indicate box content, production date and expiry date.

**Storage:** None

**Safety measures:** None

**Material**

File: labels-mAECT-columns-box.doc

Computer with MS-Word software

Printer

Paper

Copy machine

Labels: Avery labels, ref. L7163, 99.1 mm x 38.1 mm, 14 labels per sheet (2 columns x 7 rows)

**Reagents** None

**Composition** None

**Procedure**

1. Control that all materials are available.
2. Open the required file: **labels-mAECT-columns-box.doc**  
Check that the document is open. The document contains a table with 2 columns and 7 rows. Each cell contains a text from which "PROD" has to be replaced by the production date, e.g. 071125 (25 November 2007), "PER" by the expiry date (two years after the production date, e.g. 25 November 2009).

<b>mAECT Model INRB/IMT</b>  <b>Batch: PROD</b> <b>Expiry date: PER</b> <b>For in vitro use only</b>  <b>STORE COLUMNS AT 4-8°C</b>	<b>mAECT Model INRB/IMT</b>  <b>Batch: PROD</b> <b>Expiry date: PER</b> <b>For in vitro use only</b>  <b>STORE COLUMNS AT 4-8°C</b>
---	---

3. To modify the production date, click "edit" and "replace"; in the frame "find what", write **PROD**; in the frame "replace with" write the production date, e.g. **071125** (25 November 2007). Click "Replace All" + OK and close the window.
4. To modify the expiry date, click "edit" and "replace"; in the frame "find what", write **PER**; in the frame "replace with" write the date 2 years after the production date, but in this format: e.g. 25 November 2009. Click "Replace All" + OK and close the window.
5. Check that all cells now contain the production date.
6. Print the page on an ordinary A4 paper sheet.
7. Close the document without saving it. Normally, the document is "Read only" and cannot be modified.
8. Copy the printed sheet on as many label sheets as needed, taking into account that each sheet contains 14 labels.
9. Stick the labels on each box.
10. Stick one label on the production sheet.

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C For in vitro

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

**mAECT Model INRB/IMT**

Batch: PROD  
Expiry date: PER  
For in vitro use only

STORE COLUMNS AT 4-8°C

## **Packaging boxes quality control**

**Intended use:**      The packaging box is used to package 10 mAECT kits.  
This SOP describes the procedure to control the quality of the boxes provided by the supplier.

**Storage:**      No particular recommendation

**Material**

Ruler with graduation in mm

**Procedure**

1. Note the receipt date
2. Note the batch number
3. Check packaging integrity
4. Control that the number of boxes received corresponds to what was ordered
5. Check the following parameters on 50 boxes  
*Note: put aside each box that does not correspond to specifications and group them according to problems*
  - width
  - length
  - unfolded
  - after assembly: height, width, length
6. Count the number of defective boxes
7. Return defective boxes to supplier for replacement
8. Store boxes for mAECT packaging

**QUALITY CONTROL SHEET**

**Packaging boxes quality control**

<b>DATE</b>	
<b>CONTROLLER NAME</b>	

RECEIPT DATE	
BATCH NUMBER	
PACKAGING INTEGRITY	
NUMBER OF BOXES ORDERED	
NUMBER OF BOXES DELIVERED	

**NUMBER OF OBSERVED FLAWS**


<b>NUMBER OF DEFECTIVE BOXES</b>	
----------------------------------	--

## **Packaging of 20 columns**

**Intended use:** mAECT minicolumns are packed by 20 in a cardboard box.

**Storage:** The mAECT minicolumns should be stored in the refrigerator (4-10°C)

### **Material**

Cardboard box  
2 plastic trays with 10 spaces for columns  
Cardboard box labels  
Adhesive tape

### **Procedure**

1. Control that all materials are available
2. Fold the cardboard boxes as indicated by the supplier
3. Mount 2x10 columns in 2 plastic trays and put it in the box.
4. Close the box with adhesive tape.
5. Prepare and stick a label (**see SOP M/19**) on each box.
6. Fill in the production sheet and stick a label on it.
7. The remaining columns (<10), as well as 2 complete packages will be kept as a backup and/or for a future quality control in case negative comments are received from the users.



**PRODUCTION SHEET**

**Packaging of 20 columns**

<b>DATE</b>	
<b>BATCH NUMBER</b>	
<b>PERSON WHO PREPARED</b>	

	<b>NUMBER</b>
<b>NUMBER OF MINICOLUMNNS</b>	
<b>NUMBER OF FILLED BOXES</b>	
<b>NUMBER DE REMAINING COLUMNS</b>	

<b>LOCATION OF BOXES (FRIDGE OR COLD ROOM)</b>	
--	--

**STICK HERE A LABEL AS STUCK ON BOXES**

**Packing of accessory materials for 20 tests**

**Use:**                      Accessory materials are packed per 20 in a cardbox together with the instruction leaflets.

**Storage:**                Accessory materials are stored in a dry place at ambient temperature

**Materials**

- Cardboard box
- 2 plastic trays with 10 spaces for centrifugation and collector tubes
- Cardboard box labels
- Centrifugation tubes of 14 ml
- Collector tubes with blue stoppers
- Plastic transfer pipettes
- Instruction leaflets in English, French, Portuguese
- Labels for accessory box
- Adhesive tape

**Procedure**

1. Control that all materials are available
2. Fold the cardboard boxes as indicated by the supplier
3. Insert each collector tube in a centrifugation tube
4. Close each collector tube with a blue stopper
5. Mount 2x10 centrifugation tubes with inserted collector tubes in 2 plastic trays and place them in the box
6. Addt 20 plastic transfer pipettes on top of the trays
7. Add 10 extra centrifugation tubes
8. Add the instruction leaflets on top of the tube
9. Close the box with adhesive tape.
10. Prepare and stick a label (**see SOP M/35**) on each box.
11. Fill in the production sheet and stick a label on it.

**PRODUCTION SHEET**

**Packing of accessory materials**

<b>DATE</b>		<b>PERSON WHO PREPARED</b>	
-------------	--	----------------------------	--

	<b>NUMBER</b>
<b>NUMBER OF ACCESSORIES</b>	
<b>NOMBRE OF BOXES FILLED</b>	

<b>LOCATION OF BOXES (CUPBOARD)</b>	
-------------------------------------	--

**STICK HERE A LABEL AS STUCK ON BOXES**

--

## **Preparation of columns labels**

**Intended use:**      Labels contain the production date. This information is important for quality control and for user feedback in the event of a problem in the field.

**Storage:**            None

**Safety measures:**    None

### **Material**

File: etiquettes colonnes.doc

Computer with MS-Word software

Printer

Paper

Copy machine

Labels: Motif labels ref. A 170-5 38.1 mm x 8 mm, 170 labels per sheet (5 columns x 34 rows)

**Reagents**            None

**Composition**        None

**Procedure**

1. Control that all materials are available.
2. Open the required file: **label columns.doc**  
Check that the document is open. The document contains a table with 5 columns and 34 rows. Each cell contains a text from which "yymmdd" has to be replaced by the production date, e.g. 071125 (25 November 2007).

YYMMDD	YYMMDD	YYMMDD	YYMMDD	YYMMDD
--------	--------	--------	--------	--------

3. To modify the text, click "edit" and "replace"; in the frame "find what", write **yymmdd**; in the frame "replace with" write the production date, e.g. 071125 (25 November 2007). Click "Replace All" + OK and close the window.
4. Check that all cells now contain the production date.
5. Print the page on an ordinary A4 paper sheet.
6. Close the document without saving it. Normally, the document is "Read only" and cannot be modified.
7. Copy the printed sheet on as many labels sheets as needed, taking into account that each sheet contains 170 labels.
8. Stick the labels on the columns just under the winglets.
9. Stick one label on the production sheet.