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research institute of fisheries

post box 193

00130

helsinki 13

att dr j.toivenen. regarding metalimpny system for fish identification. further to our letter ref.82102 from february 4 mr goas of our commercial departement would like to meet you during week 20. we have also asked dr antti soivio if he

col 193 00130 13 ref.82102 4 20.

Posti- ja telelaitos — Post- och televerket — Posti- ja televerket

FINNISH GAME AND FISHERIES RESEARCH INSTITUTE
FISHERIES DIVISION

Helsinki 29.4.1983

MR C. Coas
Métalimphy
168, rue de Rivoli
75044 PARIS Cedex 01 (
France

Referring to your letter of 4.2.1983 and your telegram of 25.4.1983 I would welcome you to Finland during the week 20.as you wished.

We have discussed much here in Finland of your new tagging system and we are very interested in it. I hope that during your visit in Finland you can show in practice how the tagging and the identification equipment is working.

To organize practical things, for instance a visit in some fish hatchery, I hope that you can quite soon tell us on what day you are coming and how long you can stay in Finland.

Your sincerely

Jorma Toivonen

Jorma Toivonen

P.O. Box 193
SF-00131 Helsinki 13
Finland

Telephone
(90-) 630794

188201883F—27

métalimphy division d' [illegible]
168, rue de Rivoli
75044 PARIS Cedex 01 (France)
Tél. : (1) 297.20.00
Télex : MEPHY 214602 F

PARIS, LE February 4th, 1983

VOTRE RÉFÉRENCE

NOTRE RÉFÉRENCE 82102/PL/BB

OBJET Métalimphy system for fish identification

Dr. J. TOIVENEN
Research Institute of Fisheries
P.O. Box 193
00130 HELSINKI 13
FINLAND

Dear Sir,

As promised during our short phone discussion of today, please find herewith a general description of our tagging system and a questionnaire.

I thank you to inform other Finnish biologists who could be interested (Dr. O. SUMARI, Dr. E. IKONEN, others... ?) and remain at your disposal for more details.

I would be grateful if you would reply quickly and am looking forward to your comments.

Sincerely yours,

Lagarde

P. LAGARDE

Encl. : 1 questionnary
1 general description

métalimphy division of imphy s.a.

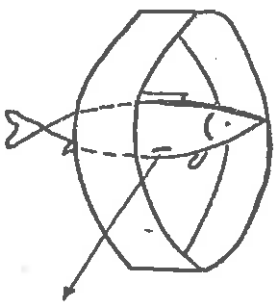
• Head Office : 168, rue de Rivoli 75001 PARIS
Tél. : (1) 297.20.00. Télex : 214 502 F.

January 1983

METALIMPHY SYSTEM FOR FISH IDENTIFICATION *

An original approach for rapid and automatic identification of living fish with an internal magnetic tag.

I GENERAL CHARACTERISTICS OF THE SYSTEM



tag

- Internal magnetic tags are placed in the abdominal cavity. They look like small cylinders (diameter 1.4 mm, length 22 to 23 mm).
  A device in the process of being developed by CNEXO will allow a tagging speed similar to that achieved with the nasal tagging method ("Microtags").

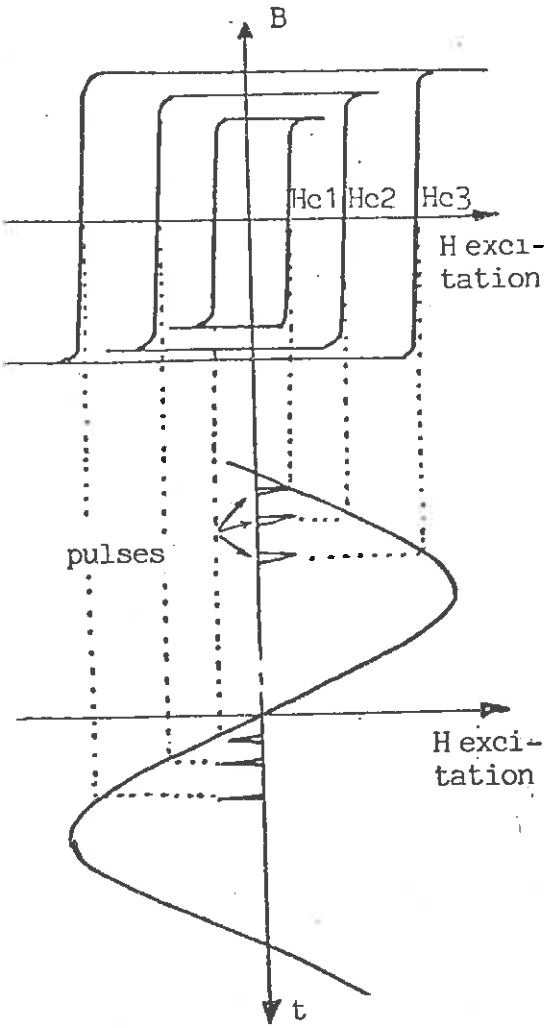
- The system makes it possible to identify rapidly and automatically 6 to 14 different tags without needing to slaughter the animal (a possible increase in number of tags is being studied).
  The fish has to swim through an open-ended cylinder of free diameter 150 mm or 300 mm, or if it is anaesthetized or dead, to be passed through it by hand.

- Trials on biological tolerance to tags have been carried out under different conditions and in different laboratories and gave promise on no secondary effect, either on growing, behaviour or survival (DUMAS AND PROUZET, 1982**).

* Developed and tested with financial help and advice from le CENTRE NATIONAL POUR L'EXPLOITATION DES OCEANS (CNEXO) and from l'INSTITUT NATIONAL DE RECHERCHES AGRONOMIQUES (INRA).

** Bulletin Français de Pisciculture n° 286 (4ème trimestre 1982)

II PRINCIPLE AND PHYSICAL BASIS OF IDENTIFICATION



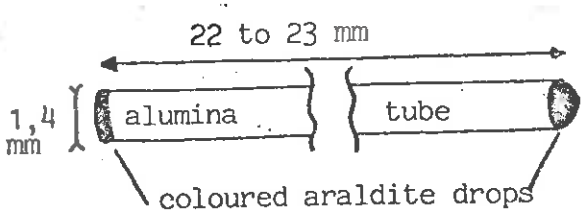
When submitted to a magnetic alternative exciting field, a magnetic thread with a square hysteresis loop reverses abruptly its induction every time the field passes over the threshold value Hc (Hc being the coercitive field).

As a result, the surrounding magnetic flux is reversed and the phenomenon can be observed as an induced voltage pulse in a detecting coil.
Different threads with different Hcs', placed together in the same exciting field, will reverse at different times and induce so many pulses in the coil.

The system developed and patented by METALIMPHY relies on these pulses for identification. It is already used for other applications.

III TAGS

The external tag envelope is an alumina tube (external diameter 1.4 mm, length 21 mm). Inside of it are several magnetic threads, the excitation of which gives the identification signal.
Each end of the alumina tube is closed by a drop of an appropriate araldite chosen for its biological compatibility. Drops' colours give a supplementary visual code identification.



In standard form this colour code is used to get a visual identification of tag magnetic code :

N° of magnetic code	1	2	3	4	5	6	7	8	9	10	11	12	13	14
end colours	blue	green	yellow	red	blue	brown	white	white	white	white	white	green	green	green
	id	id	id	id	id	id	green	yellow	red	blue	brown	yellow	red	brown

N.B. : If specially ordered, this colour code can be independent from magnetic code to increase identification possibities after slaughtering fish.
It can also be completed by coloured dots on tag's body.

IV IDENTIFICATION EQUIPMENT

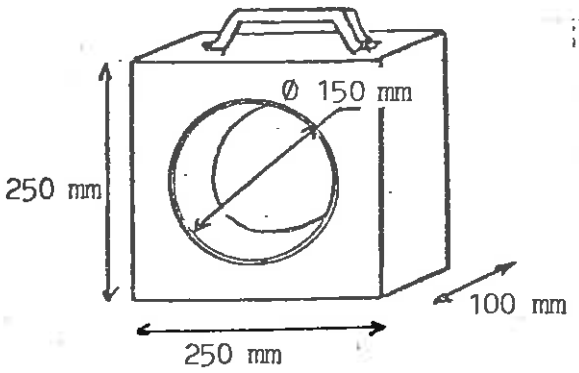
Great care was given, for excitation as well as detection and signal treatment, to avoid false reading. If any doubt remains, the "fish presence" warning light turns on but no other identification signal is displayed or transmitted.

Two versions are proposed :

IV.1. Version with a free opening 150 mm in diameter :

It is mostly developed for laboratory purposes (especially for anaesthetized fish identification).

It consists of :



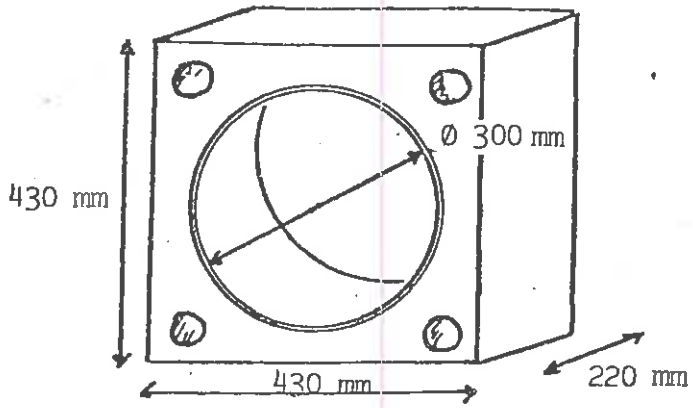
Weight ≃ 13 kg

- An excitation and detection coil set, immersable under 1.5 meter deep, in which is placed a preamplifier.
- A casing (31.8 x 21.8 x 14 cm) watertight but not immersable, for housing :
  - the microprocessor for signal shaping and processing,
  - the numerical liquid cristal display and the socket to be connected with a standard printing device,
  - the warning light "presence of fish".
- A casing (132.5 x 447.04 x 345 cm), not watertight, for housing the exciting power supply (400 Hz - 40 w) and its adaptation devices for the coil set.
- The cables to coil set and to external AC power source (220 V/50 Hz or 110 V/60 Hz).

This version is now able to identify 14 combinations (an extension to 29 at least, perhaps more, is considered for future with no hardware change).

IV.2. Version with a free opening 300 mm in diameter :

It is an extrapolation of the previous one developed mostly to identify swimming fish (at a speed of 1 meter per second or less).



Weight ≃ 50 kg

Besides coils change, it leads to :

. A stronger excitation power supply (400 Hz ≃ 300 w) in a larger watertight casing (265.9 x 447.04 x 345 cm).

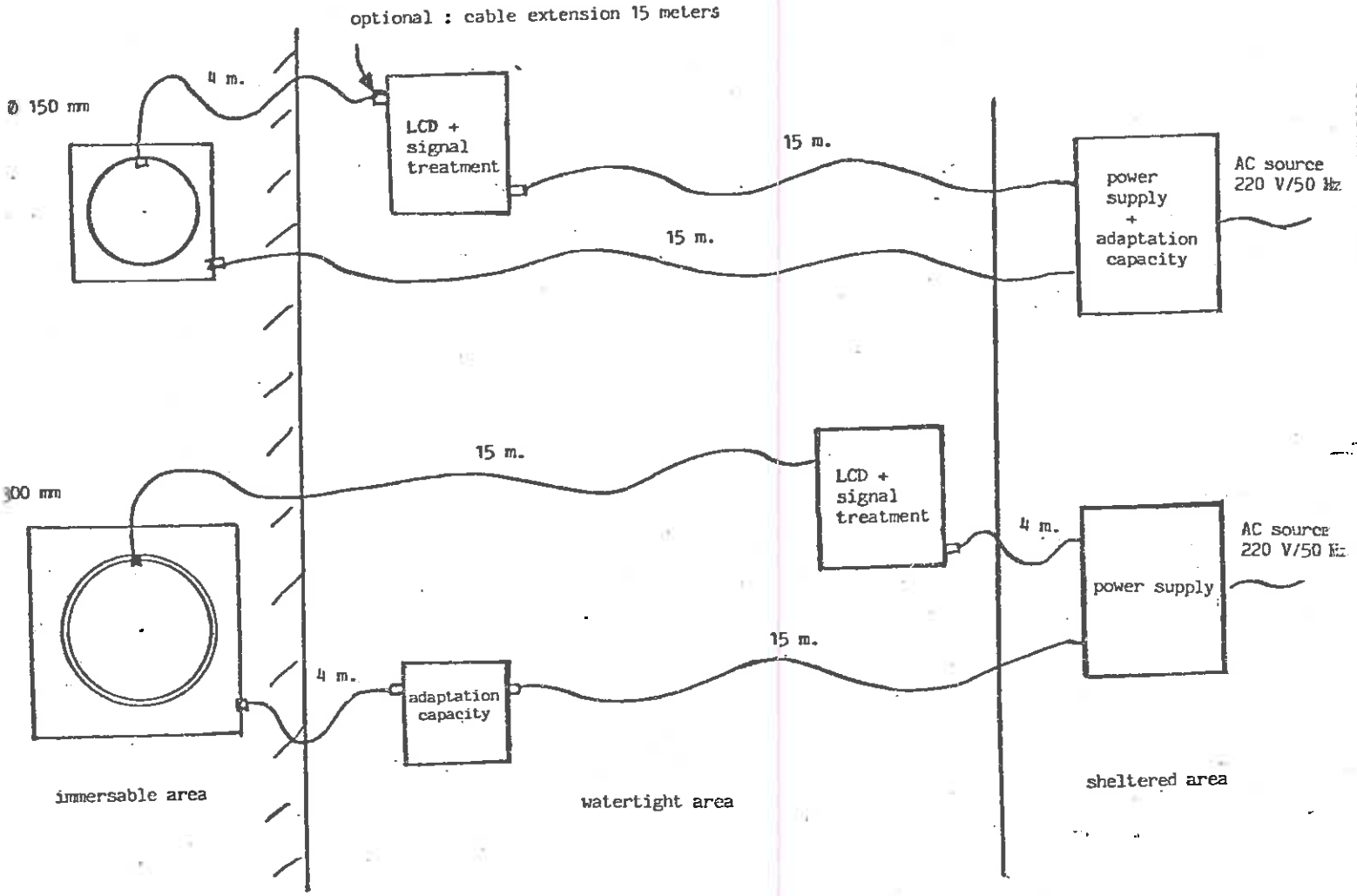
. An additional watertight casing (20.9 x 20.9 x 9.7 cm) for housing capacities for coils adaptation.

. Different connecting cables.

The microprocessor casing is the same but programmes have been modified to increase reading redundancy, which limits the number of combinations to six (an increase up to ten at least, perhaps more, is considered for the future, with no change of hardware).

More experience is needed to prove if this increase in redundancy is necessary for all applications. If not, the equipment could be reprogrammed in a 14 combinations version).

IV.3. General configuration :



Comments :

In immersable area, connections are made by seals. In watertight area, by watertight connectors; casings are also watertight.
In sheltered area, casings are ventilated and connectors are of standard type.

V FISH TAGGING

While waiting for the CNEXO's device to be put on the market, tag insertion can at present be carried out using a hollow needle as described on the attached sheet.

VI METALIMPHY SYSTEM ADVANTAGES

- Automatic and quick reading with recording possibilities.
- No fish slaughtering.
- Quick tagging.
- Long-term stability of tagging.

Encl. : 2

For more details, please contact IMPHY S.A. :

Mr. P. LAGARDE : Phone (1) 297 08 19

or Mr. C. GOAS : Phone (1) 297 08 64

métalimphy division of imphy s.a.
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MANUAL TAGGING PROCESS

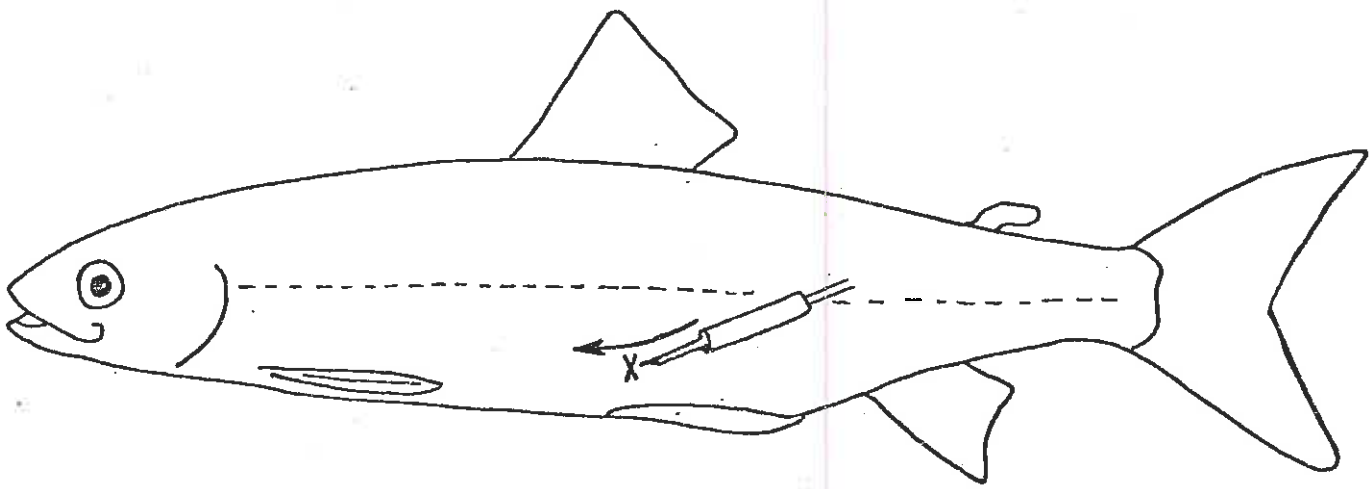
RECOMMANDED BY CNEXO AND INRA

According to DUMAS and PROUZET (1982) the following tagging process brings about no additional mortality and does not affect growing or smoltification of Atlantic salmon subyearlings reared in hatchery.

Tags are inserted in the body cavity through a hollow needle (diameter 1.5 mm).
The best way is to insert the tag laterally by pushing in the needle at an angle of 45 degrees 4 to 5 mm a little above the base of the pelvic fin.

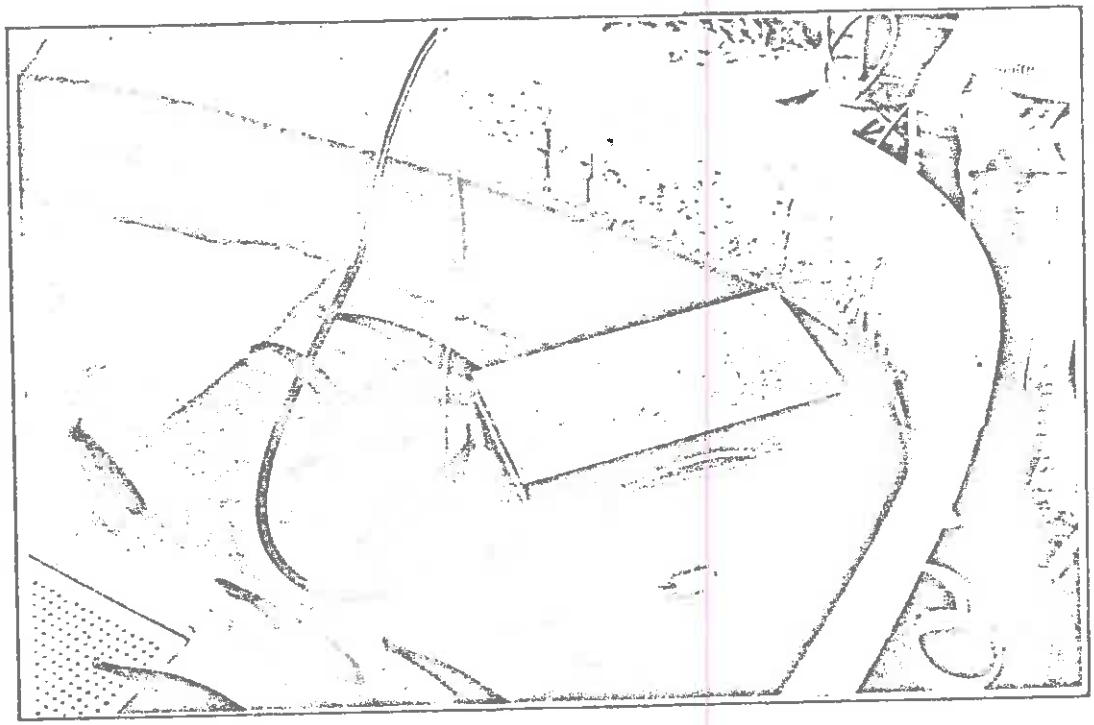
Tags are first sterilized in alcohol then inserted into the abdomen facing towards the head ot the fish.

With this tagging process, an untrained operator can tag 150 to 200 fishes per hour.



TWO VIEWS OF PROTOTYPES

WITH 150 AND 300 MM OF FREE OPENING DIAMETERS



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PARIS, LE january 1983

VOTRE RÉFÉRENCE

NOTRE RÉFÉRENCE 82033/CG/BB

OBJET METALIMPHY SYSTEM FOR FISH IDENTIFICATION

Before answering this questionnaire, please find the attached paper on the Métalimphy system, so as to have in mind the advantages it offers in comparison to other systems.

1. Which type of tagging do you use now ?

2. How many fishes do you intend to tag with your current system during :

   - 1983 :
   - 1984 :
   - 1985 :
   - 1986/89 :

3. Mark the corresponding use and if there are several of them point out the tagging ratio in % :

   - Laboratory studies :
   - Sea-farming (intensive) :
   - Sea-ranching (extensive) :
   - Natural population survey :
   - Others :

..../....

4. Which species of fish do you tag ?

	in %
Salmon	
Trout	
Others	

5. Depending on use, we propose two coil diameters for Métalimphy systems : 300 and 150 mm.

The present price of equipment being about 65 000 FF for a 150 mm opening and 90 000 FF for a 300 mm opening (ex-works from Paris), how many equipments could you consider to purchase, taking also into account the tag price

	TAG PRICE IN FF/APIECE 3,00 / 2,50	
	DETECTION EQUIPMENT DIAMETER OF DETECTOR	
YEAR	150 MM	300 MM
1983		
1984		
1985		
1986/89		

- current price 1983 : FF/apiece 3,00
- possible price for 1984/89 : FF/apiece 2,50

6. How many fishes would you consider to tag with Métalimphy system ?

	1983	1984	1985	1986 to 1989
Laboratory studies				
Sea-farming (intensive)				
Sea-ranching (extensive)				
Natural population survey				
Others				

7. If it appears with well established industrial production that the tag price could be lowered down to 2 FF/apiece, how many more tags could you purchase per year :

The tag's length is 22 to 23 mm. How many more fishes could you tag if this length was shortened, for instance to 11/12 mm ?

8. Which is the mean length of fish that you tag ?

9. If the variety of the Métalimphy tags could be raised to 20/30 or 50, could you think of increasing the tagging number with this system ?
If yes, could you then point out the amount you could consider in the following tabel :

YEAR	NUMBER OF COMBINATIONS 20/30	50
	NUMBER OF TAGS	
1983		
1984		
1985		
1986/1989		

.../...

10 . In order to test the Métalimphy system, would you accept :

a) to come and look at a demonstration given in a laboratory equipped with this system :
   - in France,
   - in the United-States and in Canada (April-May).

   or would you prefer :

b) to test by yourself an equipment lent to your laboratory :
   - how long,
   - how many tags would you then require.

11 . Your remarks :

Thanks for sending back this questionnaire to

IMPHY SA Division Métalimphy
168, rue de Rivoli
75044 PARIS Cedex 01 (France)

To the attention of Mr C. GOAS