



Teknikantie 12  
SF-02160 Espoo  
Finland  
Tel: +358-0-4354 2008  
Fax: +358-0-4354 3131

RETURN FAX: +358-0-4354 3131

## TELEFAX MESSAGE

TO: Georgia Department of Natural Resources

ATT: Mr. Slocumb

FAX NO: \_\_\_\_\_

DATE: \_\_\_\_\_

Aug 16, 1993

NUMBER OF PAGES:  
(incl. this sheet)

x

CC.: x

x

FROM: \_\_\_\_\_

Jukka Perento

RE: Lisence application for Tapio Paper Variabilty Analyzer, State of Georgia

I finally got this stuff together. I'll use your numbering.

1a. Confirmed. Color of text on Radoactive Material- label

1b. Confirmed. Enclosed a sample with the size required in order to be able to attatch it to the required location

1c. Done, enclosed

1d. Done, enclosed

1e. Done, enclosed

1f. Done, enclosed

1g. Done, enclosed

1h. Enclosed

2a. Done, enclosed

2b. Done, enclosed

2c. Done, enclosed

2d. Modified, enclosed

2e. Done, enclosed

2f. Done, enclosed

3. Enclosed

4. Other references are Ok, but reference A includes still information in regards of Dr Hannu Makkonen and Makkonen Associates and Ravina Drive address. All that may be removed. Other information on reference A is Ok.

5. Got it.

Hopefully all is satisfactory by now. We will stay waiting for your comments.

*Jukka Penna*

~~Text~~

### *Question 3, Prototype testing of BW-2h55*

#### General

New parts are commercial parts with good reliability. All parts are inspected according our quality assurance program.

#### Testing

The BW-2h55 gauge and the control software have been tested as a complete package so that the system functionality can be proved.

#### Basic Test

Aperture mechanism is tested by software loop by a series of repeated aperture movements. One loop contains the following movements:

1. Aperture closed
2. 15 mm opening
3. closed
4. 5 mm opening

The above set was repeated 10 000 times- average user might use the system once per day and only one of the two openings (2 aperture movements = 1/2 a loop)

#### Special situations tested

Following special situations are tested by repeating the test until one can be sure of flawless operation:

1. Cable between computer and Tapio Analyser cut or disconnected-> shutter closes
2. Power off from computer -> shutter closes
3. Power off from analyser -> shutter closes
4. Shutter stays closed while starting up the system and during the operation excluding these two situations; Shutter opens when basis weight gauge is being calibrated and when measurements are done with the gauge and closes automatically when measurement and/or calibration is completed.

#### Software check.

Apart from the indicator light there is also a software status indicator, which shows on display if the shutter did not respond to the movement required. This text on screen is also telling the status of aperture (closed - open).

# RADIATION PROTECTION

TAPIO  
User's Manual  
Version 1.02e

## General

The TAPIO-basis weight sensor contains a radioactive source that emits  $\beta$ - (beta-) radiation. The radioactive material is a commercial product containing Promethium-147 (Pm-147) manufactured by Amersham Int. plc. (Bucks HP7 9NA, U.K.). The aperture of the sensor is automatically closed with a cover in case the electric current is turned off. The size of the aperture is selected by electrical means.

### • Maintenance

The Basis Weight Sensor is not allowed to be opened under any circumstances.

### • Replacement and disposal of the radiation source

Since the half-life of the radiation source is 5.4 years it has to be replaced periodically. Only TAPIO® Technologies, Inc. or someone else assigned by TAPIO Technologies, Inc. possessing the proper licenses is entitled to replace the source. TAPIO® Technologies, Inc. will take care also for the disposal of the old source.

### • License of approval of type-inspection

The basis weight sensor has been evaluated as a generally licensed device. A copy of the general license is enclosed.

### • Radiation profile

The stray radiation field being emitted from the TAPIO model RW-2h55 Basis Weight sensor is very well defined and corresponds to the plane of travel of paper being tested as it is fed through the analyzer. The highest absorbed dose rate was 13.8 mrad/hr measured at the surface of the device using a detector window thickness of 7 mg/cm<sup>2</sup>. The highest value measured for the 300 mg/cm<sup>2</sup> window was 0.1 mrad/hr. These dose rates were found along 5 cm isodistance line on the left side of the device (paper plane). Measurements taken directly above and below the plane of travel yielded no measurable exposure. An absorbed dose rate of 0.5 mrad/hr was measured in front of the device (5 cm, plane of paper travel) for the shallow dose depth 7mg/cm<sup>2</sup>. There was no measurable exposure at the deep dose (300mg/cm<sup>2</sup>).

### • Operating license of the employer and the person responsible

The institution operating the TAPIO-analyzer has to designate a person to safeguard the radioactive material in the particular work place. This individual is responsible for the limitations regarding the operating personnel (age over 18 years, pregnancy etc.), records, and overall possession and handling of radioactive materials.

### • Precautions in case of fire or damaged gauge

In case of fire the whole device should be transferred away from the hazardous area if possible. If this cannot be done due to the circumstances inform immediately the local responsible person of the situation. After the fire do not enter the area until source has been located and removed by officials and the area has been cleared safe by them. *with gauge*

If there are any doubts due to damage, impact or other malfunction, that there is a problem with the aperture mechanism inform the local radiation safety officer immediately and ask him to *to measure the device and its surroundings for possible radiation.*

*contact a consulting physicist*

*field surrounding the device - Aug 16, 1993*

When the shutter is properly closed there should be no measurable radiation over the background. If the problem exist or if there still are doubts of the problem inform the manufacturer immediately. **DO NOT** stay in permises until the problem has been solved.

• **Additional reading**

It is recommended to read additional instructions regarding safety proceduras (fire, earthquake etc.) provided by the employer. In the following is the name of the mill person responsible for the above licenses and the confirmation signature of the company:

**NAME AND PHONE NUMBER OF THE PERSON RESPONSIBLE:**

Place: \_\_\_\_\_ Date: \_\_\_\_\_

-----  
Name of responsible person                      Official employer signature

Telephone where to reach: \_\_\_\_\_

16.7  
1A }

86 mm

**INSTALLATION, OPERATION AND SERVICE**

The instructions to operate the Analyser are described in the Operator's Manual with special reference to the basis weight sensor in chapters headed: Description, Basis Weight Sensor BW-2h55; Calibration, Basis Weight; And Radioactive radiation protection.

**BETA- RADIATION SOURCE. TESTS ON ITS SAFE USE**

The isotope used for  $\beta$ -radiation is a sealed and solid Protactinium-147 (Pa-147) capsule manufactured by Amersham Int. plc. (P.H.C.I.) capsule X.80955 with maximal activity of 200 mCi (7400 Ci/g). The measured activity on the Day \_\_\_\_\_ of Month \_\_\_\_\_ 19\_\_ was: \_\_\_\_\_ mCi. The manufacture's certificate on the activity is included in the delivery documents of the analyzer. The basis weight sensor shall be tested for radioactive leakage and proper functioning of on-off mechanism and indicator at installation, at source replacement, and thereafter at no longer than six month intervals. Periodically, each 4-7 years, the  $\beta$  source has to be replaced with the new one. The old source has to be sent back to the manufacturer of the Analyser.

**RECEIPT, POSSESSION, USE and TRANSFER of this device,**

Model PVA-113 with RW-2h55 Sensor, Serial No. \_\_\_\_\_ is subject to a general license or the equivalent, and the regulations of the U.S. Nuclear Regulatory Commission or a state with which the Nuclear Regulatory Commission has entered into an agreement for the exercise of regulatory authority. This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

**NOTE :**

1. Abandonment or disposal is prohibited unless transferred to persons specifically licensed by the department, the U.S. Nuclear Regulatory Commission, or an agreement state.
2. Operation is prohibited if there is indication of failure of or damage to shielding or source containment.
3. Installation, dismantling, relocation, maintenance, repair and testing involving the radioactive material, its shielding or containment shall be performed by persons specifically licensed by the department, the U.S. Nuclear Regulatory Commission, or an Agreement State.
4. Loss, theft, or transfer of this device and failure of or damage to the shielding or the source containment must be reported to the U.S. Nuclear Regulatory Commission, or an Agreement State.

**CAUTION - RADIO ACTIVE MATERIAL**

(NAME OF MANUFACTURER OR DISTRIBUTOR)

181 mm