



21th June 1994

6/300/94

Measurement of Stray Radiation for the TAPIO Model BW-2h55 Basis Weight Sensor

The stray radiation of TAPIO basis weight sensor BW-2h55 manufactured by Tapio Technologies Oy was measured. The radiation source in the sensor was a ^{147}Pm source (Amersham product code PCH80952 and serial number DU648) with nominal activity of 7.4 GBq (31th March 1994).

The detection instrument used for all measurements was a Smart ION ionization chamber survey meter manufactured by MINI INSTRUMENTS Ltd, England. The entrance window of the Smart ION has a nominal density thickness of 7 mg/cm^2 for measurement of superficial dose equivalent H' (0.07) and β dose rate. A sliding window shield (293 mg/cm^2) provides build-up to facilitate measurement of ambient dose equivalent quantity H^* (10).

The measurements were performed according to the Basis Weight Sensor Radiation Test Report, see appendix. The sensor was first measured with aperture $\phi 15\text{ mm}$ open with both windows (7 mg/cm^2 and 300 mg/cm^2) and then aperture closed with both windows.

The highest stray radiation dose rate at the surface of the sensor measured with thin window was $25.0\text{ }\mu\text{Sv/h}$ at both sides of the sensor and at distance of 5 cm $9.5\text{ }\mu\text{Sv/h}$ on the right side and $9.3\text{ }\mu\text{Sv/h}$ on the left side. The highest value measured with build-up cap was $0.6\text{ }\mu\text{Sv/h}$. When the shutter was closed the highest value measured with thin window was $0.7\text{ }\mu\text{Sv/h}$ on the right side of the sensor, with build-up cap it was $0.6\text{ }\mu\text{Sv/h}$. The background radiation measured was $0.3\text{ }\mu\text{Sv/h}$.


Senior inspector



Mauri Kaituri

Appendixes

Radioactive source test report

product code PHC80952		description PROMETHIUM-147 BETA SOURCE		customer order no S-76334 01		BSI/ISO classification C33222	
AI Item no CC9427		SEALED SOURCE		customer SONAR OY PO BOX 5 ESPOO 02201 FINLAND		special form certificate no	
source model no		nominal activity 7.4GBq				recommended working life 5 YEARS	
serial no batch no	measurement 1		measurement 2		test	test	test
		date		date			
DU647 DU648	7.4GBq	31 MAR 94			L 19 APR 94		
notes							
signature SALLY HOYLE				position PRODUCTION SUPERVISOR		date 20 APR 94	

*this classification complies with BS5288:1978, which is in agreement with ISO2919 (see overleaf for definition and description of tests)

Amersham International plc
Amersham Laboratories
White Lion Road
Buckinghamshire England HP7 9LL

Telephone (0494) 544000
Fax (0494) 543243
Cables Activity Amersham
Telex 83141 ACTIVA G

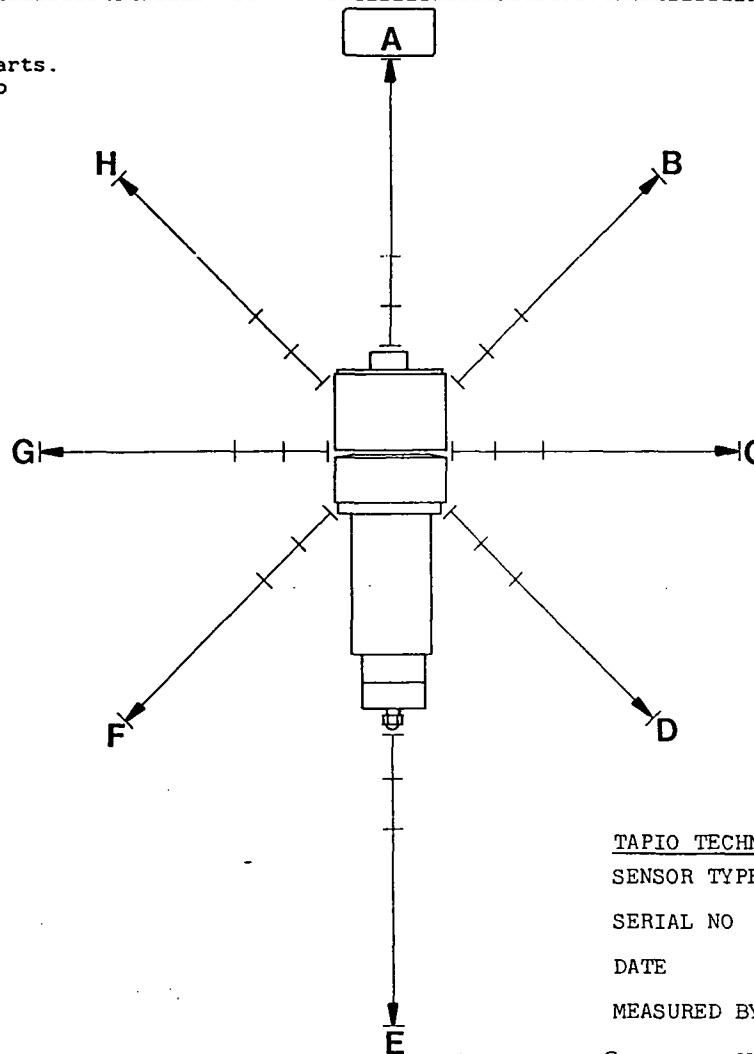
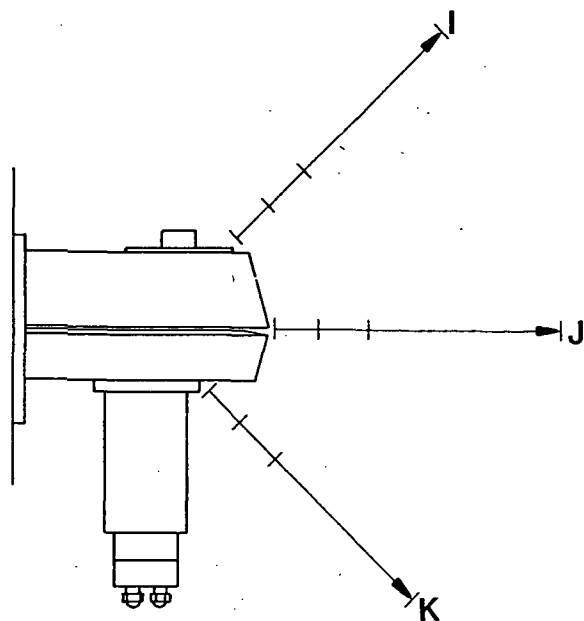
Amersham

BASIS WEIGHT SENSOR RADIATION TEST REPORT

DIRECTION	A	B	C	D	E	F	G	H	I	J	K
0 cm	0.3	0.4	25.0	0.9	0.3	0.8	25.0	0.4	0.3	1.4	0.7
5 cm	0.3	0.3	9.5	0.4	0.3	0.5	9.3	0.3	0.3	0.5	0.5
10 cm	0.3	0.3	2.6	0.3	0.3	0.4	2.3	0.3	0.3	0.3	0.4
30 cm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

[$\mu\text{Sv/h}$]

Directions A - K are according radiation measurement charts.
Distances are measured from the surface of the sensor to the given direction.



Background: $0.3 \mu\text{Sv/h}$
Window: 7 mg/cm^2
Aperture: $\emptyset 15 \text{ mm open}$

TAPIO TECHNOLOGIES OY
SENSOR TYPE : BW-2h55
SERIAL NO : 94-3
DATE : 20.6.94
MEASURED BY : Mari Kar

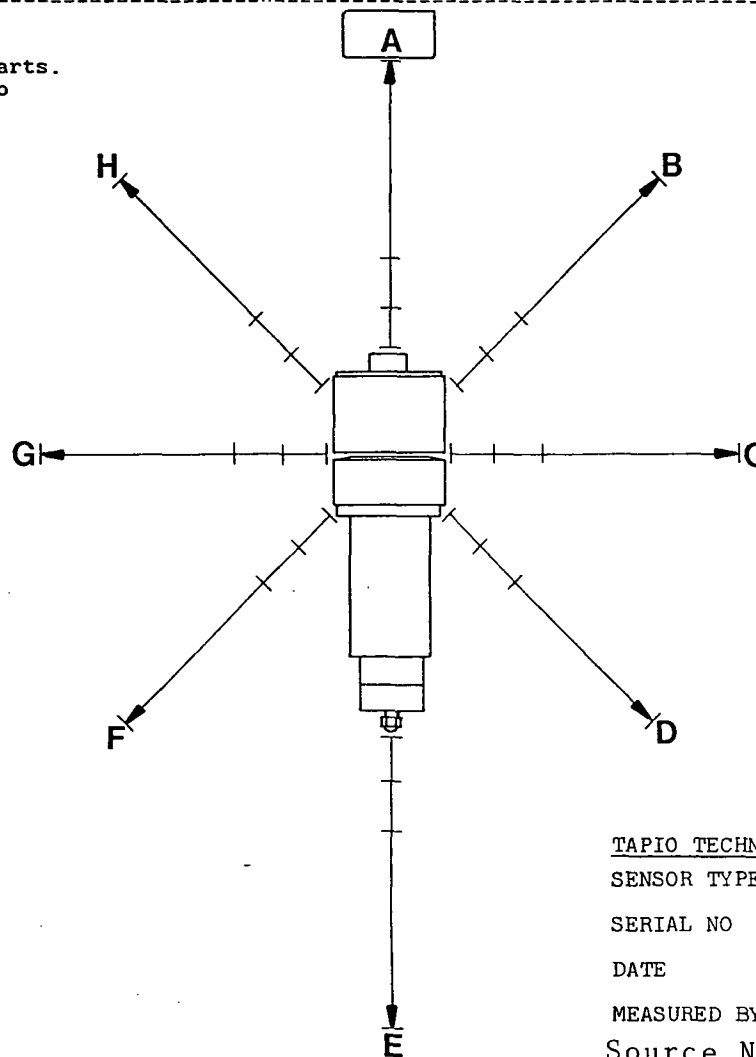
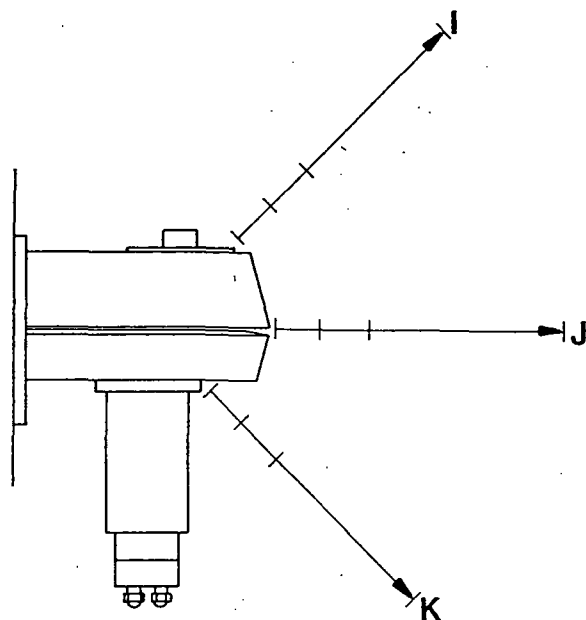
Source No: DU 648

BASIS WEIGHT SENSOR RADIATION TEST REPORT

DIRECTION	A	B	C	D	E	F	G	H	I	J	K
0 cm	0.3	0.3	0.5	0.3	0.3	0.3	0.5	0.3	0.3	0.4	0.4
5 cm	-	-	0.3	-	-	-	0.3	-	-	0.3	0.3
10 cm	-	-	-	-	-	-	0.3	-	-	-	-
30 cm	-	-	-	-	-	-	-	-	-	-	-

[$\mu\text{Sv/h}$]

Directions A - K are according radiation measurement charts.
Distances are measured from the surface of the sensor to the given direction.



Background: $0.3 \mu\text{Sv/h}$
Window: 300 mg/cm^2
Aperture: $\varnothing 15 \text{ mm open}$

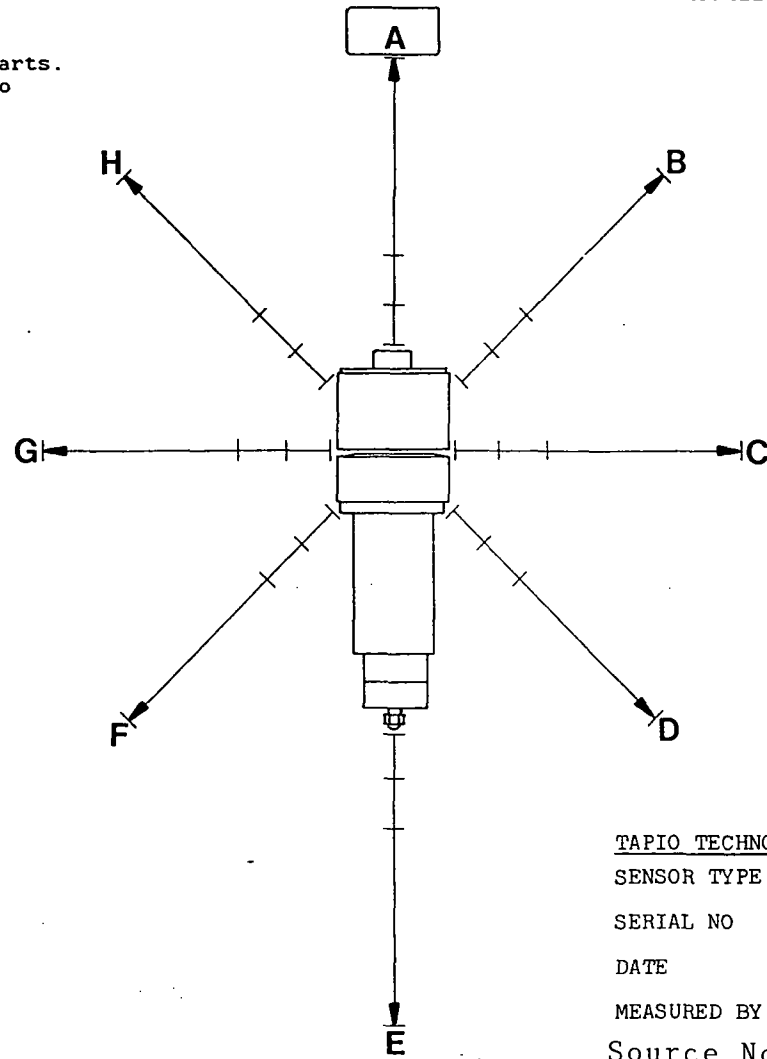
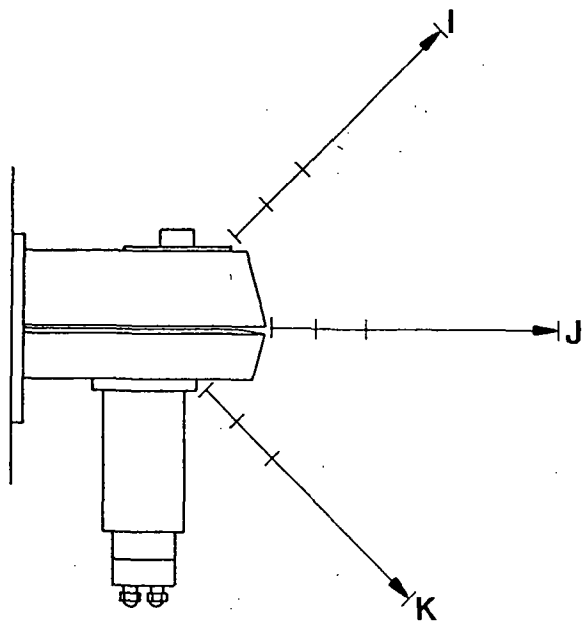
TAPIO TECHNOLOGIES OY
SENSOR TYPE : BW-2h55
SERIAL NO : 94-3
DATE : 20.6.94
MEASURED BY *Marko Kari*
Source No: DU 648

BASIS WEIGHT SENSOR RADIATION TEST REPORT

DIRECTION	A	B	C	D	E	F	G	H	I	J	K
0 cm	0.3	0.4	0.7	0.5	0.3	0.5	0.6	0.3	0.3	0.5	0.3
5 cm	-	0.4	0.5	0.4	-	0.4	0.5	-	-	0.3	-
10 cm	-	0.3	0.4	0.3	-	0.3	0.3	-	-	-	-
30 cm	-	-	0.3	-	-	-	-	-	-	-	-

[$\mu\text{Sv/h}$]

Directions A - K are according radiation measurement charts.
Distances are measured from the surface of the sensor to the given direction.



Background: $0.3 \mu\text{Sv/h}$
Window: 7 mg/cm^2
Aperture: Closed

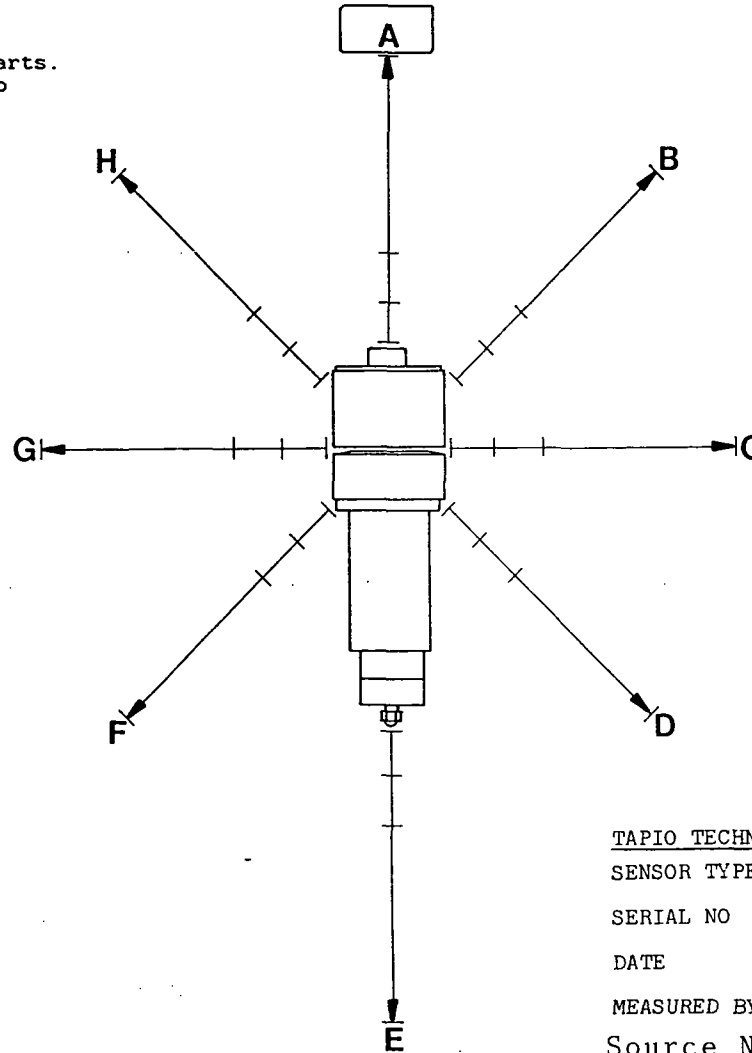
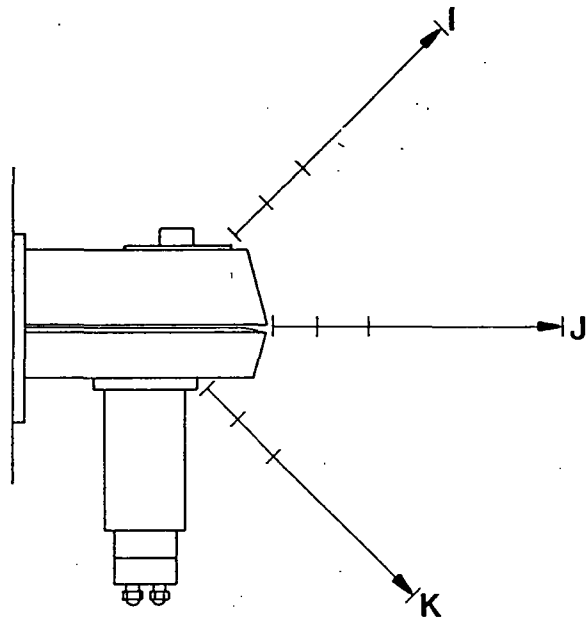
TAPIO TECHNOLOGIES OY
SENSOR TYPE : BW-2h55
SERIAL NO : 94-3
DATE : 20.6.94
MEASURED BY : *Alan Karlsen*
Source No: DU 648

BASIS WEIGHT SENSOR RADIATION TEST REPORT

DIRECTION	A	B	C	D	E	F	G	H	I	J	K
0 cm	0.3	0.4	0.6	0.5	0.3	0.5	0.5	0.3	0.3	0.4	0.3
5 cm	0.3	0.3	0.5	0.4	-	0.4	0.4	-	-	0.3	-
10 cm	-	-	0.4	0.3	-	0.3	0.3	-	-	-	-
30 cm	-	-	0.3	-	-	-	-	-	-	-	-

[μ Sv/h]

Directions A - K are according radiation measurement charts.
Distances are measured from the surface of the sensor to the given direction.



Background: 0.3 μ Sv/h
Window: 300 mg/cm²
Aperture: Closed

TAPIO TECHNOLOGIES OY
SENSOR TYPE : BW-2h55
SERIAL NO : 94-3
DATE : 20.6.94
MEASURED BY : *Matti Kankkonen*

Source No: DU 648