



CMS60D and CMS60XD

Hand – Foot – Clothes Contamination Monitors

TECHNICAL SPECIFICATIONS

ENG_Rev.05



CMS60D andCMS60XD TECHN	Date			
This publication cancels and	This publication cancels and replaces any previous edition and revision13-01-2020			
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Revision N°	Type of Revision	Date
00	Emission	16-06-2010
01	Option	02-09-2010
02	Update	12-09-2013
03	Update	31-10-2014
04	Update ISO	30-10-2018
05	Minor revision	13-01-2020



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1. INTENDED USE

The CMS60D and CMS60XD hand – foot - clothes monitors are contaminometers that have been designed and built to measure gamma radiation and contamination levels on hands, feet, clothes, gloves and footwear caused by gamma and beta-emitters.

They are mandatory instruments for operators check in Nuclear Medicine, Radiochemical Labs and each Area with possibility of beta-gamma radioisotopes contamination.

The two contaminometer models are identical; they only differ by the type of detectors used.

Model	Detector type
CMS60D	GM tube detectors
CMS60XD	Xe proportional detectors

Table 1



Image 1



2. GENERAL DIMENSIONS



Image 2

External dimensions	mm	450(w) x 950(d) x 1.500(h)
Weight	Kg	65
LCD Monitor	Inch	17"

Table 2 Reading Key: w = width, d = depth, h = height



3. DETECTORS

Model	CMS60D	CMS60XD
Detectors type	N. 5 GM tubes	N. 2 RXD 1000T with n. 2 channels each N. 1 RXD 270 (for clothes)
Detecting surface	$250 \text{ cm}^2 \text{ each}$	1000 cm ² each (RXD 1000T) 270 cm ² each (RXD 270)
Window thickness	14 mg/cm^2	6,75 mg/cm ²
Window material	Aluminium	Titanium 15 μm
Lower energy limit	10 Kev for Gamma 150 Kev for Beta	N.A.

Table 3 Reading Key: w = width, d = depth, h = height



Image 3 – GM tube detector

Image 4 - RXD detector



• CMS60D

The CMS60D are equipped with n. 5 identical GM tubes detectors, n. 2 for the hands and feet and n. 1 for clothes.

The table below shows the detector efficiency per isotope, defined as counts per second obtained with a 100 Bq total activity flat source

RADIO NUCLIDE	cps
I125	0.54
T1201	0.27
F18	9.7
Tc99m	0.19
I131	1.35
Co60	0.38
Ga67	0.23

Table 4 - Values calculated and referred to 100 cm^2 . Statistical error $\pm 15 \%$.

• CMS60XD

The model CMS60XD comes with n. 2 RXD 1000T detectors for hands and feet and n. 1 RXD 270 detector for clothes. The RXD 1000T detector consists of two independent channels, for independent measures of the right hand, left hand, right foot and left foot. The detectors are Xe proportional. They are tightly sealed and filled with high-purity Xe.

The table below shows the detector efficiency per isotope, defined as counts per second obtained with a 100 Bq total activity flat source

RADIO NUCLIDE	cps
C14	4
P32	36
S35	4.2
C136	25.5
Co60	12.3
Tc99m	2.7
I125	2.5
I131	26
Cs137	25
Am241	6

Table 5 - Values calculated and referred to 100 cm^2 . Statistical error $\pm 15 \%$.



4. CERTIFICATES AND COMPLIANCES

The CMS60D and CMS60XD has been designed and built according to the following international standards:

- EN 12100 (risks assessment)
- EN 349 (safety distances)
- EN 60204 (electrical safety)
- Dir. 2006/42 Machinery directive
- Dir.89/336 CE EMC
- Dir. 2006/95 CE Low voltage





5. MAIN COMPONENTS



Pos.	Description
1	LCD graphic display
2	Hands contaminometer and control push button panel
3	Clothes contaminometer
4	Feet contaminometer
5	Ethernet connection – RSR 232 connection
6	Power sockets – Main power switch

Table 6



6. MEARUSING CYCLE

The measuring cycle is performed automatically through these steps:

- operator selection
- isotope selection
- hands feet clothes measurements

An automatic power off of detectors after every measure optimizes their lifetime The graphic LCD shows digital indications of the measure of each position. Measure unit can be set in cps or Bq/cm2 (with isotope selection by keyboard).





6.1 - OPERATOR SELECTION

The system allows two possibilities:

• STANDARD - Choosing from a list of operators via the push button control panel: the database of the operators can be directly configured by the user



• OPTION - Entering via a magnetic card: the software can be customized to be able to read the magnetic cards used by hospital staff



Image 8



6.2 - ISOTOPE SELECTION

Before beginning the test, the system will ask the operator to select the isotope to be tested. This selection is performed via the isotope selection keys provided on the panel. The database contains as default isotopes: Tl201, Tc99m, Ga67, Co60, I131, I125, F18, Co57, In111, I123.

Please note: if the measurement unit is cps, there is no isotope selection option.

6.3 - HANDS FEET CLOTHES MEASUREMENTS

The system performs in sequence the measurements of hands (front and back), feet and clothes (by the use of the portable detector) with an automatic background subtraction: it measures the background and excludes incidental peaks not due to background activity, such as radioactive syringes passage.



Image 9 - Clothes detector



Alarm thresholds can be set as a multiple of background standard deviation.

At the end of the cycle a report is shown on the monitor and automatically saved on the archive. Each measure report contains the following information: operator, measure date and time, alarm status for each detector, measure value and error for each detector, selected isotope.



Image 10

The operator, via Ethernet or RS232 connection can easily:

- downloaded and printed the archive reports
- configure alarm thresholds and the other parameters of the measurement cycle



7. OPTIONS

• Magnetic card reader

If this option is of your interest, please require a dedicated quotation to your contact person

8. SITE PREPARATION FOR INSTALLATION

For the correct equipment installation, the installation site has to be prepared according to the following technical requirements. The responsibility is at customer charge. The following requirement must be placed at 400 mm ca. from the floor level

Ethernet connection to local LAN (OPTION)	Qty 1x	RJ 45	Table	7
Electrical Socket (Schuko type)	Qty 1x	220 V 50 Hz		

9. CONTROL AND VALIDATION TESTS: FAT - SAT - IQ - OQ - PQ

Tema Sinergie s.r.l. is a ISO9001: certified company since year 2000. According to ISO9001:(Quality Management Systems – Requirements) all products undergo stricts control check prior to equipment shipment to customer.

All tests are performed by high qualified internal personnel by means of calibrated instruments that satisfy all international standards.

For detailed information of the validation test please check the file:

Qualification and Acceptance Tests FAT-SAT-IQ-OQ-PQ

If this file is not attached, please require it to your contact person.



10. TECHNICAL SUMMARY

General data		
External dimensions	mm	450(w) x 950(d) x 1.500(h)
Weight	Kg	65
LCD Monitor	Inch	17
Power supply	V	110 - 220
Frequency	Hz	50 - 60
Power consumption	W	60
CMS60D detector		
Detectors	type	N. 5 GM tubes
Detecting surface	cm^2	250 each
Window thickness	mg/cm ²	14
Window material		Aluminium
Lower energy limit	Kev	10 for Gamma - 150 for Beta
CMS60XD detector		
Detectors	type	N. 2 RXD 1000T - N. 1 RXD 270
Detecting surface	am^2	1.000 each (RXD 1000T)
Detecting surface	CIII	270 ⁽ RXD 270)
Window thickness	mg/cm^2	6,75 mg/cm ²
Window material		Titanium 15 μm

Table 8

Please note: the images of this document have to be considered as an example, merely illustrative. In view of continuous research and development Tema Sinergie reserves the right to modify dimensions, specifications and equipment without previous notice.



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