

Nucline™ TH-22, TH-33, TH-45 Gamma Camera Family



The Gold Standard in the Thyroid Scintigraphy

Mediso Medical Imaging Systems

Mediso Medical Imaging Systems with headquarters in Budapest is a dynamic supplier of Nuclear Medicine and modern Hybrid Imaging techniques to the health care and medical research institutions of the world. The company was founded in 1990 by experts of the largest research and manufacturing company of the region which has been engaged of nuclear equipment manufacturing since 1960.

Main activities of the company:

- Researching innovative human and preclinical imaging technologies
- Developing leading edge human and preclinical systems
- Manufacturing, servicing and selling imaging equipment
- Providing diagnostic clinical services

Research and Development

The business strength and perspective of Mediso is based on its R&D activity. To keep production on the leading edge continuous development of new products is a must. The company's declared aim is to develop competitive Nuclear Medicine and Hybrid Imaging equipment applying the most up-to-date technology. More than 50% of Mediso employees are engaged with R&D. (75% of Mediso employees hold higher academic degrees.)

Numbers of co-operations have been formed with hospitals, clinics and scientific institutions ensuring that the developed technology is responsive to the needs of Mediso's clinical partners.

Production

High quality unique systems designed with top level engineering and elaborated solid solutions are implemented to physical reality by the manufacturing department of Mediso. Carefully selected suppliers of quality parts and specialised high-precision subsystem manufacturers are key factors in the quality of final product integration.

Sales and After-sale Services

Mediso-affiliated German and Polish subsidiaries and world-wide distributor network ensure close contact with our customers and offers quick response for their requests. More than 1100 Mediso clinical cameras are installed worldwide in 90 countries.

Diagnostic Clinical Services

Mediso operates two PET-CT and nuclear medicine centres in Debrecen University and in Budapest. The strong university and clinical background gives Mediso a first-hand clinical experience and important application feedback.

The Gold Standard in the thyroid scintigraphy

Nucline™ TH-22, TH-33 and TH-45 small-field gamma camera family is distinguished by a unique design and high quality production of the systems. All cameras have the latest detector technology and high-performance Windows-based workstations.

Nucline™ TH-cameras can easily be adapted to your needs. Highly sensitive detectors as well as high quality electronics provide high performance images in various applications. Superior image quality and resolution of TH-gamma cameras deliver the best quality and the highest reliability in diagnosis in all studies. Starting with acquisition, through evaluation until documentation and archiving patient data, all tasks are performed automatically according to your requirements using full DICOM functionality.

InterView™ software offers an easy and intuitive operation. The design of result page is flexible and takes your personal wishes into account.

Evaluation on workstations from other manufacturers is easily possible due to the full DICOM functionality and compatibility.

With these features the **Nucline™** TH-camera family offers you all advantages of a modern small-field gamma camera system with powerful computing platform for simultaneous acquisition and analysis in a single operation, including documentation and archiving patient data.

Simple and brilliant

The concept of **Nucline™** gamma camera family: reliable, simple and intuitive, maximum performance, easy to use and high quality.



*Patient table is not part of the system.

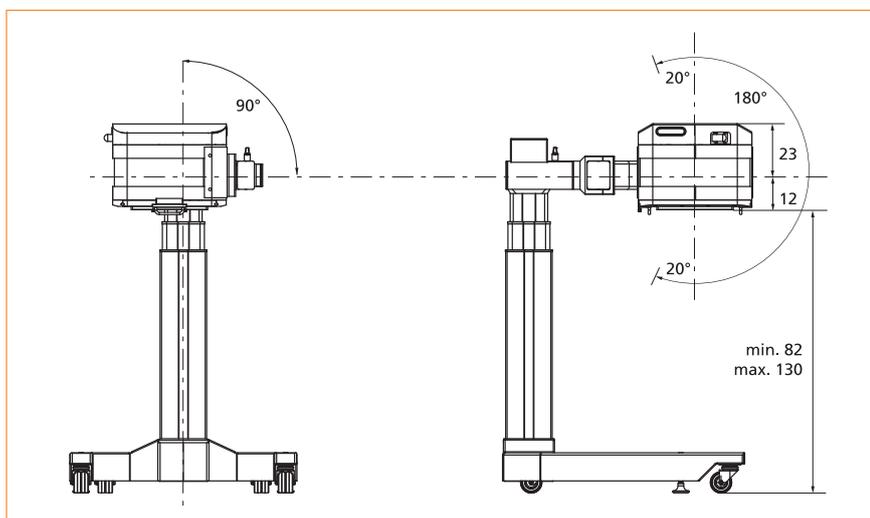
TH-22, TH-33 and TH-45

The various TH cameras differ only in their size of Field of View (FOV). Besides the primarily intended examination type the thyroid scintigraphy, other examinations (e.g. Sentinel Node, kidney or gastrointestinal) can also be performed.

Crystal size	TH-22	230 x 210 mm
	TH-33	260 x 246 mm
	TH-45	300 x 300 mm
FOV (Field of View)	TH-22	180 x 180 mm
	TH-33	215 x 215 mm
	TH-45	250 x 250 mm

Gantry

- Adjustable height setting of stand with high precision electro-mechanical movement.
- Single hand detector handling and accurate positioning of the detector head even below the patient table
- Broad range of vertical adjustment (480 mm) with digital display of height
- Quickly adjustable detector orientations, vertical and horizontal detector angle indicator
- Hand operated detector rotation and locks.



Dimensions in centimeter and degree.

NEMA-Specification

	HP			UHP		
Energy range (keV)	40 - 400					
Lead shielding thickness of detector (mm)	12-28					
Intrinsic energy resolution with Tc-99m (%)	9,9			9,6		
Maximal countrate (cps)	220.000			350.000		
Intrinsic homogeneity						
Differential CFOV (%)	2,4			1,9		
Differential UFOV (%)	2,5			2,0		
Integral CFOV (%)	2,9			2,4		
Integral UFOV (%)	3,0			2,5		
Intrinsic linearity						
Differential CFOV (mm)	0,18			0,09		
Differential UFOV (mm)	0,20			0,10		
Absolute CFOV (mm)	0,38			0,28		
Absolute UFOV (mm)	0,40			0,30		
Available crystal thickness (mm)	6,5*	9,5	12,5	6,5*	9,5	12,5
Intrinsic spatial resolution						
CFOV FWHM (mm)	3,2	3,9	4,3	2,7	3,4	3,8
UFOV FWHM (mm)	3,3	4	4,4	2,8	3,5	3,9
System spatial resolution with collimator						
LEHR-Collimator FWHM (mm)	7,5	8,0	8,1	7,2	7,7	7,8
LEHR-Collimator FWTM (mm)	13,5	13,9	14,5	12,9	13,4	14,1

*Available only for TH22 und TH33

Large Selection of Collimators

We offer a wide range of various high quality collimators for the **Nucline™** TH-gamma camera family.

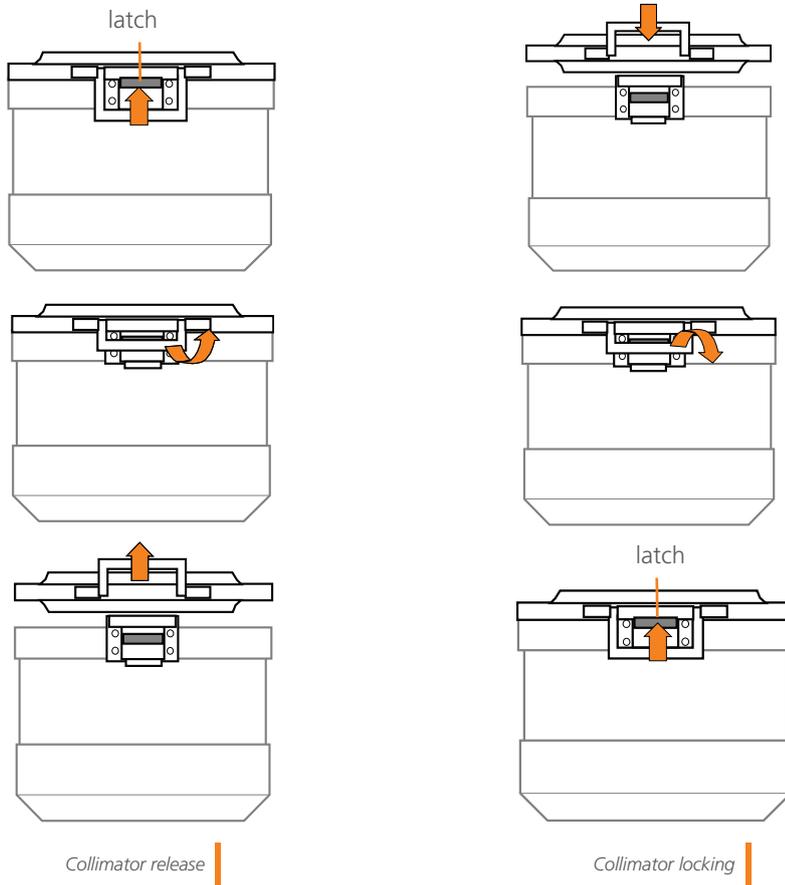
The HEGP⁽⁶⁾, and MEGP⁽⁵⁾ collimators are made of microcast lead, the LHEP⁽⁷⁾ collimators are made of lead cast with tungsten insert and other collimators are made with microlinear technology.

With extremely high manufacturing accuracy we achieved an excellent image quality, particularly at high photon energies (I-131) where the septal-penetration is minimized.

Name	Hole length (mm)	Hole size (mm)	Septal Thickness (mm)	Nominal energy (keV)	Septal penetration (%)	Collimator weight (kg) TH-22/33	Collimator weight (kg) TH-45	Geometric resolution @10 cm (FWHM in mm)	System Sensitivity (cpm/μCi ± 7 %)					
									HP			UHP		
									Crystal thickness (mm)			Crystal thickness (mm)		
									HP/UHP	6.5	9.5	12.5	6.5	9.5
LEGP ⁽¹⁾	35	1,9	0,2	140	1,1	12	16	8.0	265	290	305	290	310	330
LETH ⁽²⁾	35	1,9	0,2	140	1,1	14	19	8.0	265	290	305	290	310	330
LEHR ⁽³⁾	35	1,5	0,2	140	0,3	13	17	6.3	155	165	175	165	180	190
LEUHR ⁽⁴⁾	34	1,2	0,2	140	0,1	17	20	5.1	100	110	115	105	115	125
MEGP ⁽⁵⁾	35	2,5	1,4	300	1,4	24	28	10.8	175	190	200	190	205	215
HEGP ⁽⁶⁾	55	3,4	1,6	364	5,9	25	38	11.3	55	60	65	60	65	70

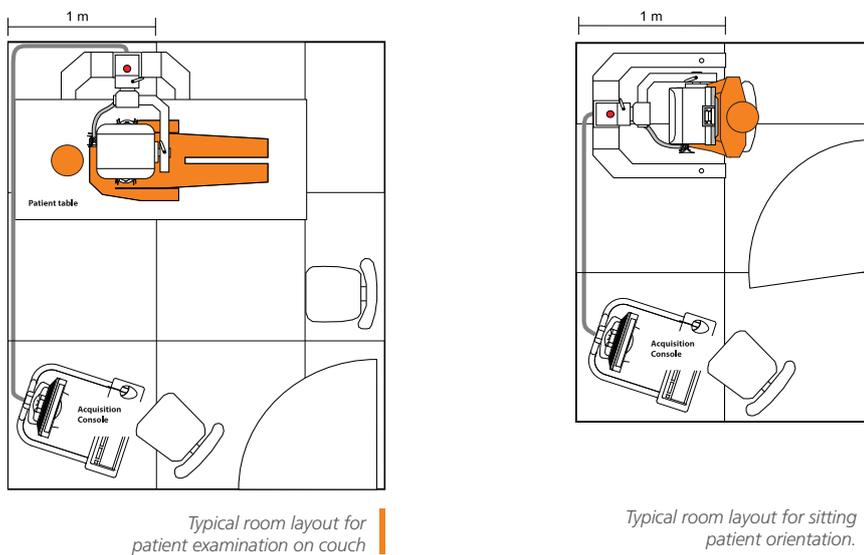
(1) Low Energy General Purpose collimator, (2) Low Energy Thyroid collimator, (3) Low Energy High Resolution collimator, (4) Low Energy Ultra High Resolution collimator, (5) Medium Energy General Purpose collimator, (6) High Energy General Purpose collimator, (7) Low/High Energy Pinhole collimator

The Collimator Change - Can't be Easier



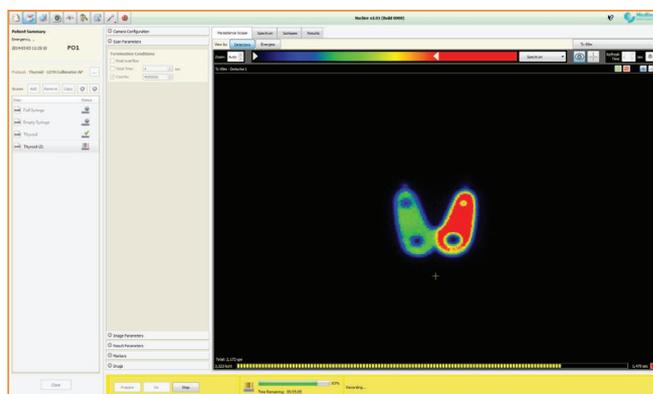
Collimator cart for collimator exchange and storage rack are optionally available.

Easy one-day installation



Nucline™ - The Acquisition Software

- Intuitive Windows-based acquisition platform
- Covers all standard acquisition methods
 - planar
 - dynamic
 - gated
- Standard and user-specific acquisition protocols
- Acquisition protocols of single and multiple syringes
- Automatic and manual anatomic markers
- Calibration, data management and displaying of the results
- Full DICOM 3.0 compatibility



Representation of a thyroid phantom with the **Nucline™** acquisition software. Marker is at about the position of the jugulum.

InterView™ - The evaluation and post processing software

InterView™ is your software for all applications of nuclear medicine, supporting quantitative and organ-specific distribution of different radiopharmaceuticals in the body and displaying the distribution change over the time.

The main functions of the software are accessible through drop down menus and the most commonly used clinical features are available in the Quick Access Toolbar.

The automated evaluation procedures are selectable according to organs or acquisition methods.

The tools are arranged according to the clinical applications in logical order.

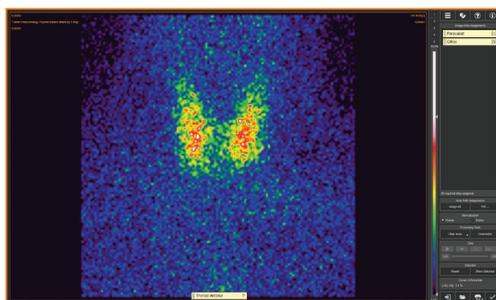
Each step corresponds to a page in a workbook in which the user can scroll to perform modifications. The program guides the user intuitively through the necessary steps.

In the application there are editable templates, and many possibilities, to combine texts and images freely simply and easily.

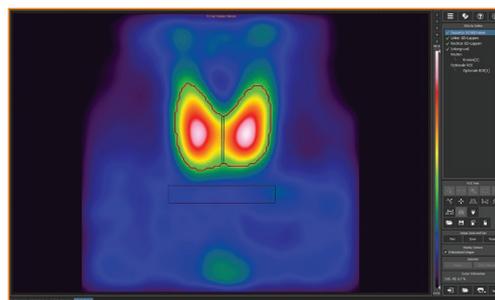
The software supports data exchange with other nuclear medicine application using the industry standard DICOM and Interfile.

Different image processing methods are used:

- Automatic background subtraction
- Multiplication
- Motion correction
- Activity correction
- Manual and automatic detection of markers
- Different predefined filters (see as illustrated)



Acquired Thyroid image



Acquired Thyroid image Filtered Thyroid image with automatic ROI

Examination methods

Thyroid uptake of Tc-99m

Routine evaluation of the thyroid examinations with Tc-99m-pertechnetate. The reports contain all relevant patient- and examination information, may show the raw and / or filtered images, the result of the thyroid uptake and an estimation of thyroid weight and size. The uptake can be determined either by using measurement of syringe activity by the camera system or by direct input of the activity - measured on an activity meter- into the evaluation program.

Thyroid uptake of I-131

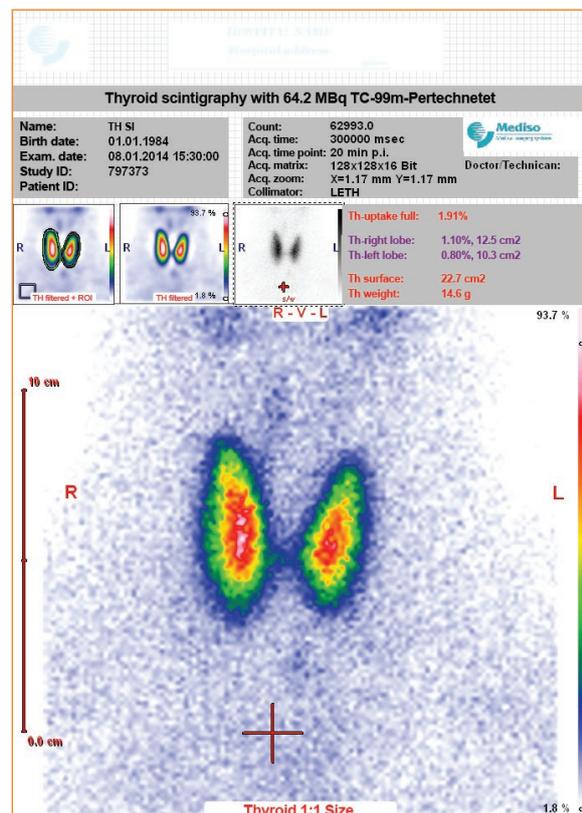
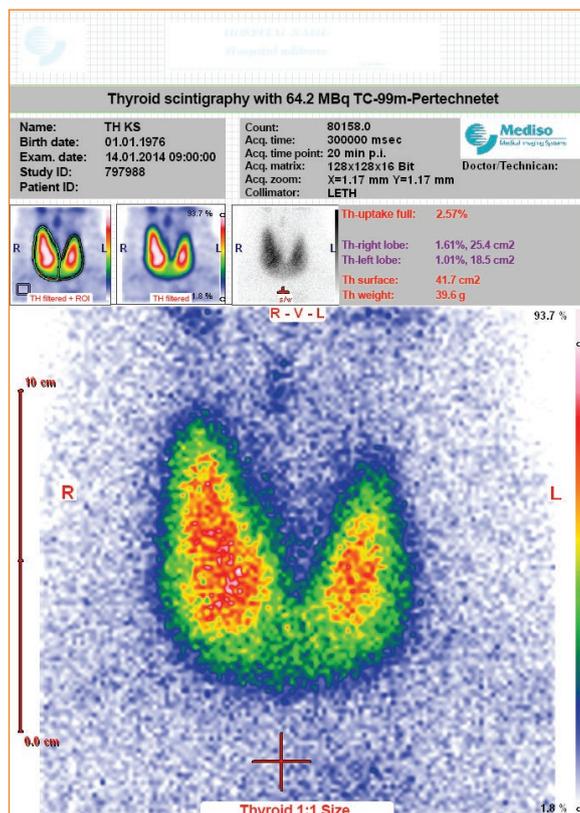
Representation of the iodine uptake based on several measurement points of phantom and of patient-thyroid image pairs. Uptake will be calculated by using different algorithms using parameters like half-life, geometric values, weight of the thyroid and optionally I-131 therapy parameters. Thyroid weight can be estimated using different calculation methods independently from the isotope.

Iodine-Thyroid clearance I-123

Calculates clearance of thyroid with I-123. The initial and residual activity can be measured directly with the gamma camera system or by a dose calibrator.

Parathyroid dual-labeling Tc-99m and Th-201

The aim of this evaluation is the localization and rough estimate of parathyroid adenomas by subtraction of parathyroid and thyroid images with different radiopharmaceuticals (dual labeling). The evaluation software creates suitably scaled images for comparison.



Conformance Statement

Quality management system operated by Mediso Medical Imaging Systems complies with Council Directive 93/42/EEC Annex II.

Product design, development, production and services comply with EN ISO 13485

Safety labels are attached to appropriate places on equipment and appear in all operation manuals.

The supplied software complies with DICOM standard.

The technical information provided here is not a detailed specification.

For details and up to date information please contact your local distributor or Mediso Medical Imaging Systems.



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