

Shielded Workbench



Clean environment and radiation protection

LWB shielded workbenches protect the product from particulate and bacterial contamination and, at the same time, protect the operator and the surroundings from ionising radiation and radioactive substances.

The workbenches are modular: both the shielding and the equipment of the working area are configured according to the radionuclides, activities and procedures of the particular facility.

Advantages

- Modular lead shielding – thickness chosen according to the activities and energies of the radionuclides handled
- Modular compartments under the work surface – can be rebuilt when the technology changes
- Shielded compartments for ^{99m}Tc generators, ^{68}Ga generators, radioactive waste and a well-type dose calibrator
- Motorised ^{99m}Tc generator drawer with manual override capability
- Dose calibrator with manual or automatic sample transfer
- High load capacity of the work surface for Lynax dispensing units and additional shielding
- Laminar flow of cleanliness grade A / ISO 5, HEPA H14 filters
- CR2000 control system with touch screen and remote monitoring
- Energy-saving EC fan and standby mode
- Technical gas outlets, 230 V sockets and data connections in the working area

Versions

LWB12

Working area width 1 230 mm. Suitable, for example, for Lynax dispensing units for PET.

LWB18

Working area width 1 840 mm. Typical configurations:

- **LWB18 PET/Ga** – installation of ^{68}Ga technology (e.g. GalliaPharm – Eckert & Ziegler or Galli Eo – IRE ELiT) and the Lynax PT459R5 automatic dispensing unit for PET radiopharmaceuticals and ^{177}Lu
- **LWB18 SPECT** – space for two ^{99m}Tc generators with motorised drawer



LWB18 with space for ^{68}Ga generators, well-type dose calibrator and shielded waste compartment



LWB18 PET/Ga working area with the PT459R5 dispensing unit



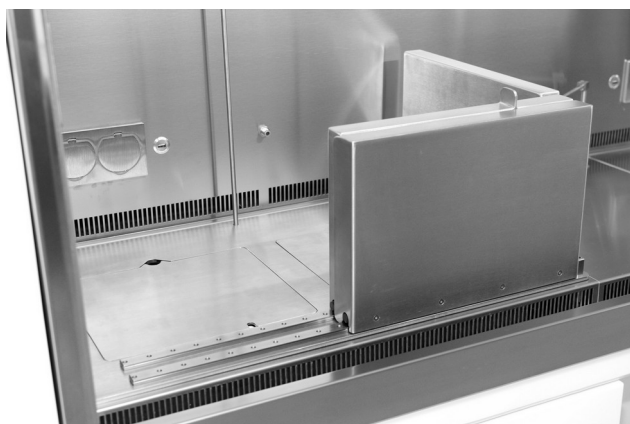
LWB12 in basic configuration

Mechanical design

- **Base frame and outer surfaces** – carbon steel with a baked powder coating resistant to abrasion and disinfectants
- **Working area** – AISI 316L stainless steel; the work surface is a removable tray with a watertight tub underneath that collects any spilled liquids; high load capacity
- **Front window** – sliding front window of safety glass, slightly inclined to prevent reflections, frameless for a clear view; motorised movement with linear actuators and position monitoring
- **Front intake grille** – the inclined edge prevents it from being covered by the hands and reduces turbulence
- **Work surface height** – for seated work, on request for standing work; the whole work surface is within comfortable reach
- **Lead glass shield** – in a stainless steel frame; the holder contains additional lead shielding
- **Materials** – all materials in the working area are non-absorbent, easy to decontaminate and sterilisable

Air handling

- **Airflow** – vertical laminar flow in the working area, velocity 0.40 ± 0.05 m/s
- **Operator protection** – average inflow through the working opening of 0.6 m/s (min. 0.4 m/s) prevents air escaping from the working area towards the operator; working opening height 180 mm, 470 mm with the front window open
- **Filters** – main and exhaust HEPA H14 filters according to EN 1822 (efficiency ≥ 99.995 % at MPPS) – both the air in the working area and the air exhausted from the workbench are filtered; the control system monitors the pressure drop and signals warning and alarm limits
- **Exhaust** – connection to the building ventilation via a $\varnothing$ 250 mm duct; exhaust air volume 400 m³/h (LWB12) and 700 m³/h (LWB18); the workbench can also operate without connection to the building ventilation
- **Fan** – electronically commutated (EC) motor with up to 70 % lower energy consumption than AC motors; maintains the airflow velocity as the filters gradually load
- **Standby mode** – when work is interrupted, the front window closes partially and the airflow velocity is reduced; inflow through the front opening stays at a safe value and no sanitisation is needed before resuming work
- **Working area equipment** – germicidal UV-C lamp that does not disturb the airflow, LED lighting dimmable 0–100 % (max. 1 300 lx), temperature sensor



Configuration for ⁶⁸Ga generators – sliding shielding modules



Configuration for ⁶⁸Ga generators – open compartment

Shielding and shielded modules

Lead shielding of the walls and of the space under the work surface is complemented by shielded modules built into the work surface and the base cabinet. The thickness of all shielding layers can be adapted to customer requirements.

Modular compartments under the work surface

The side compartments under the work surface are designed as a modular system from the outset. When the technology in the workbench changes, they can be rebuilt without altering the overall structure of the workbench, so the equipment does not have to be moved out of the clean area.

Compartment for ^{99m}Tc generators

One or two ^{99m}Tc generators are housed in a shielded well under the work surface. A motorised drawer moves them into the working position and back after elution. The generators can also be positioned mechanically, so a technical fault does not stop the work of the department.

Compartment for ^{68}Ga generators

Shielded space for ^{68}Ga generators and the associated synthesis technology (e.g. GalliaPharm – Eckert & Ziegler or Galli Eo – IRE ELiT).

Well-type dose calibrator

The ionisation chamber of the well-type dose calibrator is built into shielding under the work surface. The sample is placed into the chamber manually or by an automatic transfer arm. On request, the cabinet can be adapted for a dose calibrator the facility already owns.

Waste compartment

The shielded compartment for radioactive waste holds two plastic containers. They stand in a holder on a pull-out drawer that positions them exactly under the disposal openings, so replacement is easy and new containers are always in the right position.

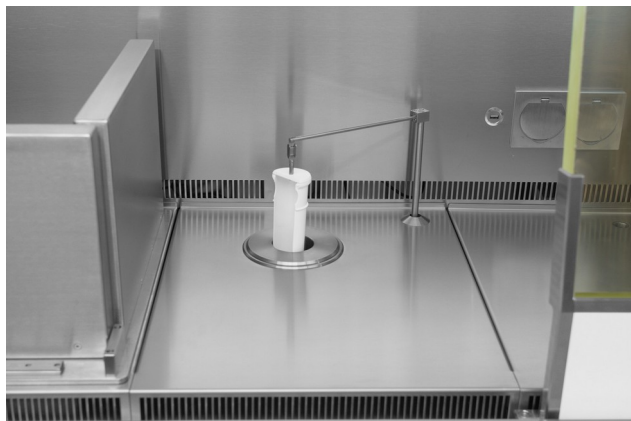
Sliding lead glass

The lead glass with a shielding equivalent of 5–30 mm Pb (as chosen by the customer) is positioned to provide adequate protection while keeping the work surface easily accessible. It slides manually and, thanks to precise roller bearings, very lightly.

The workbench can be further equipped with an additional lead screen, a Lynax dispensing unit and other shielding and handling aids, such as tungsten containers or tweezers.

Connections and controls

- **Technical gases** – Up to three technical gas outlets can be provided in the working area, each with a shut-off valve and pressure indicator.
- **Electrical and data connections** – Up to four 230 V sockets, switched centrally from the control panel on the front, and up to four USB or RJ45 (Ethernet) data connections can be provided in the working area.
- **Adjustable holder** – The workbench is usually supplied with an adjustable arm for the controls of equipment inside the workbench, such as the display of the dose calibrator or the control computer of a Lynax dispensing unit.



Sample transfer arm of the dose calibrator



Disposal openings of the waste compartment

Technical specifications

Parameter	LWB12	LWB18
Working area dimensions (W × H × D)	1 230 × 690 × 560 mm	1 840 × 690 × 560 mm
Outer width*	1 240–1 448 mm	1 850–2 058 mm
Outer height*	2 200–2 680 mm	2 200–2 680 mm
Outer depth*	780–885 mm	780–885 mm
Power supply	230 V / 50 Hz	230 V / 50 Hz
Power consumption	500 W	900 W
Airflow velocity	0.40 ± 0.05 m/s	0.40 ± 0.05 m/s
Noise level	max. 57 dB(A)	max. 57 dB(A)
Illumination	max. 1 300 lx	max. 1 300 lx
Inflow through working opening	average 0.6 m/s, min. 0.4 m/s	average 0.6 m/s, min. 0.4 m/s
Exhaust air volume	400 m³/h	700 m³/h
Exhaust duct	Ø 250 mm	Ø 250 mm
Filters (main and exhaust)	2 × HEPA H14	2 × HEPA H14

* Depending on the shielding and version.

Shielding parameters

Shielded part	Shielding
Walls and work surface	5–50 mm Pb
^{99m} Tc generators	30–50 mm Pb
⁶⁸ Ga generators	40–50 mm Pb
Well-type dose calibrator	20–50 mm Pb
Radioactive waste compartment	20–50 mm Pb
Sliding lead glass	5–30 mm Pb equivalent

CR2000 control system

Large touch screen and fully automatic operation: once a mode is selected (idle, operation, standby, cleaning, sterilisation), the system sets the target parameters itself. Access rights management, UV-C timers, alarm limit settings (airflow, pressure, temperatures) and lighting intensity. Remote control and service support via Android, iOS and Windows; deviations from safe values are signalled acoustically and optically and sent by e-mail or to a mobile phone.

Standards and classes

- Cleanliness grade A according to EU GMP, Volume 4, Annex 1
- ISO class 5 according to EN ISO 14644-1
- Class II microbiological safety cabinet according to EN 12469: tightness Li-C, cleanability Cl-C, sterilisability Sl-C – the highest ratings on the scale of the standard
- HEPA H14 filters according to EN 1822