

# TMP HOT CELLS

## REMOTE MANIPULATION AND RADIOPHARMACEUTICAL PRODUCTION HOT CELL



Designed to enable operators to carry out a maximum number of hot operations, the TMP range of shielded cells can be **customized to suit your needs and applications (research and production)**.

This range of highly shielded cells (between 100 and 200 mm of lead) is equipped with **remote manipulators for more complex manipulations**. They can also be fitted with ball-and-socket grippers for simpler tasks.

The TMP range of shielded cells is fully compliant with regulatory requirements, both in terms of Good Manufacturing Practice (GMP) and radiation protection standards.

Their meticulous interior finish (no asperity  $Ra < 0.8 \mu m$ ) in 316L stainless steel and their radiused corners are ideal for cleaning and decontamination.

### ASSOCIATED PRODUCTS

- DS-75 or DS-100 radiosynthesis hot cell
- RS-75 dispensing hot cell
- GCS: Gas Compression System
- DOM: fractionating and dispensing system
- Posisafe® Pb 30: Type A transport container

## REGULATORY FRAMEWORK

The TMP hot cell meets the requirements of the **European machinery 2006/42/EC** and electromagnetic compatibility **2004/108/EC directives**.

Conforms to the requirements of **good preparations practices (GPP & GMP)** for radiopharmaceutical drugs, subject to the implementation of suitable procedures, jointly with the customer.

In terms of radiation protection, the TMP hot cell meets the requirements of **the European Directive 96/29 EURATOM of 29 June 1996**. It guarantees **a dose rate at 5 cm from the walls of less than 25 µSv/h** for the operator.

Also meets the requirements of the **order 16 January 2015 approving Decision No. 2014-DC-0463 of the French Nuclear Safety Authority (ASN)** mainly concerning the ventilation and negative pressure of the shielded hot cell, the TMP hot cell can be immediately connected

to the ventilation network, independently of the rest of the building, with a 125 mm diameter suction outlet located on the ceiling of the room. It is fitted with an exhaust fan (measurement at the cell outlet 120 m<sup>3</sup>/h, 1.7 m/s) located after the filtration system and allows to obtain between 100 and 250 Pa negative pressure inside the cell.

The hot cell is fitted with a self-contained ventilation and filtration system composed of a HEPA inlet filtration and active carbon and HEPA outlet filters.

The different air classes in the cell are measured per **standard ISO 14644**. An **ISO 7 Class C** controlled atmosphere zone (GMP criteria) under laminar flow is provided along the entire length of the work surface (Class A optional)

The **Class 3** sealing in the hot cell is measured per **standard ISO 10648**.

## FOCUS

Connection to the building's nuclear ventilation network is ensured by **automatically opening valves**, enabling the hot cell to be put under negative pressure or confined. A pressure gauge continuously displays the vacuum level in the enclosure\*. Filtration is provided by a HEPA filter at the inlet and one or more HEPA and activated carbon filters at the outlet. The latter are installed inside the hot cell as standard.

All the functions of the cell are **controlled on a touch screen**: inflating of the seals, lighting, ventilation valve control, etc. The screen also continuously displays the irradiation values and negative pressure inside each hot cell\*.



The front of the hot cell is equipped with a large leaded-glass viewing window (dimensions: W 460 x H 460 mm) for **full visibility of the work area**. The interior of the hot cell (with a work surface width of between 1,000 and 2,000 mm, and a depth of between 800 and 1,200 mm) offers a comfortable,

**fully accessible workspace**, which can be accessed using handling tongs with ball joints and/or suitably installed remote manipulators. Access to the work area is via a large rear door, located in the technical gallery, for all loading and/or cleaning operations. This configuration separates the working area (on the laboratory side) from the rear area (on the technical side), with different pressure and dust levels.

Each hot cell features liquid or gaseous target tube inlets, and different types of electric and fluidic connectors (nitrogen, hydrogen, compressed air, etc.), and **covers all users needs**.

They are also equipped with individually controllable electrical outlets.



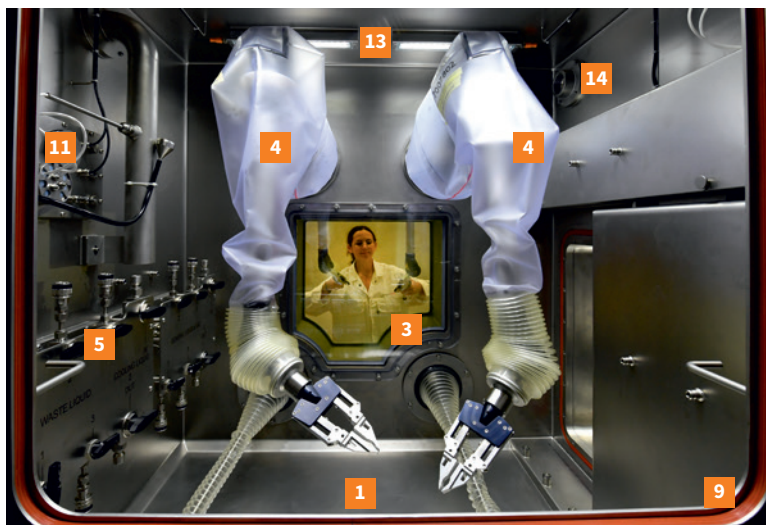
The cell can be equipped with a **large armored airlock or a simple automatic sliding door inside the cell** to allow products to enter or leave. The airlock features an automatically operated loading drawer to facilitate transfer operations.

Depending on the application, this cell can also be fitted with :

- DPTE® airlock and PMP doors
- garbage can compartment for liquid or solid waste
- activimeter location
- bottle outlet

\*Compliant with the recommendations of the French Nuclear Safety Authority (ASN)





**1** | Internal work surface, width 1,000 - 2,000 mm, depth 800 - 1,200 mm **2** | Shielded ball joint and/or remote handling tongs **3** | Lead-glass window for full visibility of the work surface **4** | Remote manipulators **5** | Remote-operated valves for gases and/or fluids **6** | Touchscreen displays irradiation levels and controls all cell functions, in particular door opening management according to dose rate\* **7** | Illuminated beacons indicate irradiation levels in the enclosure\* **8** | Shielded external rear door equipped with two door safety switches\* **9** | Plexiglass seal with inflatable gasket ensures Class 3 tightness **10** | Mixed HEPA + activated carbon outlet filter **11** | Sealed bushings for electrical inputs, RH, temperature, air speed, vacuum and dust sensors **12** | 4 controllable 230 V electrical outlets, Ethernet, USB. All electrical outlets can be controlled independently from the control panel **13** | LED lighting **14** | HEPA filter at inlet to ensure class C in operation and at rest (GMP compliance) **15** | Gas and fluid management and control

\*Compliant with the recommendations of the French Nuclear Safety Authority (ASN)

# CHARACTERISTICS

## General

### Overall dimensions:

depend on the inner chamber dimensions

### Hot cell weight:

related to the shielding thickness and the inner chamber dimensions

### Exterior finish:

white lacquered aluminium finish, similar to cleanroom panels, and 304L stainless steel

## Radiation protection

### Dose rate:

All our cells are homogeneously shielded to obtain a dose rate  $\leq 25 \mu\text{Sv/h}$  at 5 cm from the walls, depending on the activity and nature of the defined radioelement(s)\*

## Installation requirements

### Connection to the nuclear ventilation network:

DN50 per chamber – approx. 50 m<sup>3</sup>/h.

### General power supply voltage:

230 V / 32 A - 50 / 60 Hz

### Exchange of signals:

several dry contacts are provided for communication with the system. 4-20mA signals can be supplied.

### Compressed air:

7 bars - Air quality 2-4-2 (ISO 8573-1)

### Technical gas:

according to requirements

### Floor load:

related to cell weight

## Inner work surface

### Internal dimensions between:

L 1,000 to 2,000mm x D 800 to 1,200mm x H 1,250 to 1,500mm

**Interior finish:** 316L stainless steel (no asperity Ra < 0.8  $\mu\text{m}$ ), acid protection is available as an option

### Shielding thickness:

according to requirements between 75 mm and 250 mm of lead

**Air class:** according to requirements (A, B, C, D)

### Dim. lead glass viewing window:

L 460 x H 460 mm (for a cell height until 1,200 mm)

### Thickness of the lead glass viewing window:

equivalent to compartment shielding

### Type of lighting:

LED (> 1,000 Lux)

### Interior power sockets:

controllable electrical outlet, Ethernet, USB...

### Technical access at rear:

a shielded door and plexiglass panel provide access to the interior

### Technical gas inlet/outlet:

according to requirements

### Technical fluids inlet/outlet:

according to requirements

### Manipulation:

- 1 or 2 remote manipulators (load capacity to be defined)  
- and/or 1 or 2 ball joints with tongs

## Shielded pass-through

**Internal dimensions :** customisable according to requirements

### Shielding thickness:

customisable according to requirements

### Sliding tray:

lead capacity until 100 kg

### Number and type of ways:

- 2 ways side loading  
- 2 ways front loading  
- 3 ways

### Interior finish:

316L stainless steel (no asperity Ra < 0.8  $\mu\text{m}$ )

## Filtration

### Inlet:

HEPA (HEPA + Active carbon optional)

### Outlet:

HEPA (HEPA + Active carbon optional)

## Additional equipments

### Target inlets:

Target receiving station can be integrated

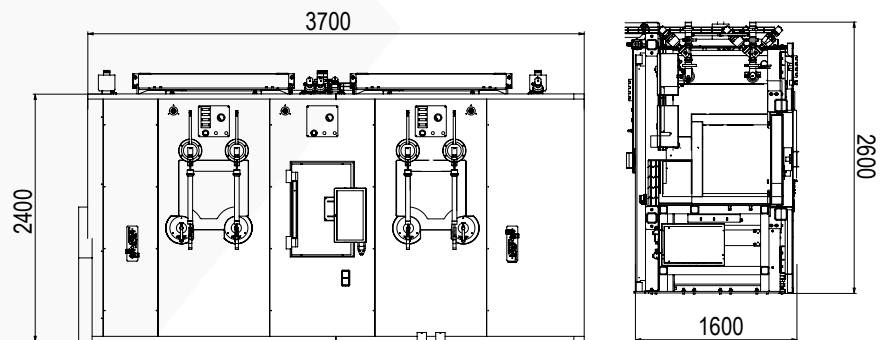
### DPTE® pass-through and PMP door

### Dose calibrator

### Waste compartment

**Reference: contact us**

## EFFECTIVE DIMENSIONS (mm)



## ADVANTAGES

- **GMP conformity:** meets the good manufacturing practice standards
- **Materials:** 316L stainless steel on the inside, brushed finish / 304 stainless steel on the outside, brushed finish
- **Appropriate radiation protection:** between 100 and 200 lead shielding thickness according to your needs
- **Filtration:** air quality in accordance with ISO standard 14644-1, HEPA filters (inlet) / HEPA + active charcoal (outlet)
- **Sealing:** Sealing Class 3 in accordance with ISO standard 10648
- **Manipulation:** equipped with two remote manipulators and/or two handling tongs with ball joints, the cell is configured to perform the necessary tasks or operations

\*Corresponding to two consecutive cyclotron accelerations (French Nuclear Safety Authority (ASN) recommendations)