



LASER CASTLE

Laser Safety Cabins



Laser Castle is a modular, rapid-build, laser safety cabin certified to international laser safety standards.

The cabins are designed, manufactured, installed and certified by Lasermet. They form an integrated laser safety system used to protect personnel from the dangers of laser radiation emitted from high powered lasers and provides an ideal solution for OEMs of laser welding robots and associated laser applications.

Lasermet’s laser safety enclosures protect personnel from the dangers of laser beams by absorbing the laser power in the specially designed wall and roof panels.

These modular, Class 1, room sized laser enclosures - for high power lasers - are tested and certified to ANSI Z136.1 – (Safe Use of Lasers) and EN 60825-4 (Safety of Laser Products Part 4 - Laser Guards), and can be rapidly designed, built and installed by Lasermet.

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They are supplied complete with Lasermet’s interlock control system and dual message, dual colour, low voltage, illuminated LED signs. Lasermet’s audible warning system can also be installed. A CCTV system (Standard or High Definition) covers the operations inside the laser safety enclosure and provision is made for fume extraction making this a cost effective and extremely easy method of enclosing the laser system, which then complies to international laser safety standards.

Active “Laser Jailer” upgrade option

The passive enclosure can be upgraded to an active enclosure by specifying the patented “Laser Jailer” Active Laser Guarding System. (US Patent No. 8 416 820) Modular active tiles cover the internal walls, ceiling and doors to detect high power laser beam strikes. If this occurs Lasermet's fail-safe technology isolates the laser safety input in less than 50ms.



Laser Castle



LASER CASTLE - CAM-locking SafeTy Laser Enclosure

Passive Guarding

- Modular & Flexible Design
- Lightweight & Strong
- Superior Performance compared to Steel & Aluminium
- Rapid Build Times
- Complete Range of Laser Safe Access Doors
- Standard and Custom Colours Available

All Enclosures certified to laser safety standards EN/IEC 60825-4

Laser Safety Compliance

- Machinery Directive 98/37/EC
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- EN 60825-4 Safety of Laser Products Part 4: Laser Guards
- Z136.1 Safe use of lasers
- EN ISO 13849-1 Safety of Machinery: Safety Related Parts of Control Systems
- EN 60947-1 Low Voltage Switchgear and Control gear
- EN 61010-1 Safety Requirements for Electrical Equipment

Why do we need Laser Castle?

Traditional laser safety enclosures using 2mm mild steel to guard against escaping laser beams provide inadequate protection against the multi-kW lasers now being used.

Tests carried out by an independent test house, prove that Lasermet's specially formulated, modular passive wall panels can provide safe containment of 5kW laser beams for up to 7 minutes of sustained impact.

Tests were carried out using 50mm spot sizes and provided the PEL ratings shown below.

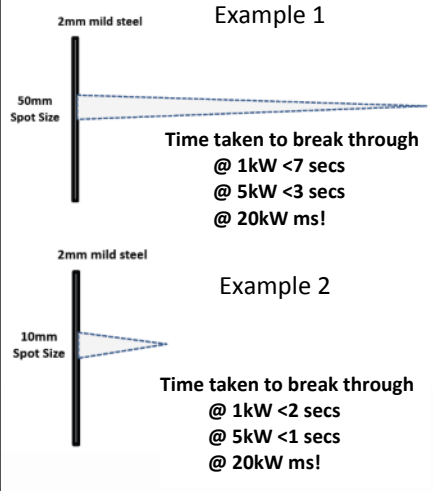
Irradiated Area	PEL (T3) 10 s	PEL (T2) 100 s
4 mm ²	310 MW/m ²	170 MW/m ²
2000 mm ²	3.1 MW/m ²	1.7 MW/m ²

When do we need Active Guarding protection - the Laser Jailer?

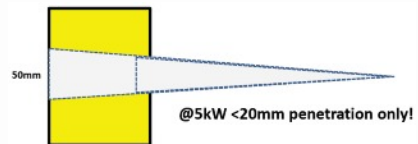
Active laser guarding is recommended for laser powers in excess of 5kW. However, the spot size is also an important factor as well as the focus of the beam.

Laser Jailer is also a modular system made up from detector tiles which line the inside of the laser cabin. The tiles are electrically connected to the interlock controller so that if a beam strikes the internal wall, Lasermet's fail-safe technology isolates the laser safety input in less than 50ms.

Tests on 2mm mild steel



Tests on Lasermet's specially formulated laser blocking material used in the Laser Castle modules



Close up of Lasermet's active laser guarding panels within the enclosure

Concept of the Laser Castle

Rapid build - just a couple of days to complete the installation

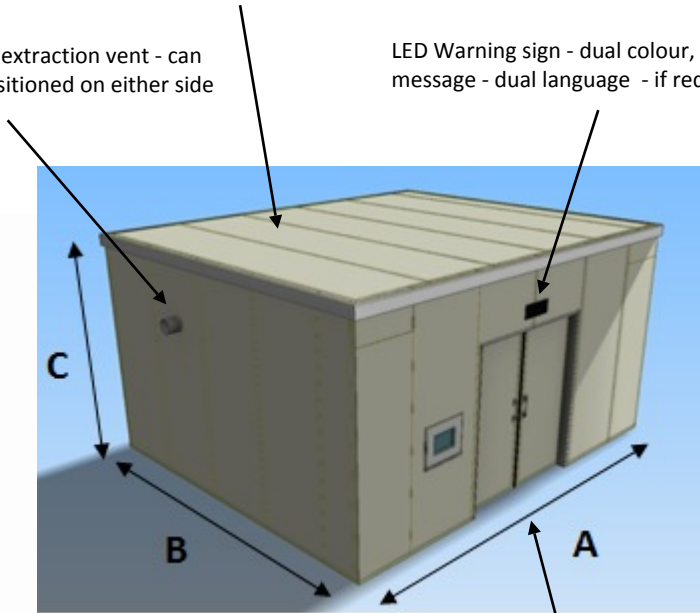
Modular panels - suitable for extending the cabin size - or relocating the cabin

Fume extraction vent - can be positioned on either side

Laser safety is mastered by the ICS-6 Interlock controller. All laser related equipment in the cabin is connected to the controller.



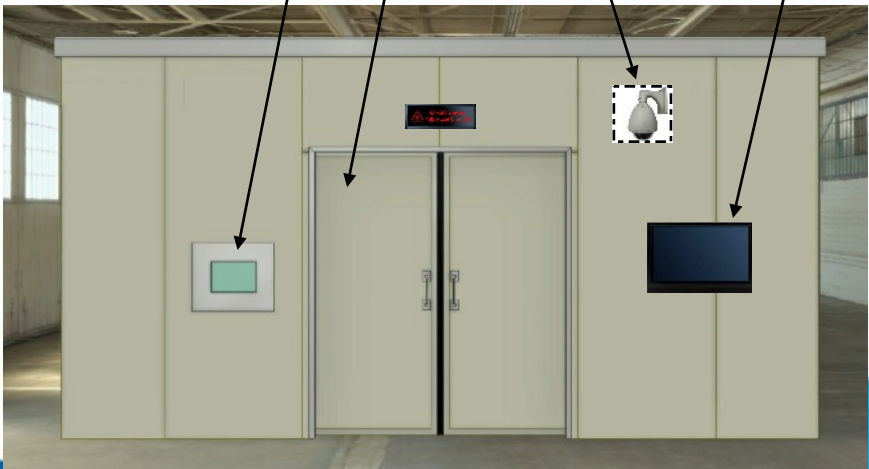
LED Warning sign - dual colour, dual message - dual language - if required.



Typical dimensions
 A = 6.6m 21' 8"
 B = 5.5m 18' 0"
 C = 3.5m 11' 62"

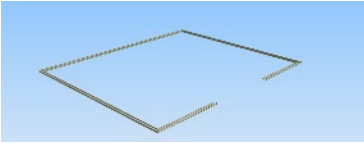
Double manually operated doors - 2.2m w x 2.5m h 7'3" w x 8'2" h
 Single automatic motorised door - 1.7m w x 2.5m h 5'7" w x 8'2" h

Active window Internal HD CCTV camera Monitor

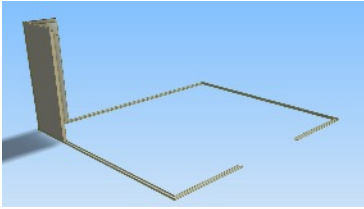


The rapid build process

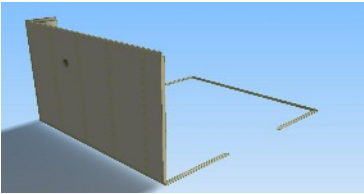
It is essential that the floor is flat and clean before construction takes place.



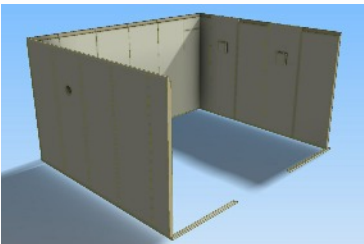
Floor channel fixing and marking out typically takes 1 hour



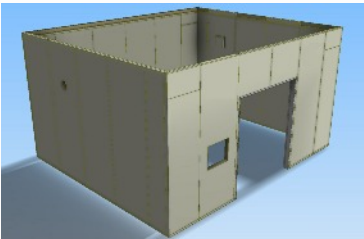
First corner: Typically choose the area with the least access



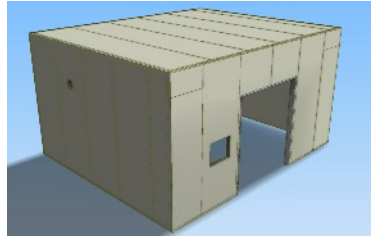
Left hand wall



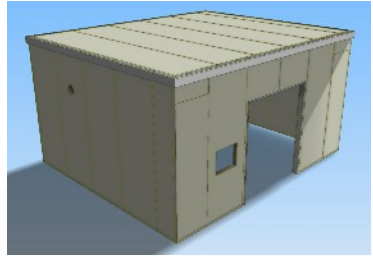
Rear and right hand side walls



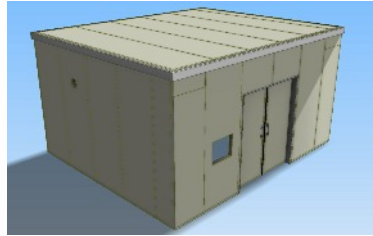
Front wall



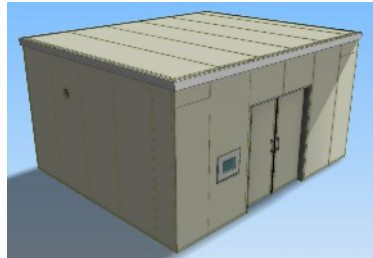
Roof



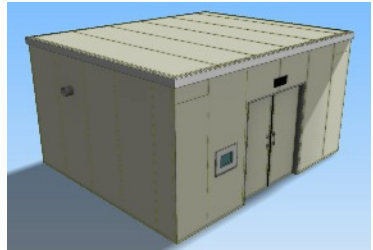
Top planking option



Doors



Active window



Interlock and extraction

Door options

All doors are connected to the interlock controller with either a magnetic lock or interlock switch. The laser cannot be operated with the door (or doors) open. They must be securely closed to switch on the laser.

The doors enable standard forklifts to travel through the door opening.



Manually operated doors



Motorised doors

Service door

A service door option is also available. This can be installed in any of the remaining walls.



Door Maglocks

The doors are secured using a Magshear magnetic lock system. This ensures the doors cannot be opened when the laser is operating



Magshear maglock

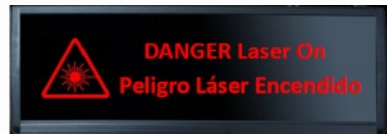
ICS-6 “ELISe” Expandable Laser Interlock System ‘e’

The interlock controller ensures the laser only operates when all of the laser safety interlock



controls are in a safe mode. This means that the doors must be closed, the LED warning sign is illuminated, the active window (if fitted) is functioning and that all of the switches and maglocks are operating correctly. Also the extractor fan should be running. Only when all of the above functions are in operationally safe mode will the controller power the laser operator switch enabling the laser to be fired.

Illuminated LED Signs



Lasermet’s smart, high quality, LED warning signs are dual colour and dual message (and even dual language).

Audio Alert

Lasermet’s audible warning system alerts personnel.



HD CCTV System components



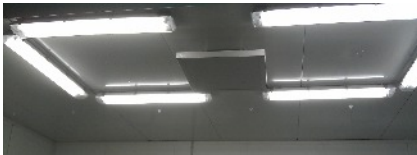
1. HD Camera
2. Monitor
3. Digital video recorder
4. Joystick control
5. OEM Interface

Active laser safety window

The optional active window is also linked to the interlock controller so that if the window is struck by the laser beam the laser is switched off.

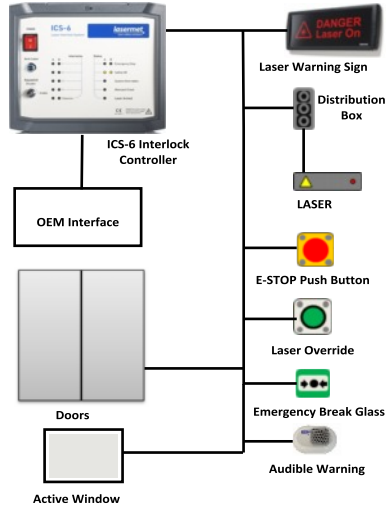


Lighting



Good internal lighting is provided.

Simplified overview of the laser safety system - main components



Containment

All electrical wiring is housed within containment as shown.



Completed installation including containment, lighting, interlock, ventilation and CCTV.

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