

# LASER CASTLE

## Laser Safety Cabins



**lasermet**  
laser safety solutions\*



Cert No 14125056



2682

ISO/IEC 17025:2005

Only for optical testing to:  
BS EN 60025-1  
BS EN 60025-12  
BS EN 60601-2-22

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# 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 Lasernet. 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.

They are supplied complete with Lasermet's interlock control system and dual message, dual color, 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.



Laser Castle

# LASER CASTLE

## Laser Safety Cabins

### Active “Laser Jailer” Upgrade Option

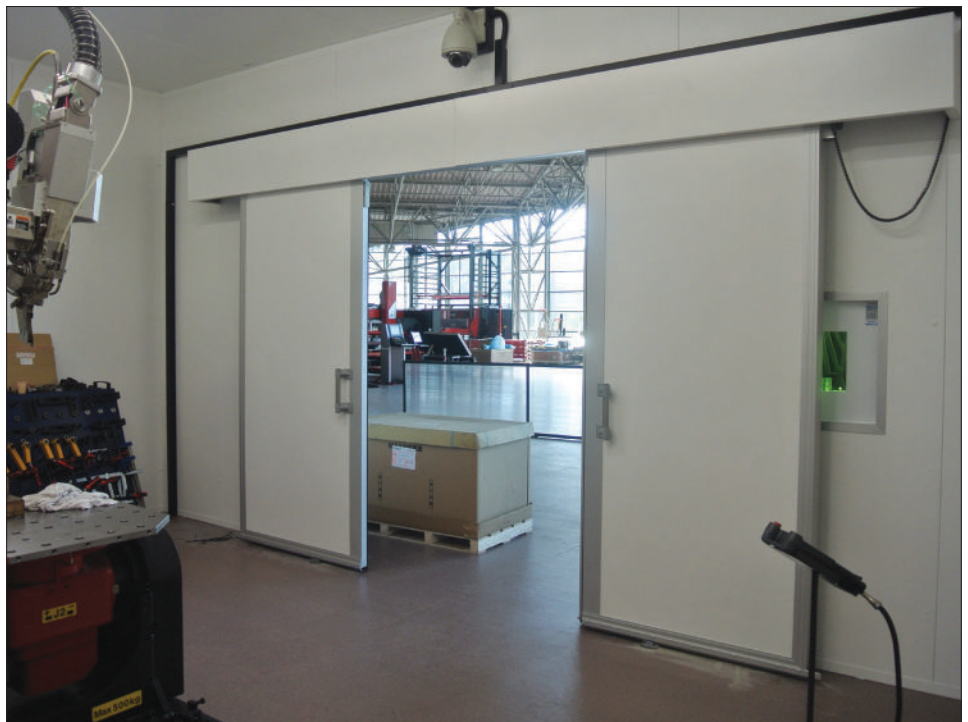
The passive enclosure can be upgraded to an active enclosure by specifying the patented Laser Jailer Active Laser Guarding System. (US Patent No. 8 416 820).

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 Safety Compliance

- Machinery Directive 98/37/EC
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- EN60825-4 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



LASER CASTLE - CAM-locking SafeTy Laser Enclosure

### Passive Guarding

- Modular & flexible design
- Lightweight & strong
- Superior performance compared to Steel & Aluminum
- Rapid-build times
- Complete range of laser safe access doors
- Standard and custom colors available

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

# 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.

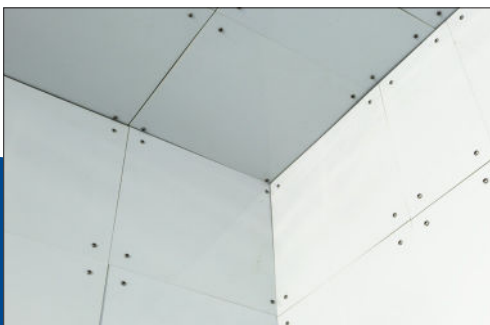
Tests were carried out using 50mm spot sizes and provided the PEL ratings shown below.

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

## 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.

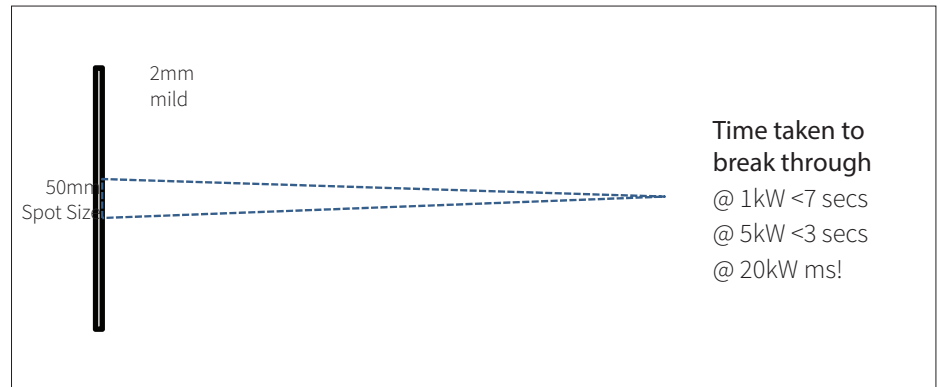
Laser Jailer is also a modular system made up from detector tiles which line the inside of the laser cabin. The tiles are electrically connected to the interlock controller so that if a beam strikes the internal wall, Lasermet's fail-safe technology isolates the laser safety input in less than 50ms.



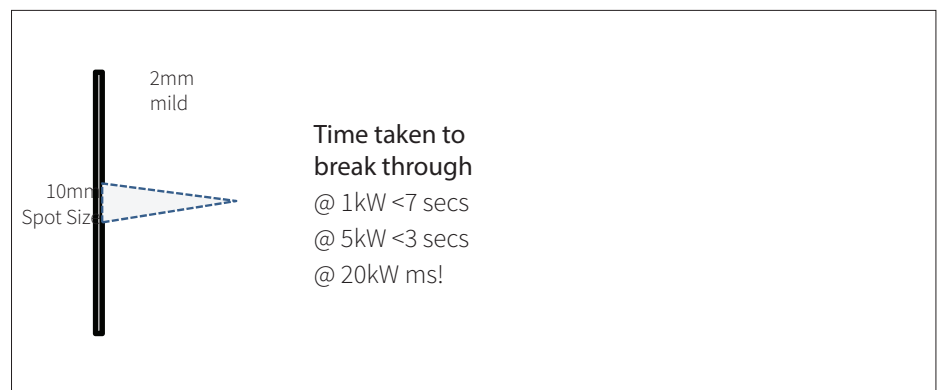
Inside of the Laser Cabin

## Tests on 2mm Mild Steel

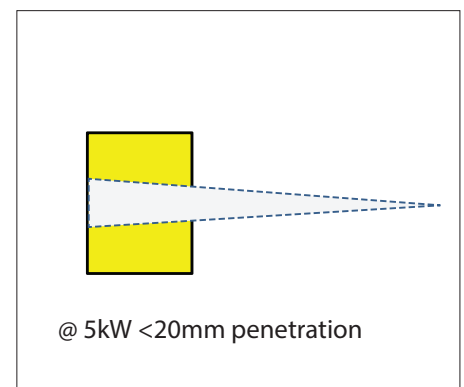
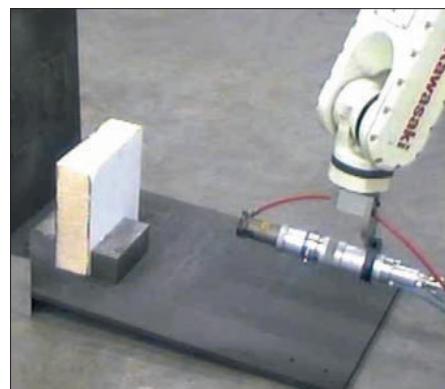
### Example 1



### Example 2



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



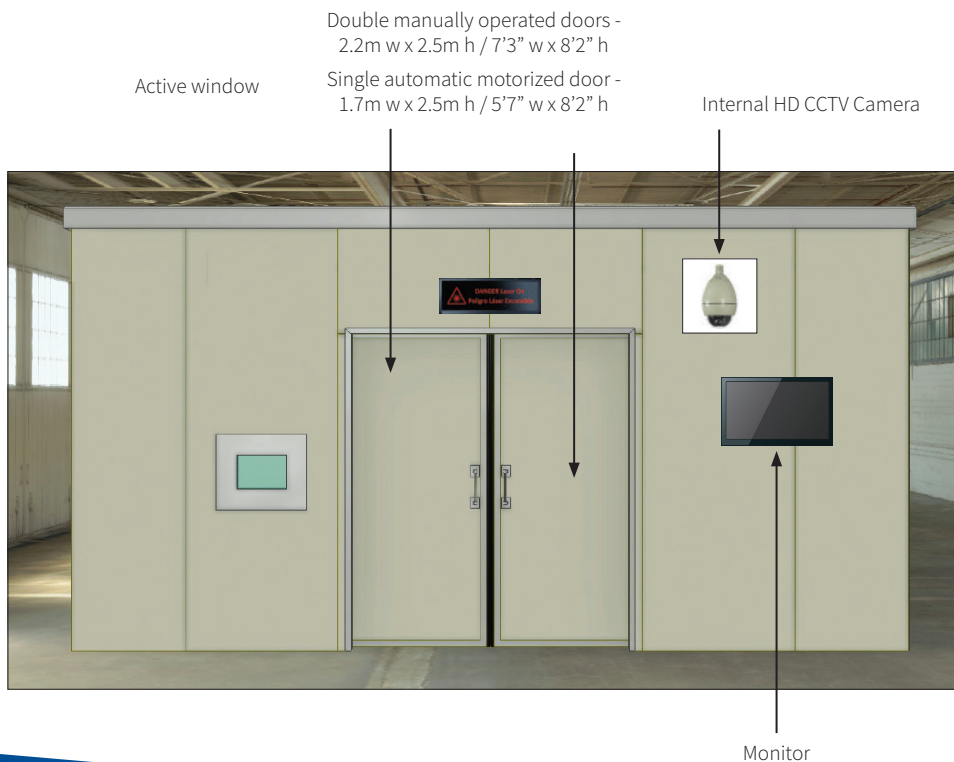
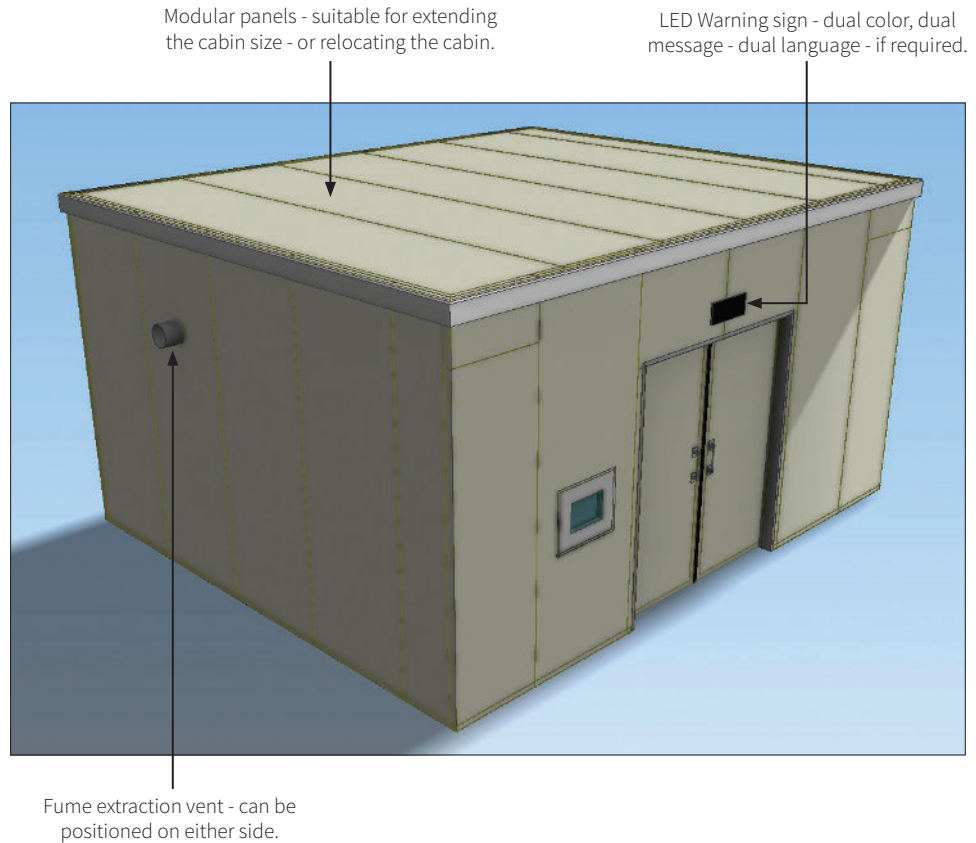


# Concept of the Laser Castle

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

## Typical Dimensions

Width	6.6m
Height	3.5m
Depth	5.5m

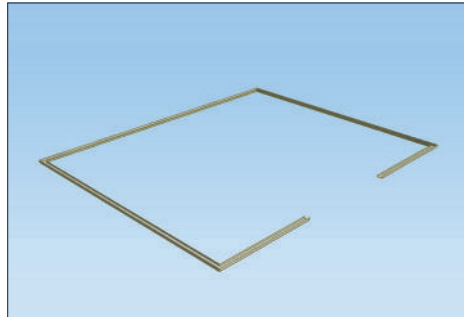


# The Rapid-build Process

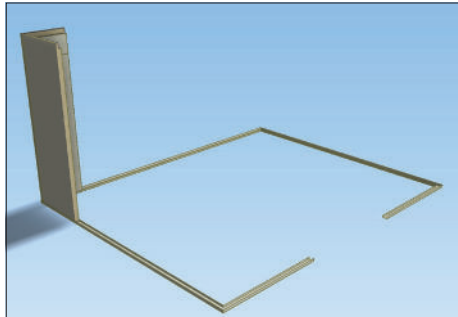
## Laser Safety Cabins

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

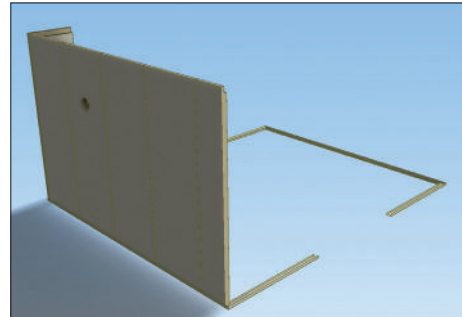
It is essential that the floor is flat and clean before construction takes place.



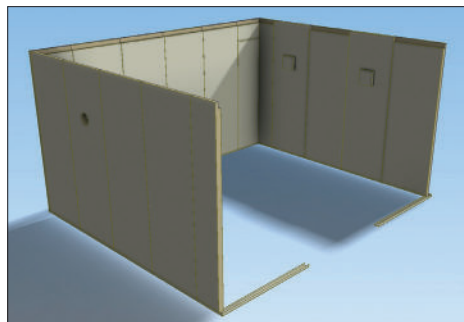
Floor channel fixing and marking out typically takes 1 hour



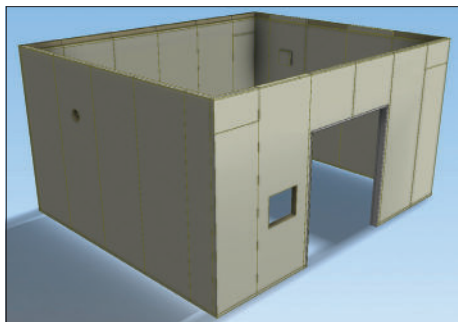
First corner: Typically choose the area with the least access



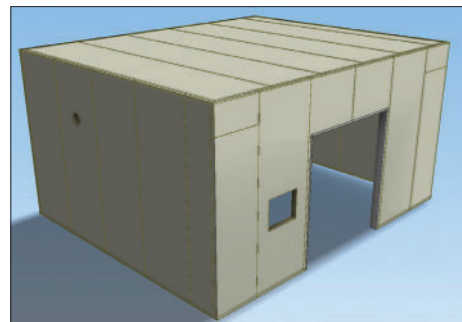
Left hand wall



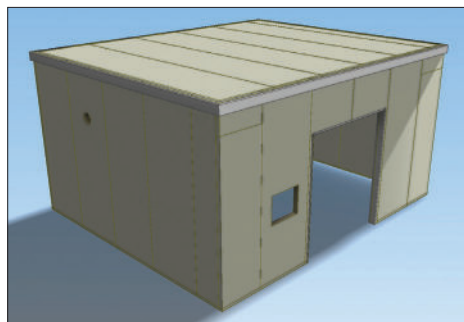
Rear and right hand side walls



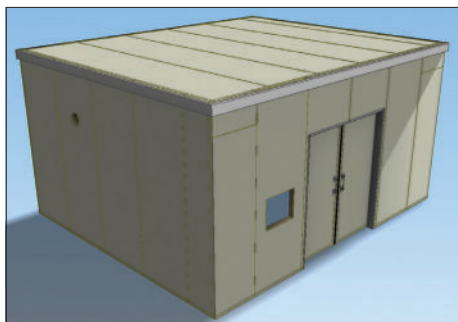
Front wall



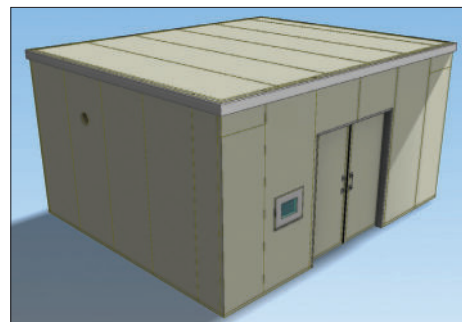
Roof



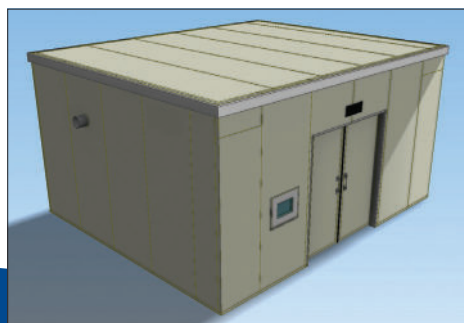
Top planking option



Doors



Active window



Interlock and extraction

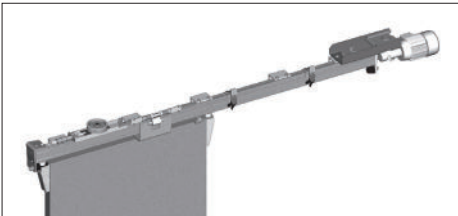
### Door Options

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



Motorized doors

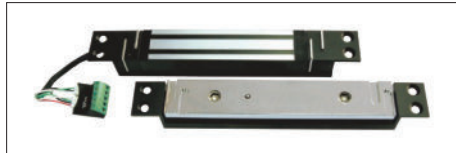
### Audio Alert

Lasermet's audible warning system alerts personnel.



### 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.



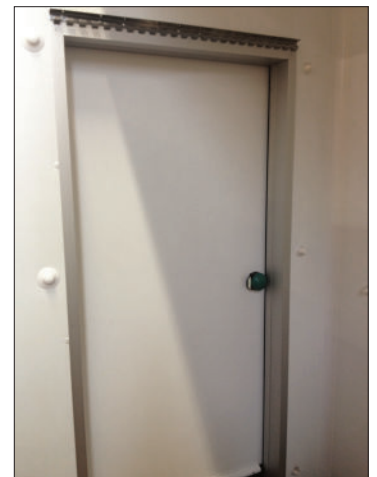
### Illuminated LED Signs

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



### Service Door

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



## HD CCTV System Components

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

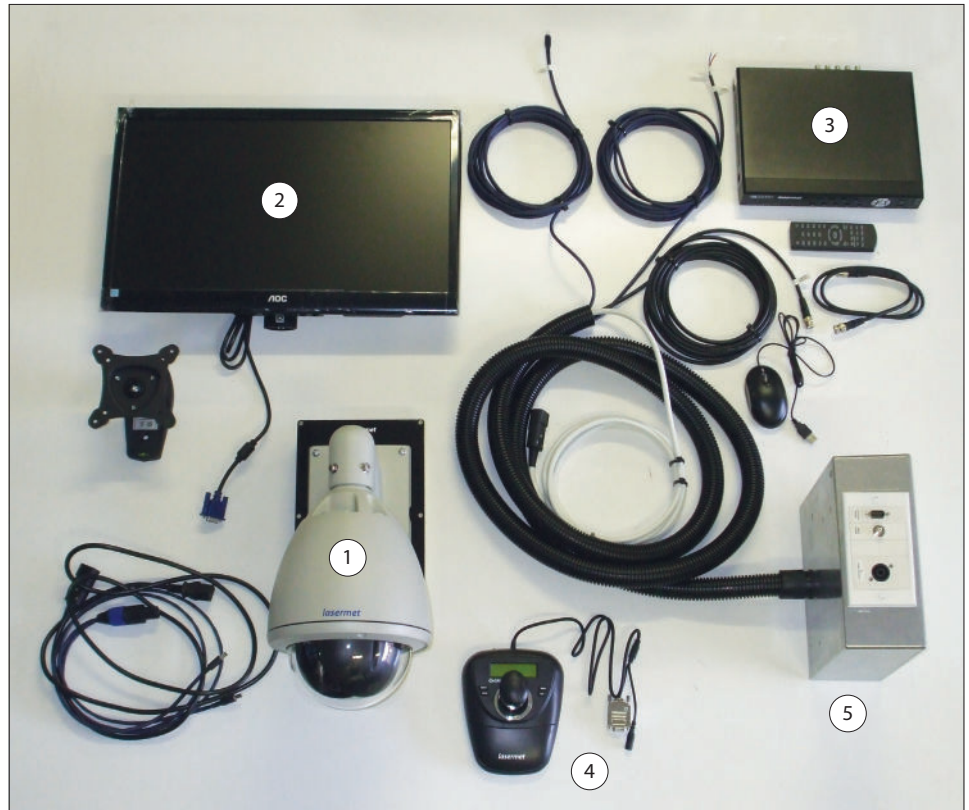
## Active Laser Safety Window

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.

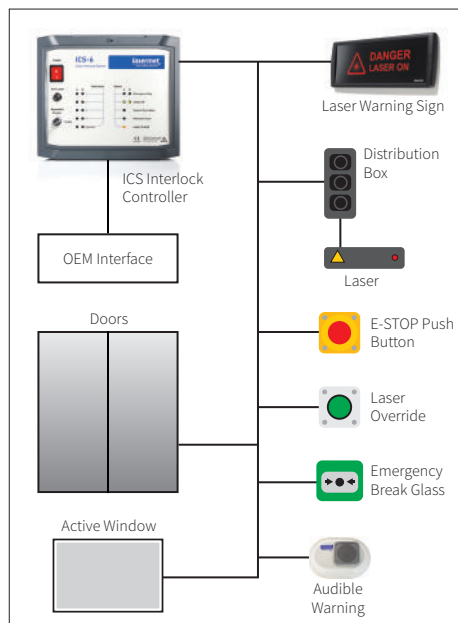


## Lighting

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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