

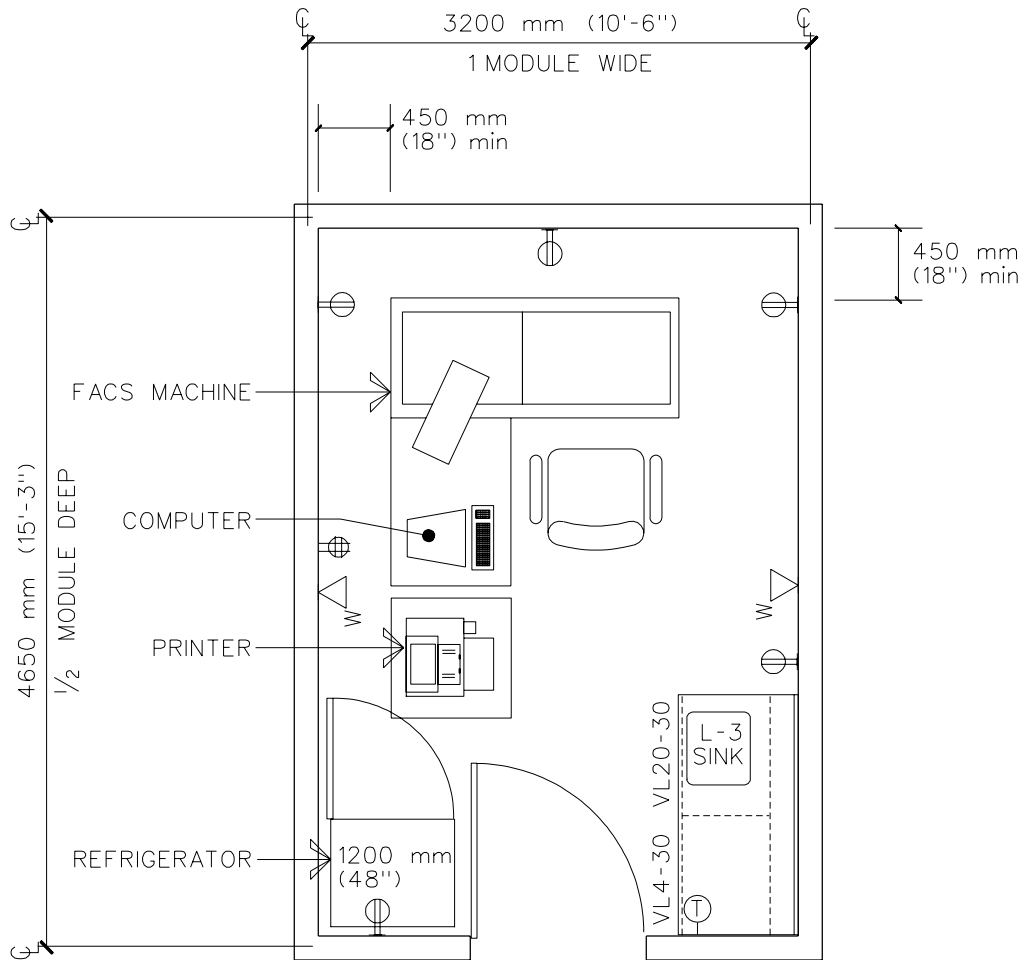
## **Section 5**

# **Design Guide Plates: Specialized Areas**

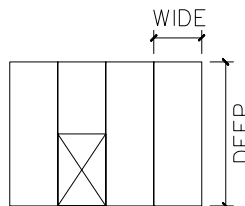
Guide  
Plate  
Series

- 5 - 1 ..... Fluorescent Activated Cell Sorter Room  
(FACS)
  - Equipment & Utility Plan
  - Reflected Ceiling Plan
  - Design Standards
  - Equipment Guide List
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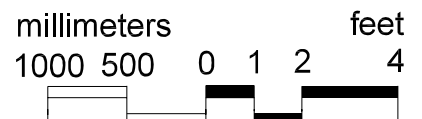
# Equipment & Utility Plan Fluorescent Activated Cell Sorter Room (FACS)



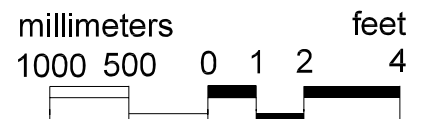
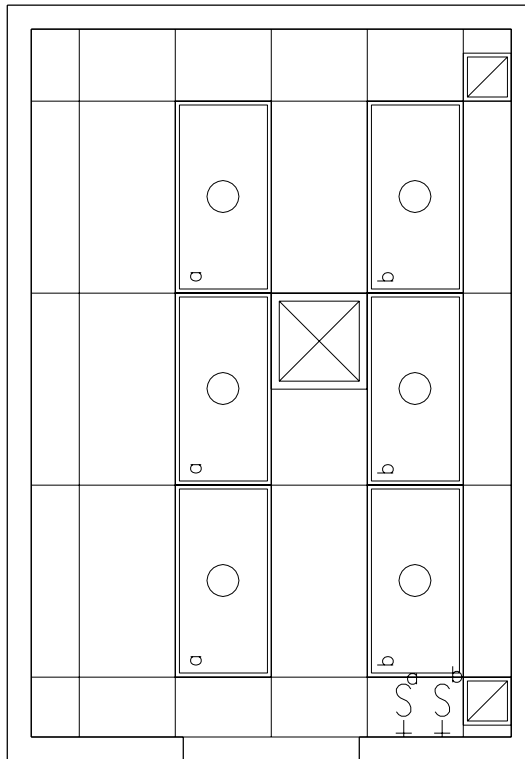
NOTE:  
THIS ROOM IS 1/2 MODULE  
DEEP AND 1 MODULE WIDE.



14 m<sup>2</sup>  
(148 ft<sup>2</sup>)



# Reflected Ceiling Plan Fluorescent Activated Cell Sorter Room (FACS)



# Design Standards

## Fluorescent Activated Cell Sorter Room (FACS)

### ARCHITECTURAL

Floor Area	14 m <sup>2</sup> (148 ft <sup>2</sup> )	Wall Finish	gwb
Ceiling	at	Base	rb
Ceiling Height	2700 mm (9 ft)	Floor Finish	vct
RFI Shielding	-	Slab Depression	-
Soundproofing	-	Floor Load	-

### Lighting

### ELECTRICAL

### Power

General	750 lx (70 fc)	General	-
Special	-	Special	-
Louvered deep cell parabolic fixtures, T-8 lamps		Emergency	-

### COMMUNICATIONS

Telephone	yes	ADP	yes
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### HEATING, VENTILATING AND AIR CONDITIONING

AC Load Lights	630 W	Dry Bulb Temp Cooling	24°C (76°F)
AC Load Equipment	86 W/m <sup>2</sup> (8.0 W/ft <sup>2</sup> )*	Dry Bulb Temp Heating	22°C (72°F)
Number of People	2	Relative Humidity - Cooling	50%
Noise Criteria	NC-40	Relative Humidity - Heating	30%
Room Pressure	(0)	Minimum % Outside Air	100
Min Air Changes per Hour	6	100% Exhaust Air	yes
Steam	-	Special Exhaust	-

\*Based on water cooled laser generators

### PLUMBING AND LABORATORY GASES

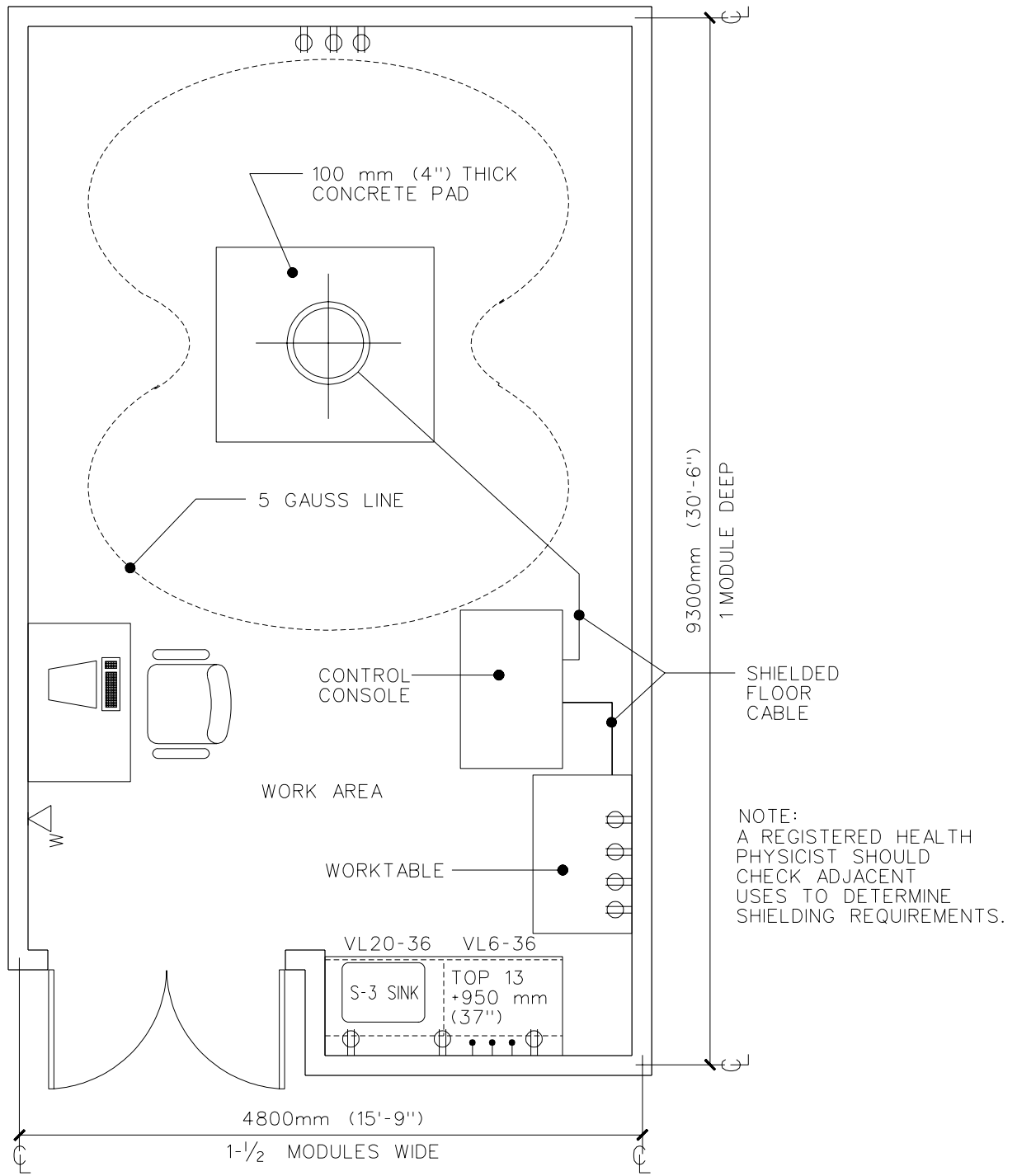
Sanitary Drain	yes	Cold Water	yes
Acid Waste	-	Hot Water	yes
Other	-	Reagent Grade Water	-
Fuel Gas	-	Laboratory Air	-
Nitrogen	-	Laboratory Vacuum	-

# Equipment Guide List

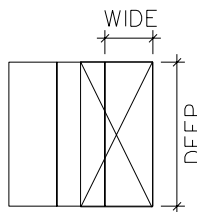
## Fluorescent Activated Cell Sorter Room (FACS)

qty	symbol	ai	description
1		VV	MACHINE, FLUORESCENT ACTIVATED CELL SORTER (FACS), 1778 MM X 1422 MM (70" X 56") WITH 457 MM (18") CLEARANCE ON ALL SIDES
1		VV	CRT, COMPUTER SYSTEM, WITH KEYBOARD
1		VV	TABLE, COMPUTER, APPROX., 762 MM X 762 MM X 660 MM (30" X 30" X 26")
1		VV	PRINTER, COMPUTER SYSTEM
1		VV	STAND, COMPUTER PRINTER, APPROX., 610 MM X 610 MM X 660 MM (24" X 24" X 26")
AR		CC	OUTLET, ADP (EMPTY CONDUIT SYSTEM) (SEE ELECTRICAL ENGINEERING SERVICE GUIDE LINES)
1		CC	RECEPTACLE, ELECTRICAL, QUADRUPLX, FOR COMPUTER EQUIPMENT ITEMS (PG-08-1, MCS 16140; H-08-3, CS 866-1)
1		VV	CHAIR, ROTARY, WITH ARMS
1	VL20/20 A	CF	CABINET, UNDERCOUNTER, SINK UNIT, 2 HINGED PANEL DOORS, WIDTH - 762 MM (30"); DEPTH - 559 MM (22"); HEIGHT - 787 MM (31"); FOR FLOOR MOUNTED ADD 127 MM (5") TOE BASE (PG-08-1 & PG-08-6, MCS 12345)
1	L-3	CF	SINK, MOLDED, RESIN WITH END OR CORNER DRAIN OUTLET, 457 MM X 381 MM X 279 MM (18" X 15" X 11") (PG-08-1 & PG-08-6, MCS 11602)
1	VL4/4A	CF	CABINET, UNDERCOUNTER, WITH 2 DUST SEAL DRAWERS, 2 HINGED DOORS AND 1 ADJUSTABLE SHELF, WIDTH, 762 MM (30"); DEPTH - 559 MM (22"); HEIGHT 787 MM (31"); FOR FLOOR MOUNTED ADD 127 MM (5") TOE BASE (PG-08-1 & PG-08-6, MCS 12345)
1		VV	CLOCK, BATTERY OPERATED
2		CC	RECEPTACLE, ELECTRICAL, DUPLEX, 120 VOLT, 30 AMP, DEDICATED CIRCUIT (PG-08-1, MCS 16140)
AR		CC	RECEPTACLE, ELECTRICAL, DUPLEX, 120 VOLT, 20 AMP (PG-08-1, MCS 16140; H-08-3, CS 801-3)

# Equipment & Utility Plan Nuclear Magnetic Resonance Room (NMR)

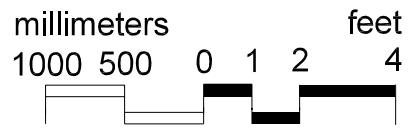


NOTE:  
THE SIZE OF THIS ROOM IS DEPENDENT UPON THE MAGNET MANUFACTURER'S REQUIREMENTS

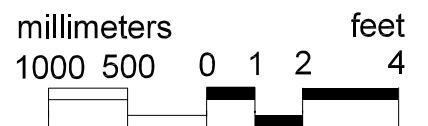
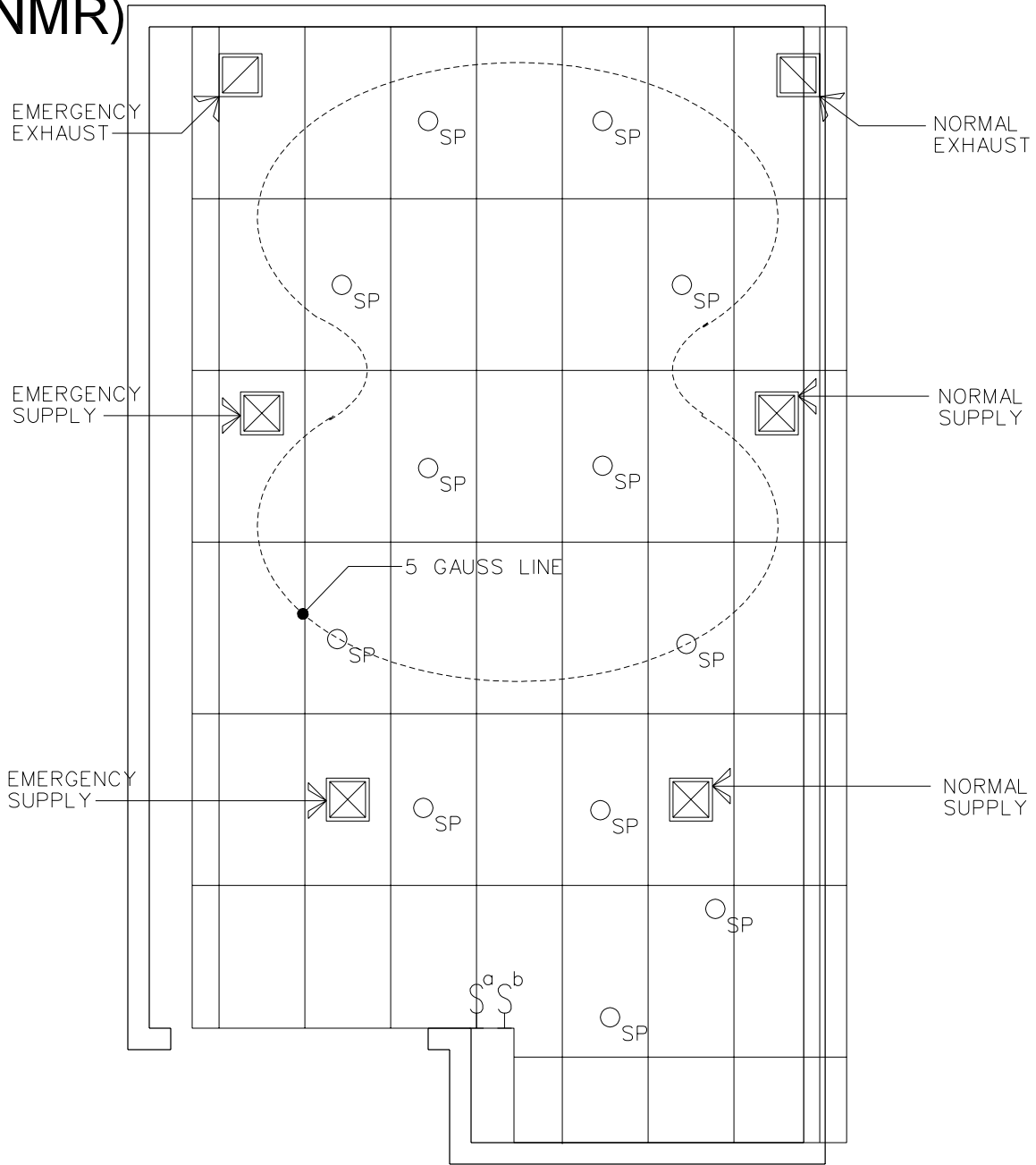


GENERAL NOTES:  
MARK THE 5 GAUSS LINE OF MAGNET AND POST WARNING SIGNS.  
VERTICAL MAGNETIC FIELDS ARE LARGER THAN HORIZONTAL FIELDS.  
LOCATE MAGNET ON A LOWER FLOOR.

42 m<sup>2</sup>  
(457 ft<sup>2</sup>)



# Reflected Ceiling Plan Nuclear Magnetic Resonance Room (NMR)



# Design Standards

## Nuclear Magnetic Resonance Room (MNR)

### ARCHITECTURAL

Floor Area	42 m <sup>2</sup> (457 ft <sup>2</sup> )	Wall Finish	gwb
Ceiling	at	Base	rb
Ceiling Height	2700 mm (9 ft)*	Floor Finish	vct
RFI Shielding	yes	Slab Depression	-
Soundproofing	-	Floor Load	-

\*4100 mm (13'6") min over magnet 1.5 m<sup>2</sup> (16 ft<sup>2</sup>) min

### SPECIAL EQUIPMENT

Nuclear magnetic resonance machine			
	Lighting	ELECTRICAL	Power
General	750 lx (70 fc)	General	-
Special	-	Emergency	ventilation system
Direct current, non-ferrous, incandescent fixtures with PAR38 halogen flood lamps on dimmer switches		Copper cladding on wiring	

### COMMUNICATIONS

Telephone	yes	ADP	yes
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### HEATING, VENTILATING AND AIR CONDITIONING

AC Load Lights	2760 W	Dry Bulb Temp Cooling	23°C (74°F)
AC Load Equipment	70 W/m <sup>2</sup> (6.5 W/ft <sup>2</sup> )**	Dry Bulb Temp Heating	22°C (72°F)
Number of People	3	Relative Humidity - Cooling	50%
Noise Criteria	NC-40	Relative Humidity - Heating	30%
Room Pressure	(0)	Minimum % Outside Air	100
Min Air Changes per Hour	6	100% Exhaust Air	yes
Steam	-	Special Exhaust	yes***

\*\*Minimum requirement

\*\*\*Use only copper piping and aluminum or PVC ductwork inside the room.

### PLUMBING AND LABORATORY GASES

Sanitary Drain	-	Cold Water	yes
Acid Waste	yes	Hot Water	yes
Other	-	Reagent Grade Water	-
Fuel Gas	yes	Laboratory Air	yes
Nitrogen	-	Laboratory Vacuum	yes

#### Additional Notes:

1. Utility requirements for magnets vary greatly among manufacturers. There are different kinds of magnets with specific utility requirements. Requirements also vary if gradient power supply and gradient coils are used, and whether they are air-cooled or water-cooled. A water-cooled system, consisting of a closed loop water supply with water-to-water heat exchanger to a refrigerator type heat exchanger, is recommended for gradient power supply and gradient coils. The water must be filtered to protect equipment. Provide domestic water back-up for cooling water in case of emergency.



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# Equipment Guide List

## Nuclear Magnetic Resonance Room (NMR)

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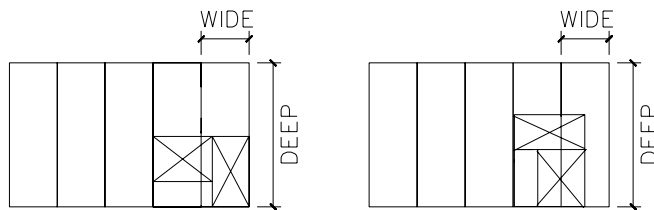
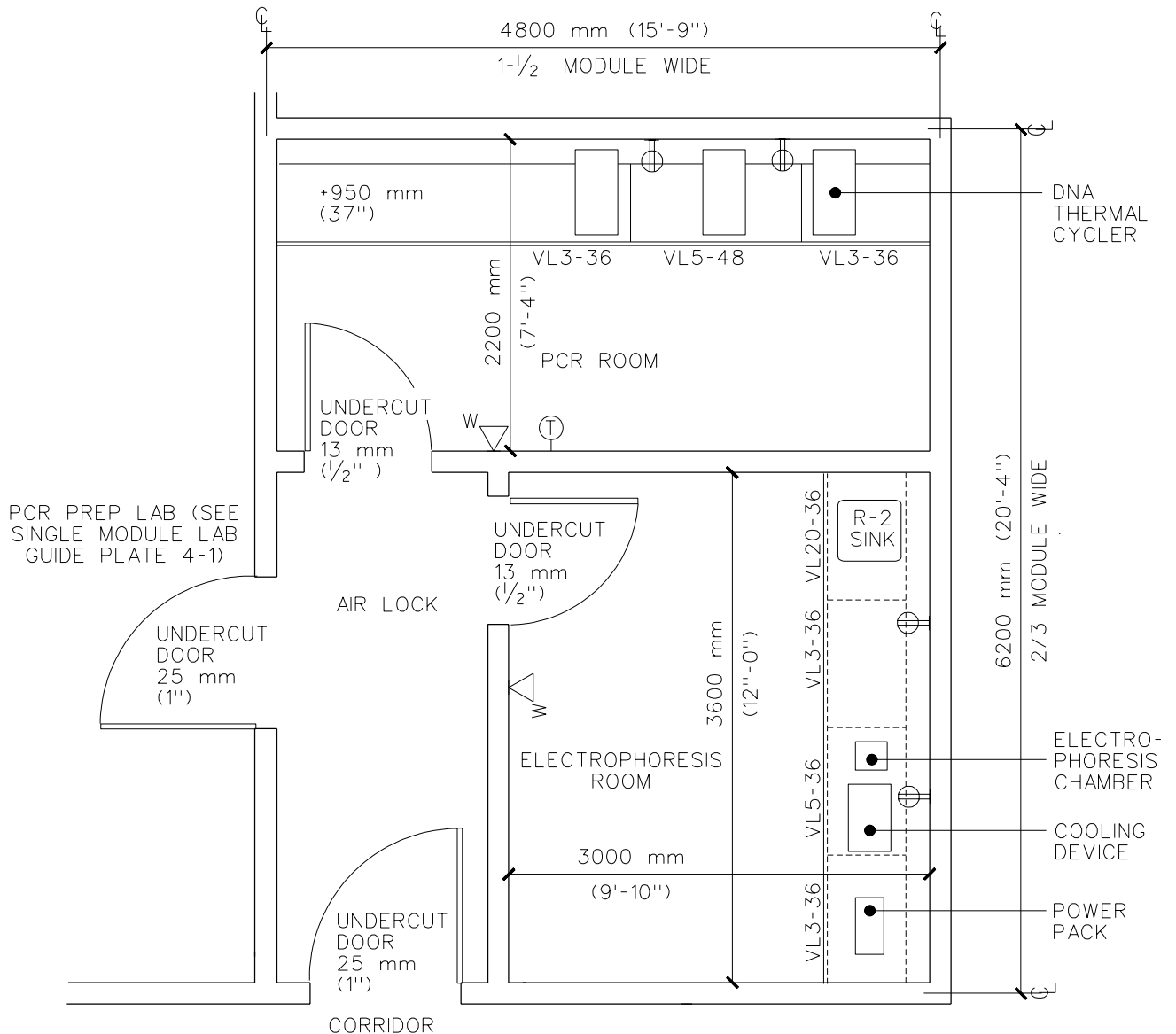
qty	symbol	ai	description
1		VC	MACHINE, NUCLEAR MAGNETIC RESONANCE (NMR)
1		VC	CONSOLE, CONTROL
1	VL20/ 20A	CF	CABINET, UNDERCOUNTER, SINK UNIT, 2 HINGED PANEL DOORS, WIDTH - 914 MM (36"); DEPTH - 559 MM (22"); HEIGHT 787 MM (31"); FOR FLOOR MOUNTED ADD 127 MM (5") TOW BASE (PG-08-1 & PG-08-6, MCS 12345)
1	S-3	CF	SINK, MOLDED, RESIN WITH END OR CORNER DRAIN OUTLET, 635 MM X 457 MM X 406 MM (25" X 18" X 16") (PG-08-1 & PG-08-6, MCS 11602)
1	TOP 13/ 13A	CF	COUNTER TOP, EPOXY, RESIN, WITH DRIP GROOVE, 25 MM (1") THICK (PG-08-1 & PG-08-6, MCS 11602)
1		CC	OUTLETS, ONE EACH, LAB AIR, FUEL GAS AND LAB VACUUM GROUPED OVER COUNTER (PG-08-1 & PG-08-6, MCS 11602)
1		CC	RECEPTACLE, ELECTRICAL, 208 VOLT, 20 AMP, 1 PHASE, DEDICATED CIRCUIT (PG-08-1, MCS 16140)
			NOTE: PROVIDE COOLING FOR MAGNET, COMPRESSED AIR OR NITROGEN AS REQUIRED.

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### Additional Notes (continued):

- Superconducting magnets use liquid cryogenics (helium and nitrogen). Due to quenching and to prevent explosion due to overpressure in the magnet, excess pressure is relieved through rupture discs. Discharge from these discs must be relieved to the outside through vents. Also, a separate emergency exhaust system is required with a minimum of 12 air changes per hour to exhaust above the roof any accidental gas spillage inside the room. The emergency exhaust system shall be activated by an oxygen sensor. Also, provide emergency make-up supply air from the normal supply system whenever the emergency exhaust air is activated.
- Some manufacturers do not recommend blowing air directly at magnets.

# Equipment & Utility Plan Polymerase Chain Reaction Suite (PCR)



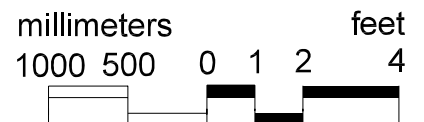
NOTE:  
THIS SUITE CAN BE PLANNED IN VARIOUS WAYS.  
THIS KEY SUGGESTS TWO ARRANGEMENTS.  
SEE DIAGRAM 3-4 FOR MODULE SIZE.

NOTE:  
LOCATE PHOSPHOR IMAGER AND  
IMAGE ERASER IN DRY LAB.

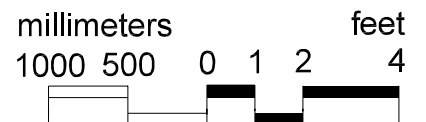
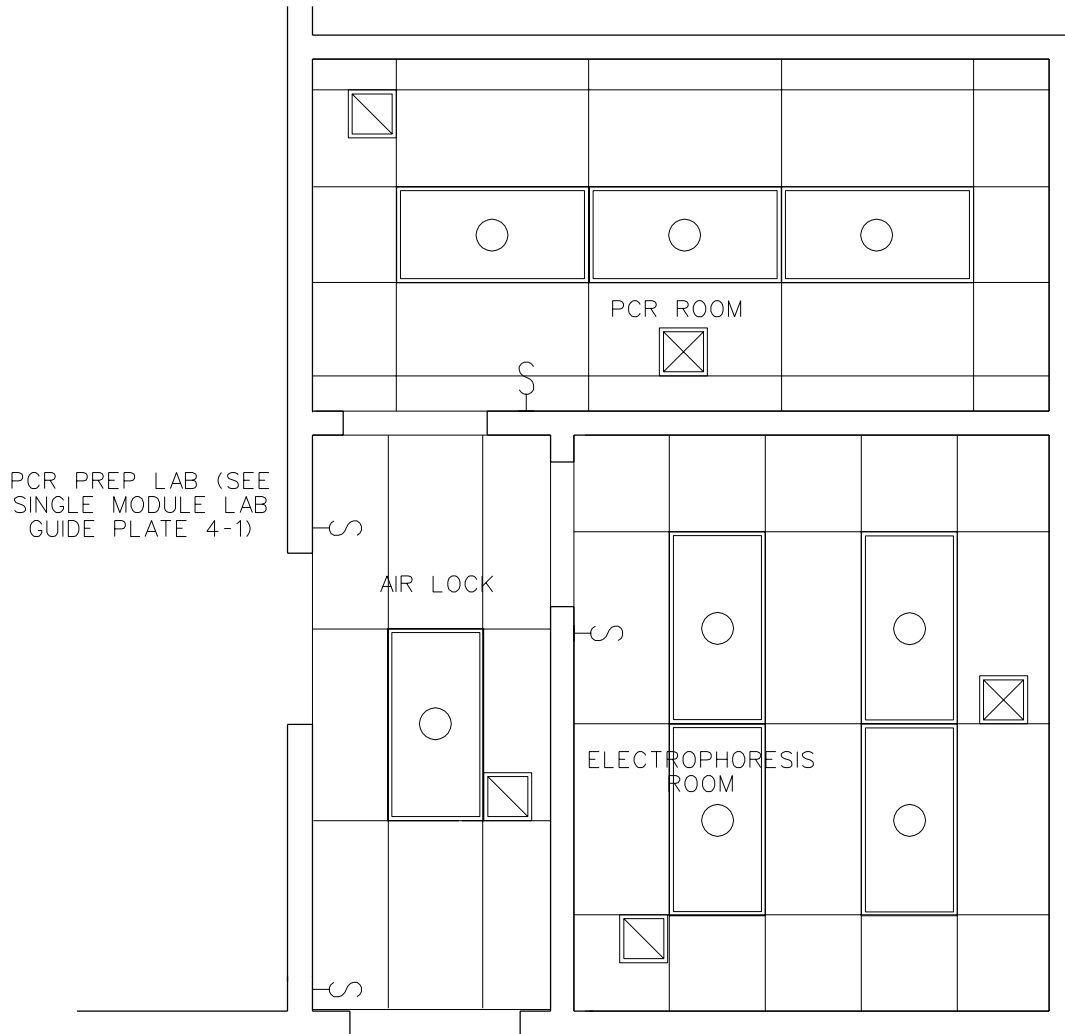
NOTE:  
PREP LAB UTILIZES A LAMINAR  
FLOW HOOD PROVIDING A  
STERILE ENVIRONMENT.

**Suite 54 m<sup>2</sup>**  
**(589 ft<sup>2</sup>)**

INCLUDES SINGLE  
MODULE LAB



# Reflected Ceiling Plan Polymerase Chain Reaction Suite (PCR)



# Design Standards

## Polymerase Chain Reactor Room (PCR)

### ARCHITECTURAL

Floor Area	10 m <sup>2</sup> (112 ft <sup>2</sup> )*	Wall Finish	gwb
Ceiling	at	Base	rb
Ceiling Height	2700 mm (9 ft)	Floor Finish	vct
RFI Shielding	-	Slab Depression	-
Soundproofing	-	Floor Load	-

\*Floor area may change depending on suite layout.

### Lighting

### ELECTRICAL

### Power

General	750 lx (70 fc)	General	-
Special	1100 lx (100 fc) task	Special	-
Louvered deep cell parabolic fixtures, T-8 lamps		Emergency	-

### COMMUNICATIONS

Telephone	yes	ADP	-
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### HEATING, VENTILATING AND AIR CONDITIONING

AC Load Lights	315 W	Dry Bulb Temp Cooling	24°C (76°F)
AC Load Equipment	32 W/m <sup>2</sup> (3.0 W/ft <sup>2</sup> )	Dry Bulb Temp Heating	22°C (72°F)
Number of People	1	Relative Humidity - Cooling	50%
Noise Criteria	NC-40	Relative Humidity - Heating	30%
Room Pressure	positive**	Minimum % Outside Air	100
Min Air Changes per Hour	4	100% Exhaust Air	yes
Steam	-	Special Exhaust	-

\*\*Maintain positive pressure with respect to air lock by exhausting 15% less than supply air.

Maintain positive pressure in air lock with respect to corridor and PCR Prep Lab.

### PLUMBING AND LABORATORY GASES

Sanitary Drain	-	Cold Water	-
Acid Waste	-	Hot Water	-
Other	-	Reagent Grade Water	-
Fuel Gas	-	Laboratory Air	-
Nitrogen	-	Laboratory Vacuum	-

# Design Standards

## Electrophoresis Room

### ARCHITECTURAL

Floor Area	11 m <sup>2</sup> (118 ft <sup>2</sup> )*	Wall Finish	gwb
Ceiling	at	Base	rb
Ceiling Height	2700 mm (9 ft)	Floor Finish	vct
RFI Shielding	-	Slab Depression	-
Soundproofing	-	Floor Load	-

\*Floor area may change depending on suite layout.

### Lighting

### ELECTRICAL

### Power

General	750 lx (70 fc)	General	-
Special	1100 lx (100 fc) task	Special	-
Louvered deep cell parabolic fixtures, T-8 lamps		Emergency	-

### COMMUNICATIONS

Telephone	yes	ADP	-
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### HEATING, VENTILATING AND AIR CONDITIONING

AC Load Lights	420 W	Dry Bulb Temp Cooling	24°C (76°F)
AC Load Equipment	32 W/m <sup>2</sup> (3.0 W/ft <sup>2</sup> )	Dry Bulb Temp Heating	22°C (72°F)
Number of People	1	Relative Humidity - Cooling	50%
Noise Criteria	NC-40	Relative Humidity - Heating	30%
Room Pressure	positive**	Minimum % Outside Air	100
Min Air Changes per Hour	4	100% Exhaust Air	yes
Steam	-	Special Exhaust	-

\*\*Maintain positive pressure with respect to air lock to air lock by exhausting 15% less than supply air.

Maintain positive pressure in air lock with respect to corridor and PCR Prep Lab.

### PLUMBING AND LABORATORY GASES

Sanitary Drain	-	Cold Water	yes
Acid Waste	yes	Hot Water	yes
Other	-	Reagent Grade Water	-
Fuel Gas	-	Laboratory Air	-
Nitrogen	-	Laboratory Vacuum	-

September 30, 1995

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# Equipment Guide List

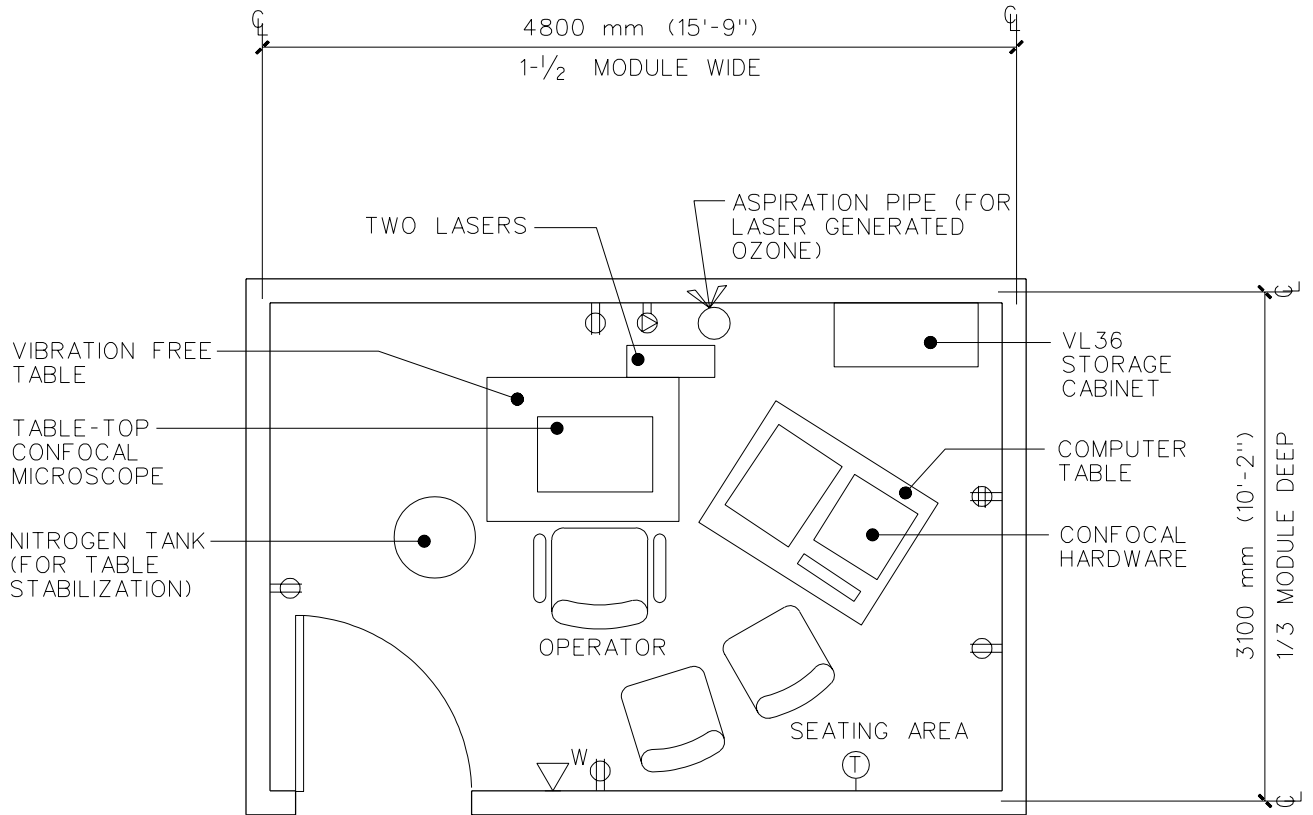
## Polymerase Chain Reaction Suite (PCR)

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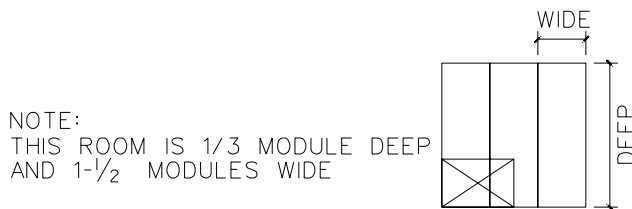
qty	symbol	ai	description
AR		VV	CYCLERS, DNA THERMAL, 305 MM X 610 MM (12" X 24")"
NOTE: FOR EQUIPMENT REQUIREMENTS SEE (LABORATORIES, GENERAL) LISTED IN GUIDE PLATE 4-1			
1		VV	POWER PACK
1		VV	COOLING DEVICE
1		VV	ELECTROPHORESIS CHAMBER

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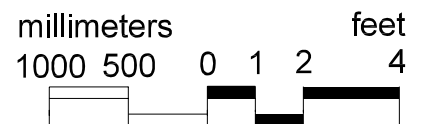
# Equipment & Utility Plan Confocal Microscope Room



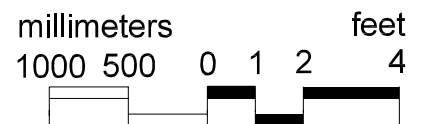
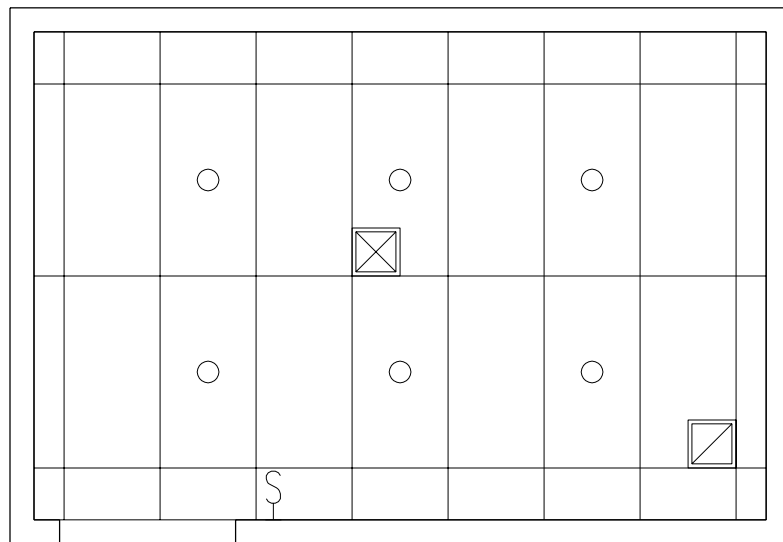
NOTE:  
LOCATE THIS SPACE AWAY FROM  
MAGNETIC FIELD GENERATORS, AND  
SOURCES OF VIBRATION (MECH RMS,  
ELEVATORS, BUSY ROADWAYS, ETC).



14 m<sup>2</sup>  
(147 ft<sup>2</sup>)



# Reflected Ceiling Plan Confocal Microscope Room





# Design Standards

## Confocal Microscope Room

### ARCHITECTURAL

Floor Area	14 m <sup>2</sup> (147 ft <sup>2</sup> )	Wall Finish	gwb
Ceiling	at	Base	rb
Ceiling Height	2700 mm (9 ft)	Floor Finish	vct
RFI Shielding	-	Slab Depression	-
Soundproofing	-	Floor Load	-

### Lighting

### ELECTRICAL

### Power

General	325 lx (30 fc)	General	-
Special	-	Special	-
Incandescent fixtures with PAR38 halogen flood lamps on dimmer switch		Emergency	-

### COMMUNICATIONS

Telephone	yes	ADP	yes
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### HEATING, VENTILATING AND AIR CONDITIONING

AC Load Lights	600 W	Dry Bulb Temp Cooling	24°C (76°F)
AC Load Equipment	48 W/m <sup>2</sup> (4.5 W/ft <sup>2</sup> )*	Dry Bulb Temp Heating	22°C (72°F)
Number of People	3	Relative Humidity - Cooling	50%
Noise Criteria	NC-40	Relative Humidity - Heating	30%
Room Pressure	positive	Minimum % Outside Air	100
Min Air Changes per Hour	6	100% Exhaust Air	yes
Steam	-	Special Exhaust	-

\*Based on water cooled laser generator. See note 1 below.

### PLUMBING AND LABORATORY GASES

Sanitary Drain	-	Cold Water	see below
Acid Waste	-	Hot Water	-
Other	-	Reagent Grade Water	-
Fuel Gas	-	Laboratory Air	-
Nitrogen	-	Laboratory Vacuum	-

#### Additional Notes:

1. Use of water-cooled laser generators is preferred as air-cooled generators dissipate excessive heat into the room. Tie into a common closed circuit cooler for all water-cooled equipment in the Research Facility. Provide domestic water backup for cooling water in case of emergency.

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# Equipment Guide List

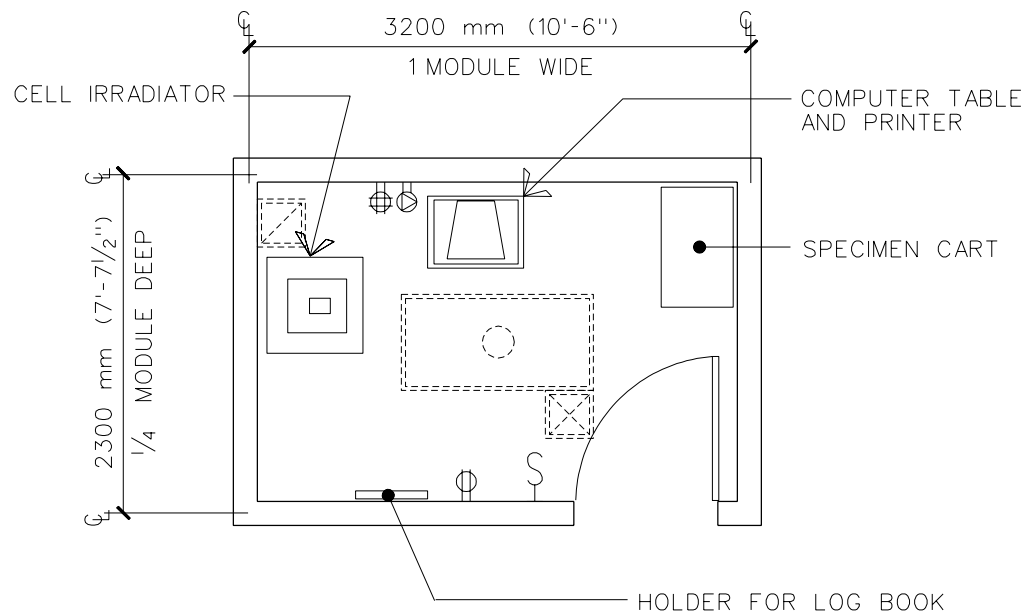
## Confocal Microscope Room

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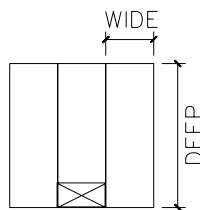
qty	symbol	ai	description
1		VV	MICROSCOPE, CONFOCAL AND ANCILLARY EQUIPMENT
1		VV	TABLE, VIBRATION FREE, 1219 MM X 914 MM (48" X 36")
1		VV	TANK, NITROGEN STORAGE
1		VV	TABLE, COMPUTER, 1219 MM X 914 MM (48" X 36")
1	VL36	CF	CABINET, FULL HEIGHT, WITH SLOPING TOP, 2 GLAZED SLIDING DOORS AND 5 ADJUSTABLE SHELVES, WIDTH - 914 MM (36"); DEPTH - 406 MM (16"); HEIGHT - 2134 MM (84") (PG-08-1 & PG-08-6, MCS 12345)
1		VV	CHAIR, ROTARY, WITH ARMS
AR		VV	CHAIR, ROTARY, WITHOUT ARMS
1		VV	CLOCK, BATTERY OPERATED
1		CC	RECEPTACLE, ELECTRICAL, 208 VOLT, 20 AMP 1 PHASE (PG-08-1, MCS 16140; H-08-3, CS 801-3)
AR		CC	RECEPTACLE, ELECTRICAL, DUPLEX, 120 VOLT, 20 AMP (PG-08-1, MCS 16140; H-08-3, CS 801-3)

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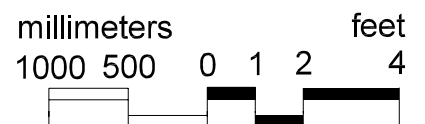
# Equipment & Utility Plan Cell Irradiator Room



NOTE:  
THIS ROOM IS 1/4 MODULE  
DEEP AND 1 MODULE WIDE.



6.6 m<sup>2</sup>  
(71 ft<sup>2</sup>)



# Design Standards

## Cell Irradiator Room

### ARCHITECTURAL

Floor Area	6.6 m <sup>2</sup> (71 ft <sup>2</sup> )	Wall Finish	gwb
Ceiling	at	Base	rb
Ceiling Height	2700 mm (9 ft)	Floor Finish	vct
RFI Shielding	-	Slab Depression	-
Soundproofing	-	Floor Load	-

### Lighting

### ELECTRICAL

### Power

General	550 lx (50 fc)	General	-
Special	-	Special	-
Louvered deep cell parabolic fixtures, T-8 lamps		Emergency	-

### COMMUNICATIONS

Telephone	-	ADP	yes
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### HEATING, VENTILATING AND AIR CONDITIONING

AC Load Lights	105 W	Dry Bulb Temp Cooling	24°C (76°F)
AC Load Equipment	97 W/m <sup>2</sup> (9.0 W/ft <sup>2</sup> )	Dry Bulb Temp Heating	22°C (72°F)
Number of People	1*	Relative Humidity - Cooling	50%
Noise Criteria	NC-40	Relative Humidity - Heating	30%
Room Pressure	negative	Minimum % Outside Air	100
Min Air Changes per Hour	6	100% Exhaust Air	yes
Steam	-	Special Exhaust	-

\*This room intended for short occupancy.

### PLUMBING AND LABORATORY GASES

Sanitary Drain	-	Cold Water	-
Acid Waste	-	Hot Water	-
Other	-	Reagent Grade Water	-
Fuel Gas	-	Laboratory Air	-
Nitrogen	-	Laboratory Vacuum	-

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## Equipment Guide List Cell Irradiator Room

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qty	symbol	ai	description
1		VV	IRRADIATOR, GAMMA CELL, 610 MM X 610 MM (24" X 24")
1		VV	CART, SPECIMEN
1		VV	HOLDER, FOR LOG BOOK, WALL MOUNTED
1		VV	CRT, COMPUTER SYSTEM, WITH KEYBOARD
1		VV	PRINTER, COMPUTER SYSTEM
1		VV	TABLE, COMPUTER AND PRINTER
AR		CC	OUTLET, ADP (EMPTY CONDUIT SYSTEM) (SEE ELECTRICAL ENGINEERING SERVICE GUIDE LINES)
1		CC	RECEPTACLE, ELECTRICAL, QUADRUPLX, FOR COMPUTER EQUIPMENT ITEMS (PG-08-1, MCS 16140; H-08-3, CS 866-1)
AR		CC	RECEPTACLE, ELECTRICAL, DUPLEX, 120 VOLT, 20 AMP (PG-08-1, MCS 16140; H-08-3, CS 801-3)

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