FACILITIES MAINTENANCE AND ENGINEERING

SPECIFICATION FOR

WALK-IN ENVIRONMENTAL CHAMBER

BUILDING 538

NATIONAL CANCER INSTITUTE AT FREDERICK

(NCI-FREDERICK)

FORT DETRICK,

FREDERICK, MARYLAND

Revision	Date	Reason for Revision	By	Checked	Approved
2	9/29/04	Miscellaneous changes			
1	9/17/04	Condenser is outside remote unit.	RGP	GKT	LW
0	6/18/04	For Review	RGP		

Attachment 1

WALK-IN ENVIRONMENTAL CHAMBER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers the requirements for a walk-in type environmental chamber. Refrigeration and control units shall be capable of maintaining interior chamber temperature of 4°C ± 1°C,based on summer design temperatures of 97°F dry bulb and 50% relative humidity. The chamber shall include all panels designed for rapid and accurate on-the-job site assembly, remotely installed refrigeration compressor and condenser, interior light fixtures, and all controls and devices required for specific operation. The chamber supplier shall field assemble the chamber, completely install all mechanical components, install lighting fixtures and switches and install and connect all electrical power, control and instrumentation circuits. Supplier shall perform start up and check out all systems to verify that the environmental chamber is performing as specified above.

B. Dimensions

Height (exterior):	8'-6"
Width (exterior):	9'-8"
Length (exterior):	19'-0"

1.02 OPERATING MANUALS

A. Included as part of the requirements shall be five (5) sets of operating instructions, repair (O&M) manuals and a complete parts replacement list specifying model numbers and companies of manufacture.

1.03 CODES

A. All items including electrical and refrigeration shall meet any and all code requirements of the intended use of each component supplied.

1.04 WARRANTY

A. The cold chamber shall be covered by a five (5) year warranty except for the refrigeration system. The refrigeration equipment shall be guaranteed for one (1) year and the compressor shall carry a five (5) year replacement warranty. In addition, all of the equipment and the chamber and components shall carry a one (1) year service warranty. The supplier shall provide the service warranty.

1.05 SUBMITTALS

Requirements: Provide 4 copies of submittal data as described below for evaluation purposes.

A. Shop Drawings: Submit shop drawings on D size paper, minimum scale 3/8"=1'-0", which include dimensioned architectural plans and elevations, mechanical and electrical plans, and other information and details required for proper evaluation and coordinated installation with other related work.

B. Mechanical plan shall include, as a minimum, refrigeration piping schematic showing all components and their respective size or capacity, airflow schematic, and sequence of operation, control diagrams, and electrical schematic.

C. Electrical plan shall show all power connections to the equipment, the voltage, amperage, and KW load for each circuit, and a control and power wiring schematic. Provide single line control wiring diagram.

D. Provide roughing-in requirements for mechanical and electrical services.

1.06 JOB SITE CONDITIONS

A. A job site visit to the NCI – Frederick, shall be made to determine the extent of installation and any difficulties that may exist, and to determine the length of conduit, wire and refrigerant piping runs.

PART 2 - PRODUCTS

2.01 PANEL CONSTRUCTION

A. Manufacturer's standard panels shall be used to construct room that best fits the allocated space. Corner panels shall be 12" x 12", 90 degree configuration.

B. Panels shall have a minimum of 4" foamed-in-place urethane insulation. Panel sections shall lock together from inside the room with cam-type fasteners, providing accurate, tight joining. A minimum of 3 locking devices shall be used on each vertical joint. Distance between locking devices shall not exceed 46".

C. Edge of panels shall be foamed-in-place, tongue and groove construction with every tongue including an interior and exterior flexible vinyl gasket to assure a tight fit.

D. Each panel shall have built-in galvanized steel reinforcing ribs for mounting triple tier adjustable wall shelving. The spacing of the internal reinforcement shall be 16" O.C. and marked on the interior walls for easy location by the shelf installer.

2.02 FLOOR PANELS

A. Floor panels shall be 4" thick and constructed of 0.100 "non-skid" aluminum plate on the interior and 14 gauge galvanized steel on the exterior. The floor must be able to support uniformly distributed loads of 700 pounds per square foot.

2.03 INSULATION

A. Insulation of all wall, ceiling, and floor panels shall be 4" of foamed-in-place urethane, 2.4-lb./cu. ft. density, having a thermal conductivity (K factor) not exceeding .029. The "R" Factor shall be 33.90 or better. The insulation shall be of 97% closed cell structure that is impervious to moisture.

2.04 STANDARDS AND CERTIFICATIONS

A. Each panel shall have UL fire test rating of 25 or less for flame spread and display the UL label for this rating. Panel system shall be approved by Factory Mutual (Standard #4880) for Class I building type, insulated wall and ceiling construction in combination. The walk-in chamber shall carry the NSF label.

2.05 FINISHES

A. Chamber shall have interior and exterior finishes as described below:

1. Unexposed Exterior - 26-gauge stucco galvalume.
2. Exposed Exterior – 0.040 embossed white aluminum.
3. Interior - 0.040 embossed white aluminum.
4. Interior floor – 0.100 "non-skid" aluminum plate

2.06 DOOR CONSTRUCTION

A. Swing-type door opening shall have a clearance of 36" x 78", Construction and finish shall be same as that of adjacent wall panels. Door shall be flush mounted.

B. Door Gasket shall be of thermoplastic material mounted along both sides and the top of the door. An adjustable rubber double-edged wiper gasket will be mounted along the door's bottom edge.

C. All door hardware shall be polished aluminum or stainless steel. Hinges shall be provided of self-closing type with pin and cam design. The door handle and catch assembly shall be of automatic closing type. Door handle mechanism shall permit easy and convenient opening without the necessity of manipulating strike release mechanisms.

D. Door shall include an interior safety release to permit accidental lock-in even when door is locked from exterior.

E. The door shall include a heated, double-glass viewing window with manual wiper.

2.07 LIGHTING

A. Two lighting fixtures shall be provided. Fixtures shall be nominally 1' x 4', vapor tight fluorescent fixtures operated at 120 volt AC, each with cold temperature electronic ballast (<10% THD) suitable for operation @ -20F and two (2) 32 watt, T-8, RS, CW fluorescent lamps including conduits, wiring, etc., as indicated and as required to accomplish the designed lighting layout. One switch for controlling cold room lights shall be provided. Light switch shall be rated at 120 volt, 20 amps, with "RED" pilot light. A dedicated 120 volt, 20 amp circuit will be supplied by SAIC for the cold room lighting and controls.

2.08 REFRIGERATION

A. System shall be of the industrial type design. Include all components necessary to accomplish effective, efficient, serviceable installation. System shall consist of, but not be limited to an air-cooled outdoor compressor/condenser unit mounted on a 24" high galvanized steel stand, evaporator, receiver, moisture indicating sight glass, liquid filter-drier, dual pressure controls, suction accumulator, liquid solenoid valves, expansion valve, manual liquid line shut-off valves, and all interconnecting piping, insulation, charging, and wiring.

B. Connect condensate pipe to the condensate drain line provided by SAIC. Include condensate line trap below condensate source.

C. The outdoor compressor/condenser unit shall be rated for 230 VAC/1 phase/60 Hz. The unit shall include a low ambient temperature kit and shall be installed outdoors with the supplied stand on an existing concrete pad.

D. The evaporator shall be rated for 120V/1 phase/60 Hz.

E. The interior lighting shall be rated for 120V/1 phase/60 Hz.

2.09 CONTROLS

A. General: All instruments, controls, and major electrical components shall be remotely installed in a welded stainless steel control center. The control center shall be mounted at eye level near the outside of the cold room to the right of the door

when standing outside facing the door. The control center shall be sized to fit in the designated location on the outside of the cold room, and have a lockable hinged service door for front access to control and electrical components. A recessed front panel with translucent hinged cover and lock to prevent unauthorized adjustments shall be supplied. The control panel shall include the main and safety temperature controls, related switches, relays, and pilot lights. Separate branch circuit protection shall be provided within the control panel for main controller power input, limit controllers, each main control output device, other output devices grouped as necessary, and fan motors. The panel shall be clearly labeled in a permanent fashion showing functions of all switches, name of control panel manufacturer, and party to contact for service.

B. Main Temperature Control: A Johnson Penn Stat, model A19 BBC-2C (-30°C - 100°C), shall accomplish temperature control with the sensor mounted on the side of the evaporator. This controller will control a solenoid valve in the refrigeration piping to cycle the condensing unit.

C. Temperature Recorder: Furnish and install electronic Honeywell Trueline model temperature recorder. Instrument shall have a range extending at least 10 degrees beyond the range of the room. Chart calibration shall be Celsius degrees. Chart rotation shall be 7-day. Input (sensor) for temperature shall be RTD with stainless steel sheath mounted in a stainless steel holder positioning the sensor at least 1" from the wall surface. Provide one spare set of disposable fiber tip pen cartridges and 100 replacement charts with unit. The temperature recorder shall include a spare 4-20MA-temperature output for future connection to the Building Automation System and (1) set of Form "C" dry alarm contacts for connection to the Building Automation System.

2.10 REFRIGERATION PIPING

A. Pitch all lines down in direction of refrigerant flow, 1/4" in 10'. All vertical piping shall be installed plumb.

B. Use type "ACR" refrigerant piping and hard-wrought fittings.

C. Use nitrogen while making joints.

D. Use sil-foss solder (minimum 15% silver content) except on copper to steel joints, use silver solder.

E. Trap vertical suction risers greater than 10' in length.

F. Insulate only after pressure test and leak test. Minimum 3/8" thickness closed cell tubing.

G. Evacuate lines after leak testing (leak test system @200 psig).

H. Use the minimum amount of bends and fittings. Use long radius ells.

I. Trap condensate lines at the unit drain connection.

J. Use vibration eliminators (flexible connections) in lines near compressor and parallel to compressor crankshaft.

K. Dismantle solenoid valves, expansion valves, and hand valves and sight glasses before soldering into place.

L. Do not use ells or fittings between expansion valves and distributors. (Run should be straight-thru from expansion valve to distributor.)

M. Install stop valves at the condenser for liquid lines in order to be able to valve off condensers for service.

N. Install a charging valve in the liquid line past the liquid receiver.

O. Solenoid valves and combination check and relief valves should also be in horizontal lines.

P. Install replaceable filter dryer in liquid line.

PART 3 - EXECUTION

3.01 ERECTION

A. The contractor shall deliver the complete room and components to the job site and furnish all labor, tools, equipment, materials, or any other items required to erect and place in operation as specified. Electric power shall be provided by SAIC within 72" of the equipment locations. Electrical tie-in shall be made to this disconnect by the supplier. Refrigerant piping requiring insulation shall be insulated with closed cell Armaflex insulation.

3.02 ELECTRICAL INSTALLATION

A. All electrical power and control wiring shall be installed in electrical metallic tubing with seal offs at each building floor, ceiling and wall penetration. All conduits penetrating the controlled environment room shall have seal-off fittings. Flexible conduit, where necessary, shall be oil tight/liquid tight only, with appropriate fittings.

Electrical materials and installation shall meet all requirements of the latest edition of the National Electrical Code. If transformers are required to reduce voltage for motors, they shall be furnished and installed by the supplier. Furnish and install all conduits, wires, fittings, fused disconnects and any other item of equipment or materials required to place the refrigerated walk-in chamber in operation. SAIC-Frederick will provide a 240 VAC, single phase, 30 amp disconnect switch within 72" of the compressor/condenser unit and two120 volt single phase, 20 amp breakers within 72" of the control panel. The Environmental chamber supplier shall provide any and all other conduits and control wiring required. All conduits shall be minimum 3/4" trade size or larger as required. All wiring shall be copper with THHN/THWN insulation. All pieces of equipment shall be grounded using separate ground wire having green insulation. (Conduit ground will not be accepted). "Seal off" fitting on any conduit run shall not be farther than 12" from the point of penetration.

END OF SPECIFICATION