SECTION ONE • General Information

1. SCOPE OF WORK
	1. General Provisions
		1. Controlled Environmental Rooms (referred to as “CER’s” or “chambers”) shall be prefabricated, all metal clad construction; to be furnished and installed as a complete self-contained unit and system, including all essential plenums, mechanical equipment, controls, and all other equipment necessary to maintain the environmental conditions specified.
		2. Factory-trained technicians will deliver chamber components to their final location and complete assembly of chambers in place.
		3. The Controlled Environmental Room Provider (referred to as the “Manufacturer”) will furnish and install refrigeration piping, electrical power wiring, control wiring and connections to all devices that comprise an integral part of each chamber.
		4. Start-up and field testing of chambers will be performed by Manufacturer’s trained technicians.
		5. Supportive documentation and training shall be supplied by Manufacturer as specified.
		6. Additional services will be provided, as applicable, as documented and agreed by contract or formal service agreement.
		7. All major components are assembled and factory tested prior to delivery, including air handlers, condensers, and control panels. Documentation of factory testing will be available to owner or architect upon request.
2. QUALITY ASSURANCE
	1. Reference Standards
		1. All major components shall have applicable UL, AMCA, NEMA, ASME, ANSI and AHRI certifications which include motors, compressors, evaporator fan and evaporator coils, water-cooled condensers or air-cooled condensers, humidification/dehumidification equipment, and control panel assemblies.
		2. The latest published edition and applicable addenda of each reference apply:
		* ANSI/ASHRAE Standard 15 Safety Standard for Refrigeration Systems
		* ANSI/ASHRAE Standard 90.1 (Energy Standard for Buildings Except Low-Rise Residential Buildings.
		* /AHRI - 420 Performances Rating of Forced-Circulation Free-Delivery
		* Unit Coolers for Refrigeration
		* ANSI/AHRI - 540 Standard for Performance Rating of Positive Displacement
		* Refrigerant Compressors and Compressor Units
			+ ANSI - B9.1 Safety Code for Mechanical Refrigeration
			+ UL–723 Test for Surface Burning Characteristics of Building Materials.
			+ NFPA - 70 National Electric Code.
			+ NFPA - 79 Electrical Standard for Industrial Machinery.
		1. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
		* All joints to be tongue and groove for structural strength and to provide vapor barrier to prevent heat loss and moisture infiltration per ASTM E-283.
		* Foam insulation is to be of a non-flammable, non-flame supporting grade with a "K" value of 0.118 BTU / hour / foot squared / degrees Fahrenheit / inch in accordance with ASTM C518.
		* Insulation shall have a minimum 97% closed cell structure and “R” factor shall be 31 or greater in a thickness of 4 inches – values in accordance with ASTM C-236/C-1363 methods. Freezer panels (ceilings and walls) to have an “R” value of 38 or greater, and shall be provided in 4” or 5” thicknesses.
	2. Manufacturer Qualifications
		1. Manufacturer shall have had not less than ten (10) years of successful and regular production of components/equipment used for the Project.
		2. Manufacturer of CER systems shall have been in satisfactory operation on at least 50 similar installations for not less than five (5) years.
		3. Manufacturer shall be capable of providing service with a 12-hour notification during normal business hours Monday-Friday. After-hours and weekend response time shall be a maximum of 24 hours upon notification.
		4. Any deviations from the specification, including type of finishes as set forth herein, shall be listed in detail, separate from product data submissions described above, and such that the Architect/Engr. does not have to expend unnecessary time during evaluation.
		5. The CER design and installation shall conform to the referenced standards in this section and also conform to applicable codes, ordinances and regulations governing the use and safety of refrigerant gases. Additionally, the enclosure must be NSF-approved.
		6. Manufacturer shall inventory factory parts (or a fully compatible upgrade) for a minimum of five (5) years and have experienced refrigeration service technicians and mechanics in direct employ, to assure the Owner of reliable service.
	3. Accepted Manufacturers
		1. The following manufacturers are approved for quality standards. No other manufactures will be allowed.
3. Darwin Chambers Company, provided by Nycom, Inc.
4. Thermmax, Inc.
5. Harris Environmental

* 1. Warranty
		1. As applicable, mechanical refrigeration equipment, parts, and labor will be guaranteed in written form for a minimum period of one year from the date of chamber start-up and continuous normal operation. The warranty will guarantee that the chamber(s) will:
		+ Maintain within the specified tolerance, the selected temperature and/or relative humidity levels.
		+ Be free from condensate on the outside of the chamber.
		+ Be free from defects due to faulty materials or workmanship.
		+ All Parts and labor will be guaranteed in written form from the date of chamber start-up and continuous normal operation, or upon Owner acceptance of certifications and functional test results, whichever is first.
		1. Additionally, written warranties shall be provided covering defects in material, workmanship and performance for the following items, per the following schedule:
		+ Enclosures: Minimum ten-year warranty covering all items connected with the enclosure, including panels, doors and door hardware.
		+ As applicable, Compressor(s), Control Panel: Standard three to five-year warranty.
	2. Installation/Training
		1. Manufacturer will provide highly skilled, factory-trained personnel to perform and oversee installation of chamber enclosure and all components.
		2. Services of a factory-trained technician will be made available for one man-day, minimum, to tune controls and instruct the owner on proper usage and care.
	3. Testing
		1. An inspection shall be performed to assure that all joints are tight, all components are present, and in proper relationship to each other, and the general and specific requirements of this specification have been complied with.
		2. Functional Performance Test / Report: Submit written report which includes the findings from the system performance test made on site; state the test was performed in accordance with the specified test requirements; state the test design requirements and results attained; state the system complies with the specified operational requirements; and indicate whether the system has passed, or reason why the system failed the test.
1. PRODUCT DATA
2. 1. Room Schedule/Operation

Environmental Room

Chamber Operation:

Chamber temperature range: °C, ± °C (throughout storage area)

Operational set-point: °C.

Chamber humidity range (as applicable): %RH, ± %RH

Operational set-point: %RH.

Chamber size, exterior (actual): W x L x H

* 1. Submittals
		1. Shop Drawings shall be supplied prior to the commencement of manufacture.
		2. Shop Drawings shall be verified by the Contractor to assure clearances, utilities, and other interfaces. The Drawings shall include enclosure layout, elevations, dimensions, thicknesses, types and locations of connections and openings, and other pertinent construction and erection details including the routing and diameter of refrigeration tubing and coil condensate drain.
		3. Indicate the room’s structural (floor, columns, etc.) architectural (walls, ceilings, etc.) mechanical (duct, equipment, etc.) and electrical (panels, conduits, etc.) components that are immediately adjacent to the CER.
		4. Indicate performance requirements, which include, as a minimum, cooling and heating parameters and capacities. Provide refrigeration piping schematic showing all components and their respective size or capacity, air schematic and written sequence.
		5. Functional Performance Test/Report
		+ Submit written report which includes the findings from the system performance test made on site; state the test was performed in accordance with the specified test requirements; state the test design requirements and results attained; state the system complies with the specified operational requirements; and indicate whether the system has passed, or reason why the system failed the test.
		1. Operations Manual
		+ A complete comprehensive instruction and maintenance manual shall be provided with each CER. The manual shall include sequential operating instructions, routine preventative maintenance instructions, and complete schematics. The data shall include, but is not limited to the following:
			- Shop drawings and wiring diagrams
			- System components and parts descriptions
			- Operating sequences, procedures, instructions, and/or theory of operation
			- Specific maintenance and troubleshooting instructions
			- Recommended service schedule. Include maintenance schedules for each component part of the systems furnished in this section. Include information on frequency of, and detailed instruction for, maintenance procedures and all items required for each maintenance activity
			- Recommended spare parts inventory
			- Name and contact information for service provider
			- Warranty; to be provided in written form upon delivery, for each chamber
	2. Delivery, Storage, and Handling
		1. Compliance with recommendations (from point of manufacture) regarding handling and storage of all environmental chamber components before and during construction is mandatory.
		2. Manufacturer shall coordinate with other trades affecting, or affected by this work, to assure the steady progress of all work performed under the contract.
		3. Manufacturer shall replace any panels or components damaged during shipment, storage, or handling with new, identical, factory-supplied components.

SECTION TWO • Construction and Design

1. MATERIAL CONSTRUCTION
2. 1. General
		1. Rooms will be furnished as complete functional units with all essential components, piping, control systems, and complete conditioning systems as required in order to satisfy all environmental conditions as specified.
		* The CER will be delivered in sections designed to pass without interference through standard doorways.
		* All metal and other materials will be shaped and sized as required, with all angles sharp and true. All surfaces will be finished smooth. Punching and shearing will be neatly done. Permanent connections will be welded, riveted, or bolted, with all exposed welds ground smooth and flush with adjacent surfaces.
	2. Panel Construction
		1. Standard wall panels shall be nominal 4” in width, designed to be interchangeable.
		2. Corner panels shall be 90¼ angles with actual 12” exterior horizontal measurements. Nominal 1' and 3' panels shall be used if required to meet job site conditions, and all are gauged for uniformity in size.
		3. Edges of panels shall be tongue and groove with locking facilities foamed-in-place at time of fabrication. Rigidity and uniformity shall meet or exceed industry accepted standards and panel interior construction shall be fabricated to deter biodegradation and moisture retention. Structural metal, wood, or fiberglass material shall *not* be used between interior and exterior surfaces.
		* Panel Surfaces: (Standard) Interior, white embossed aluminum. Exterior, white embossed galvanized steel. 304 stainless steel and other surfaces are available.
		* Panel locking assemblies shall be accomplished by foamed-in-place locking assemblies.
		* Panels are all 100% poured-in-place polyurethane construction, min. R-Value 31+.
	3. Floor Construction
		1. Rooms may be provided with or without floor panels.
		2. Wall panels will be flat bottom and secured to floor on 24” centers.
		3. If floorless, CER shall be installed on customer-provided recessed slab.
		4. Vinyl screeds shall be utilized coved on both sides, to rest level with the floor.
		5. Insulated floors shall be similar in construction to wall and ceiling panels. Standard floors are designed to accommodate up to 600 lbs. per square foot of evenly distributed weight.
		6. Floor depth shall be a nominal 4 inches. (2” depth is available, where required).
		7. Additional reinforcement of floor panels shall be used as required. Added reinforcement and/or insulation may add to depth, and are provided as custom. Standard floor surface finishes include smooth aluminum or 300 Series stainless steel. Other finishes, textures, coatings, and coverings are available upon request.
	4. Ceiling Construction
		1. The ceiling will be an industry standard CER type; smooth interior surface finish to match adjacent interior wall panels. LEED EBOM-friendly ceiling structure will be free of unnecessary crevices and obstructions. Where required, support hangers or other reinforcements may be utilized in order to ensure structural integrity. Construction of ceiling will be adequate to support top-mounted mechanical equipment and personnel.
	5. Door Construction
		1. The door will be an in-fitting, swinging, flush-mounted type, and will have the same metal finish and insulation as adjacent walls. A thermoplastic gasket with a magnetic core will be mounted on the top edge and along both sides of the door that will keep the door closed and form a tight seal. Door gaskets shall be NSF-approved. Construction of door panel will include a welded heavy-duty "U" channel-type reinforced steel frame around the entire perimeter of the door opening to prevent rocking or twisting.
		* Standard size 36” W x 78” H. (Most custom sizes/types available upon request.)
		* Anti-condensate heater wires shall be concealed behind the metal edge of the doorjamb on all four sides.
		* Heaters will be connected to a temperature switch or controller to automatically provide sufficient heat to eliminate condensation and frost under various ambient humidity conditions.
		* The door will use a minimum of two cam-lift, self-closing hinges. The door latch will be designed to open the door easily by breaking the magnetic force of the door gasket. The latch will have a key lock, and include an interior safety release handle to prevent accidental lock-in. Door hardware will be satin-finish aluminum or chrome-plated.
3. CONTROLS AND INSTRUMENTATION
4. 1. Control Console
		1. Manufacturer shall provide a control console incorporating a key-locked acrylic or Lexan door for viewing and protecting the settable controls. Protection Classifications: IP 65 to EN 60529, NEMA 12, including see-through door. The console will be mounted on the chamber exterior, next to the door if possible. The console includes all instruments, controls, switches, indicator lights, alarms, and alarm contacts. The electrical control enclosure shall be labeled/listed by a certified National Testing Lab.

* 1. Control Systems
		1. Unless specified otherwise, controllers shall be self-tuning microprocessor-based PID controls with dual digital LED readout, allowing for continuous display of the both the set-point and actual chamber condition. Controller set-up data will be stored in non-volatile memory and retain settings upon power loss without the use of batteries. Independent controllers will be used to control chamber temperature and chamber humidity.
		2. Temperature control will utilize solid-state microprocessor-based digital controllers with RTD sensing. Sensitivity of the sensor shall be better than 1.0°C throughout specified temperature range. Sensors will be located as required to detect the average temperature within the chamber.
		3. Where applicable, relative humidity control will utilize solid-state microprocessor-based digital control with Rotronic S2 Hygroclip sensing. Sensors will be located as required to detect the average relative humidity within the chamber.
		4. Microprocessor control of light levels, redundant cooling systems, and other variables may be added as a custom option.
		5. Set points shall be set through simple arrow keys on the chamber microprocessor controls. The controllers will simultaneously display both actual and set-point variables. The temperature control system will allow for the operation of the resistance heating elements or hot gas bypass valves through solid state relays (SSR’s) according to the controller output. This feature will provide for reducing the total operating cost of the chamber while still providing for the use of the heaters for rapid recovery from an upset in chamber temperature or load.
		6. Alternate microprocessor control systems and (touch-screen) interfaces are available
		(as standard), upon request.
	2. Independent High and Low Alarms
		1. Independent High/Low alarms will have SPDT contacts for remote alarm monitoring or phone dialers. Separate alarms for high and low operating variables shall be provided. As applicable, alarm set-points will be digital, measured in degrees Celsius and percent RH.
		2. The contacts will switch upon an alarm condition. Each alarm will have an adjustable delay period of 0-150 minutes before alarm action will occur. Remote alarm contacts will be wired into the control panel terminal block and be ready for hook-up to customer monitoring devices. Remote alarm contacts (relays) will be plug-in replaceable and will have both the NC and NO contacts available. The audible alarm will have a time-delayed silence of 0-60 min.
		3. Integration/connection to existing BMS (Building Maintenance Systems) and other services, is available as a custom option.
	3. Control and Switch Functions
		1. All will be clearly labeled with non-fading polycarbonate labels requiring no stamping or silkscreen markings that wear off.
		2. All control relays and indicators are solid state for long life and reliability.
		3. All program menus will be logically arranged for intuitive operation.
	4. Data Recording
		1. Where specified, either a data-logging equipment bundle or else a 10” recorder, with switch-selectable 24-hour or 7-day chart movement, shall be provided. Chart recorders will utilize a 10" circular chart and will be mounted adjacent to the control panel. Recorder accuracy to be ± 1%, full scale (Honeywell DR4300 or equivalent).
	5. Additional Components/Considerations
		1. Accurate and NIST-traceable temperature sensing using platinum Resistance

Temperature Detectors will be used for control and recording instruments.

* + 1. Single point chamber power connection with over-current protection will be provided in the control panel for all power components.
		2. All wiring identified will be identified with permanent labels for efficient troubleshooting.
		3. Plug-in components will be used wherever feasible.
		4. All components will be mounted on a DIN rail inside the control console for simple retrofit, repair, and diagnosis.
1. COOLING EQUIPMENT
2. 1. Compressor/Condensing Unit *(all cooling systems/components are as applicable)*
		1. Where required to maintain conditions as specified, the compressor/condensing unit will be an air-cooled or water-cooled unit, and shall be appropriately sized to provide performance as stated.
		2. As standard, compressor/condensing units are top-mounted. (Remote mounting, and other options are available. All components of the condensing unit will be designed for 125 psi working pressure or 150% of maximum operating pressure; whichever is greater.
		3. The unit will have a minimum of a crankcase pressure regulator, accumulator, vibration absorbers if applicable and thermal protection. Cycling solenoids or fully proportional refrigeration bypass valves will be used in the hot gas line. Isolation solenoids are acceptable for pump down only in the liquid and hot gas line. The condensing unit will be designed for continuous operation for maximum compressor life, to eliminate on and off cycling and to resist RF interference.
		4. Water-cooled units will be pro­vided with water regulating valves to maintain head pressure. The compressor/condensing unit will be linked to an evaporator of matching capacity in one of the following three types of conditioning designs. Refrigerant type will be R-134A or R-404A, unless specified otherwise.
		5. The condensing unit will have a single point electrical connection terminating with a fused disconnect switch as the connection point.
	2. Conditioning Type
		1. The air-handler will be of copper tube/aluminum fin or copper tube/copper fin and stainless steel coil endplate construction to prevent corrosion.
	3. Sub-Assembly Quality Control
		1. For systems incorporating the Darwin PFTCU (Precision Fluid Temperature Control Unit), Quality Control testing is completed and documented at the point of manufacture, and the assembled unit (as a closed system) may be shipped with refrigerant, ready for installation by field personnel—without the requirement of a licensed HVAC technician at the installation site.
		2. Otherwise, the above mentioned sub-assemblies (condensing unit, air-handler/evaporator) are evacuated to 500 microns and held at this condition for five hours prior to pre-charging with 150 psig of dry nitrogen. The units are tagged with dry nitrogen charge pressure, temperatures, date, and testing technician's initials. The units are shipped and installed with the "tagging" procedure intact. Upon start up, the nitrogen charge is evacuated and the units are charged with refrigerant. Field installation personnel can readily determine if shipping damage has occurred by comparing the recorded "tag" pressure with current system pressure.
	4. Refrigerant Piping
		1. Piping carrying refrigerant will be Type L ACR copper with copper fittings. 15% Silver solder or DynaFlow will be used for all joints. Condensate drain lines on chambers above 0.0°C will be PVC or copper tubing. On chambers operating below 0.0°C, drain lines will be type L copper tubing, wrapped with heating cable and covered with Armaflex ½“ insulation. The cable will heat continuously below 0.0°C. Piping for condensing unit water will be Type L copper.
	5. Insulation
		1. Suction and hot gas refrigeration lines will be insulated with closed-cell foam plastic similar to "Armaflex" or an equivalent.
		2. The material will be tubular in form, and sized in accordance with the pipe size. Insulation thickness will be a minimum of ½" for cold rooms and warm rooms, and ¾" for freezers. Joints will be thoroughly bonded by the adhesive recommended by the insulation.
		3. Manufacturer will meet local and state fire and smoke requirements. Penetrations of the insulation must be thoroughly sealed to form a complete vapor barrier. Wherever the insulation terminates, all edges will be sealed to the pipe with sealant. The condenser inlet water line will be insulated with closed-cell foam plastic insulation.
	6. Performance
		1. As applicable, chambers may have a defined temperature uniformity (see preceding schedule) across the work surface 40" off the floor and to within 12" of the walls. The uniformity is the variation between points across the plane as measured by a multi-point recorder with thermocouple, thermistor, or RTD sensing.

* 1. System Capacity
		1. Refrigeration and heating systems will be capable of operation as specified, without running at full capacity, more than 80% of the time under the following conditions:
		+ Temperature (and humidity, as applicable) specifications assume standard operation in a controlled ambient condition of 72°F, ±8°F and a dew-point at or below 50°F.
		+ Up to four door-opening events per hour.
		+ An additional electrical load of five watts per sq. ft. of floor area.
	2. Automatic Defrost System
		1. For rooms with set point temperatures below 4° C, provide hot gas bypass defrost with timer and fan delay switch. Set defrost initiation time and duration so that temperature increase is minimized while achieving complete removal of accumulated frost.
1. ACCESSORIES / COMPONENTS
2. 1. Shelving
		1. Shelving, when specified, will be removable and adjustable. Freestanding shelving will be adjustable on a minimum of 2" centers, four-tier and utilize four 74"or 86" posts. All shelving will be removable without special tools and will typically be constructed of stainless steel or epoxy-coated plated steel, with a guarantee of a minimum of five years corrosion resistance.
		2. Shelving will be open wire unless specified other. Leveling shims/screws will be provided at the base of the posts of freestanding shelving units.
	2. Humidification
		1. Where specified, humidification shall be achieved via an ultrasonic humidifier, as required to maintain operation as specified.
		2. UV sterilization of supply water shall be provided. Water to be used must meet the following requirements: Conductivity of >0.1µS, TDS of < 10 ppm at 1-10 Pounds per Square Inch (PSI) of water pressure.
		3. Deionizing filtration systems may be provided, where needed to meet this requirement.
	3. Dehumidification
		1. As applicable, dehumidification shall be achieved via regenerating desiccant drier, compressed air, or heat-regenerating desiccant drier, to maintain operation as specified.
	4. Wiring
		1. Interconnecting wiring will be installed in UL Listed PVC conduit within room, and UL listed EMT outside of room. Conduit will be a minimum of ½" trade size, as applicable.
	5. Lighting
		1. Where specified, Manufacturer will provide vapor-proof LED or fluorescent lighting. The housing will be corrosion-resistant fiberglass or ABS plastic. Fixtures feature a clear prismatic acrylic lens with closed-cell neoprene gasketing bonded to the housing to form a continuous seal for the lens, with cam latches to clamp the lens (diffuser) to the housing.
		* Typical light levels are 70 fc., minimum, as measured at 40" above the floor.
		* Low temperature fluorescent or incandescent lamps may be supplied for freezers operating at -20°C or below.
		1. Light control options, such as mechanical or microprocessor-controlled cycling for diurnal or circadian studies are available upon request.
		2. Custom light levels, configurations, and full or specified partial spectrum lighting is available upon request.
	6. Observation Windows
		1. Standard observation windows, when included, shall be centered on door or panel at standard (view) height, unless otherwise specified. Standard size is 14” W x 14” H. Other sizes are available as custom, as door or panel sizing permits. The window will consist of two to three panes of low-e glass with sealed air spaces between them.
	7. Sleeves/Pass-through Ports
		1. Sleeves for service piping, gas line cables, and drain water lines will be cylindrical in cross section, formed of 1/8" or 3/16" PVC and sealed to the chamber enclosure from both ends with silicone sealant. Sleeves will be of sufficient size to allow a least 1/8" clearance around the service line. The void between service lines and the sleeves inside and out will be sealed with sealant that remains flexible. Caps will be provided to seal pass-throughs used for equipment line passage when not in use.
	8. Ventilation System
		1. As applicable, ventilation supply and exhaust shall be provided on a continual basis,
		to achieve required air exchange rates (CFM).
		2. Custom filtration and/or dehumidification of supply and/or exhaust air is available
		upon request.

SECTION THREE • Requirements

1. MANFACTURER REQUIREMENTS
2. 1. Installation

The chamber and all conditioning equipment shall be delivered and installed to achieve performance as specified. Chamber conditioning equipment, lighting, and internal electrical wiring will be interconnected. Chamber will be started and field-tested by Manufacturer prior to project completion.

Manufacturer shall seal joints and openings, including penetrations for piping or electrical wiring, in the outside and inside faces of the CER. All room mechanical, electrical and hardware components shall be adjusted, and all exposed surfaces cleaned, after installation.

* 1. Testing

Inspection shall be performed to assure that all joints are tight, all components are present, and in proper relationship to each other, and the general and specific requirements of this specification have been complied with. All costs related to testing are included in the contract sum.

Manufacturer shall comply with the following requirements, at minimum:

* + 1. General: Provide all instrumentation and equipment as needed for testing, and perform the specified performance and acceptance tests.
		2. Control temperature set-point: Measure and record room temperature during a continuous 24-hour test period. The room(s) shall maintain the given temperature set-point within ±1.0°C, unless otherwise specified.
		3. Temperature gradient: Measure and record room temperature during a continuous 24-hour test period. Where applicable, verify that the maximum temperature gradient from floor to ceiling does not exceed 1.0°C.
		4. Recovery test: Perform recovery test as described previously. All rooms, except for freezers shall recover within 5 minutes.
		5. Internal load test: Each room shall maintain temperature within ±1.0°C of set-point when operating with the specified number of people, make up ventilation air, and internal heat gain from lighting and equipment.
		6. Rooms with relative humidity control shall be tested for humidity control performance and recovery as applicable and/or agreed.
		7. Documentation: Manufacturer shall submit written reports of all tests. Reports shall indicate testing procedures followed, instruments used, and tabulation of results.
		8. Witnessing of test: Owner’s representative shall be given the option of witnessing and confirming test results. Notify owner’s representatives in writing at least 7 days prior to conducting tests.

1. SITE REQUIREMENTS
	1. General

Manufacturer shall not be responsible for altering existing building or design conditions or pulling in mechanical services for equipment.

* 1. Electrical

Electrical contractor will provide fused disconnects for each condensing unit, as applicable, and connection to condensing unit junction box at a location as directed by Manufacturer. Chamber control panel and interior receptacles will require junction boxes by others.

* 1. Water (Humidity Systems)

As applicable, Darwin Chambers Co. recommends Conductivity of > 0.1µS, TDS of < 10 ppm at 1-10 Pounds per Square Inch (PSI) of water pressure.

* 1. Plumbing

The plumbing contractor or Owner will provide water supply and return to water-cooled condensing units, water supply and waste disposal site for humidification unit, all services and connections to casework within chamber, and floor drain connections. All final connections to equipment will be made by Owner as directed by Manufacturer.

* 1. Drain Site

Manufacturer will run condensate drain line to sink drain within chamber(s) or to floor drain outside of chambers and within 10 feet or as specified.

* 1. Level Floor

Owner will provide for Manufacturer, a level floor as a base for the prefabricated chamber floor. Floor will not exceed 3/8" in 10' and will not exceed 1/8" within a 2' span.