

NNM08AA54C

ATTACHMENT J-9

SYSTEM DEFINITIONS

Introduction: The following attachment identifies the primary systems at MSFC and assigns a number to each type of system to be used as a cross reference with Attachment J-10. Each of the unique system numbers (1st column) identifies the system as shown in the 2nd column. For each system there is a system description which briefly defines the function of the system, an output description which defines the expected outputs from the systems and a section on components which describes the major components in the system.

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SYSTEM DEFINITIONS**

SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
1	Water Cooled A/C System	
	A. Description	That system which supplies conditioned air (cooled and or heated) to the occupied or utilized space, to include personnel, equipment or storage utilization as defined by the Government.
	B. Output	The occupied space shall be maintained at temperatures specified in the design specifications for personnel comfort. Air exchanges and indoor air quality shall be provided to meet current ASHRAE recommendations. Discharge Air temperatures from HVAC units shall be as directed in Spring/Summer and Fall/Winter Seasonal Adjustment plans.
	C. Components	Those systems are defined to include chilled water, direct expansion systems, and PTOA (Pre-Treated Outside Air), interior and exterior locations including mechanical rooms, computer rooms, and overhead installations. This may also include but not be limited to permanent chillers and portable chillers, spot coolers, window units, D/X split systems, fan coil units, condenser units, package units, and floor mounted computer room type units. This application includes a condenser water system. Components shall be defined as, but not limited to, coil (CW and refrigerant), fan and fan variable frequency drive unit, motor, belt, filters, control valves, reboiler, condensate collection pans an piping, overflow protection devices, humidity control heaters (hot water and electric) and instrumentation, humidifiers, compressor and associated instrumentation and controls, gauges and other instrumentation and controls specific to the air handler systems including flow devices, probes, delta-Pressure switches, etc., which are remotely recorded by the FMCS or manually recorded to provide energy management of FMCS data, and controls specific to the air handler systems, air distribution systems such as mixing boxes, variable air terminals, fans, heaters, ducting, dampers, insulation and accelerometers.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
2	Air Cooled A/C System	
	A. Description	That system which supplies conditioned air (heated and or cooled) to the occupied or utilized space, to include personnel, equipment or storage utilization as defined by the Government.
	B. Output	The occupied space shall be maintained at temperatures specified in the design specifications for critical areas. Air exchanges and indoor air quality shall be provided to meet current ASHRAE recommendations. Discharge Air temperatures from HVAC units shall be as directed in Spring/Summer and Fall/Winter Seasonal Adjustment plans.
	C. Components	Those systems are defined to include direct expansion systems, and PTOA (Pre-Treated Outside Air), interior and exterior locations including mechanical rooms, computer rooms, and overhead installations. This may also include but not be limited to permanent chillers and portable chillers, spot coolers, window units, D/X split systems, fan coil units, condenser units, package units, and floor mounted computer room type units. Condenser water system is not used in this application. Components shall be defined as, but not limited to, coil (CW and refrigerant), fan, constant and variable frequency fan drive units, motor, belt, filters, control valves, reboiler, condensate collection pans and piping, overflow protection devices, humidity control heaters (hot water and electric), and instrumentation, humidifiers, compressor, and associated instrumentation and controls, gauges and other instrumentation and controls specific to the air handler systems including flow devices, probes, delta-pressure switches, etc., which are remotely recorded by the FMCS or manually recorded to provide energy management of FMCS data, air distribution systems such as mixing boxes, variable air terminals, fans, heaters, ducting, dampers, insulation, and accelerometers.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
3	Packaged A/C System	
	A. Description	That system which supplies conditioned air (cooled and or heated) to the occupied or utilized space, to include personnel, equipment or storage utilization as defined by the Government.
	B. Output	The occupied space shall be maintained at temperatures specified in the design specifications for personnel comfort. Air exchanges and indoor air quality shall be provided to meet current ASHRAE recommendations. Discharge air temperatures from HVAC units shall be as directed in Spring/Summer and Fall/Winter seasonal adjustment plans.
	C. Components	Those systems are defined to include Packaged A/C components that fit into a fixed ventilation system without the use of condenser water systems or exterior fans for heat removal. Removes heat by passing outside air or recirculated air over a cooling and or heating coil into building.
4	Split A/C System	
	A. Description	That system which supplies conditioned air to the occupied or utilized space, to include personnel, equipment, or storage utilization as defined by the Government.
	B. Output	The occupied space shall be maintained at temperatures specified in the design specifications for personnel comfort. Air exchanges and indoor air quality shall be provided to meet current ASHRAE recommendations. Discharge air temperatures from these HVAC units shall be as directed in Spring/Summer and Fall/Winter Seasonal Adjustment plans.
	C. Components	Those systems which are defined to include separate condensing units from the cooling units which operate on direct expansion from the refrigerant.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
5	Secondary Chilled Water Loop System	
	A. Description	Those closed loop cooling systems that use a chilled water heat exchanger(s) to provide a secondary cooling water loop to provide cleaner cooling water (usually distilled water) for sensitive/critical equipment.
	B. Output	These systems shall meet the designed requirements for flow, temperature, and capacity and be free of leaks. Insulation shall be maintained intact.
	C. Components	Closed loop cooling systems may contain, but not be limited to, any combination of heat exchangers, pumps, piping, fittings, labels, valves, flow indicators, expansion tanks, strainers, filters, auto air eliminators, insulation, instrumentation, and controls.
6	Refrigeration System	
	A. Description	Those direct expansion refrigerant units or systems that provide for a closed loop cooled or frozen storage for food, film, samples or specimens as found in cafeterias or laboratories.
	B. Output	Those systems shall meet the design requirements of the manufacturer's and end-users for temperature and capacity and shall be maintained free of leaks and in accordance with all ASHRAE regulations.
	C. Components	Refrigerant units or systems may contain, but not be limited to; refrigerators, freezers, or combination units of either single unit sized (somewhat portable) or walk-in sized (usually built-in). Components shall include sealed doors, latches, compressors, coils, filters, piping, valves, strainers, insulation and instrumentation. Using various refrigerants such as R-12, R-22, and R-113, and R134a.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
7	Cooling Towers and Condenser Water System	
	A. Description	Cooling towers/condenser water systems are heat rejection systems that provide cooling water for condensing refrigerants in HVAC/Chillers or other cooling applications.
	B. Output	These systems shall perform within designed performance specifications. Contractor shall provide water treatment system(s) to maintain corrosion rates less than 2.0 mils per year and shall maintain the water and tower areas free of algae and other foreign matter.
	C. Components	Cooling tower/condenser water systems are defined as containing, but not limited to, all or any combination of cooling towers, piping, fittings, strainers, labels, fans, gear boxes, flow elements, basins, pumps, valves, fire detection and protection equipment, controls, accelerometers, and instrumentation including flow devices, probes, delta-pressure switches, etc., which are remotely recorded by the FMCS or manually recorded to provide energy management of FMCS data.
8	Hot Water Heating System	
	A. Description	That system which supplies and distributes hot water to various buildings for use in the HVAC systems.
	B. Output	The hot water systems shall be maintained at between 80 and 180 degrees F at the coils as the system or seasonal plan requires.
	C. Components	The hot water system components shall include, but not be limited, to hot water boilers, heat exchangers, coils, pumps, valves, strainers, piping, instrumentation, and insulation. The system shall be maintained free of leakage.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
9	Steam Heating System	
	A. Description	That system which supplies and distributes steam to the various buildings for use in HVAC. It shall also include the system which collects and return condensate (cooled steam to hot water) produced from the steam system.
	B. Output	The steam systems shall be maintained at between 7 and 100 psig at the steam boilers outlet as the systems or seasonal plan requires. Process use steam shall be provided to meet the design requirements for individual building users. The condensate return systems shall function to collect and return the condensate produced by the steam system to each condensate collection system or feed water tank. State Certification of all steam boilers that run above 15 psig shall be accomplished yearly and shall require at least a daily preventative maintenance watch. The systems shall be maintained free of leakage.
	C. Components	The steam system and condensate return system are defined to include but not limited to the steam and condensate return systems inside each building. The single central steam plant system shall be maintained from the plant to each building it serves. The components of the steam system shall include, but not be limited to, steam boilers, pressure reducing/regulating stations, instrumentation, pressure switches, FMCS components, heat exchangers; steam coils, relief valves, valves, traps, pumps, tanks, strainers, piping, and insulation.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
10	Natural Gas Heating System	
	A. Description	Those systems that provide heating by use of direct natural gas burning in a heating device and heated air disbursement.
	B. Output	The natural gas heaters or systems shall be maintained to provide safe space heating as per the manufacturers requirements and their design parameters and as is adjustable at each thermostat (if applicable).
	C. Components	The natural gas heating systems components shall include but not be limited to; piping from each building gas regulator to each heating device, valves, regulators, strainers, electric fans, thermostats, and structural supports.
11	Electric Heating System	
	A. Description	That system which supplies and distributes electrically heated air.
	B. Output	The electric heaters shall be maintained to distribute heated air as per manufacturers requirements and as is adjustable at each thermostat.
	C. Components	The electric heaters or heating systems shall include but not limited to; heaters, thermostats, and the electric wiring from the main breakers.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
12	Compressed Air System	
	A. Description	That system which supplies and distributes dry, compressed air to the building for use as control (HVAC) and shop service air.
	B. Output	The compressed air systems shall deliver compressed air to the buildings at between 80 and 120 PSI +/- 3 PSI with a dewpoint of -40F +/- 5F, as required. The downstream regulated pressure for control air shall be maintained at a nominal 20 PSI +/- 1 PSI. Certification of all pressure vessels (air receivers) shall be provided for every four (4) years as applicable. The systems shall be free of leakage, air or oil. Control air systems shall be maintained free of all oil.
	C. Components	The compressed air systems are defined to include the compressed air system inside the facility described as control air and shop service air. It will be supplied by the local compressor systems and be distributed throughout each building per the system drawings and available documentation. The components of this system may include, but not be limited to, control or service air compressors and receivers, piping, associated gauges, thermometers, and other instrumentation and controls; pressure regulating stations, associated instrumentation and controls; condensate traps; electric, and refrigerated air dryers; filters, relief valves, and valves.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
13	Building Power System	
	A. Description	That system which supplies all electrical power to any given building to include backup power sources if present.
	B. Output	Power shall be at various standard voltages (120 volt single phase, 240 volt three phase, 480 volt three phase) and available amperage shall be consistent with wire size per the National Electric Code.
	C. Components	Those systems include the building transformers, the building feeds from the transformers (including current carrying conductor and conduit), distribution system to lighting and power panels (including all components, the current carrying conductor, and the conveyance system), backup emergency generators (if applicable), uninterruptible power supplies (if applicable),
14	Interior Building Power Distribution System	
	A. Description	That system which supplies electrical power to operate equipment such as machine tools, computers, etc. System limits include power distribution panels to the actual piece of equipment if hardwired or to the electrical outlet.
16	Exterior Lighting Systems	
	A. Description	That system which supplies lighting to exterior areas at the center including exterior building lights and parking lot lighting.
	B. Output	Appropriate lighting levels in various work areas in compliance with IEEE standards.
	C. Components	Those systems Include lighting distribution panels, all switches and other electrical components in the circuits, all current carrying conductors including their conveyance system, and all lamp fixtures.

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SYSTEM NO	SYSTEM	SYSTEM DESCRIPTION, OUTPUT, AND COMPONENTS
17	Fire and Gas Detection systems	
	A. Description	That system which supplies alarms and alerts that either a fire or a hazardous gas is present.
	B. Output	Audible and visual alarms as well as remote alarms at either the RASA fire station, NASA Security Headquarters or the UCS desk.
	C. Components	System components include detector heads, wiring, multiplexer units, and transmitters.
18	Maintenance Detection System	
	A. Description	That system which supplies alarms and alerts that a system or component is in an abnormal condition.
	B. Output	Audible and visual alarms and remote alarms at the UCS desk.
	C. Components	System components include detector heads, wiring, multiplexer units, and transmitters.